

**TOSHIBA**

# RF Semiconductors

PRODUCT GUIDE

# RF Semiconductors

## (Transistors, Diodes and Cell-Packs)

As you well know, today semiconductors are essential for use in a very wide range of applications—from consumer to industrial use. In any application, your choice of Toshiba semiconductors will always be correct. To help you choose which Toshiba semiconductors product is best for your particular application of the moment, this brochure outlines maximum ratings and electrical characteristics by package type. For further details, please refer to technical datasheets available for each product.

### RF Transistors

Toshiba produce a number of RF transistors in a variety of packages for TV and radio tuners.

They include the following:

- GaAs MESFETs—USQ Series: 3SK274, 3SK284, 3SK320  
SMQ Series: 3SK240, 3SK283
- MOSFETs—USQ Series: 3SK256 to 3SK260, 3SK293, 3SK294  
SMQ Series: 3SK207, 3SK225, 3SK232, 3SK291, 3SK292
- VHF / UHF low-noise amplifiers—2SC5064 Series, 2SC5084 Series, 2SC5089 series, 2SC5094 Series, 2SC5254 Series, 2SC5259 series, 2SC5315 Series, 3SC5320 Series
- FM tuners—2SK241, 2SK1771, 3SK195

### RF Diodes

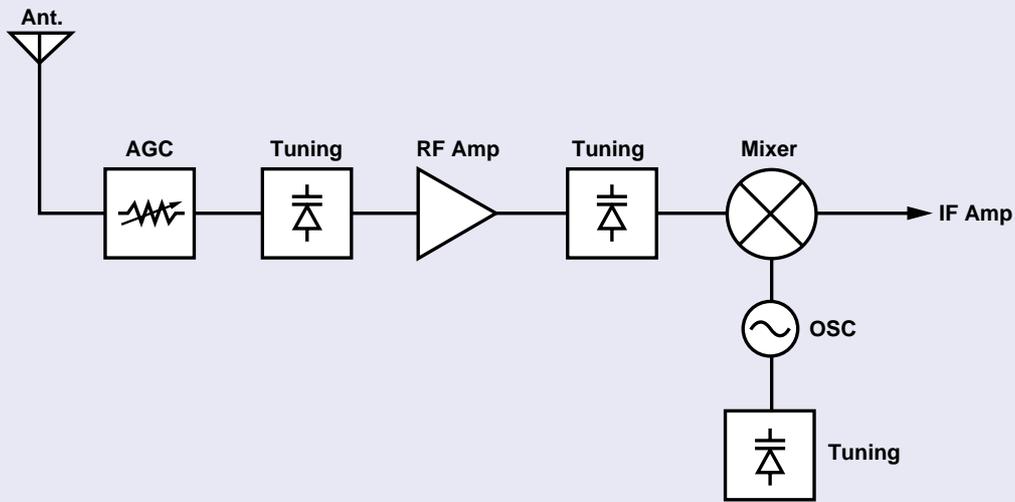
Toshiba provide various packages for tuning, mixing, automatic frequency control (AFC), band switches, TV / VTR tuners, radios, and CATV converters.

### RF Cell-Packs

Toshiba provide wide band amplifier, differential circuit amplifier, MOS / GaAs amplifier, and double balanced mixer.

# 1. Application Block Diagrams

## ● 1-1 RF Devices for AM Tuners



Application	Type	Package	Product No.	
AGC	PIN diode	Single	S-MINI	<b>1SV128</b>
			USC	<b>1SV271</b> <b>1SV307</b>
			ESC	<b>1SV308</b> *JDP2S01E *JDP2S04E
			TESC	*JDP2S01T *JDP2S02T
		Double	S-MINI	<b>1SV172</b>
			SMQ	<b>1SV237</b>
			USM	<b>1SV252</b>
			USQ	<b>1SV312</b> *JDP4P02U

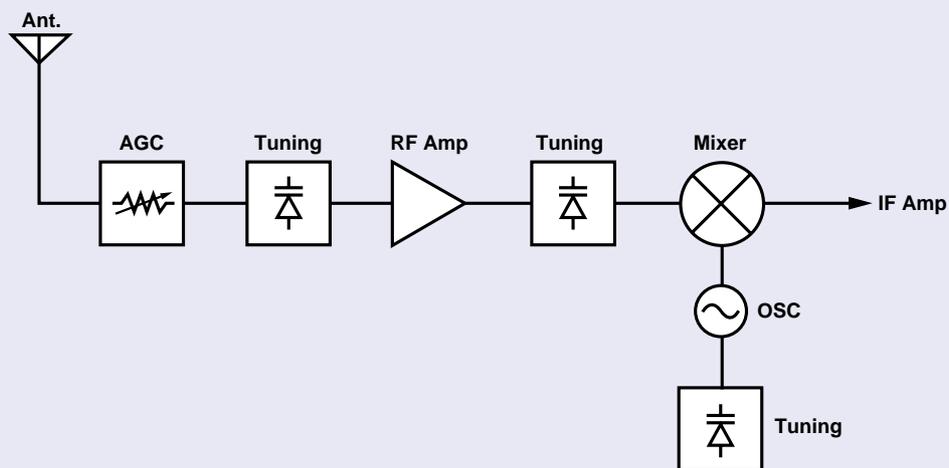
\* New

Application	Type	Package	Product No.
AGC	Bipolar transistor	MINI	<b>2SC2458</b>
		S-MINI	<b>2SC2712</b>
RF Amp	J-FET	TO-92	<b>2SK709</b>
		MINI	<b>2SK710</b>
		S-MINI	<b>2SK711</b>
		USM	<b>2SK1875</b>
AGC + RF Amp	Hybrid transistor	SMV	<b>HN3G01J</b>

Application	Type	Package	Product No.
Tuning	Tuning Varicap	MINI	<b>1SV102</b> <b>1SV149-B</b>
			FM8

Application	Type	Package	Product No.	
Mixer	Bipolar transistor	TO-92	<b>2SC380TM</b> <b>2SC941TM</b>	
			MINI	<b>2SC2669</b> <b>2SC2670</b>
		S-MINI		<b>2SC2715</b> <b>2SC2716</b>

## ● 1-2 RF Devices for FM Tuners



Application	Type	Package	Product No.	
AGC	PIN diode	Single	S-MINI	<b>1SV128</b>
			USC	<b>1SV271</b> <b>1SV307</b>
			ESC	<b>1SV308</b> *JDP2S01E *JDP2S04E
			TESC	*JDP2S01T *JDP2S02T
			USQ	<b>1SV312</b> *JDP4P02U
	Double	S-MINI	<b>1SV172</b>	
		SMQ	<b>1SV237</b>	
		USM	<b>1SV252</b>	
		USQ	<b>1SV312</b> *JDP4P02U	
		USQ	<b>1SV312</b> *JDP4P02U	

\* New

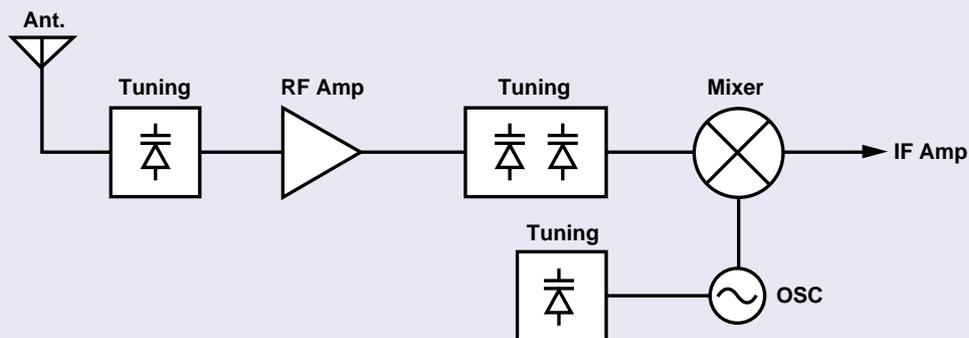
Application	Type	Package	Product No.
RF Amp	Dual gate MOSFET	SMQ	<b>3SK195</b>
			<b>3SK225</b>
			<b>3SK226</b>
		USQ	<b>3SK257</b>
			<b>3SK258</b>
	Single gate MOSFET	MINI	<b>2SK241</b>
		S-MINI	<b>2SK302</b>
		USM	<b>2SK882</b>
		SMQ	<b>2SK1771</b>
	Bipolar transistor	MINI	<b>2SC2668</b>
		S-MINI	<b>2SC2714</b>
		USM	<b>2SC4215</b>
	J-FET	MINI	<b>2SK161</b>
			<b>2SK192A</b>
		S-MINI	<b>2SK211</b>
<b>2SK210</b>			
USM			<b>2SK881</b>

Application	Type	Package	Product No.	
Tuning	Tuning varicap diode	Double	MINI	<b>1SV101</b>
			MINI	<b>1SV103</b> <b>1SV147</b>
			S-MINI	<b>1SV225</b> <b>1SV228</b>
		Single	S-MINI	<b>1SV160</b>
			AFC varicap diode	S-MINI

Application	Type	Package	Product No.
Mixer	Dual gate MOSFET	USQ	<b>3SK260</b>
		MINI	<b>2SC2668</b>
	Bipolar transistor	S-MINI	<b>2SC2714</b>
		USM	<b>2SC4215</b>
		SSM	<b>2SC4915</b>

Application	Type	Package	Product No.
OSC	J-FET	MINI	<b>2SK192A</b>
		S-MINI	<b>2SK210</b>
	Bipolar transistor	MINI	<b>2SC2668</b>
			<b>2SC2995</b>
		S-MINI	<b>2SC2714</b>
			<b>2SC2996</b>
		USM	<b>2SC4215</b>
		SSM	<b>2SC4915</b>

## ● 1-3 RF Devices for TV and VTR Tuners



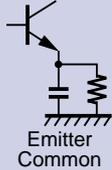
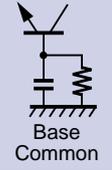
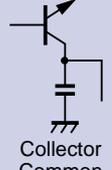
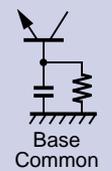
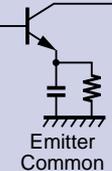
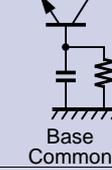
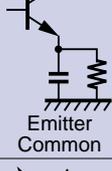
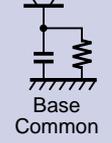
Application	Type	Band	Package	Product No.
Tuning	Tuning varicap diode	Wide-band VHF	USC	<b>1SV215 1SV217 1SV262 1SV288</b> <b>1SV231 1SV232 1SV269 1SV302</b>
			ESC	<b>1SV282 1SV290</b> <b>1SV283 1SV303</b>
			S-MINI (Double type)	<b>1SV242</b>
		UHF	USC	<b>1SV214</b>
	ESC		<b>1SV278</b>	
	AFC diode	VHF to UHF	USC	<b>1SV216</b>
RF Amp	Dual gate FET	VHF (wide-band)	SMQ	<b>3SK195 3SK225</b> <b>3SK226 3SK292</b>
			USQ	<b>3SK259 3SK257 3SK258 3SK294</b>
		UHF	SMQ	<b>#3SK240 3SK199 3SK207 3SK232 3SK291</b>
			USQ	<b>#3SK274 3SK256 3SK249 3SK293</b>
Mixer	Dual gate FET	VHF and wide-band VHF	USQ	<b>3SK260 3SK259</b>
			S-MINI	<b>1SS295 (Double)</b>
	Schottky diode	UHF	USC	<b>1SS315</b>
			TESC	<b>*JDH2S01T</b>

\* New # GaAs

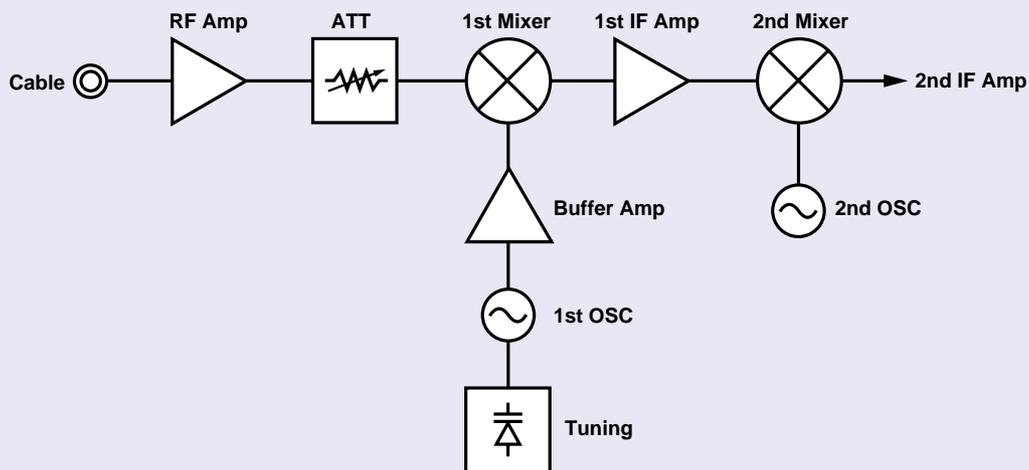
Application	Type	Band	Internal connection	Package	Product No.	
Tuning	Band switch	Single	—	USC	<b>1SS314</b>	
				ESC	<b>1SS381</b>	
				TESC	<b>*JDS2S03T</b>	
		Double	VHF and wide-band VHF	Anode Common	S-MINI	<b>1SS269</b> <b>1SS268</b>
					USM	<b>1SS313</b>
				Cathode Common	USM	<b>1SS312</b>
					SSM	<b>1SS364</b>

Package: SMV (SSOP5-P-095), \* New

(Continued)

Application	Type	Band	Circuit diagram	Package	Product No.	
RF Amp	Bipolar transistor	VHF		USM	<b>2SC4249</b>	
				SM	<b>2SC3122</b>	
		UHF		USM	<b>2SC4244</b>	
				SMQ	<b>2SC4214</b>	
OSC	Bipolar transistor	VHF (wide-band)		USM	<b>2SC4251</b> <b>2SC4246</b> <b>2SC4252</b>	
				S-MINI	<b>2SC3124</b> <b>2SC3121</b> <b>2SC4255</b>	
		UHF		USM	<b>2SC4246</b>	
				S-MINI	<b>2SC3121</b>	
		UHF		USM	<b>2SC4247</b> <b>2SC4248</b>	
				S-MINI	<b>2SC3547A</b> <b>2SC3547B</b>	
Mixer	Bipolar transistor	VHF (wide-band)		USM	<b>2SC4250</b> <b>2SC4245</b>	
				S-MINI	<b>2SC3123</b> <b>2SC3120</b>	
			VHF (wide-band)		USM	<b>2SC4253</b> <b>2SC4251</b> <b>2SC4246</b>
					S-MINI	<b>2SC3125</b> <b>2SC3124</b> <b>2SC3121</b>
		UHF		S-MINI	<b>2SC3120</b> <b>2SC3862</b>	
				S-MINI	<b>2SC3547A</b> <b>2SC3547B</b>	
			UHF		USM	<b>2SC4245</b>
					USM	<b>2SC4247</b> <b>2SC4248</b>

## ● 1-4 RF Devices for CATV Converters



Application	Type	Package	Product No.
RF Amp	Bipolar transistor	SMQ	<b>2SC5087</b>

Application	Type	Package	Product No.	
ATT	PIN diode	Single	S-MINI	<b>1SV128</b>
			USC	<b>1SV271</b>
				<b>1SV307</b>
			ESC	<b>1SV308</b> *JDP2S01E *JDP2S04E
			TESC	*JDP2S01T *JDP2S02T
		Double	S-MINI	<b>1SV172</b>
			SMQ	<b>1SV237</b>
			USM	<b>1SV252</b>
			USQ	<b>1SV312</b>
				*JDP4P02U

\* New

Application	Type	Package	Product No.
1st Mixer	Schottky diode	S-MINI	<b>1SS154</b> (Single) <b>1SS271</b> (Double)

Application	Type	Package	Product No.
1st IF Amp	Bipolar transistor	S-MINI	<b>2SC5084</b>
		SMQ	<b>2SC5087</b>
	GaAs dual gate FET	SMQ	<b>3SK240</b>
		USQ	<b>3SK274</b>
	Si dual gate MOSFET	SMQ	<b>3SK199</b>
			<b>3SK232</b> <b>3SK291</b> <b>3SK292</b>
		USQ	<b>3SK249</b>
			<b>3SK293</b> <b>3SK294</b>

