

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

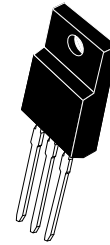
- Relay Drivers, Lamp Drivers, Motor Drivers

SPECIFICATIONS

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

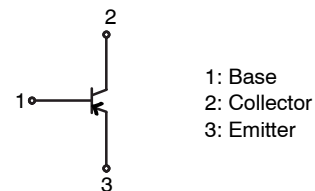
Symbol	Parameter	Condition	Value	Unit
V_{CBO}	Collector-to-Base Voltage		–50	V
V_{CEO}	Collector-to-Emitter Voltage		–50	V
V_{EBO}	Emitter-to-Base Voltage		–6	V
I_C	Collector Current		–10	A
I_{CP}	Collector Current (Pulse)	$PW \leq 10 \mu\text{s}$, duty cycle $\leq 1\%$	–13	A
I_B	Base Current		–2	A
P_C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

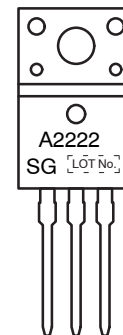


TO–220F–3FS
CASE 221AM

ELECTRICAL CONNECTION



MARKING DIAGRAM



ORDERING INFORMATION

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

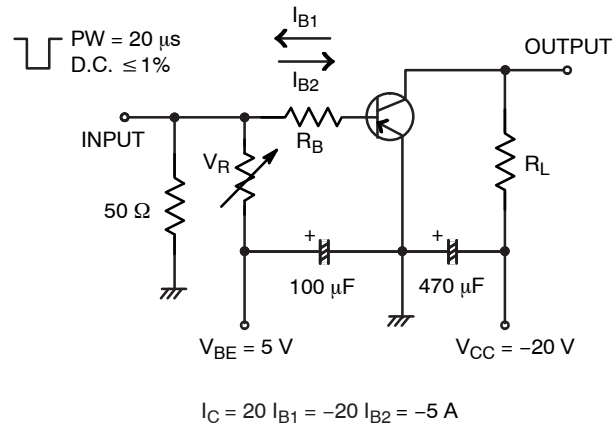
2SA2222SG

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

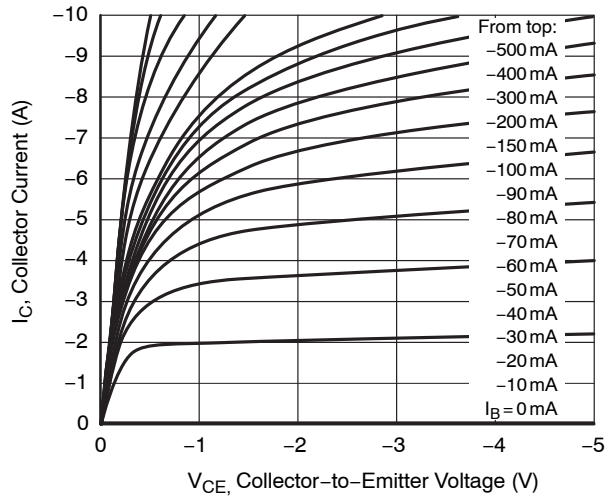


Figure 1. $I_C - V_{CE}$

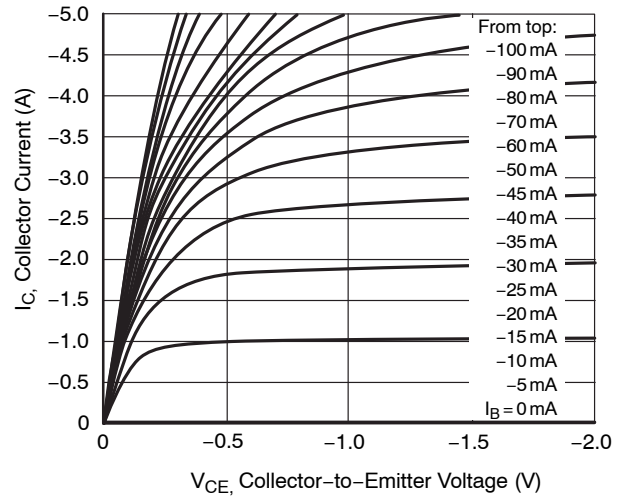


