

Bipolar Transistor

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

2SC6144SG

Features

- Adoption of MBIT Process
- Large Current Capacitance ($I_C = 10$ A)
- Low Collector-to-Emitter Saturation Voltage ($V_{CE(sat)} = 180$ mV(typ.))
- High-speed Switching ($t_f = 25$ ns(typ.))

Applications

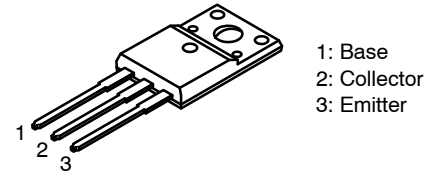
- Relay Drivers, Lamp Drivers, Motor Drivers

Specifications

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

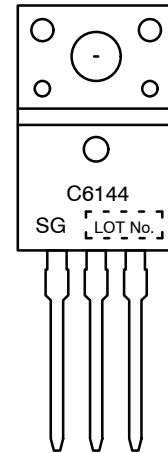
Parameter	Symbol	Conditions	Ratings	Units
Collector-to-Base Voltage	V_{CBO}		60	V
Collector-to-Emitter Voltage	V_{CEO}		50	V
Emitter-to-Base Voltage	V_{EBO}		5	V
Collector Current	I_C		10	A
Collector Current (Pulse)	I_{CP}		13	A
Base Current	I_B		2	A
Collector Dissipation	P_C	$T_C = 25^\circ\text{C}$, $P_T \leq 1$ s	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.

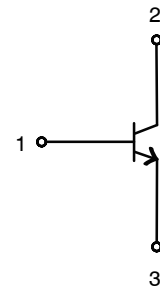


TO-220F-3FS
CASE 221AM

MARKING DIAGRAM



ELECTRICAL CONNECTION



ORDERING INFORMATION

Device	Package	Shipping
2SC6144SG	TO-220F-3FS (Pb-Free)	50 Units / Tube

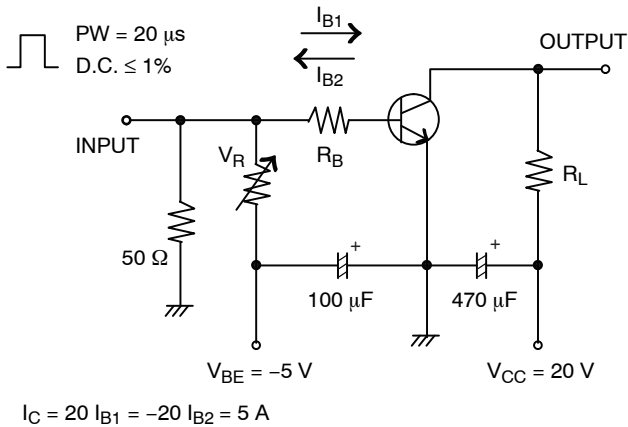
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ELECTRICAL CHARACTERISTICS at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings			Units
			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}	$V_{CE} = 2\text{ V}, I_C = 270\text{ mA}$	200	–	560	
Gain-Bandwidth Product	f_T	$V_{CE} = 10\text{ V}, I_C = 3\text{ A}$	–	330	–	MHz
Output Capacitance	C_{ob}	$V_{CB} = 10\text{ V}, f = 1\text{ MHz}$	–	60	–	pF
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 6\text{ A}, I_B = 300\text{ mA}$	–	180	360	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	$V_{(BR)CBO}$	$I_C = 100\text{ }\mu\text{A}, I_E = 0\text{ A}$	60	–	–	V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 1\text{ mA}, R_{BE} = \infty$	50	–	–	V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = 100\text{ }\mu\text{A}, I_C = 0\text{ A}$	5	–	–	V
Turn-On Time	t_{ON}	See specified Test Circuit.	–	62	–	ns
Storage Time	t_{stg}		–	350	–	ns
Fall Time	t_f		–	25	–	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