Application	Type	Package	Product No.
2nd Mixer	Schottky diode	SMQ	<b>1SS239</b>
		S-MINI	<b>1SS154</b> (Single) <b>1SS271</b> (Double)
	Si dual gate MOSFET	SMQ	<b>3SK199</b>
			<b>3SK232</b> <b>3SK291</b>
		USQ	<b>3SK249</b>
			<b>3SK293</b>

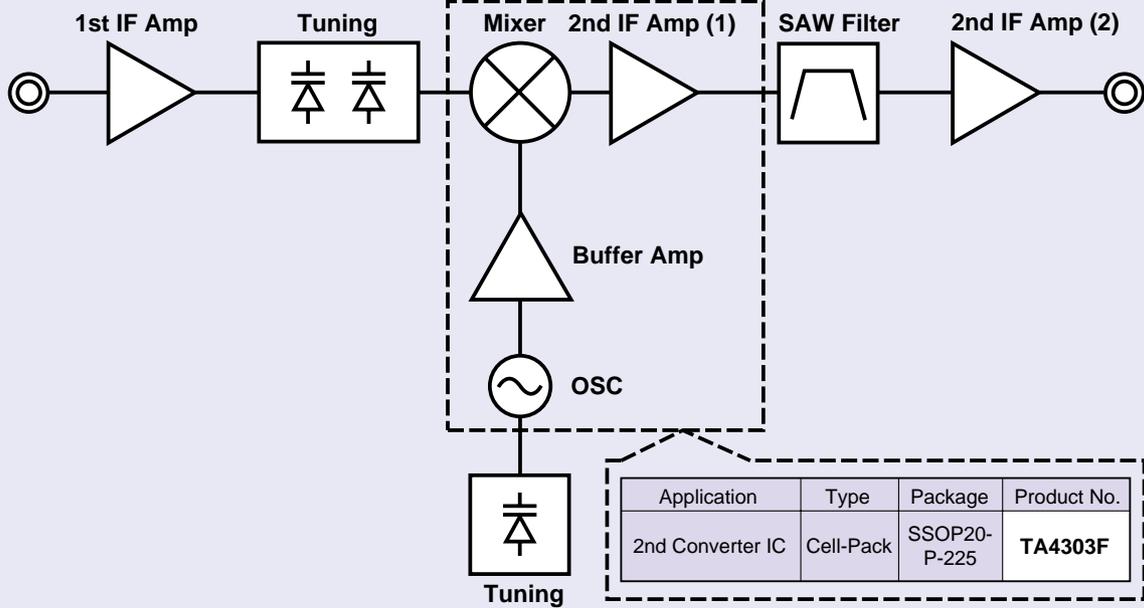
Application	Type	Package	Product No.
Buffer Amp	Bipolar transistor	SMQ	<b>2SC5087</b>
		S-MINI	<b>2SC5084</b>

Application	Type	Package	Product No.	
1st OSC	Bipolar transistor	Base common	S-MINI	<b>2SC4255</b>
			USM	<b>2SC4252</b>

Application	Type	Package	Product No.
Tuning	Tuning Varicap	USC	<b>1SV214</b>
		ESC	<b>1SV230</b> <b>1SV278</b>

Application	Type	Package	Product No.
2nd OSC	Bipolar transistor	USM	<b>2SC4246</b>
		S-MINI	<b>2SC3121</b>
	Si dual gate MOSFET	SMQ	<b>3SK199</b>
			<b>3SK232</b> <b>3SK291</b> <b>3SK293</b>
		USQ	<b>3SK249</b>
			<b>3SK293</b>

## ● 1-5 RF Devices for SHF 2nd Converters



Application	Type	Package	Product No.
1st IF Amp (2)	Bipolar transistor	SMQ	<b>2SC5087 2SC5262</b>
			<b>2SC5092 2SC5257</b>
		USQ	<b>2SC5088 2SC5093</b>
			<b>2SC5263 2SC5258</b>
			<b>2SC5319 2SC5324</b>

Application	Type	Package	Product No.
2nd IF Amp (1)	Bipolar transistor	SMQ	<b>2SC5087 2SC5262</b>
			<b>2SC5092 2SC5257</b>
		S-MINI	<b>2SC5084 2SC5254</b>
			<b>2SC5089 2SC5259</b>
	Cell-Pack	SMQ	<b>TA4002F</b>
		SMV	<b>TA4003F</b>

Application	Type	Package	Product No.
Tuning	Preselector and tuning varicap diode	USC	<b>1SV245 1SV287</b>
			<b>1SV309 1SV291</b>
		ESC	

Application	Type	Package	Product No.
2nd IF Amp (2)	Bipolar transistor	S-MINI	<b>2SC5084 2SC5254</b>
		SMQ	<b>2SC5087 2SC5257</b>
	Cell-Pack	SM6	<b>TA4000F</b>

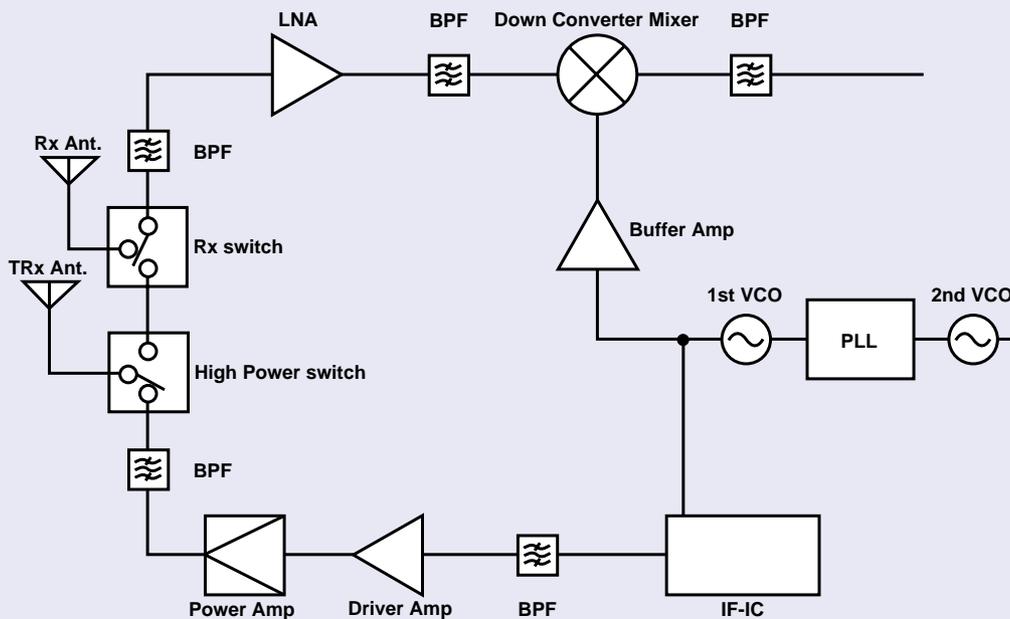
Application	Type	Package	Product No.
Mixer	Bipolar transistor	SMQ	<b>2SC5087 2SC5262</b>
			<b>2SC5092 2SC5257</b>
	Schottky diode	S-MINI	<b>1SS154 (single)</b> <b>1SS271 (double)</b>

Application	Type	Package	Product No.
Buffer Amp	Bipolar transistor	SMQ	<b>2SC5087 2SC5262</b>
			<b>2SC5092 2SC5257</b>
		USQ	<b>2SC5088 2SC5093</b>
			<b>2SC5263 2SC5258</b> <b>2SC5319 2SC5324</b>

Application	Type	Package	Product No.
OSC	Bipolar transistor	S-MINI	<b>2SC5084</b> <b>2SC5089</b>

Package: SMV (SSOP5-P-0.95), SM6 (SSOP6-P-0.95)

## ● 1-6 RF Devices for 800 MHz Band Analog and Digital Cellular Phones



Application	Type	Package	Product No.
Power Amp (GSM)	Module	5-14A	<b>S-AU80</b>

Application	Type	Package	Product No.
Rx Switch	GaAs Cell Pack	SM6	<b>#TG2206F</b>

# GaAs

Application	Type	Package	Product No.
LNA	GaAs FET	USQ	<b>#3SK320</b>

# GaAs

Application	Type	Package	Product No.
Down converter Mixer	GaAs FET	USQ	<b>#3SK320</b>

# GaAs

Application	Type	Package	Product No.
Buff Amp	Si Cell Pack	SMV	<b>TA4003F</b>
	Si Cell Pack	SMV	<b>TA4004F</b>
	Si Cell Pack	USV	<b>*TA4012FU</b>

\* New

### Si Bipolar Transistors

Application	Package		
	USM	SSM	TESM
LNA, Buff Amp	2SC5065	2SC5066	2SC5066FT
	2SC5085	2SC5086	2SC5086FT
	2SC5090	2SC5091	2SC5091FT
	2SC5095	2SC5096	2SC5096FT
	2SC5255	2SC5256	2SC5256FT
	2SC5060	2SC5261	2SC5261FT
	*MT3S06U	*MT3S06S	*MT3S06T
	*MT3S07U	*MT3S07S	*MT3S07T
Mixer	2SC5065	2SC5066	2SC5066FT
	2SC5085	2SC5086	2SC5086FT
	2SC5107	2SC5108	2SC5108FT
	2SC5110	2SC5111	2SC5111FT
VCO	2SC5065	2SC5066	2SC5066FT
	2SC5085	2SC5086	2SC5086FT
	2SC5107	2SC5108	2SC5108FT
	2SC5110	2SC5111	2SC5111FT
	*MT3S03AU	*MT3S03AS	*MT3S03AT
	*MT3S04AU	*MT3S04AS	*MT3S04AT
	*MT3S07U	*MT3S07S	*MT3S07T

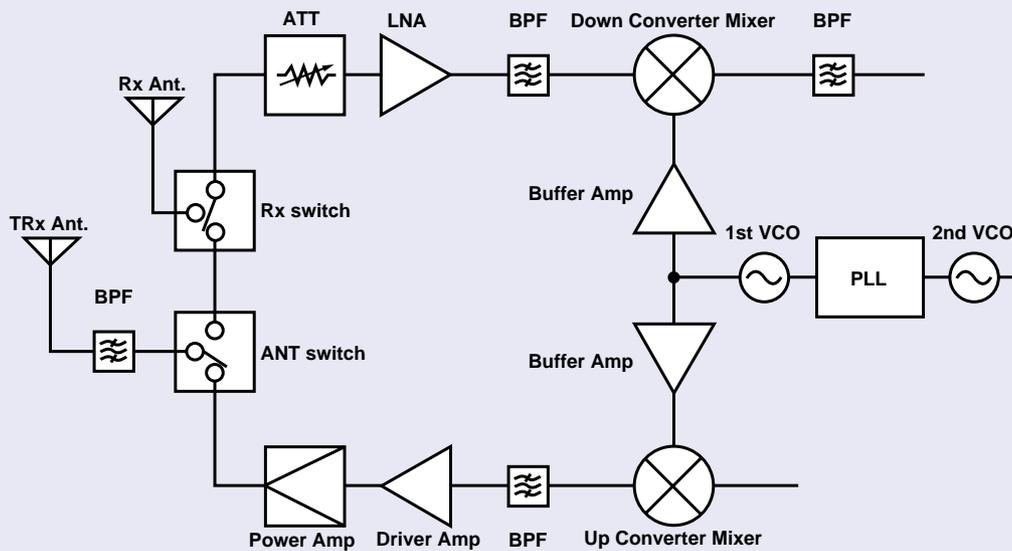
\* New

### Varicap Diodes

Application	Package	
	USC	ESC
VCO	1SV229	1SV279
	1SV270	1SV281
	1SV276	1SV284
	1SV277	1SV285
	1SV304	1SV305
	1SV310	1SV311
	1SV313	1SV314
	*1SV328	*1SV329

\* New

## ● 1-7 RF Devices for 1.9 GHz Band Digital Cordless Phones



Application	Type	Package	Product No.
ANT switch	GaAs cell-pack	SM6	# <b>TG2205F</b>

# GaAs

Application	Type	Package	Product No.
Power Amp	GaAs cell-pack	SM8	# <b>TG2006F</b>

# GaAs

Application	Type	Package	Product No.
Driver Amp	Si cell-pack	USV	* <b>TA4012FU</b>

\* New

Application	Type	Package	Product No.
UP converter mixer	Si cell-pack	SM8	<b>TA4103F</b>

Application	Type	Package	Product No.
Rx switch	GaAs cell-pack	SM6	# <b>TG2206F</b>

# GaAs

Application	Type	Package	Product No.
ATT	GaAs cell-pack	SM6	# <b>TG2202F</b>

# GaAs

Application	Type	Package	Product No.
LNA	Si Bi-Transistor	USQ	<b>2SC5324</b>
	GaAs FET	USQ	# <b>3SK320</b>

# GaAs

Application	Type	Package	Product No.
Down converter mixer	GaAs FET	USQ	# <b>3SK320</b>
	Si Bi-transistor	USQ	<b>2SC5324</b>

# GaAs

Application	Type	Package	Product No.
Buff Amp	Si cell-pack	USV	* <b>TA4011FU</b>

\* New

Application	Type	Package	Product No.
1st VCO	Si Bi-transistor	SSM	<b>2SC5261</b>
	Si Bi-transistor	TESM	<b>2SC5261FT</b>
	Si Bi-transistor	SSM	<b>2SC5322</b>
	Si Bi-transistor	TESM	<b>2SC5322FT</b>
	Varicap diode	ESC	<b>1SV280</b>
	Varicap diode	ESC	<b>1SV285</b>
	Varicap diode	ESC	<b>1SV314</b>
	Si Bi-transistor	SSM	* <b>MT3S04AS</b>
	Si Bi-transistor	TESM	* <b>MT3S04AT</b>
	Si Bi-transistor	SSM	* <b>MT3S03AS</b>
	Si Bi-transistor	TESM	* <b>MT3S03AT</b>

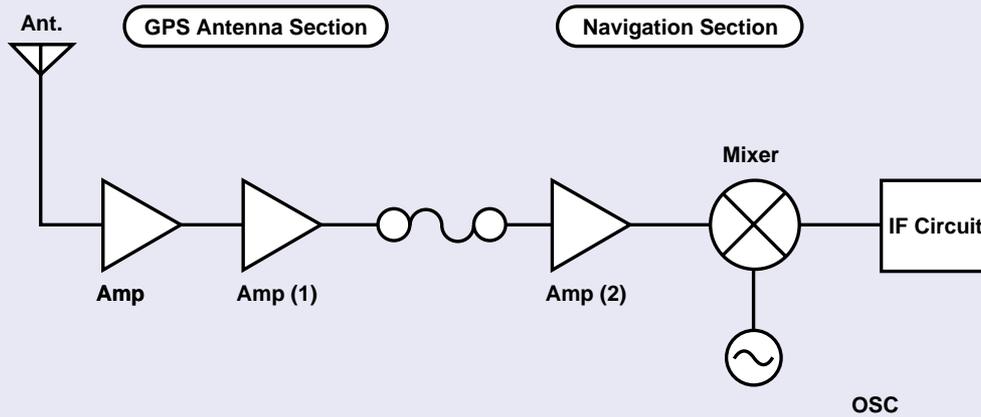
\* New

Application	Type	Package	Product No.
2nd VCO	Si Bi-transistor	SSM	<b>2SC5086</b>
	Si Bi-transistor	TESM	<b>2SC5086FT</b>
	Varicap diode	ESC	<b>1SV279</b>
	Varicap diode	ESC	<b>1SV284</b>
	Varicap diode	ESC	<b>1SV305</b>
	Si Bi-transistor	SSM	* <b>MT3S04AS</b>
	Si Bi-transistor	TESM	* <b>MT3S04AT</b>
	Si Bi-transistor	SSM	* <b>MT3S03AS</b>
	Si Bi-transistor	TESM	* <b>MT3S03AT</b>

\* New

Bi-transistor: Bipolar transistor

## ● 1-8 RF Devices for Global Positioning System (GPS) LNB Dawn Converters



### GPS Antenna Section

Application	Type	Package	Product No.
Amp (1)	Bipolar transistor	USQ	2SC5093
			2SC5258
			2SC5319
		*MT4S06U	
		SMQ	2SC5092
			2SC5257
	2SC5318		
	*MT4S06		
	cell-pack	ES6	*TA4016AFE