Figure 2. $I_C - V_{CE}$

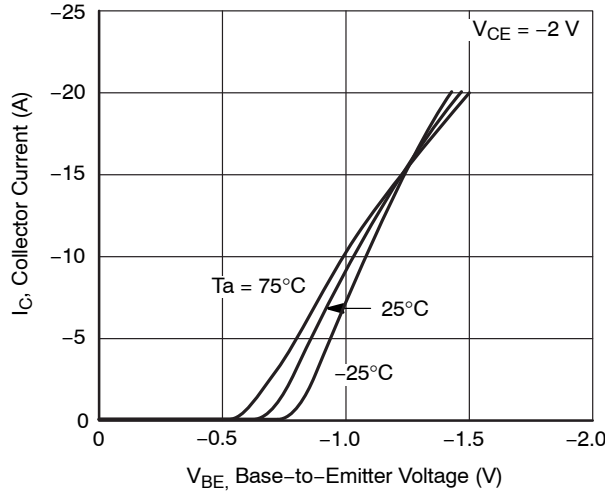


Figure 3. $I_C - V_{BE}$

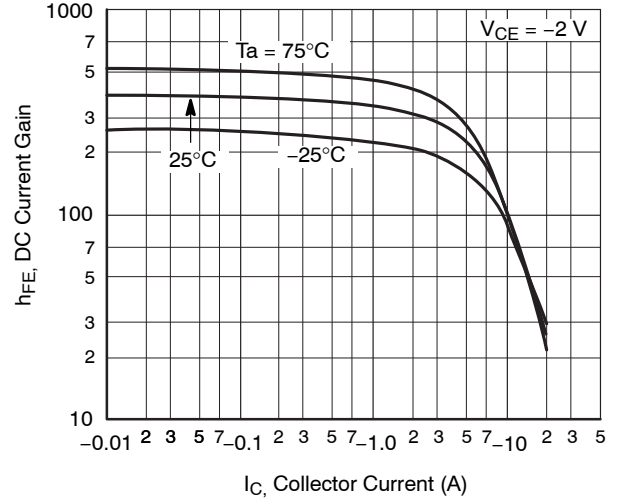


Figure 4. $h_{FE} - I_C$

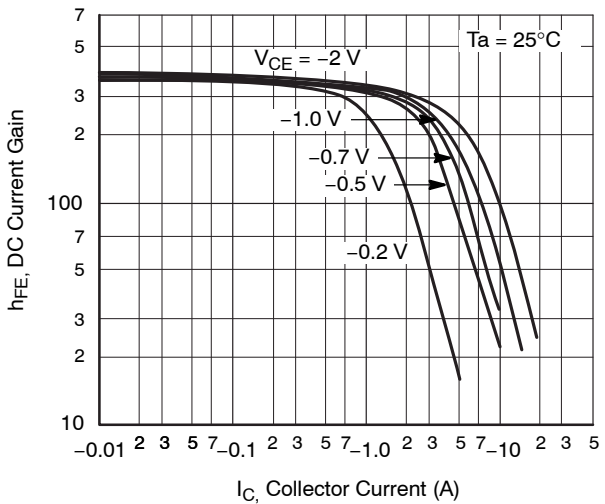


Figure 5. $h_{FE} - I_C$

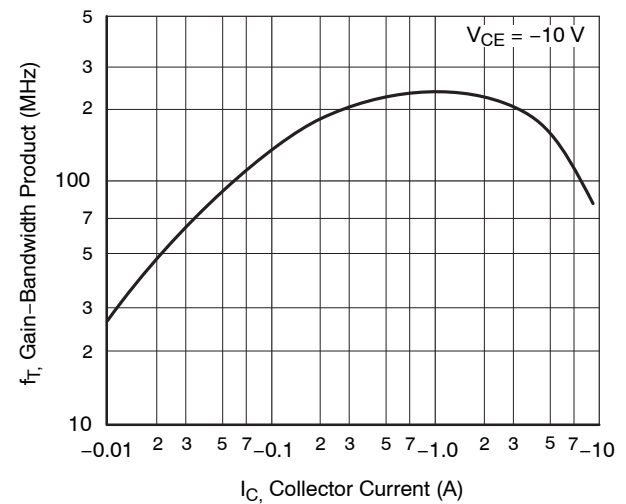
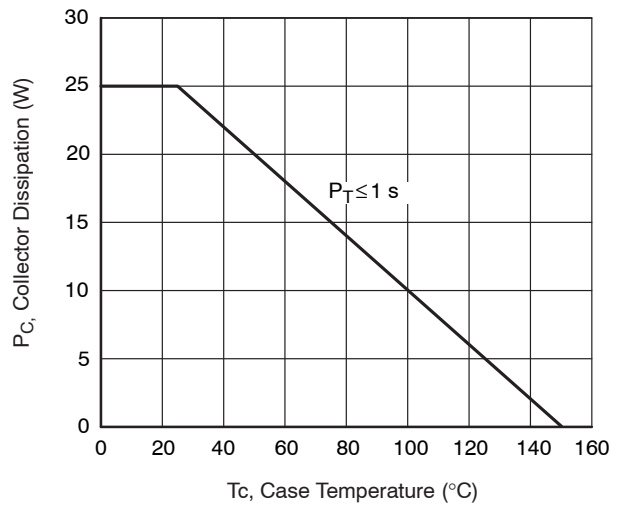
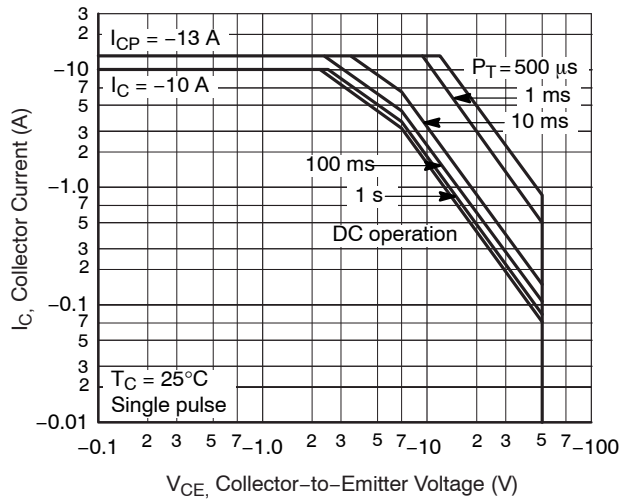
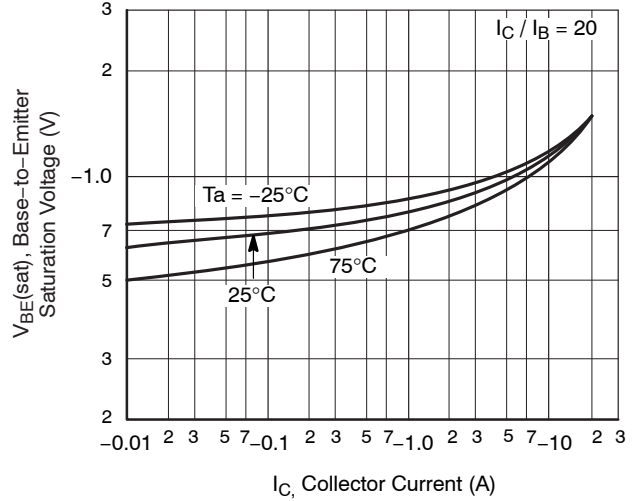
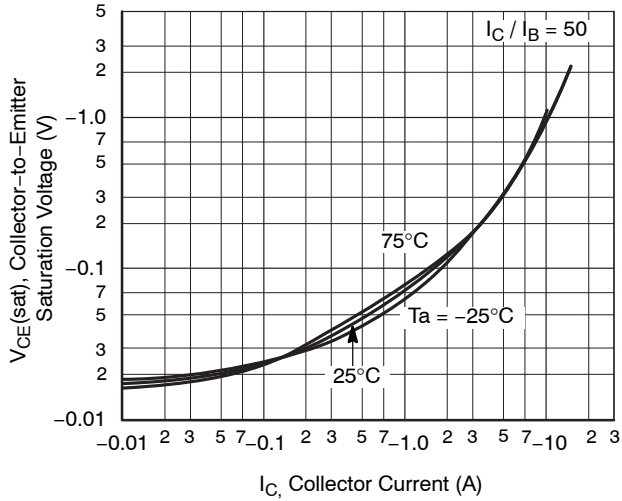
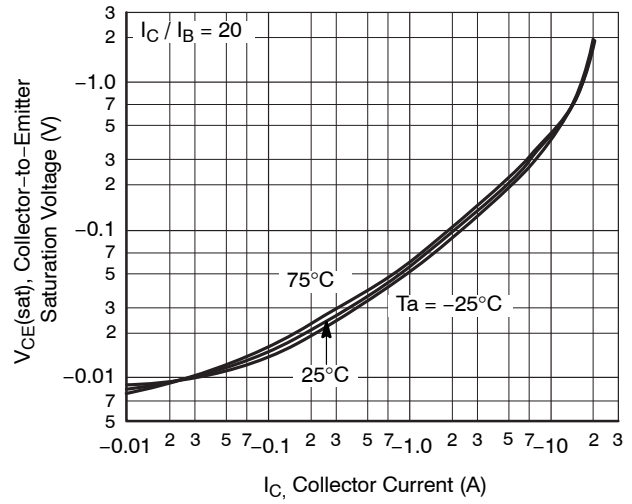
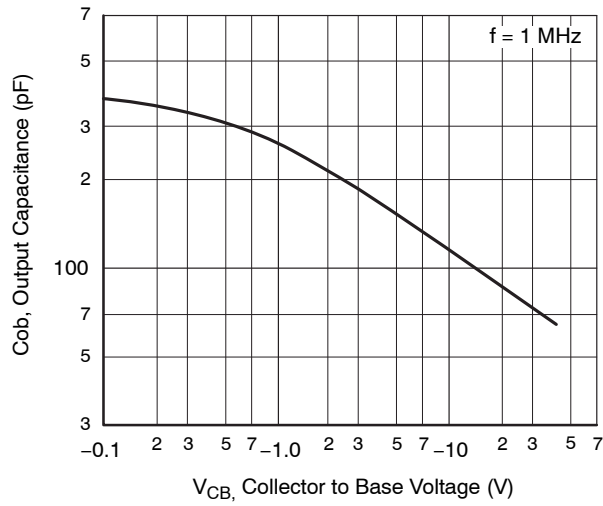