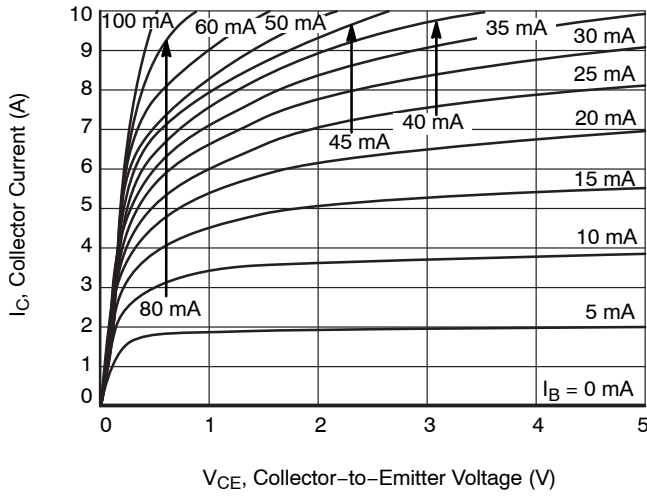


Figure 1. $I_C - V_{CE}$

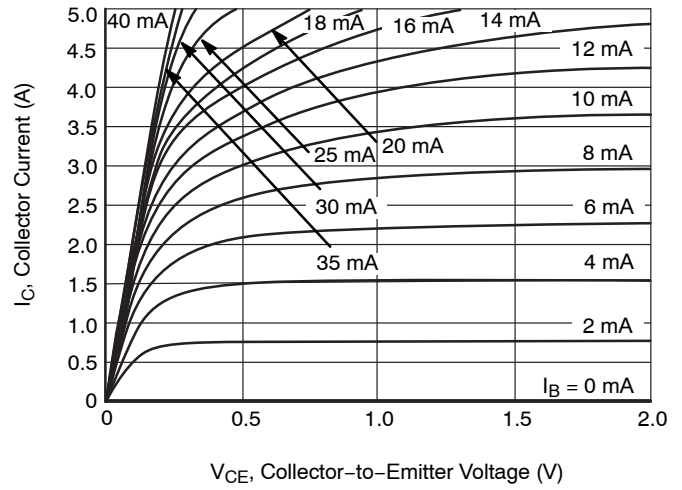


Figure 2. $I_C - V_{CE}$

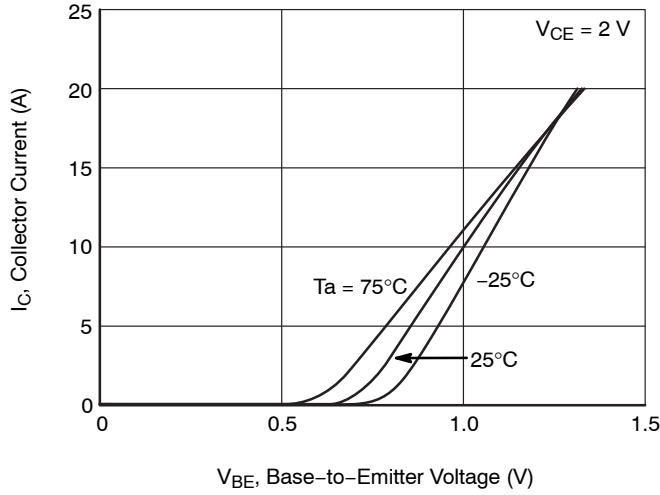


Figure 3. $I_C - V_{BE}$

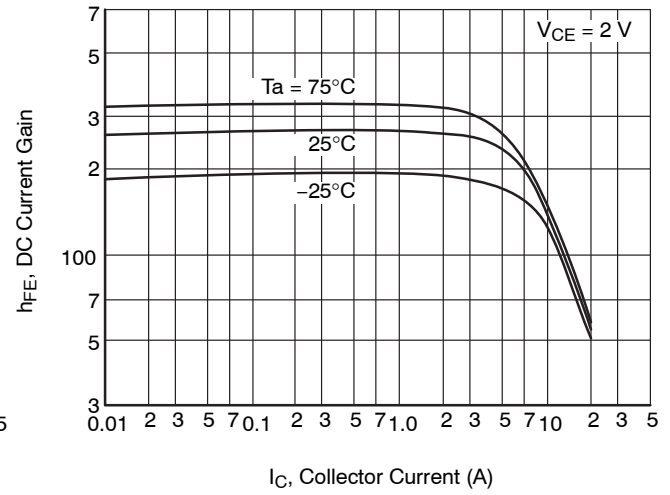


Figure 4. $h_{FE} - I_C$

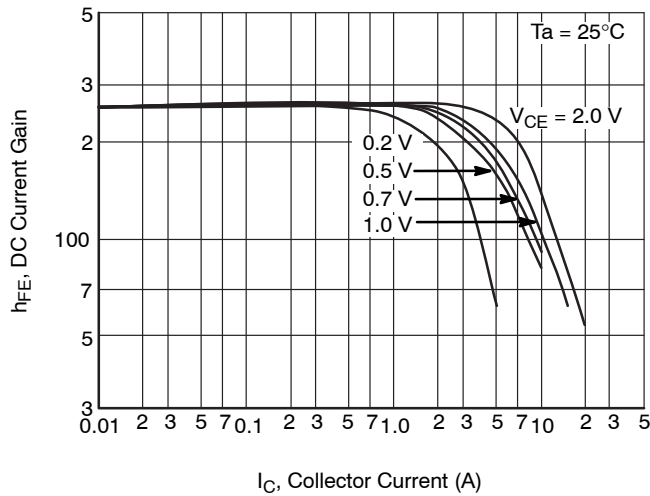