\* Under development \* New

### Navigation Section

Application	Type	Package	Product No.
Amp (2)	Bipolar transistor	USQ	2SC5093
			2SC5258
			2SC5319
		*MT4S06U	
		SMQ	2SC5092
			2SC5257
	2SC5318		
	*MT4S06		
	MIX, OSC	Bipolar transistor	USQ
2SC5258			
2SC5319			
*MT4S06U			
SMQ		2SC5092	
		2SC5257	
	2SC5318		
*MT4S06			

\* New

## 2. Selection Guides

### ● 2-1 Transistors for TV Tuners

Application			Package			
			Super-Mini (SOT-23 MOD./ TO-236 MOD.)	Ultra Super-Mini	Super-Mini Quad (SOT-143 MOD.)	USQ
						
UHF	RF	GaAs MES			#3SK240	#3SK274 #3SK320
		MOS			3SK199 3SK207 3SK232 3SK291	3SK256 3SK249 3SK293
		Bipolar		2SC4244	2SC4214	
	Mixer	Bipolar	2SC3120 2SC3862	2SC4245		
	OSC	Bipolar	2SC3120 2SC3121 2SC3547A 2SC3547B	2SC4245 2SC4246 2SC4527 2SC4247 2SC4248		
VHF	RF	MOS			3SK195 3SK225 3SK226 3SK292	3SK257 3SK258 3SK294
		Bipolar	2SC3122	2SC4249		
	Mixer	Bipolar	2SC3123	2SC4250		
		MOS				3SK260
	OSC	Bipolar	2SC3124 2SC4255	2SC4251 2SC4252		

#GaAs

### ● 2-2 Diodes for TV Tuners

Application		Package				
		Ultra Super-Mini coaxial lead	ESC	Super-Mini (SOT-23 MOD./ TO-236 MOD.)	Ultra Super-Mini	SSM
						
UHF	Tuning	1SV214	1SV278			
	AFC	1SV216				
	Mixer	1SS315		1SS295		
VHF	Tuning	1SV214 1SV215 1SV217 1SV231 1SV232	1SV278	1SV242		
		1SV262 1SV269 1SV288 1SV302	1SV282 1SV283 1SV290 1SV303			
	Band switch	1SS314	1SS381	1SS268 1SS269	1SS312 1SS313	1SS364
	AFC	1SV216				

## ● 2-3 Transistors for VHF to UHF Bands

Application		Package							
		TO-92	Power-Mini (SOT-89)	Super-Mini (SOT-23 MOD. TO-236 MOD.)	Ultra Super-Mini	SSM	TESM	Super-Mini Quad. (SOT-143 MOD.)	USQ
VHF to UHF low noise amp	PNP*transistor	<b>2SA1161</b>							
	NPN*transistor	<b>2SC2498</b>  <b>2SC2644</b> <b>2SC2753</b> <b>2SC3605</b>	<b>2SC3268</b> <b>2SC3607</b> <b>2SC4318</b>	<b>2SC3098</b> <b>2SC3099</b> <b>2SC3011</b> <b>2SC5064</b> <b>2SC3429</b> <b>2SC5084</b> <b>2SC5089</b> <b>2SC5094</b>  <b>2SC5254</b> <b>2SC5259</b> <b>2SC5315</b> <b>2SC5320</b>	<b>2SC4392</b> <b>2SC5065</b> <b>2SC4393</b> <b>2SC5085</b> <b>2SC5090</b> <b>2SC5095</b>  <b>2SC5255</b> <b>2SC5260</b> <b>2SC5316</b> <b>2SC5321</b> <b>2SC5463</b> <b>*MT3S06U</b> <b>*MT3S07U</b>	<b>2SC5066</b>  <b>2SC5086</b> <b>2SC5091</b> <b>2SC5096</b> <b>2SC5313</b> <b>2SC5256</b> <b>2SC5261</b> <b>2SC5317</b> <b>2SC5322</b> <b>2SC5464</b> <b>*MT3S06S</b> <b>*MT3S07S</b>	<b>2SC5066FT</b>  <b>2SC5086FT</b> <b>2SC5091FT</b> <b>2SC5096FT</b>  <b>2SC5256FT</b> <b>2SC5261FT</b> <b>2SC5317FT</b> <b>2SC5322FT</b> <b>2SC5464FT</b> <b>*MT3S06T</b> <b>*MT3S07T</b>	<b>2SC5087</b> <b>2SC5092</b> <b>2SC5097</b>  <b>2SC5257</b> <b>2SC5262</b> <b>2SC5318</b> <b>2SC5323</b>	<b>2SC5088</b> <b>2SC5093</b> <b>2SC5098</b>  <b>2SC5258</b> <b>2SC5263</b> <b>2SC5319</b> <b>2SC5324</b>  <b>*MT4S06</b> <b>*MT4S07</b>
VHF to UHF OSC	NPN*transistor			<b>2SC3547A</b> <b>2SC3547B</b> <b>2SC5106</b> <b>2SC5109</b> <b>*MT3S03A</b> <b>*MT3S04A</b>	<b>2SC4247</b> <b>2SC4248</b> <b>2SC5107</b> <b>2SC5110</b> <b>*MT3S03AU</b> <b>*MT3S04AU</b>	<b>2SC5108</b> <b>2SC5111</b> <b>*MT3S03AS</b> <b>*MT3S04AS</b>	<b>2SC5108FT</b> <b>2SC5111FT</b> <b>*MT3S03AT</b> <b>*MT3S04AT</b>	<b>*MT4S03A</b> <b>*MT4S04A</b>	<b>*MT4S03AU</b> <b>*MT4S04AU</b>

\* New

## ● 2-4 Diodes for VHF to UHF Bands

Application		Package						
		Super-Mini Quad. (SOR-143 MOD.)	Super-Mini (SOT-23 MOD. TO-236 MOD.)	USM	Ultra Super-Mini coaxial-lead	ESC	USQ	TESC
Attenuator, Switch	Single		<b>1SV128</b>		<b>1SV271</b> <b>1SV307</b>	<b>*JDP2S04E</b> <b>1SV308</b> <b>*JDP2S01E</b>	<b>*JDP4P02U</b>	<b>*JDP2S02T</b> <b>*JDP2S01T</b>
	PIN Twin	<b>1SV237</b>	<b>1SV172</b>	<b>1SV252</b>			<b>1SV312</b>	
Mixer	Single		<b>1SS154</b>					
	SBD Twin		<b>1SS271</b> <b>1SS295</b>		<b>1SS315</b>			<b>*JDH2S01T</b>
Tuning					<b>1SV229</b> <b>1SV230</b> <b>1SV239</b> <b>1SV245</b> <b>1SV270</b> <b>1SV276</b> <b>1SV277</b> <b>1SV287</b> <b>1SV304</b> <b>1SV310</b> <b>1SV313</b> <b>*1SV328</b>	<b>1SV279</b> <b>1SV286</b> <b>1SV280</b> <b>1SV309</b> <b>1SV281</b> <b>1SV284</b> <b>1SV285</b> <b>1SV291</b> <b>1SV305</b> <b>1SV311</b> <b>1SV314</b> <b>*1SV329</b>	<b>1SV306</b>	

\* New

## ● 2-5 Transistors for AM / FM Tuners

Application			Package					Super-Mini Quad. (SOT-143 MOD.)	USQ
			TO-92	Mini	Super-Mini (SOT-23 MOD. TO-236 MOD.)	Ultra Super-Mini	SSM		
									
FM	RF	Dual gate MOS						<b>3SK195</b> <b>3SK225</b> <b>3SK226</b> <b>3SK292</b>	<b>3SK257</b> <b>3SK258</b> <b>3SK294</b>
		Single gate MOS						<b>2SK1771</b>	
		Cascode MOS		<b>2SK241</b>	<b>2SK302</b>	<b>2SK882</b>			
		Cascode J-FET		<b>2SK161</b>	<b>2SK211</b>	<b>2SK881</b>			
		Single gate J-FET		<b>2SK192A</b>	<b>2SK210</b>				
	Bipolar	<b>2SC1923</b>	<b>2SC2668</b>	<b>2SC2714</b>	<b>2SC4215</b>	<b>2SC4915</b>			
	Mixer	Dual gate MOS							<b>3SK260</b>
		Bipolar	<b>2SC1923</b>	<b>2SC2668</b>	<b>2SC2714</b>	<b>2SC4215</b>	<b>2SC4915</b>		
	OSC	Single gate J-FET		<b>2SK192A</b>	<b>2SK210</b>				
		Bipolar	<b>2SC1923</b>	<b>2SC2668</b> <b>2SC2995</b>	<b>2SC2714</b> <b>2SC2996</b>	<b>2SC4215</b>	<b>2SC4915</b>		
IF	Bipolar	<b>2SC380TM</b>	<b>2SC2669</b> <b>2SC2995</b>	<b>2SC2715</b> <b>2SC2996</b>					
AM	RF	Single gate J-FET	<b>2SK709</b>	<b>2SK710</b>	<b>2SK711</b>	<b>2SK1875</b>			
		Bipolar	<b>2SC941TM</b>	<b>2SC2670</b>	<b>2SC2716</b>				
	Converter	Bipolar	<b>2SC380TM</b> <b>2SC941TM</b> <b>2SC1815</b>	<b>2SC2669</b> <b>2SC2670</b> <b>2SC2458</b>	<b>2SC2715</b> <b>2SC2716</b> <b>2SC2712</b>	<b>2SC4116</b>			
	IF	Bipolar	<b>2SC380TM</b> <b>2SC1815</b>	<b>2SC2669</b> <b>2SC2458</b>	<b>2SC2715</b> <b>2SC2712</b>	<b>2SC4116</b>			

## ● 2-6 Diodes for AM / FM Tuners

Application		Package			
		MINI MOD.	Mini	Super-Mini (SOT-23 MOD./ TO-236 MOD.)	Ultra Super-Mini
					
FM tuning	High VT		<b>1SV103</b>	<b>1SV225</b>	
	Low VT	<b>1SV101</b>	<b>1SV147</b>	<b>1SV228</b>	
AM tuning	High VT	<b>1SV102</b>			
	Low VT	<b>1SV149-B</b>			
AFC				<b>1SV160</b>	
Attenuator, switch(PIN)	Single			<b>1SV128</b>	
	Twin			<b>1SV172</b>	<b>1SV252</b>

## ● 2-7 Hybrid Transistors

Application		Package				
		SMV (SSOP5-P-0.95)	US6	FM8	TU6	ES6
						
AM RF (with AGC)		<b>HN3G01J</b>				
TV VHF			<b>HN3C01FU</b>			
TV UHF			<b>HN3C02FU</b> <b>HN3C03FU</b>			
VHF to UHF low noise amp			<b>HN3C09FU</b> <b>HN3C10FU</b> <b>HN3C11FU</b> <b>HN3C12FU</b> <b>HN2C10FU</b> <b>HN2C12FU</b> <b>HN3C13FU</b> <b>HN3C14FU</b> <b>HN3C15FU</b> <b>HN3C16FU</b> <b>HN3C17FU</b> <b>HN3C18FU</b>		<b>HN2C10FT, HN2C12FT</b> <b>HN3C12FT, HN3C10FT</b> <b>HN2C13FT, HN2C14FT</b> <b>HN3C14FT, HN3C16FT</b> <b>HN3C18FT</b> <b>HN9C01FT, HN9C02FT</b> <b>HN9C03FT, HN9C04FT</b> <b>HN9C05FT, HN9C07FT</b> <b>HN9C08FT, HN9C09FT</b> <b>HN9C10FT, HN9C12FT</b> <b>HN9C13FT, HN9C14FT</b> <b>HN9C15FT, HN9C16FT</b> <b>HN9C18FT, HN9C19FT</b> <b>HN9C20FT, HN9C21FT</b> <b>HN9C22FT, *MT6C03AT</b> <b>*MT6C04AT, *MT6C06T</b> <b>*MT6L03AT, *MT6L04AT</b> <b>*MT6P03AT, *MT6P04AT</b> <b>*MT6L50AT, *MT6L51AT</b> <b>*MT6L52AT, *MT6L57AT</b> <b>*MT6L58AT, *MT6L59T</b>	<b>*MT6C03AE</b> <b>*MT6C04AE</b> <b>*MT6C06E</b> <b>*MT6P03AE</b> <b>*MT6P04AE</b> <b>*MT6P06E</b> <b>*MT6P07E</b> <b>*MT6L03AE</b> <b>*MT6L04AE</b> <b>*MT6L50AE</b> <b>*MT6L51AE</b> <b>*MT6L52AE</b> <b>*MT6L57AE</b> <b>*MT6L58AE</b> <b>*MT6L59E</b>
AM tuning				<b>HN1V01H</b> <b>HN1V02H</b> <b>HN2V02H</b>		

\* New

## ● 2-8 Cell-Packs

Application	Package							
	SMQ	SMV (SSOP5-P-0.95)	SM6 (SSOP6-P-0.95)	SM8 (SSOP8-P-0.65)	SSOP20-P- 225-1.00	USV (SSOP5-P-0.65)	ES6 (SSOP6-P-05)	TU6
								
Diff. wide-band amp			TA4000F					
VHF to UHF wide-band amp	TA4001F TA4002F	TA4003F TA4004F *TA4011F *TA4012F *TA4013F				*TA4011FU *TA4012FU *TA4013FU	♦TA4016AFE	
VHF to UHF amp mixer			TA4100F					
VHF to UHF DBM				TA4101F				
1.9GHz U/C mixer				TA4103F				
Power Amp				#TG2006F				
SPDT Switch			#TG2205F #TG2206F	#TG2200AF #TG2209F				
ATT			#TG2202F					
BS converter IC					TA4303F			
TCXO							*TA4014FE *TA4015FE	*TA4014FT *TA4015FT

♦ Under development (TA4016AFE)

# GaAs

\* New

# 3. Main Characteristics

## ● 3-1 Transistors for TV Tuners

Application	Product No.	Absolute Maximum Ratings			Electrical Characteristics													Package
		V <sub>CEO</sub>	I <sub>C</sub>	P <sub>C</sub>	h <sub>FE</sub>		f <sub>T</sub> (Typ.)		G <sub>p</sub> (G <sub>c</sub> )/NF (Typ.)				C <sub>re</sub>	C <sub>ob</sub>				
		(V)	(mA)	(mW)	V <sub>CE</sub>	I <sub>C</sub>	(MHz)	V <sub>CE</sub>	I <sub>C</sub>	(dB/dB)	V <sub>CC</sub>	I <sub>C</sub>	V <sub>AGC</sub>	f	(C <sub>rb</sub> ▲)	(pF)		
VHF RF	<b>2SC3122</b>	30	20	150	60 to 300	10	2	650	10	2	24/2	12	—	1.4	200	0.3	—	S-MINI
	<b>2SC4249</b>	30	20	100	60 to 300	10	2	650	10	2	24/2	12	—	1.4	200	0.35	—	USM
VHF Mixer	<b>2SC3123</b>	20	50	150	40 to 300	10	5	1400	10	5	23°/3.8	12	3	—	200	0.4	—	S-MINI
	<b>2SC4250</b>	20	50	100	40 to 300	10	5	1400	10	5	25°/4.3	12	3	—	200	0.45	—	USM
VHF OSC	<b>2SC3124</b>	15	50	150	40 to 200	3	8	1100	10	8	—	—	—	—	—	—	0.9	S-MINI
	<b>2SC4251</b>	15	50	100	40 to 200	3	8	1100	10	8	—	—	—	—	—	—	0.9	USM
	<b>2SC4252</b>	12	30	100	40 to 250	10	5	2000	10	5	—	—	—	—	—	—	1.05	USM
	<b>2SC4255</b>	12	30	150	40 to 250	10	5	2000	10	5	—	—	—	—	—	—	1.05	S-MINI
UHF RF	<b>2SC3828</b>	20	20	150	40MIN.	10	2	1100	10	2	18/5max	12	—	3	800	0.2▲	—	SMQ
	<b>2SC4214</b>	20	20	150	40MIN.	3	1	850	3	1	15/2.8	4.5	—	2	800	0.3▲	—	SMQ
	<b>2SC4244</b>	20	20	100	40MIN.	3	1	850	3	1	17/4	4.5	—	2	800	0.4▲	—	USM
UHF Mixer	<b>2SC3862</b>	15	50	150	40 to 200	10	5	2400	10	2	—	—	—	—	—	0.6	—	S-MINI E.B.Rev
UHF Mixer/ OSC	<b>2SC3120</b>	15	50	150	40 to 200	10	5	2400	10	2	17°/8	10	2	—	800	0.6	—	S-MINI
	<b>2SC4245</b>	15	50	100	40 to 200	10	5	2400	10	2	17°/8	10	2	—	800	0.6	—	USM
UHF OSC	<b>2SC3121</b>	15	50	150	60 to 320	3	8	1500	10	8	—	—	—	—	—	—	0.9	S-MINI
	<b>2SC3547A</b>	12	30	150	35 to 130	10	5	4000	10	10	—	—	—	—	—	—	1.05	S-MINI
	<b>2SC3547B</b>	12	30	150	70 to 300	10	5	4000	10	10	—	—	—	—	—	—	1.05	S-MINI
	<b>2SC4246</b>	15	50	100	60 to 320	3	8	1500	10	8	—	—	—	—	—	—	0.9	USM
	<b>2SC4247</b>	12	30	100	35 to 130	10	5	4000	10	10	—	—	—	—	—	—	1.05	USM
	<b>2SC4248</b>	12	30	100	70 to 300	10	5	4000	10	10	—	—	—	—	—	—	1.05	USM
	<b>2SC4527</b>	15	50	100	60 to 320	3	8	1500	10	8	—	—	—	—	—	—	0.9	USM E.B.Rev
PIF amp	<b>2SC3125</b>	25	50	150	20 to 200	10	10	600	10	10	—	—	—	—	—	—	1.1	S-MINI
	<b>2SC4253</b>	25	50	100	20 to 200	10	10	600	10	10	—	—	—	—	—	—	1.1	USM