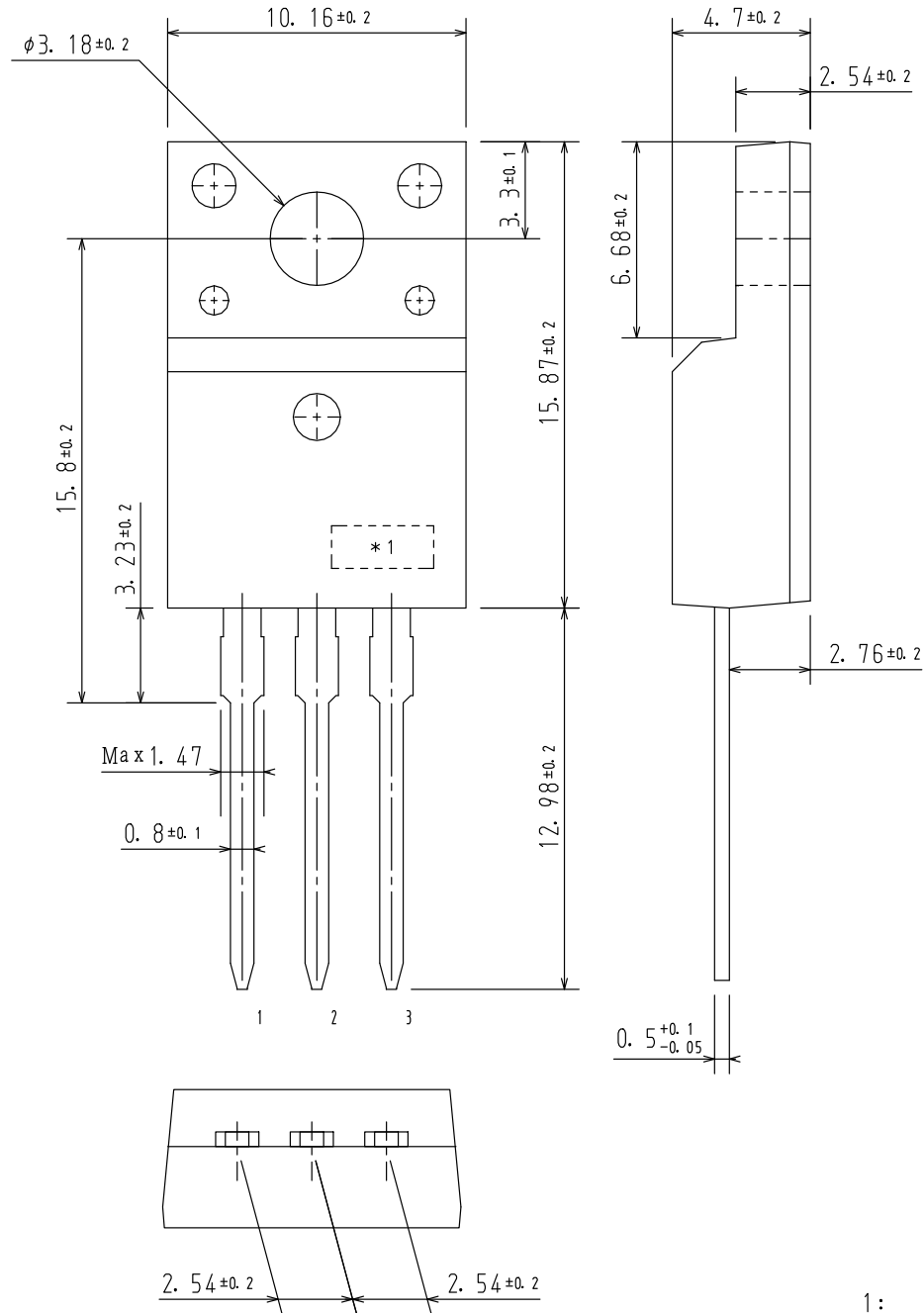
Figure 6. $f_T - I_C$

TYPICAL CHARACTERISTICS (CONTINUED)



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

DATE 30 JAN 2012



*1 Lot indication

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