

Bipolar Transistor

–50 V, –10 A, Low $V_{CE(sat)}$, PNP TO–220F–3FS

2SA2222SG

Features

- Adoption of MBIT Process
- Large Current Capacity ($I_C = -10$ A)
- Low Collector to Emitter Saturation Voltage ($V_{CE(sat)} = -250$ mV (Typ.))
- High-speed Switching ($t_f = 22$ ns (Typ.))
- This is a Pb-Free Device

Applications

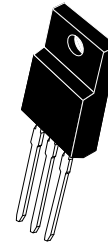
- Relay Drivers, Lamp Drivers, Motor Drivers

SPECIFICATIONS

ABSOLUTE MAXIMUM RATINGS at $T_a = 25^\circ\text{C}$

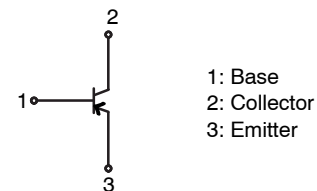
Parameter	Symbol	Value	Unit
Collector-to-Base Voltage	V_{CBO}	–50	V
Collector-to-Emitter Voltage	V_{CEO}	–50	V
Emitter-to-Base Voltage	V_{EBO}	–6	V
Collector Current	I_C	–10	A
Collector Current (Pulse)	I_{CP}	–13	A
Base Current	I_B	–2	A
Collector Dissipation	$T_c = 25^\circ\text{C}, P_T \leq 1\text{s}$	P_C	25 W
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature	T_{STG}	–55 to +150	$^\circ\text{C}$

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

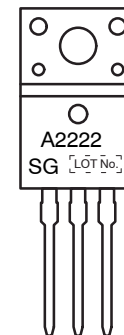


TO–220F–3FS
CASE 221AM

ELECTRICAL CONNECTION



MARKING DIAGRAM



ORDERING INFORMATION

Device	Package	Shipping
2SA2222SG	TO–220F–3FS (Pb-Free)	50 Units/Tube

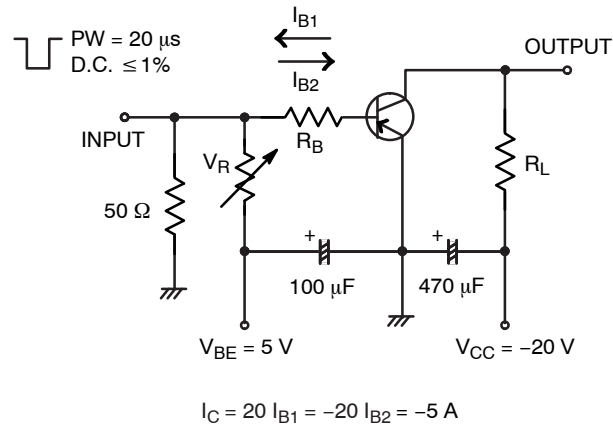
2SA2222SG

ELECTRICAL CHARACTERISTICS at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings			Unit
			Min	Typ	Max	
Collector Cutoff Current	I_{CBO}	$V_{CB} = -40\text{ V}, I_E = 0\text{ A}$			-10	μA
Emitter Cutoff Current	I_{EBO}	$V_{EB} = -4\text{ V}, I_C = 0\text{ A}$			-10	μA
DC Current Gain	h_{FE}	$V_{CE} = -2\text{ V}, I_C = -270\text{ mA}$	150		450	
Gain-Bandwidth Product	f_T	$V_{CE} = -10\text{ V}, I_C = -1\text{ A}$		230		MHz
Output Capacitance	C_{ob}	$V_{CB} = -10\text{ V}, f = 1\text{ MHz}$		115		pF
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = -6\text{ A}, I_B = -300\text{ mA}$		-250	-500	mV
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = -6\text{ A}, I_B = -300\text{ mA}$			-1.2	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = -100\text{ }\mu\text{A}, I_E = 0\text{ A}$	-50			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = -1\text{ mA}, R_{BE} = \infty$	-50			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = -100\text{ }\mu\text{A}, I_C = 0\text{ A}$	-6			V
Turn-On Time	t_{on}	See specified Test Circuit		40		ns
Storage Time	t_{stg}			240		ns
Fall Time	t_f			22		ns