### ● 3-2 Transistors for VHF to UHF Bands

Application	Product No.	Absolute Maximum Ratings					Electrical Characteristics											Package
		V <sub>CEO</sub>	I <sub>c</sub>	P <sub>c</sub>	C <sub>ob</sub>	C <sub>re</sub>	f <sub>T</sub> (Typ.)			S <sub>21e2</sub> (Typ.)				NF (Typ.)				
		(V)	(mA)	(mW)	(pF)	(pF)	(GHz)	V <sub>CE</sub> (V)	I <sub>c</sub> (mA)	(dB)	V <sub>CE</sub> (V)	I <sub>c</sub> (mA)	f (GHz)	(dB)	V <sub>CE</sub> (V)	I <sub>c</sub> (mA)	f (GHz)	
VHF to UHF amp	2SA1161	-8	-30	200	0.95	0.75	3.5	-5	-10	8.0	-5	-10	1	3.5	-5	-3	1	TO-92
	2SA1245	-8	-30	150	0.75	0.6	4	-5	-10	9.5	-5	-10	1	3	-5	-3	1	S-MINI
	2SC2498	20	50	300	1.15	0.75	3.5	10	10	14.5	10	10	0.5	2.5	10	5	0.5	TO-92
	2SC2644	12	120	500	1.6	1.1	4	10	30	14.0	10	30	0.5	2.3	10	10	0.5	TO-92
	2SC2753	12	70	300	1.1	0.65	5	10	20	10.5	10	20	1	1.7	10	5	1	TO-92
	2SC3011	7	30	150	0.7	0.5	6.5	5	10	12	5	10	1	2.3	5	5	1	S-MINI
	2SC3098	20	50	150	1.15	0.75	3.5	10	10	14.5	10	10	0.5	2.5	10	5	0.5	S-MINI
	2SC3099	20	30	150	0.9	0.6	4	10	10	15.0	10	10	0.5	1.7	10	3	0.5	S-MINI
	2SC3268	12	70	*800	1.05	0.7	5	10	20	9.5	10	20	1	2	10	5	1	PW-MINI
	2SC3429	12	70	150	0.85	0.57	5	10	20	10.5	10	20	1	1.7	10	5	1	S-MINI
	2SC3605	12	80	600	1.2	0.75	6.5	10	20	10	10	20	1	1.1	10	5	1	TO-92
	2SC3607	12	80	*800	1.15	0.8	6.5	10	20	9.5	10	20	1	1.1	10	5	1	PW-MINI
	2SC4318	10	40	800	0.75	0.55	9	8	20	5.5	8	20	2	1.7	8	5	2	PW-MINI
	2SC4392	7	30	100	0.7	0.5	6.5	5	10	12	5	10	1	2.3	5	5	1	USM
	2SC4393	12	70	100	0.85	0.57	5	10	20	10.5	10	20	1	1.7	5	5	1	USM
	2SC5064	12	30	150	0.7	0.45	7	5	10	12	5	10	1	1.1	5	3	1	S-MINI
	2SC5065	12	30	100	0.7	0.45	7	5	10	12	5	10	1	1.1	5	3	1	USM
	2SC5066	12	30	100	0.7	0.45	7	5	10	12	5	10	1	1.1	5	3	1	SSM
	2SC5066FT	12	30	100	0.7	0.45	7	5	10	12	5	10	1	1.1	5	3	1	TESM
	2SC5084	12	80	150	1.0	0.65	7	10	20	11	10	20	1	1.1	10	5	1	SM
	2SC5085	12	80	100	1.0	0.65	7	10	20	11	10	20	1	1.1	10	5	1	USM
	2SC5086	12	80	100	1.0	0.65	7	10	20	11	10	20	1	1.1	10	5	1	SSM
	2SC5086FT	12	80	100	1.0	0.65	7	10	20	11	10	20	1	1.1	10	5	1	ESM
	*MT3S04AT	5	40	100	—	0.8	7	3	7	12.5	3	20	1	1.2	3	7	1	TESM
	MT3S04AS	5	40	100	—	0.8	7	3	7	12.5	3	20	1	1.2	3	7	1	SSM
	*MT3S06T	5	15	60	—	0.25	10	3	7	9.5	3	7	2	1.4	3	3	2	TESM
	*MT3S07T	5	25	100	—	0.4	12	3	15	9.5	3	15	2	1.3	3	5	2	TESM
	2SC5087	12	80	150	1.1	0.65	7	10	20	13	10	20	1	1.1	10	5	1	SMQ
	2SC5088	12	80	100	1.1	0.65	7	10	20	13	10	20	1	1.1	10	5	1	USQ
	2SC5089	10	40	150	0.7	0.5	10	8	20	7	8	20	2	1.7	8	5	2	S-MINI
	2SC5090	10	40	100	0.7	0.5	10	8	20	7	8	20	2	1.7	8	5	2	USM
	2SC5091	10	40	100	0.7	0.5	10	8	20	7	8	20	2	1.7	8	5	2	SSM
	2SC5091FT	10	40	100	0.7	0.5	10	8	20	7	8	20	2	1.7	8	5	2	TESM
	2SC5092	10	40	150	0.5	0.35	10	8	20	10	8	20	2	1.8	8	5	2	SMQ
2SC5093	10	40	100	0.65	0.45	10	8	20	9.5	8	20	2	1.8	8	5	2	USQ	
2SC5094	10	15	150	0.5	0.4	10	6	7	7.5	6	7	2	1.8	6	3	2	S-MINI	
2SC5095	10	15	100	0.5	0.4	10	6	7	7.5	6	7	2	1.8	6	3	2	USM	
2SC5096	10	15	100	0.5	0.4	10	6	7	7.5	6	7	2	1.8	6	3	2	SSM	
2SC5096FT	10	15	100	0.5	0.4	10	6	7	7.5	6	7	2	1.8	6	3	2	TESM	
MT3S03AS	5	40	100	—	0.75	10	3	20	8	3	20	2	1.4	3	7	2	SSM	
*MT3S03AT	5	40	100	—	0.75	10	3	20	8	3	20	2	1.4	3	7	2	TESM	
2SC5097	10	15	150	0.5	0.35	10	6	7	10	6	7	2	1.8	6	3	2	SMQ	
2SC5098	10	15	100	0.5	0.34	10	6	7	10	6	7	2	1.8	6	3	2	USQ	

\* New

☆ Al<sub>2</sub>O<sub>3</sub> Substrate (Area 250mm<sup>2</sup>, Thick 0.8mm)

(Continued)

Application	Product No.	Absolute Maximum Ratings					Electrical Characteristics											Package
		V <sub>CEO</sub>	I <sub>C</sub>	P <sub>C</sub>	C <sub>ob</sub>	C <sub>re</sub>	f <sub>T</sub> (Typ.)			S <sub>21e2</sub> (Typ.)			NF (Typ.)					
		(V)	(mA)	(mW)	(pF)	(pF)	(GHz)	V <sub>CE</sub> (V)	I <sub>C</sub> (mA)	(dB)	V <sub>CE</sub> (V)	I <sub>C</sub> (mA)	f (GHz)	(dB)	V <sub>CE</sub> (V)	I <sub>C</sub> (mA)	f (GHz)	
VHF to UHF amp	2SC5254	7	40	150	0.65	0.5	12	5	20	8.5	5	20	2	1.5	5	5	2	S-MINI
	2SC5255	7	40	100	0.5	0.35	12	5	20	8.5	5	20	2	1.5	5	5	2	USM
	2SC5256	7	40	100	0.65	0.5	12	5	20	8.5	5	20	2	1.5	5	5	2	SSM
	2SC5256FT	7	40	100	0.65	0.5	12	5	20	8.5	5	20	2	1.5	5	5	2	TESM
	2SC5257	7	40	150	0.65	0.45	12	5	20	9.5	5	20	2	1.5	5	5	2	SMQ
	2SC5258	7	40	100	0.65	0.45	12	5	20	9.5	5	20	2	1.5	5	5	2	USQ
	2SC5259	7	15	150	0.4	0.3	12	5	7	9	5	7	2	1.8	5	3	2	S-MINI
	2SC5260	7	15	100	0.4	0.3	12	5	7	9	5	7	2	1.8	5	3	2	USM
	2SC5261	7	15	100	0.4	0.3	12	5	7	9	5	7	2	1.8	5	3	2	SSM
	2SC5261FT	7	15	100	0.4	0.3	12	5	7	9	5	7	2	1.8	5	3	2	TESM
	2SC5262	7	15	150	0.45	0.35	12	5	7	10	5	7	2	1.7	5	3	2	SMQ
	2SC5263	7	15	100	0.45	0.35	12	5	7	10	5	7	2	1.7	5	3	2	USQ
	2SC5315	5	20	150	0.6	0.45	15	3	15	9.5	3	15	2	1.3	3	5	2	S-MINI
	2SC5316	5	20	100	0.6	0.45	15	3	15	9.5	3	15	2	1.3	3	5	2	USM
	2SC5317	5	20	100	0.6	0.45	15	3	15	9.5	3	15	2	1.3	3	5	2	SSM
	2SC5317FT	5	20	100	0.6	0.45	15	3	15	9.5	3	15	2	1.3	3	5	2	TESM
	2SC5318	5	20	150	0.6	0.4	15	3	15	11.5	3	15	2	1.3	3	5	2	SMQ
	2SC5319	5	20	100	0.6	0.4	15	3	15	11.5	3	15	2	1.3	3	5	2	USQ
	2SC5320	5	10	150	0.4	0.3	15	3	7	10	3	7	2	1.4	3	3	2	S-MINI
	2SC5321	5	10	100	0.4	0.3	15	3	7	10	3	7	2	1.4	3	3	2	USM
	2SC5322	5	10	100	0.4	0.3	15	3	7	10	3	7	2	1.4	3	3	2	SSM
	2SC5322FT	5	10	100	0.4	0.3	15	3	7	10	3	7	2	1.4	3	3	2	TESM
	2SC5323	5	10	150	0.4	0.25	15	3	7	12	3	7	2	1.4	3	3	2	SMQ
	2SC5324	5	10	100	0.4	0.25	15	3	7	12	3	7	2	1.4	3	3	2	USQ
2SC5463	12	60	100	0.75	0.5	7	8	15	12	8	15	1	1.1	8	5	1	USM	
2SC5464	12	60	100	0.75	0.5	7	8	15	12	8	15	1	1.1	8	5	1	SSM	
2SC5464FT	12	60	100	0.75	0.5	7	8	15	12	8	15	1	1.1	8	5	1	TESM	
VHF to UHF OSC	2SC3547A	12	30	150	1.05	—	4	10	10	—	—	—	—	—	—	—	—	S-MINI
	2SC3547B	12	30	150	1.05	—	4	10	10	—	—	—	—	—	—	—	—	S-MINI
	2SC4247	12	30	100	1.05	—	4	10	10	—	—	—	—	—	—	—	—	USM
	2SC4248	12	30	100	1.05	—	4	10	10	—	—	—	—	—	—	—	—	USM
	2SC5106	10	30	150	0.7	0.5	6	5	5	11	5	5	1	—	—	—	—	S-MINI
	2SC5107	10	30	100	0.7	0.5	6	5	5	11	5	5	1	—	—	—	—	USM
	2SC5108	10	30	100	0.7	0.5	6	5	5	11	5	5	1	—	—	—	—	SSM
	2SC5108FT	10	30	100	0.7	0.5	6	5	5	11	5	5	1	—	—	—	—	TESM
	2SC5109	10	60	150	0.9	0.7	5	5	5	10	5	5	1	—	—	—	—	S-MINI
	2SC5110	10	60	100	0.9	0.7	5	5	5	10	5	5	1	—	—	—	—	USM
	2SC5111	10	60	100	0.9	0.7	5	5	5	10	5	5	1	—	—	—	—	SSM
	2SC5111FT	10	60	100	0.9	0.7	5	5	5	10	5	5	1	—	—	—	—	TESM
	*MT3S03AS	5	40	100	—	0.75	10	3	20	8	3	20	2	1.4	3	7	2	SSM
	*MT3S03AT	5	40	100	—	0.75	10	3	20	8	3	20	2	1.4	3	7	2	TESM
	*MT3S04AS	5	40	100	—	0.8	7	3	7	12.5	3	20	1	1.2	3	7	1	SSM
	*MT3S04AT	5	40	100	—	0.8	7	3	7	12.5	3	20	1	1.2	3	7	1	TESM

\* New

### ● 3-3 Transistors for AM / FM Tuners

Application	Product No.	Absolute Maximum Ratings			Electrical Characteristics							Package
		V <sub>CEO</sub> (V)	I <sub>c</sub> (mA)	P <sub>c</sub> (mW)	h <sub>FE</sub>		f <sub>T</sub> (Typ.) (Min)			C <sub>re</sub> (C <sub>ob</sub> ) (pF)		
					V <sub>CE</sub> (V)	I <sub>c</sub> (mA)	(MHz)	V <sub>CE</sub> (V)	I <sub>c</sub> (mA)			
FM RF, mixer/OSC	<b>2SC1923</b>	30	20	100	40 to 200	6	1	550	6	1	0.7	TO-92
	<b>2SC2668</b>	30	20	100	40 to 200	6	1	550	6	1	0.7	MINI
	<b>2SC2714</b>	30	20	100	40 to 200	6	1	550	6	1	0.7	S-MINI
	<b>2SC4215</b>	30	20	100	40 to 200	6	1	550	6	1	0.7	USM
	<b>2SC4915</b>	30	20	100	40 to 200	6	1	550	6	1	0.7	SSM
FM OSC	<b>2SC2995</b>	30	50	200	40 to 240	6	1	350	6	1	0.9	MINI
	<b>2SC2996</b>	30	50	150	40 to 240	6	1	350	6	1	0.9	S-MINI
FM IF/AM converter IF	<b>2SC380TM</b>	30	50	300	40 to 240	12	2	(100)	10	1	(2.0)	TO-92
	<b>2SC2669</b>	30	50	200	40 to 240	12	2	(100)	10	1	(2.0)	MINI
	<b>2SC2715</b>	30	50	150	40 to 240	12	2	(100)	10	1	(2.0)	S-MINI
AM RF, converter	<b>2SC941TM</b>	30	100	400	40 to 240	12	2	(80)	10	2	2.2	TO-92
	<b>2SC2670</b>	30	100	200	40 to 240	12	2	(80)	10	2	2.2	MINI
	<b>2SC2716</b>	30	100	150	40 to 240	12	2	(80)	10	2	2.2	S-MINI
AM converter, IF	<b>2SC1815</b>	50	150	400	70 to 700	6	2	(80)	10	1	(2.0)	TO-92
	<b>2SC2458</b>	50	150	200	70 to 700	6	2	(80)	10	1	(2.0)	MINI
	<b>2SC2712</b>	50	150	150	70 to 700	6	2	(80)	10	1	(2.0)	S-MINI
	<b>2SC4116</b>	50	150	100	70 to 700	6	2	(80)	10	1	(2.0)	USM