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

Switching Time Test Circuit



TYPICAL CHARACTERISTICS

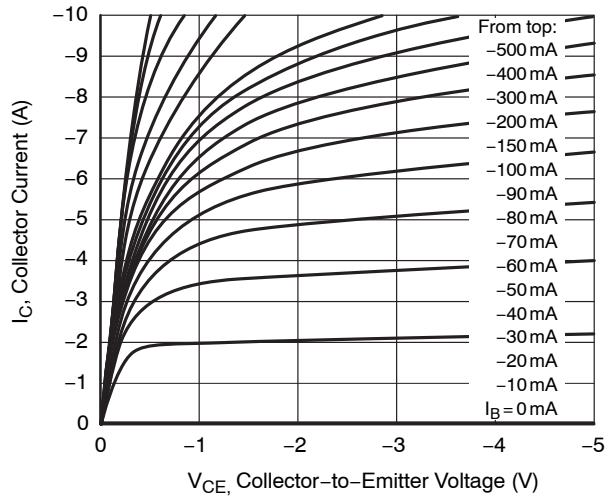


Figure 1. $I_C - V_{CE}$

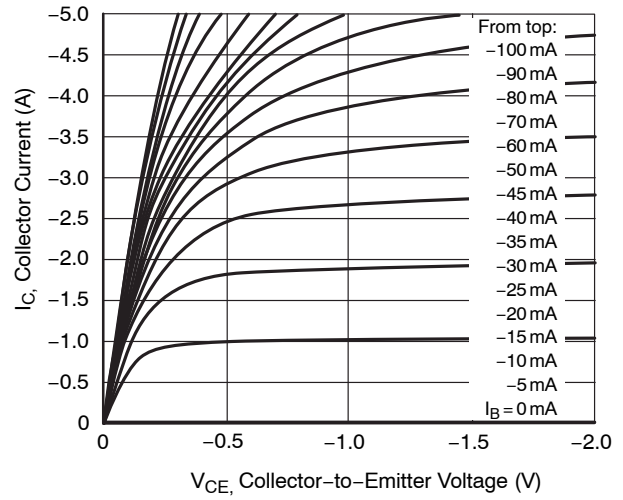


Figure 2. $I_C - V_{CE}$

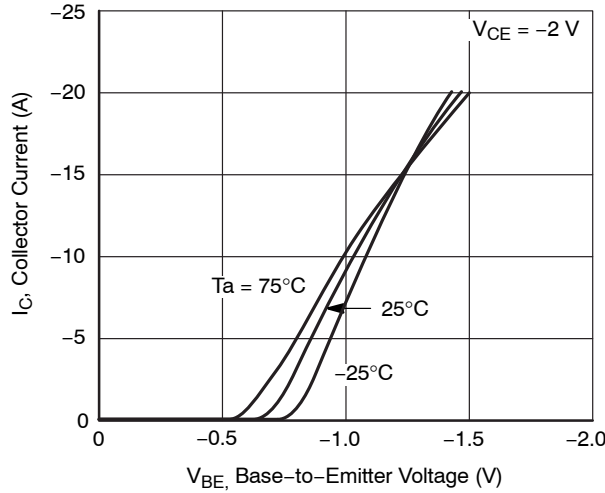


Figure 3. $I_C - V_{BE}$

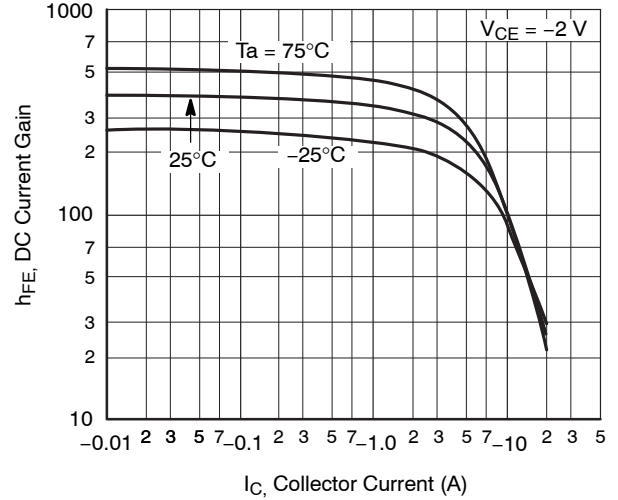


Figure 4. $h_{FE} - I_C$

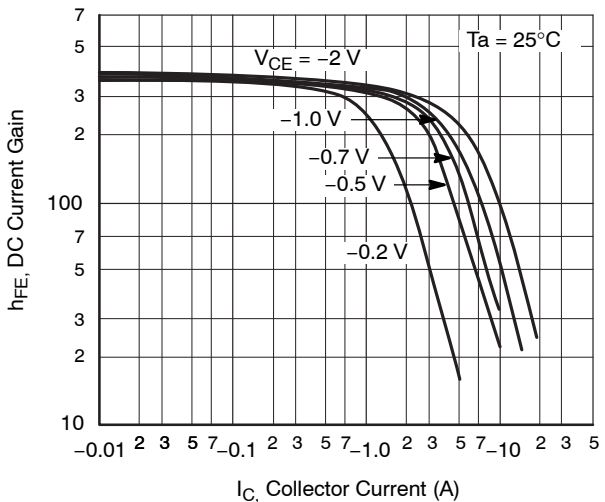


Figure 5. $h_{FE} - I_C$

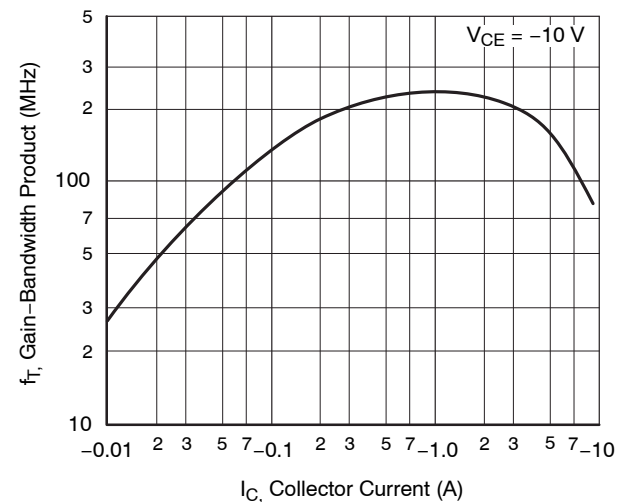


Figure 6. $f_T - I_C$

TYPICAL CHARACTERISTICS (continued)