### ● 3-4 FET for VHF to UHF Bands

Application	Product No.	Absolute Maximum Ratings			Electrical Characteristics												Package
		V <sub>DS</sub> (V <sub>GDO</sub> ) (V)	I <sub>D</sub> (mA)	P <sub>D</sub> (mW)	I <sub>DSS</sub>		Y <sub>f</sub>   (Typ.)				G <sub>PS</sub> (G <sub>Cs</sub> <sup>°</sup> )/NF(NF <sub>Cs</sub> <sup>°</sup> ) (Typ.)						
					mA	V <sub>DS</sub> (V)	V <sub>G1S</sub> / (V <sub>G2S</sub> ) (V)	@1kHz (mS)	V <sub>DS</sub> (V)	I <sub>D</sub> (mA)	V <sub>G2S</sub> (V)	(dB/dB)	V <sub>DS</sub> (V)	I <sub>D</sub> (mA)	V <sub>G2S</sub> (V)	f (MHz)	
VHF RF/mixer	3SK126	15	30	150	0 to 6	6	0/3	20	6	10	3	25/1.4	6	10	3	200	SMQ
	3SK151	15	30	150	3 to 14	6	0/3	27	6	10	3	24.5°/3.3°	6	—	—	200	SMQ
	3SK195	13.5	30	150	0 to 0.1	6	0/4	13	6	10	4	27/1.1	6	10	4	200	SMQ
	3SK225	13.5	30	150	0 to 0.1	6	0/4.5	21	6	10	4.5	22/2.0	6	10	4.5	500	SMQ
	3SK226	13.5	30	150	0 to 0.1	6	0/4.5	13	6	10	4.5	27/1.1	6	10	4.5	200	SMQ
	3SK257	13.5	30	100	0 to 0.1	6	0/4.5	21	6	10	4.5	22/2.0	6	10	4.5	500	USQ
	3SK258	13.5	30	100	0 to 0.1	6	0/4.5	13	6	10	4.5	27/1.1	6	10	4.5	200	USQ
	3SK260	15	30	100	3 to 14	6	0/3	27	6	10	3	24.5°/3.3°	6	—	—	200	USQ
	3SK292	12.5	30	150	0 to 0.1	6	0/4.5	23.5	6	10	4.5	21.5/1.8	6	10	4.5	500	SMQ
	3SK294	12.5	30	100	0 to 0.1	6	0/4.5	23.5	6	10	4.5	21.5/1.8	6	10	4.5	500	USQ
UHF RF/mixer	3SK127	15	30	150	0 to 6	6	0/3	17	6	10	3	16/3.2	6	10	3	800	SMQ
	3SK153	13.5	30	150	0 to 2	6	0/3	21	6	10	3	18.5/2.6	6	10	3	800	SMQ
	3SK199	13.5	30	150	0 to 0.1	6	0/4	21.5	6	10	4	19.5/1.9	6	10	4	800	SMQ
	3SK207	13.5	30	150	0 to 0.1	6	0/4.5	21.5	6	10	4.5	19.5/1.9	6	10	4.5	800	SMQ
	3SK232	12.5	30	150	0 to 0.1	6	0/4.5	21	6	10	4.5	20/1.5	6	10	4.5	800	SMQ
	#3SK240	(-9)	25	150	6 to 20	3	0/0	19	3	5	1	20.5/1.0	3	5	1	800	SMQ
	3SK249	12.5	30	100	0 to 0.1	6	0/4.5	21	6	10	4.5	20/1.5	6	10	4.5	800	USQ
	3SK256	13.5	30	100	0 to 0.1	6	0/4.5	21.5	6	10	4.5	19.5/1.9	6	10	4.5	800	USQ
	3SK259	15	30	100	0 to 0.1	6	0/3	18.5	6	10	3	19/2.6	6	10	3	800	USQ
	#3SK274	(-9)	25	100	6 to 20	3	0/0	19	3	5	1	20.5/1.0	3	5	1	800	USQ
	3SK291	12.5	30	150	0 to 0.1	6	0/4.5	27	6	10	4.5	23/1.5	6	10	4.5	800	SMQ
	3SK293	12.5	30	100	0 to 0.1	6	0/4.5	27	6	10	4.5	23/1.5	6	10	4.5	800	USQ
#3SK320	(-6)	20	100	9 to 18	3	0/0	22	3	5	1	15/1.4	3	5	1	2000	USQ	

#GaAs

### ● 3-5 Hybrid Transistors for VHF to UHF

Application	Product No.	Tr	V <sub>CEO</sub> (V)	I <sub>c</sub> (mA)	P <sub>c</sub> <sup>▲</sup> (mW)	h <sub>FE</sub>		f <sub>T</sub> (Typ.)				NF (Typ.)			Configuration	Package	
						V <sub>CE</sub> (V)	I <sub>c</sub> (mA)	V <sub>CE</sub> (V)	I <sub>c</sub> (mA)	(GHz)	V <sub>CE</sub> (V)	I <sub>c</sub> (mA)	(dB)	V <sub>CE</sub> (V)			I <sub>c</sub> (mA)
UHF mixer OSC	HN3C02FU		15	50	200	40 to 200	10	5	2.4	10	2	—	—	—	—	2SC3120 x2	US6
VHF to UHF low noise amp	HN2C10FT		12	80	200	80 to 240	10	20	7	10	20	1.1	1.0	5	1	2SC5085 x2	TU6
	HN2C12FT		10	15	200	50 to 160	6	7	10	6	7	1.8	6	3	2	2SC5095 x2	TU6
	HN2C13FT		5	10	300	50 to 250	3	7	—	—	—	1.4	3	3	2	2SC5322 x2	TU6
	HN2C14FT		7	15	300	50 to 160	5	7	12	5	7	1.7	5	3	2	2SC5261 x2	TU6
	HN3C10FT		12	80	200	80 to 240	10	20	7	10	20	1.1	10	5	1	2SC5086 x2	TU6
	HN3C12FT		10	15	200	50 to 160	6	7	10	6	7	1.8	6	3	2	2SC5095 x2	TU6
	HN3C14FT		10	60	200	80 to 240	5	5	5	5	5	—	—	—	—	2SC5110 x2	TU6
	HN3C16FT		7	15	200	50 to 160	5	7	12	5	7	1.7	5	3	2	2SC5260 x2	TU6
	HN3C18FT		5	10	200	50 to 250	3	7	—	—	—	1.4	3	3	2	2SC5320 x2	TU6
	HN9C01FT	Q1	10	15	200	50 to 160	6	7	10	6	7	1.8	6	3	2	2SC5096	TU6
		Q2	12	80		80 to 240	10	20	7	10	20	1.1	10	5	1	2SC5086	
	HN9C02FT	Q1	7	40	200	50 to 160	5	20	12	5	20	1.5	5	5	2	2SC5256	TU6
		Q2	12	80		80 to 240	10	20	7	10	20	1.1	10	5	1	2SC5086	
	HN9C03FT		12	80	200	80 to 240	10	20	7	10	20	1.1	10	5	1	2SC5085 x2	TU6
	HN9C04FT	Q1	7	40	200	50 to 160	5	20	12	5	20	1.5	5	5	2	2SC5256	TU6
		Q2	10	40		50 to 160	8	20	10	8	20	1.7	8	5	2	2SC5091	
	HN9C05FT	Q1	7	15	200	50 to 160	5	7	12	5	7	1.7	5	3	2	2SC5261	TU6
		Q2	10	40		50 to 160	8	20	10	8	20	1.7	8	5	2	2SC5091	
	HN9C07FT	Q1	10	40	200	50 to 160	8	20	10	8	20	1.7	8	5	2	2SC5091	TU6
		Q2	12	80		80 to 240	10	20	7	10	20	1.1	10	5	1	2SC5086	
HN9C08FT	Q1	10	40	200	50 to 160	8	20	10	8	20	1.7	8	5	2	2SC5091	TU6	
	Q2	10	40		50 to 160	6	7	10	6	7	1.7	6	3	2	2SC5096		

▲ Total PC  
Package: SM6 (SSOP6-P-0.95)

(Continued)

Application	Product No.	Tr	V <sub>CEO</sub> (V)	I <sub>c</sub> (mA)	P <sub>c</sub> <sup>▲</sup> (mW)	h <sub>FE</sub>		f <sub>T</sub> (Typ.)			NF (Typ.)			Contents	Package		
						V <sub>CE</sub> (V)	I <sub>c</sub> (mA)	(GHz)	V <sub>CE</sub> (V)	I <sub>c</sub> (mA)	(dB)	V <sub>CE</sub> (V)	I <sub>c</sub> (mA)			f (GHz)	
VHF to UHF low noise amp	HN9C09FT		10	15	200	50 to 160	6	7	10	6	7	1.8	6	3	2	2SC5096 x2	TU6
	HN9C10FT	Q1	7	15	200	50 to 160	5	7	12	5	7	1.7	5	3	2	2SC5261	TU6
		Q2	12	80		80 to 240	10	20	7	10	20	1.1	10	5	1	2SC5086	
	HN9C12FT	Q1	10	30	200	80 to 240	5	5	6	5	5	—	—	—	—	2SC5108	TU6
		Q2	12	30		80 to 240	5	10	7	5	10	1.1	5	3	1	2SC5066	
	HN9C13FT	Q1	7	15	200	50 to 160	5	7	12	5	7	1.7	5	3	2	2SC5261	TU6
		Q2	12	30		80 to 240	5	10	7	5	10	1.1	5	3	1	2SC5066	
	HN9C14FT		12	30	200	80 to 240	5	10	7	5	10	1.1	5	3	1	2SC5066 x2	TU6
	HN9C15FT	Q1	10	40	200	50 to 160	8	20	10	8	20	1.7	8	5	2	2SC5091	TU6
		Q2	7	40		50 to 160	5	20	12	5	20	1.5	5	5	2	2SC5256	
	HN9C16FT	Q1	10	40	200	50 to 160	8	20	10	8	20	1.7	8	5	2	2SC5091	TU6
		Q2	7	15		50 to 160	5	7	12	5	7	1.7	5	3	2	2SC5261	
	HN9C18FT	Q1	12	80	200	80 to 240	10	20	7	10	20	1.1	10	5	1	2SC5086	TU6
		Q2	10	40		50 to 160	8	20	10	8	20	1.7	8	5	2	2SC5091	
HN9C19FT	Q1	10	15	200	50 to 160	6	7	10	6	7	1.8	6	3	2	2SC5096	TU6	
	Q2	12	60		80 to 240	8	15	7	8	15	1.1	8	5	1	2SC5464		
HN9C20FT		12	60	200	80 to 240	8	15	7	8	15	1.1	8	5	1	2SC5464 x2	TU6	
HN9C21FT	Q1	7	15	200	50 to 160	5	7	12	5	7	1.7	5	3	2	2SC5261	TU6	
	Q2	12	60		80 to 240	8	15	7	8	15	1.1	8	5	1	2SC5464		
HN9C22FT	Q1	10	15	200	50 to 160	6	7	10	6	7	1.8	6	3	2	2SC5096	TU6	
	Q2	10	30		80 to 240	5	10	7	5	10	1.1	5	3	1	2SC5066		
VHF to UHF OSC	HN3C13FU	10	10	30	200	80 to 240	5	5	6	5	5	—	—	—	—	2SC5106 x2	US6
	HN3C14FU	10	10	60		80 to 240	5	5	5	5	5	—	—	—	—	2SC5109 x2	
VHF mixer OSC	HN3C01FU		20	50	200	40 to 300	10	5	1.4	10	5	—	—	—	—	2SC3123 x2	US6
VHF to UHF low noise amp	HN2C10FU		12	80	200	80 to 240	10	20	7	10	20	1.1	10	5	1	2SC5084 x2	US6
	HN2C12FU		10	15	200	50 to 160	6	7	10	6	7	1.8	6	3	2	2SC5094 x2	US6
	HN3C03FU		12	30	200	35 to 130	10	5	4	10	10	—	—	—	—	2SC3547A x2	US6
	HN3C09FU		12	30	200	80 to 240	5	10	7	5	10	1.1	5	3	2	2SC5064 x2	US6
	HN3C10FU		12	80	200	80 to 240	10	20	7	10	20	1.1	10	5	1	2SC5084 x2	US6
	HN3C11FU		10	40	200	50 to 160	8	20	10	8	20	1.7	8	5	2	2SC5089 x2	US6
	HN3C12FU		10	15	200	50 to 160	6	7	10	6	7	1.8	6	3	2	2SC5094 x2	US6
	HN3C15FU		7	40	200	50 to 160	5	20	12	5	20	1.5	5	5	2	2SC5254 x2	US6
	HN3C16FU		7	15	200	50 to 160	5	7	12	5	7	1.7	5	3	2	2SC5259 x2	US6
	HN3C17FU		5	20	200	50 to 250	3	15	16	3	15	1.3	3	5	2	2SC5315 x2	US6
HN3C18FU		5	10	200	50 to 250	3	7	16	3	7	1.4	3	3	2	2SC5320 x2	US6	
VHF to UHF buffer + OSC	*MT6L50AT	Q1	7	40	200	50 to 160	5	20	12	5	20	1.5	5	5	2	2SC5256	TU6
		Q2	5	40		80 to 160	1	5	7	3	7	1.2	3	7	1	MT3S04AS	
	*MT6L50AE	Q1	7	40	100	50 to 160	5	20	12	5	20	1.5	5	5	2	2SC5256FT	ES6
		Q2	5	40		80 to 160	1	5	7	3	7	1.2	3	7	1	MT3S04AT	
	*MT6L51AT	Q1	7	40	200	50 to 160	5	20	12	5	20	1.5	5	5	2	2SC5256	TU6
		Q2	5	40		80 to 160	1	5	10	3	10	1.4	3	7	2	MT3S03AS	

▲ Total P<sub>c</sub>

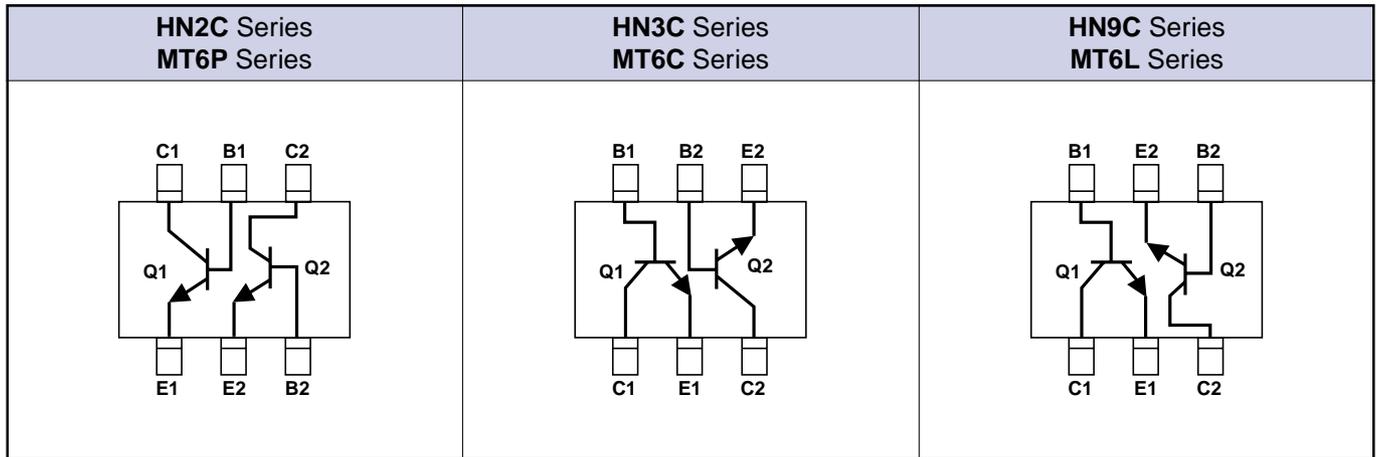
Package: SM6 (SSOP6-P-0.95)

\* New

Application	Product No.	Tr	V <sub>CEO</sub>		P <sub>C</sub> <sup>▲</sup>	h <sub>FE</sub>			f <sub>T</sub> (Typ.)			NF (Typ.)			Configuration	Package	
			(V)	(mA)		(mW)	V <sub>CE</sub> (V)	I <sub>C</sub> (mA)	(GHz)	V <sub>CE</sub> (V)	I <sub>C</sub> (mA)	(dB)	V <sub>CE</sub> (V)	I <sub>C</sub> (mA)			f (GHz)
VHF to UHF buffer + OSC	*MT6L51AE	Q1	7	40	100	50 to 160	5	20	12	5	20	1.5	5	5	2	2SC5256FT	ES6
		Q2	5	40		80 to 160	1	5	10	3	10	1.4	3	7	2	MT3S03AT	
	*MT6L52AT	Q1	5	40	200	80 to 160	1	5	10	3	10	1.4	3	7	2	MT3S03AS	TU6
		Q2	5	40		80 to 160	1	5	7	3	7	1.2	3	7	1	MT3S04AS	
	*MT6L52AE	Q1	5	40	100	80 to 160	1	5	10	3	10	1.4	3	7	2	MT3S03AT	ES6
		Q2	5	40		80 to 160	1	5	7	3	7	1.2	3	7	1	MT3S04AT	
	*MT6L57AT	Q1	5	15	150	70 to 140	1	5	10	3	5	1.6	3	3	2	MT3S06S	TU6
		Q2	5	40		80 to 160	1	5	7	3	7	1.2	3	7	1	MT3S04AS	
	*MT6L57AE	Q1	5	15	100	70 to 140	1	5	10	3	5	1.6	3	3	2	MT3S06T	ES6
		Q2	5	40		80 to 160	1	5	7	3	7	1.2	3	7	1	MT3S04AT	
	*MT6L58AT	Q1	5	15	150	70 to 140	1	5	10	3	5	1.6	3	3	2	MT3S06S	TU6
		Q2	5	40		80 to 160	1	5	10	3	10	1.4	3	7	2	MT3S03AS	
	*MT6L58AE	Q1	5	15	100	70 to 140	1	5	10	3	5	1.6	3	3	2	MT3S06T	ES6
		Q2	5	40		80 to 160	1	5	10	3	10	1.4	3	7	2	MT3S03AT	
	*MT6L59T	Q1	5	15	150	70 to 140	1	5	10	3	5	1.6	3	3	2	MT3S06S	TU6
		Q2	5	25		70 to 140	1	5	12	3	10	1.5	3	5	2	MT3S07S	
	*MT6L59E	Q1	5	15	100	70 to 140	1	5	10	3	5	1.6	3	3	2	MT3S06T	ES6
		Q2	5	25		70 to 140	1	5	12	3	10	1.5	3	5	2	MT3S07T	
	*MT6C03AT		5	40	200	80 to 160	1	5	10	3	10	1.4	3	7	2	MT3S03AS x2	TU6
	*MT6C03AE		5	40	100	80 to 160	1	5	10	3	10	1.4	3	7	2	MT3S03AT x2	ES6
	*MT6C04AT		5	40	200	80 to 160	1	5	7	3	7	1.2	3	7	1	MT3S04AS x2	TU6
	*MT6C04AE		5	40	100	80 to 160	1	5	7	3	7	1.2	3	7	1	MT3S04AT x2	ES6
	*MT6C06T		5	15	120	70 to 140	1	5	10	3	5	1.6	3	3	2	MT3S06S x2	TU6
	*MT6C06E		5	15	60	70 to 140	1	5	10	3	5	1.6	3	3	2	MT3S06T x2	ES6
*MT6P03AT		5	40	200	80 to 160	1	5	10	3	7	1.4	3	7	2	MT3S03AS x2	TU6	
*MT6P03AE		5	40	100	80 to 160	1	5	10	3	7	1.4	3	7	2	MT3S03AT x2	ES6	
*MT6P04AT		5	40	200	80 to 160	1	5	7	3	7	1.2	3	7	1	MT3S04AS x2	TU6	
*MT6P04AE		5	40	100	80 to 160	1	5	7	3	7	1.2	3	7	1	MT3S04AT x2	ES6	
*MT6P06T		5	15	120	70 to 140	1	5	10	3	5	1.6	3	3	2	MT3S06S x2	TU6	
*MT6P06E		5	15	60	70 to 140	1	5	10	3	5	1.6	3	3	2	MT3S06T x2	ES6	
*MT6P07T		5	25	200	70 to 140	1	5	12	3	10	1.5	3	5	2	MT3S07S x2	TU6	
*MT6P07E		5	25	100	70 to 140	1	5	12	3	10	1.5	3	5	2	MT3S07T x2	ES6	

▲ Total PC  
Package: SM6 (SSOP6-P-0.95)  
\* New

## US6/TU6/ES6 Pin Assignment



### ● 3-6 Hybrid Transistors AM Tuners

Application	Product No.	V <sub>GDS</sub>	I <sub>G</sub>	V <sub>CEO</sub>	I <sub>c</sub>	P <sub>T</sub>	I <sub>DSS</sub>		Y <sub>fs</sub>   (Typ.)			h <sub>FE</sub>		Configuration	Package		
		(V)	(mA)	(V)	(mA)	(mW)	(mA)	V <sub>DS</sub> (V)	V <sub>GS</sub> (V)	(mS)	V <sub>DS</sub> (V)	V <sub>GS</sub> (V)	V <sub>CE</sub> (V)			I <sub>c</sub> (mA)	
AM RF	<b>HN3G01J</b>	-20	10	50	150	200	6 to 32	5	0	25	5	0	120 to 400	6	2	2SK711 + 2SC2712	SMV

### ● 3-7 FET for AM and FM Tuners

Application	Product No.	Absolute Maximum Ratings			Electrical Characteristics											Package	
		*V <sub>DS</sub> (V <sub>GDO</sub> ) (V)	I <sub>D</sub> (I <sub>c</sub> ) (mA)	P <sub>D</sub> (mW)	I <sub>DSS</sub> (mA)	V <sub>DS</sub> (V)	V <sub>G1S</sub> / V <sub>G2S</sub> (V)	@1kHz (mS)	V <sub>DS</sub> (V)	I <sub>D</sub> (mA)	V <sub>G2S</sub> V <sub>GS</sub> (V)	G <sub>rs</sub> (G <sub>cs</sub> <sup>o</sup> )/NF(NF <sub>cs</sub> <sup>o</sup> ) (Typ.) (dB/dB)	V <sub>DS</sub> (V)	I <sub>D</sub> (mA)	V <sub>G2S</sub> V <sub>GS</sub> (V)		f (MHz)
FM RF, MIX	<b>3SK195</b>	13.5	30	150	0 to 0.1	6	0/4	13	6	10	4	27/1.1	6	—	4	200	SMQ
	<b>3SK225</b>	13.5	30	150	0 to 0.1	6	0/4.5	21	6	10	4.5	22/2.0	6	10	4.5	500	SMQ
	<b>3SK226</b>	13.5	30	150	0 to 0.1	6	0/4.5	13	6	10	4.5	27/1.1	6	10	4.5	200	SMQ
	<b>3SK257</b>	13.5	30	100	0 to 0.1	6	0/4.5	21	6	10	4.5	22/2.0	6	10	4.5	500	USQ
	<b>3SK258</b>	13.5	30	100	0 to 0.1	6	0/4.5	13	6	10	4.5	27/1.1	6	10	4.5	200	USQ
FM RF	<b>2SK241</b>	20	30	200	1.5 to 14	10	0	10	10	—	(0)	28/1.7	10	—	(0)	100	MINI
	<b>2SK302</b>	20	30	150	1.5 to 14	10	0	10	10	—	(0)	28/1.7	10	—	(0)	100	S-MINI
	<b>2SK882</b>	20	30	100	3 to 14	10	0	10	10	—	(0)	28/1.7	10	—	(0)	100	USM
	<b>2SK161</b>	(-18)	(10)	200	1 to 10	10	0	9	10	—	(0)	18/2.5	10	—	(0)	100	MINI
	<b>2SK211</b>	(-18)	(10)	150	1 to 10	10	0	9	10	—	(0)	18/2.5	10	—	(0)	100	S-MINI
	<b>2SK881</b>	(-18)	(10)	100	1 to 10	10	0	9	10	—	(0)	18/2.5	10	—	(0)	100	USM
	<b>2SK1771</b>	12.5	30	150	0 to 0.1	8	0	15	8	10	—	23/1.0	8	16	—	100	SMQ
FM RF OSC	<b>2SK192A</b>	(-18)	(10)	200	3 to 24	10	0	7	10	—	(0)	24/1.8	10	—	(0)	100	MINI
	<b>2SK210</b>	(-18)	(10)	100	3 to 24	10	0	7	10	—	(0)	24/1.8	10	—	(0)	100	S-MINI
AM RF	<b>2SK709</b>	*-20	(10)	300	6 to 32	5	0	25	5	—	(0)	-/0.5	5	1	R <sub>g</sub> 1kΩ	1kHz	TO-92
	<b>2SK710</b>	*-20	(10)	200	6 to 32	5	0	25	5	—	(0)	-/0.5	5	1	R <sub>g</sub> 1kΩ	1kHz	MINI
	<b>2SK711</b>	*-20	(10)	150	6 to 32	5	0	25	5	—	(0)	—	—	—	—	—	S-MINI
	<b>2SK1875</b>	*-20	(10)	100	6 to 32	5	0	25	5	—	(0)	—	—	—	—	—	USM

### ● 3-8 Variable Capacitance Diodes for TV Tuner / VHF to UHF Bands

Application	Product No.	V <sub>R</sub> (V)	I <sub>R</sub>		C <sub>T</sub> (1)		C <sub>T</sub> (2)		C <sub>T</sub> (1)/C <sub>T</sub> (2)	r <sub>s</sub> (Typ.)			Package
			(nA)	V <sub>R</sub> (V)	(pF)	V <sub>R</sub> (V)	(pF)	V <sub>R</sub> (V)		(Ω)	V <sub>R</sub> (V)	f (MHz)	
AFC	<b>1SV216</b>	30	10	28	10.5 to 16	2	3.3 to 5.7	10	2.5 to 3.4	0.55	5	470	USC
VHF Tuning (CATV)	<b>1SV215</b>	30	10	28	26 to 32	2	2.5 to 3.2	25	5.9min	0.6	5	470	USC
	<b>1SV217</b>	30	10	28	33 to 39	2	2.6 to 3.2	25	11min	0.83	5	470	USC
	<b>1SV231</b>	30	10	28	41 to 49.5	2	2.7 to 3.4	25	14min	1.05	5	470	USC
	<b>1SV232</b>	30	10	28	28 to 32	2	2.75 to 3.1	25	10min	0.55	5	470	USC
	<b>1SV242</b>	30	10	28	36 to 42	1	2.43 to 3.0	28	13.4min	0.65	5	470	SM
	<b>1SV262</b>	34	10	32	33 to 38	2	2.6 to 3.0	25	12min	0.6	5	470	USC
	<b>1SV282</b>	34	10	32	33 to 38	2	2.6 to 3.0	25	12min	0.6	5	470	ESC
	<b>1SV269</b>	34	10	32	29 to 34	2	2.5 to 2.9	25	10.8min	0.55	5	470	USC
	<b>1SV283</b>	34	10	32	29 to 34	2	2.5 to 2.9	25	11min	0.55	5	470	ESC
VHF, UHF Tuning	<b>1SV214</b>	30	10	28	14.16 to 16.25	1	2.11 to 2.43	25	9.5 to 7.15	0.4	5	470	USC
	<b>1SV278</b>	30	10	28	14.16 to 16.25	2	2.11 to 2.43	25	5.9 to 7.15	0.4	5	470	ESC
UHF Tuning (BS 2nd C/V) (CATV)	<b>1SV245</b>	30	10	28	3.31 to 4.55	2	0.61 to 0.77	25	5.0min	1.2	1	470	USC
	<b>1SV309</b>	30	10	28	3.31 to 4.55	2	0.61 to 0.77	25	5.0min	1.2	1	470	ESC
	<b>1SV287</b>	30	10	28	4.2 to 5.7	2	0.53 to 0.68	25	7.6typ.	1.9	1	470	USC
	<b>1SV291</b>	30	10	28	4.2 to 5.7	2	0.53 to 0.68	25	7.6typ.	1.9	1	470	ESC
	<b>1SV302</b>	30	10	28	42 to 51	2	2.1 to 3.1	25	17.5typ.	1.05	5	470	USC
	<b>1SV303</b>	30	10	28	42 to 51	2	2.1 to 3.1	25	17.5typ.	1.05	5	470	ESC
UHF VCO	<b>1SV229</b>	15	3	15	14 to 16	2	5.5 to 6.5	10	2.0min	0.2	5	470	USC
	<b>1SV279</b>	15	3	15	14 to 16	2	5.5 to 6.5	10	2.0min	0.2	5	470	ESC
	<b>1SV239</b>	15	10	15	3.8 to 4.7	2	1.5 to 2.0	10	2.0min	0.45	1	470	USC
	<b>1SV280</b>	15	3	15	3.8 to 4.7	2	1.5 to 2.0	10	2.0min	0.45	1	470	ESC
	<b>1SV270</b>	10	3	10	15 to 17	1	7.3 to 8.7	4	1.8min	0.28	1	470	USC
	<b>1SV281</b>	10	3	10	15 to 17	1	7.3 to 8.7	4	1.8min	0.28	1	470	ESC
	<b>1SV277</b>	10	3	10	4.0 to 4.9	1	1.85 to 2.35	4	2.0min	0.42	1	470	USC
	<b>1SV285</b>	10	3	10	4.0 to 4.9	1	1.85 to 2.35	4	2.0min	0.42	1	470	ESC
	<b>1SV276</b>	10	3	10	15 to 17	1	7.0 to 8.5	4	1.8min	0.22	1	470	USC
	<b>1SV284</b>	10	3	10	15 to 17	1	7.0 to 8.5	4	1.8min	0.22	1	470	ESC
	<b>1SV293</b>	10	3	10	18 to 20	1	10.1 to 11.1	4	1.55min	0.26	1	470	USC
	<b>1SV304</b>	10	3	10	17.3 to 19.3	1	5.3 to 6.6	4	3typ.	0.27	1	470	USC
	<b>1SV305</b>	10	3	10	17.3 to 19.3	1	5.3 to 6.6	4	3typ.	0.27	1	470	ESC
	<b>1SV306</b>	15	3	15	14 to 16	2	5.5 to 6.5	10	2min	0.2	5	470	USQ
	<b>1SV310</b>	10	3	10	9.7 to 11.1	1	4.45 to 5.45	4	1.8min	0.28	1	470	USC
	<b>1SV311</b>	10	3	10	9.7 to 11.1	1	4.45 to 5.45	4	1.8min	0.28	1	470	ESC
	<b>1SV313</b>	10	3	10	7.3 to 8.4	0.5	2.75 to 3.4	2.5	2.4min	0.35	1	470	USC
	<b>1SV314</b>	10	3	10	7.3 to 8.4	0.5	2.75 to 3.4	2.5	2.4min	0.35	1	470	ESC
	<b>*1SV328</b>	10	3	10	5.7 to 6.7	1	1.85 to 2.45	4	2.8typ.	0.55	1	470	USC
	<b>*1SV329</b>	10	3	10	5.7 to 6.7	1	1.85 to 2.45	4	2.8typ.	0.55	1	470	ESC
CATV Converter OSC	<b>1SV230</b>	30	10	28	13.9 to 16.1	2	1.7 to 2.1	20	7.1min	0.73	5	470	USC
	<b>1SV286</b>	30	10	28	14.5 to 16.1	2	1.56 to 1.86	20	7.1min	0.75	5	470	ESC
Wide-band Tuning (CATV)	<b>1SV288</b>	30	10	28	41 to 49.5	2	2.5 to 3.2	25	16typ.	0.92	5	470	USC
	<b>1SV290</b>	30	10	28	41 to 49.5	2	2.5 to 3.2	25	16typ.	0.92	5	470	ESC

\* New

### ● 3-9 Diodes for VCXO

Application	Product No.	V <sub>R</sub> (V)	I <sub>R</sub>		C <sub>T</sub> (1)		C <sub>T</sub> (2)		C <sub>T</sub> (1)/C <sub>T</sub> (2)	r <sub>s</sub> (Typ.)			Package
			(nA)	V <sub>R</sub> (V)	(pF)	V <sub>R</sub> (V)	(pF)	V <sub>R</sub> (V)		(Ω)	V <sub>R</sub> (V)	f (MHz)	
VCXO	*1SV322	10	3	10	26 to 30	1	6 to 7.1	4	4min	0.4	4	100	USC
	*1SV323	10	3	10	26 to 30	1	6 to 7.1	4	4min	0.4	4	100	ESC
	*1SV324	10	3	10	43 to 49.5	1	8.5 to 12.2	4	4min	0.4	4	100	USC
	*1SV325	10	3	10	43 to 49.5	1	8.5 to 12.2	4	4min	0.4	4	100	ESC
	◆1SV330	10	3	10	18	1	5.1	4	3.5typ.	0.45	1	470	USC
	◆1SV331	10	3	10	18	1	5.1	4	3.5typ.	0.45	1	470	ESC