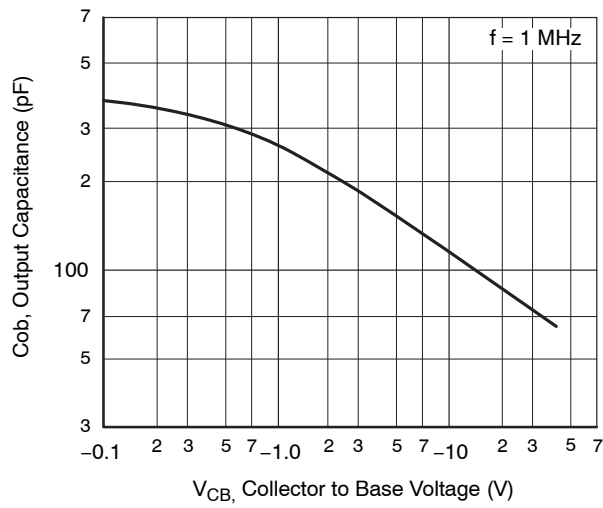


Figure 7. $C_{ob} - V_{CB}$

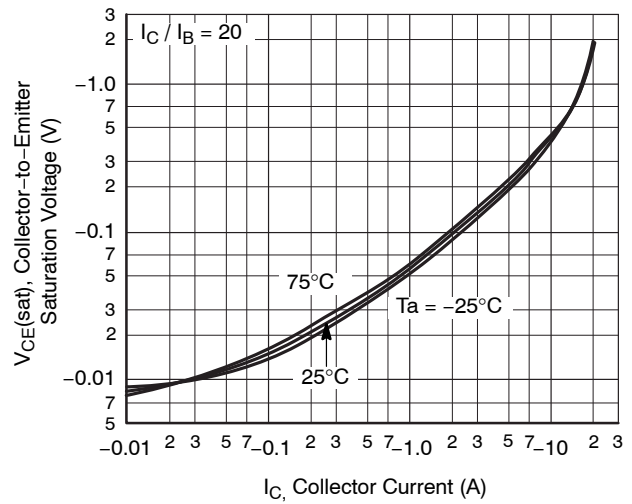


Figure 8. $V_{CE(sat)} - I_C$

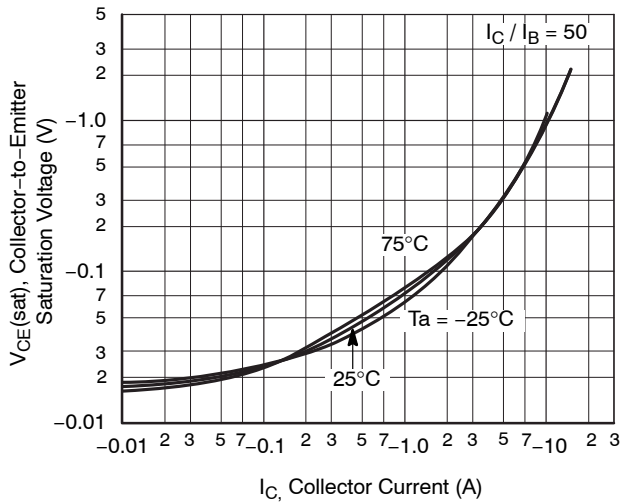


Figure 9. $V_{CE(sat)} - I_C$

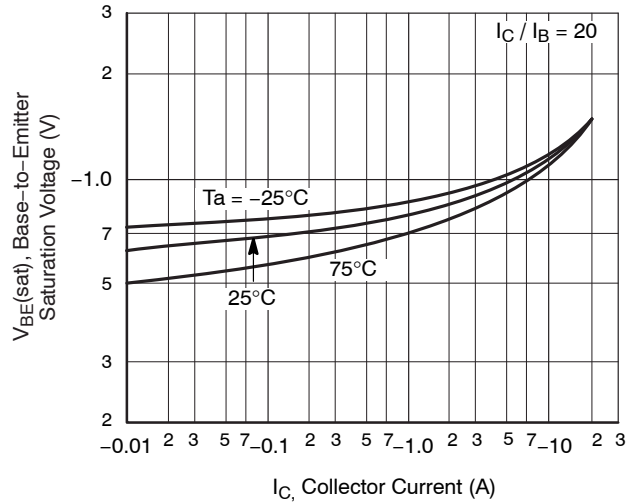


Figure 10. $V_{BE(sat)} - I_C$

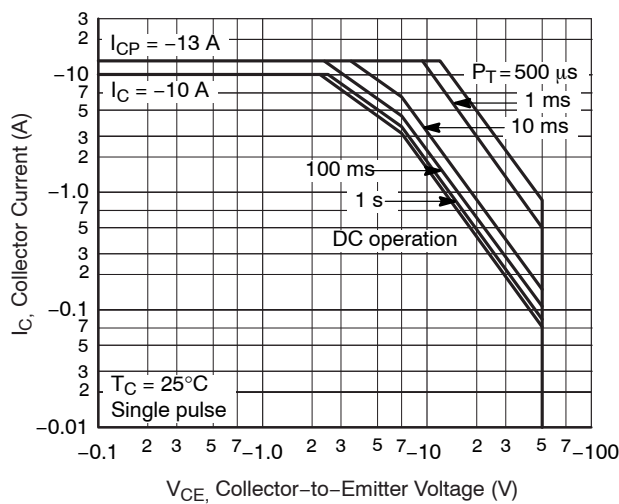