\* New ◆ Under development

### ● 3-10 Variable Capacitance Diodes for AM / FM Tuners

Application	Product No.	V <sub>R</sub> (V)	I <sub>R</sub>		C <sub>T</sub> (1)		C <sub>T</sub> (2)		Q (r <sub>s</sub> (Ω)TYP.)			Package
			(nA)	V <sub>R</sub> (V)	(pF)	V <sub>R</sub> (V)	(pF)	V <sub>R</sub> (V)	Min (-)	V <sub>R</sub> (V)	f (MHz)	
AM Tuning	1SV102	30	50	30	360 to 460	2	15 to 21	25	200	2	1	MINI
	1SV149	15	50	15	435 to 540	1	19.9 to 30	8	200	1	1	
FM Tuning	1SV101	15	10	15	28 to 32	3	12 to 14	9	(0.3)	C=30pF	50	
FM Tuning (TWIN)	1SV103	32	50	30	37 to 42	3	13.2 to 16.2	30	*(0.35)	C=20pF	50	
	1SV228	15	10	15	*28.5 to 32.5	3	*11.7 to 13.7	8	*(0.3)	3	100	S-MINI
	1SV147	15	50	15	*28.5 to 32.5	3	*11.7 to 13.7	8	*(0.3)	C=30pF	50	MINI
	1SV225	32	50	30	*18.5 to 21	3	*6.6 to 7.7	30	*(0.35)	3	100	S-MINI
AFC	1SV160	15	100	4	*7 to 14	4	—	—	(0.7)	4	50	S-MINI

\* Series Capacitance

### ● 3-11 Hybrid Variable Capacitance Diodes for AM Tuners

Application	Product No.	V <sub>R</sub> (V)	I <sub>R</sub> (Max)		C <sub>T</sub> (1)		C <sub>T</sub> (2)		Q			Configuration	Package
			(nA)	V <sub>R</sub> (V)	(pF)	V <sub>R</sub> (V)	(pF)	V <sub>R</sub> (V)	Min (-)	V <sub>R</sub> (V)	f (MHz)		
AM Tuning	HN1V01H	16	20	16	435 to 540	1	19.9 to 26.7	8	200	1	1	1SV149 x4	FM8
	HN1V02H	16	20	16	435 to 540	1	19.9 to 26.7	8	200	1	1	1SV149 x2	FM8
	HN2V02H	16	20	16	435 to 540	1	19.9 to 26.7	8	200	1	1	1SV149 x3	FM8

### ● 3-12 PIN Diodes for TV Bands Switches

Application	Product No.	V <sub>R</sub> (V)	I <sub>R</sub> (Max)		V <sub>F</sub> (Max)		C <sub>T</sub> (Typ.)		r <sub>s</sub> (Typ.)			Package	
			(μA)	V <sub>R</sub> (V)	(V)	I <sub>F</sub> (mA)	(pF)	V <sub>R</sub> (V)	(Ω)	I <sub>F</sub> (mA)	f (MHz)		
TV band switch	Single	<b>1SS314</b>	30	0.1	15	0.85	2	0.7	6	0.5	2	100	USC
		<b>1SS381</b>	30	0.1	15	0.85	2	0.7	6	0.5	2	100	ESC
		* <b>JDS2S03T</b>	30	0.1	15	0.85	2	0.7	6	0.5	2	100	TESC
	Twin	<b>1SS268</b>	30	0.1	15	0.85	2	0.8	6	0.6	2	100	S-MINI
		<b>1SS269</b>	30	0.1	15	0.85	2	0.8	6	0.6	2	100	S-MINI
		<b>1SS312</b>	30	0.1	15	0.85	2	0.8	6	0.6	2	100	USM
		<b>1SS313</b>	30	0.1	15	0.85	2	0.8	6	0.6	2	100	USM
		<b>1SS364</b>	30	0.1	15	0.85	2	0.85	6	0.6	2	100	SSM

\* New

### ● 3-13 PIN Diodes AM / FM UHF Bands

Application	Product No.	V <sub>R</sub> (V)	I <sub>R</sub> (Max)		V <sub>F</sub> (Max)		C <sub>T</sub> (Typ.)		r <sub>s</sub> (Typ.)			Package	
			(μA)	V <sub>R</sub> (V)	(V)	I <sub>F</sub> (mA)	(pF)	V <sub>R</sub> (V)	(Ω)	I <sub>F</sub> (mA)	f (MHz)		
SW, ATT	Single	<b>1SV128</b>	50	0.1	50	0.95typ.	50	0.25	50	7	10	100	S-MINI
		<b>1SV271</b>	50	0.1	50	1.0	50	0.25	50	3	10	100	USC
		<b>1SV307</b>	30	0.1	30	1.0	50	0.3	1	1	10	100	USC
		<b>1SV308</b>	30	0.1	30	1.0	50	0.3	1	1	10	100	ESC
		* <b>JDP2S01E</b>	30	0.1	30	0.95	50	0.65	1	0.65	10	100	ESC
		* <b>JDP2S04E</b>	50	0.1	50	1.0	50	0.25	50	3	10	100	ESC
		* <b>JDP2S01T</b>	30	0.1	30	0.95	50	0.65	1	0.65	10	100	TESC
		* <b>JDP2S02T</b>	30	0.1	30	1.0	50	0.5	1	1	10	100	TESC
	Twin	<b>1SV172</b>	50	0.1	50	0.95typ.	50	0.25	50	3	10	100	S-MINI
		<b>1SV237</b>	50	0.1	50	0.95typ.	50	0.25	50	4	10	100	SMQ
		<b>1SV252</b>	50	0.1	50	0.98	50	0.2	50	3.5	10	100	USM
		<b>1SV312</b>	50	0.1	50	1.0	50	0.25	50	3	10	100	USQ
	* <b>JDP4P02U</b>	30	0.1	30	1.0	50	0.5	1	1	10	100	USQ	

\* New

### ● 3-14 Schottky Barrier Diodes (SBD) for VHF to UHF Bands Mixers

Application	Product No.	V <sub>R</sub> *V <sub>RM</sub> (V)	I <sub>F</sub> (mA)	V <sub>F</sub> (Typ.)		C <sub>T</sub> (Typ.)		Package
				(V)	I <sub>F</sub> (mA)	(pF)	V <sub>R</sub> (V)	
VHS to S Band mixer	<b>1SS154</b>	6	30	0.5	10	0.8	0	S-MINI (Single)
	<b>1SS271</b>	6	30	0.5	10	0.8	0	S-MINI (Twin)
UHF mixer	<b>1SS295</b>	4	30	0.25	2	0.6	0.2	S-MINI (Twin)
	<b>1SS315</b>	* 5	30	0.25	2	0.6	0.2	USC
	* <b>JDH2S01T</b>	* 5	30	0.25	2	0.6	0.2	TESC

\* New

### ● 3-15 Cell-Packs for VHF to UHF Bands

Application	Product No.	I <sub>CC</sub>		S <sub>21</sub>   <sup>2</sup> (Typ.)			NF (Typ.)			BW (Typ.)		P <sub>o</sub> Typ. (PoldB)				Package
		(mA)	V <sub>CC</sub> (V)	(dB)	V <sub>CC</sub> (V)	f (MHz)	(dB)	V <sub>CC</sub> (V)	f (MHz)	(GHz)	V <sub>CC</sub> (V)	(dBmW)	V <sub>CC</sub> (V)	f (MHz)	Pin (dBmW)	
Diff. wide-band amp	<b>TA4000F</b>	9 to 15	5	15	5	400	4	5	400	1.3	5	-2	5	400	-10	SM6
VHF to UHF wide-band amp	<b>TA4001F</b>	14 to 24	5	12.5	5	500	5.2	5	500	2.4	5	2	5	500	0	SMQ
VHF to UHF wide-band amp	<b>TA4002F</b>	10 to 20	5	23	5	500	4.7	5	500	1.3	5	5	5	500	0	SMQ
VHF to UHF wide-band amp	<b>TA4003F</b>	2.5 to 4.5	2	11	2	500	5.2	2	500	1.5	2	0	2	500	0	SMV
VHF to UHF wide-band amp	<b>TA4004F</b>	2.5 to 4	2	10.5	2	500	4.2	2	500	1.2	2	0	2	500	0	SMV
UHF wide-band amp	* <b>TA4011F</b>	3.5	2	10	2	1500	6.5	2	1500	2.4	2	(-6)	2	1500	—	SMV
UHF wide-band amp	* <b>TA4012F</b>	6.5	2	12	2	1500	6	2	1500	2.0	2	(0)	2	1500	—	SMV
UHF wide-band amp	* <b>TA4013F</b>	10.5	2	14	2	1000	4.5	2	1000	1.7	2	(3)	2	1000	—	SMV
UHF wide-band amp	* <b>TA4011FU</b>	3.5	2	10	2	1500	6.5	2	1500	2.4	2	(-6)	2	1500	—	USV
UHF wide-band amp	* <b>TA4012FU</b>	6.5	2	12	2	1500	6	2	1500	2.0	2	(0)	2	1500	—	USV
UHF wide-band amp	* <b>TA4013FU</b>	10.5	2	14	2	1000	4.5	2	1000	1.7	2	(3)	2	1000	—	USV
UHF wide-band amp	♦ <b>TA4016AFE</b>	4 to 8	2	19	2	1500	4.5	2	1500	3.2	2	(-7)	2	1500	—	ES6

\* New ♦ Under development (TA4016AFE)

Application	Product No.	I <sub>c</sub> (mA)	P <sub>D</sub> (mW)	h <sub>FE</sub>			f <sub>T</sub> (GHz)	f <sub>T</sub>		Package
				(-)	V <sub>c</sub> (V)	I <sub>c</sub> (mA)		V <sub>c</sub> (V)	I <sub>c</sub> (mA)	
VHF to UHF RF/mixer	<b>TA4100F</b>	6 to 14	15 *(1) 30 *(2)	50 to 150 *(1) 70 to 250 *(2)	6	5 *(1) 10 *(2)	3.5 to 7	6 *(1) 4 *(2)	5 *(1) 10 *(2)	SM6

\* (1) Q1, Q2 \* (2) Q3

Application	Product No.	I <sub>CC</sub> (Typ.) (mA)	P <sub>D</sub> (mW)	G <sub>MIX</sub> /NF <sub>MIX</sub>					Package
				(dB/dB)	V <sub>CC</sub> (V)	f <sub>RF</sub> (MHz)	f <sub>LO</sub> (MHz)	f <sub>IF</sub> (MHz)	
VHF to UHF DBM	<b>TA4101F</b>	5.7	* 300	-3.5/9.0	5	800	860	60	SM8

\* Mount on glass epoxy board (Area 250mm<sup>2</sup>, Thick 1.6mm)

Application	Product No.	I <sub>c</sub> (mA)	Loss(1) (dB)	Loss(2) (dB)	ISL(1) (dB)	ISL(2) (dB)	P <sub>o</sub> 1dB (dBmW)	Package
SPDT switch	<b>#TG2206F</b>	0.1 max	0.4 typ.	0.4typ.	28 typ.	28 typ.	5 min	SM6

# GaAs

Application	Product No.	I <sub>DD</sub> (mA)	Loss (dB)	ATT (dB)	P <sub>o</sub> 1dB (dBmW)	Package
ATT	<b>#TG2202F</b>	0.1 max	0.7 typ.	22 typ.	10 typ.	SM6

# GaAs

### ● 3-16 Cell-Packs for BS Tuners

Application	Product No.	I <sub>CC</sub> (Typ.) (mA)	G <sub>c</sub> (dB)	NF (dB)	P <sub>O</sub> (sat) (dBmW)	IP3 (dBmW)	Posc (dBmW)
BS/CS converter	<b>TA4303F</b>	74	18 * <sub>1</sub>	15 * <sub>1</sub>	10 * <sub>1</sub>	17 * <sub>2</sub>	-8 * <sub>3</sub>

\*1 V<sub>CC</sub> = 5V(Amp.), f<sub>in</sub> = 1.6GHz, f<sub>IF</sub> = 400MHz

\*2 V<sub>CC</sub> = 5V(Amp.), f<sub>in</sub> = 1.596GHz, 1.6GHz, f<sub>IF</sub> = 400MHz, 404MHz

\*3 V<sub>CC</sub> = 5V(Amp.), f<sub>LO</sub> = 1.6GHz

### ● 3-17 Cell-Packs for Personal Handy Phone System

Application	Product No.	I <sub>DD</sub>			P <sub>O</sub> (dBmW)	G <sub>p</sub> (dB)	Package
		(mA)	V <sub>DD</sub> (V)	V <sub>G2</sub> (V)			
Power amp	# <b>TG2006F</b>	130typ.	3	0, 1, 3	21min	23typ.	SM8

# GaAs

Application	Product No.	I <sub>DD</sub> (mA)	Loss(1) (dB)	Loss(2) (dB)	ISL(1) (dB)	ISL(2) (dB)	P <sub>O1dB</sub> (dBmW)	Package
ANT switch	# <b>TG2200AF</b>	0.1max	0.5typ.	0.5typ.	25typ.	25typ.	24typ.	SM8
	# <b>TG2205F</b>	0.01max	0.5typ.	0.5typ.	25typ.	25typ.	24typ.	SM6
	# <b>TG2206F</b>	—	0.4typ.	0.4typ.	28typ.	28typ.	20typ.	SM6

# GaAs

Application	Product No.	I <sub>CC</sub> Typ.		G <sub>c</sub> / P <sub>O1dB</sub> (Typ.)						Package
		(mA)	V <sub>CC</sub> (V)	(dB/dBmW)	V <sub>CC</sub> (V)	f <sub>RF</sub> (MHz)	f <sub>IF</sub> (MHz)	f <sub>LO</sub> (MHz)	P <sub>LO</sub> (dBmW)	
1.9GHz U/C mixer	<b>TA4103F</b>	26.5	3	3/-17	3	1900	240	1660	-20	SM8

Package : SM8 (SSOP8-P-0.65)

### ● 3-18 Cell-Pack for TCXO

Application	Product No.	I <sub>CC</sub> Typ.		f (MHz)	V <sub>out</sub> (V <sub>pp</sub> )	Fs (ppm)	Package
		(mA)	V <sub>CC</sub> (V)				
TCXO	* <b>TA4014FT</b>	1.2	3	10 to 30	1.2typ.	±0.1typ.	TU6
	* <b>TA4014FE</b>	1.2	3	10 to 30	1.2typ.	±0.1typ.	ES6
	* <b>TA4015FT</b>	1.3	3	10 to 30	1.2typ.	±0.1typ.	TU6
	* <b>TA4015FE</b>	1.3	3	10 to 30	1.2typ.	±0.1typ.	ES6

f: Frequency range      Fs: Frequency stability vs supply voltage

\* New

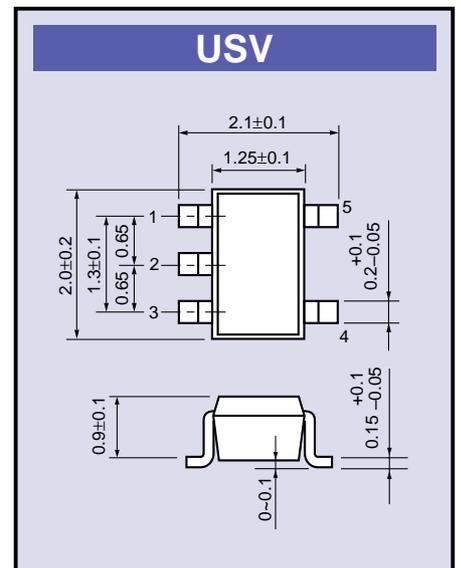
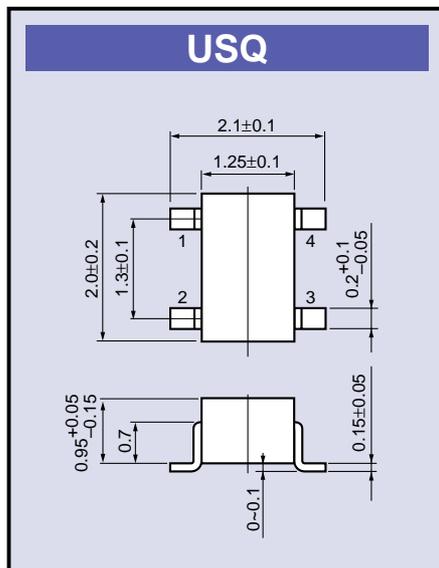
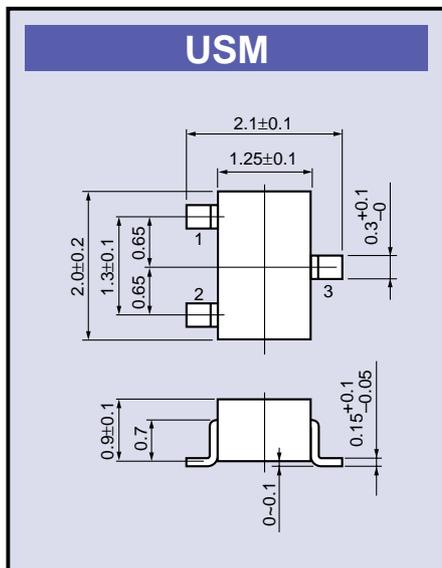
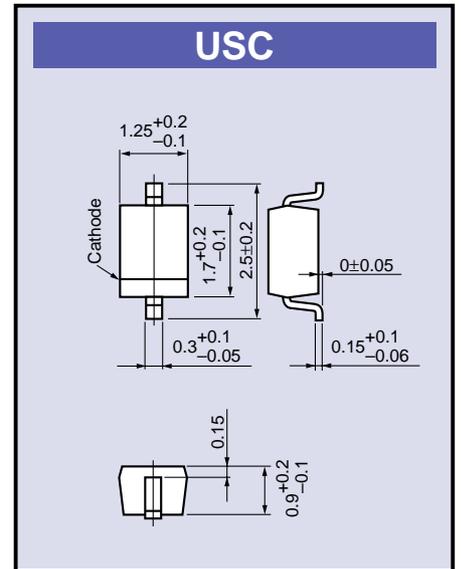
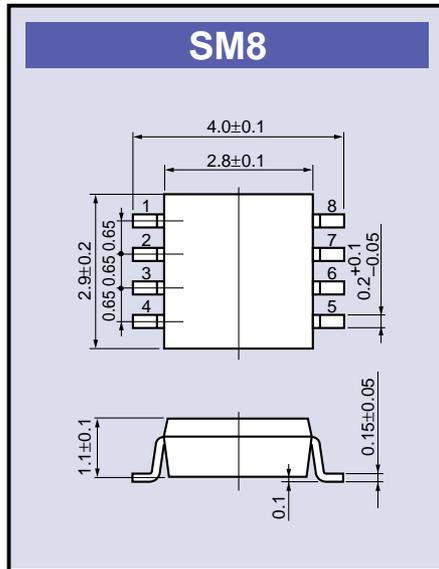
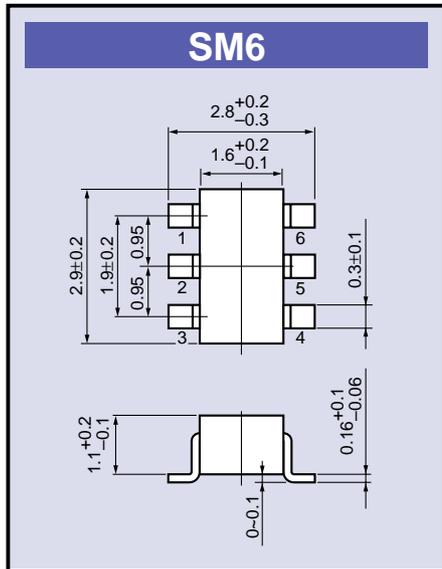
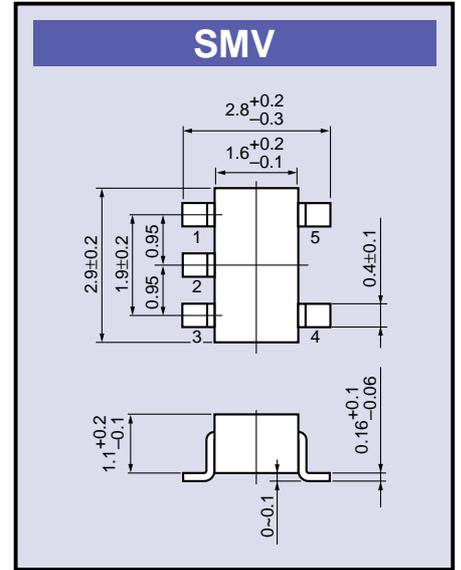
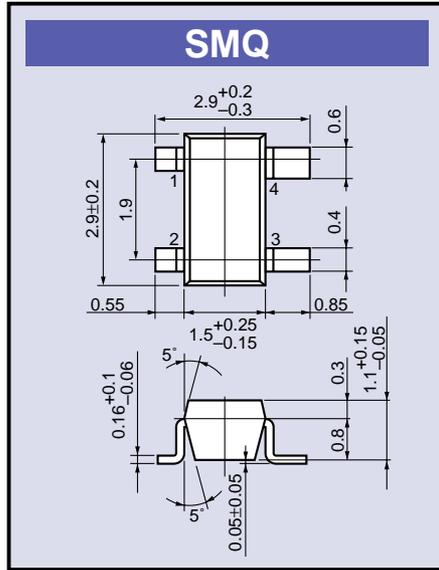
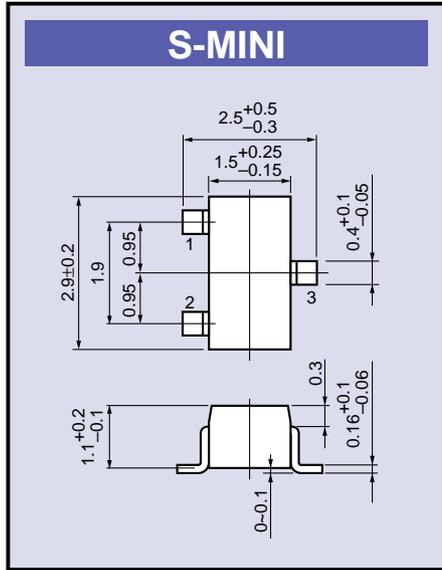
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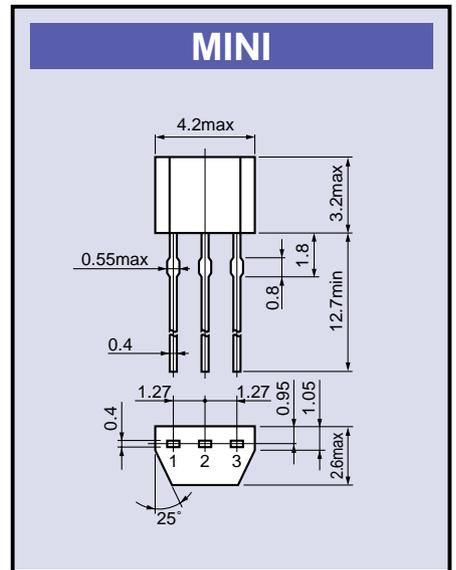
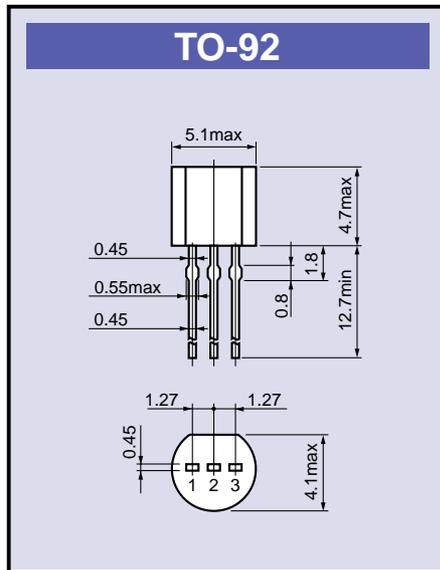
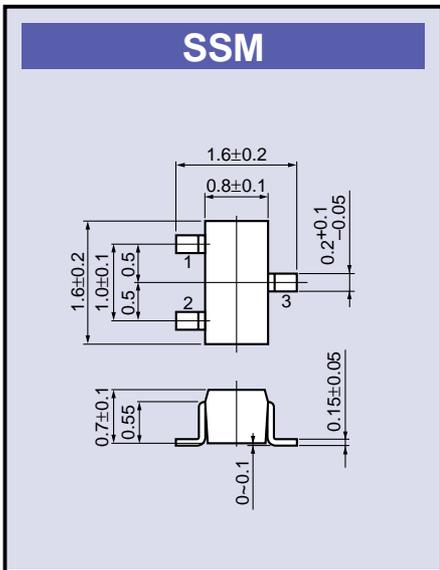
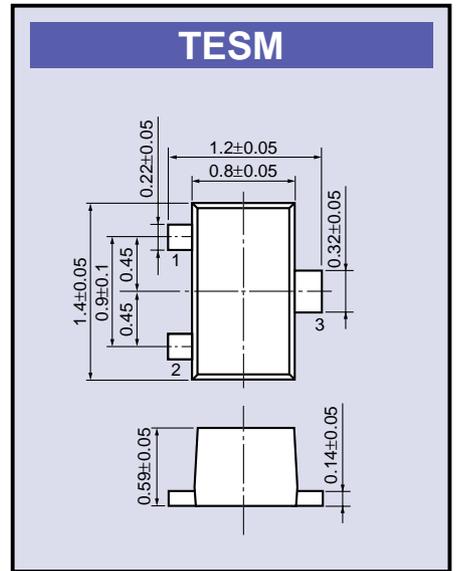
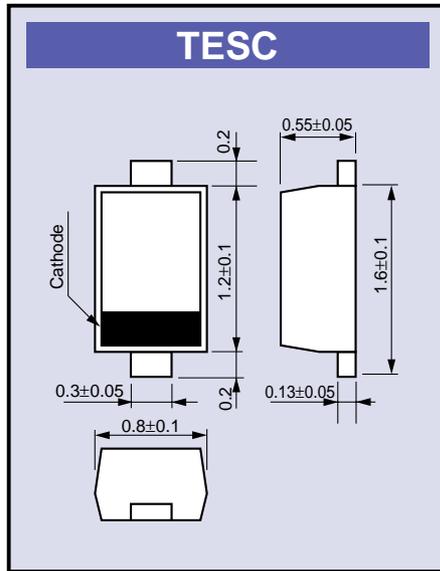
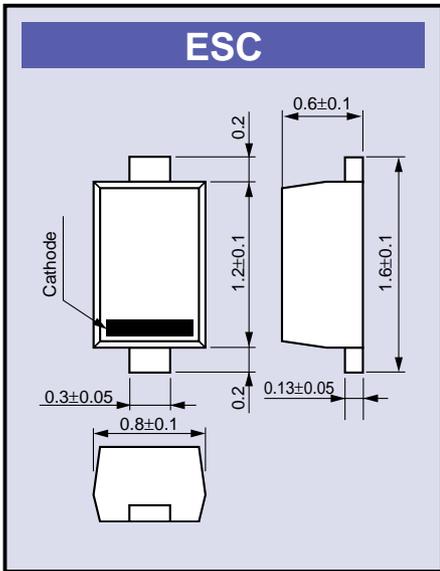
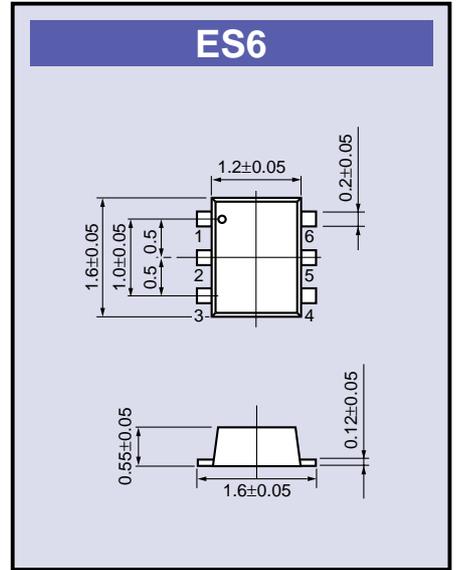
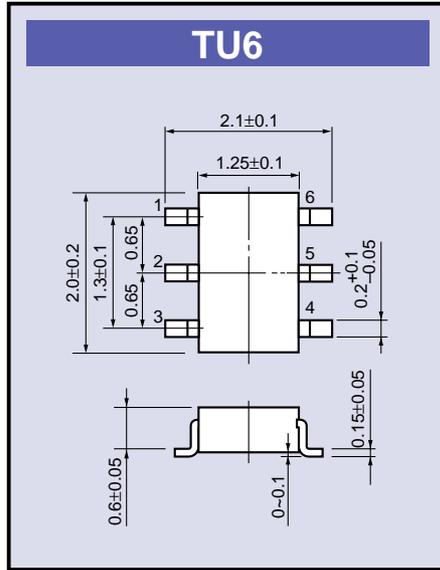
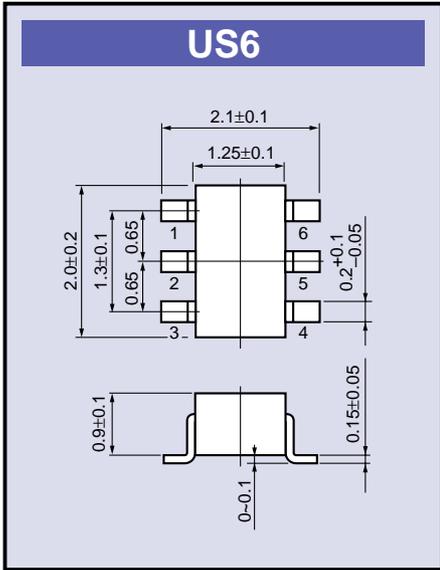
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SPDT switch	* <b>TG2209F</b>	0.1max	1.0typ.	1.0typ.	20typ.	20typ.	15min	SM8

\* New

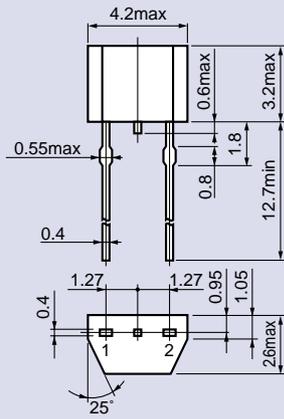
# 4. Package Dimensions

## 4-1 Package Dimensions (Unit in mm)

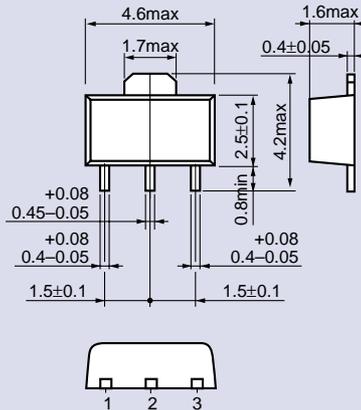




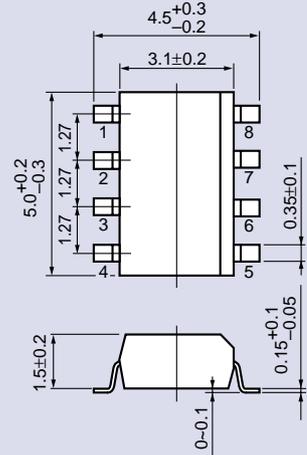
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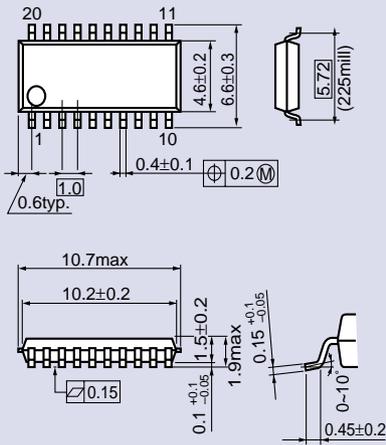
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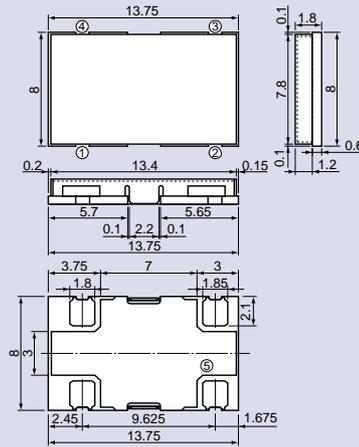
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### SSOP



### 5-14A



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