Figure 11. Forward Bias A S O

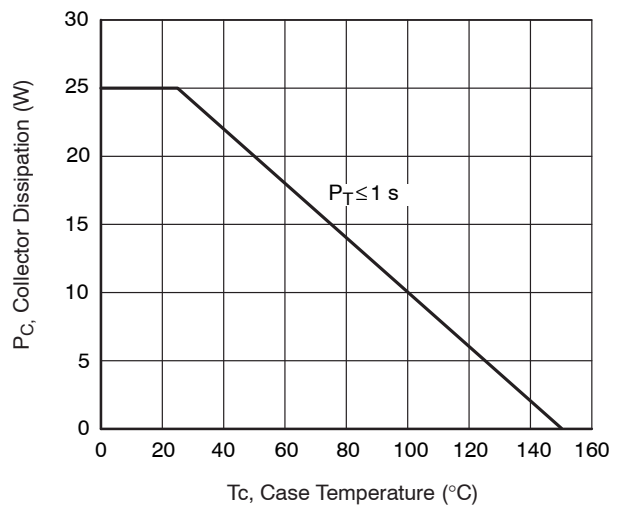
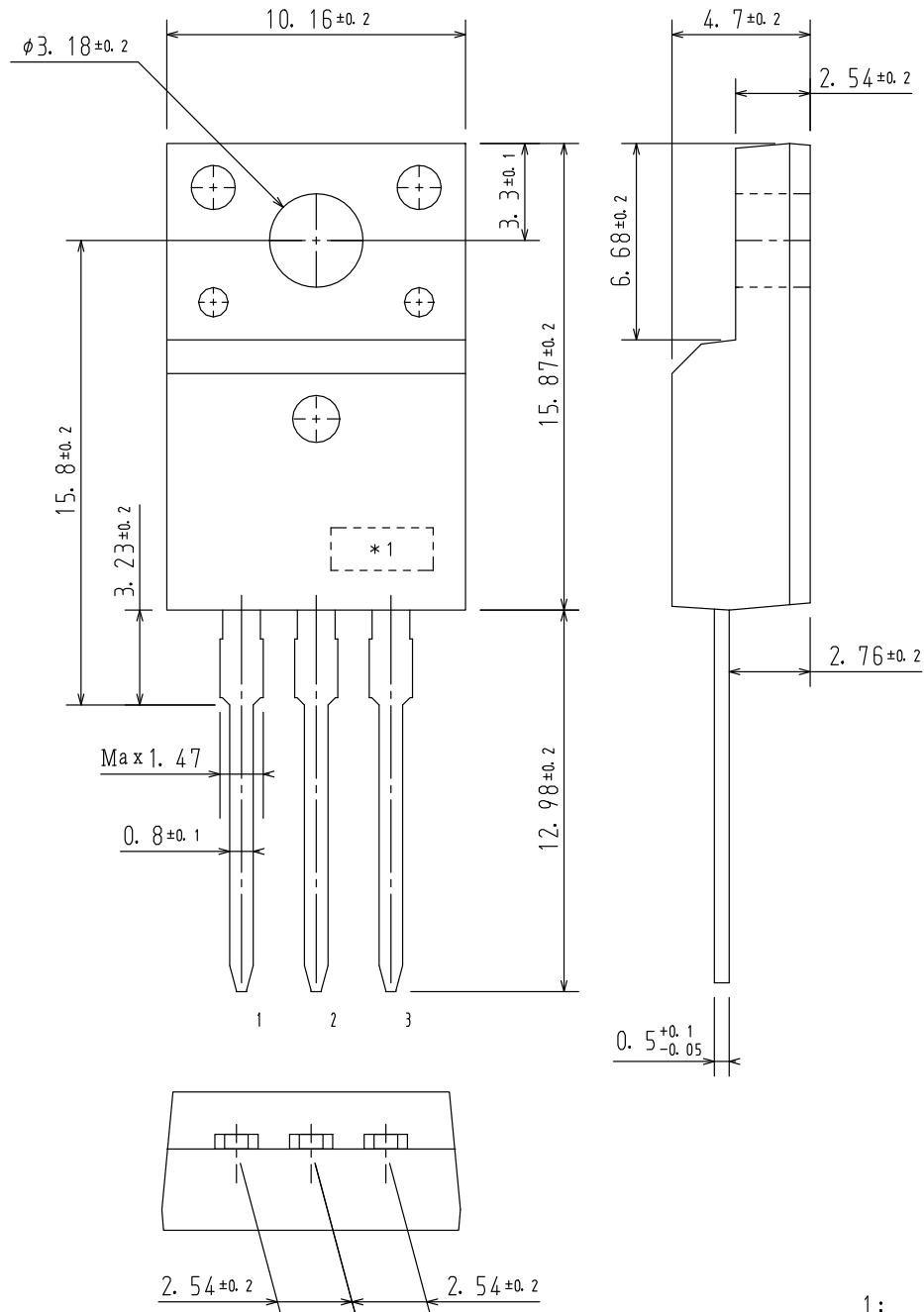


Figure 12. $P_C - T_C$

TO-220F-3FS
CASE 221AM
ISSUE O


DATE 30 JAN 2012



*1 Lot indication

$$\begin{array}{l} 1: \\ 2: \\ 3: \end{array}$$

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