Figure 5. $h_{FE} - I_C$

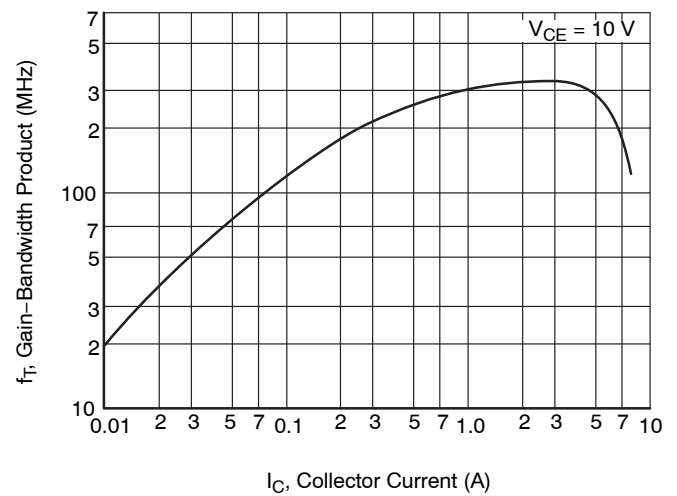


Figure 6. $f_T - I_C$

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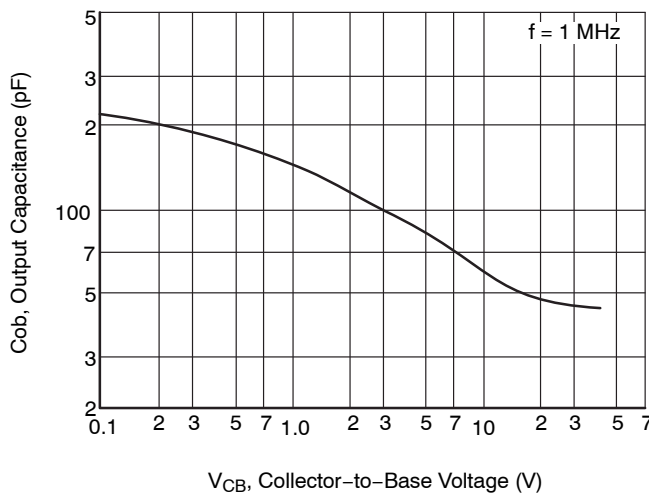


Figure 7. $C_{ob} - V_{CB}$

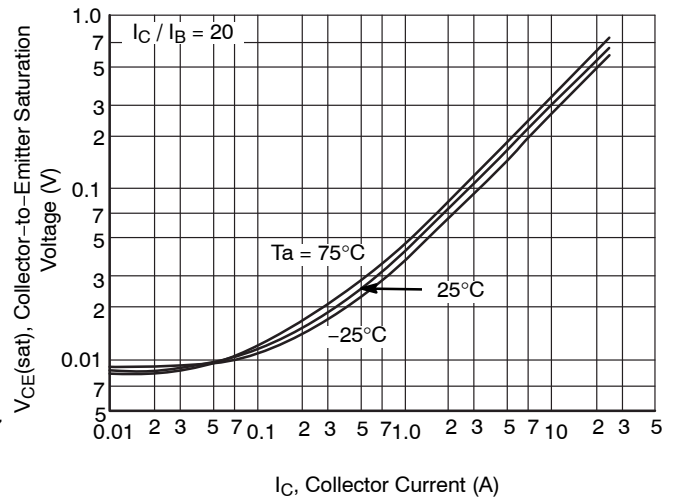


Figure 8. $V_{CE(sat)} - I_C$

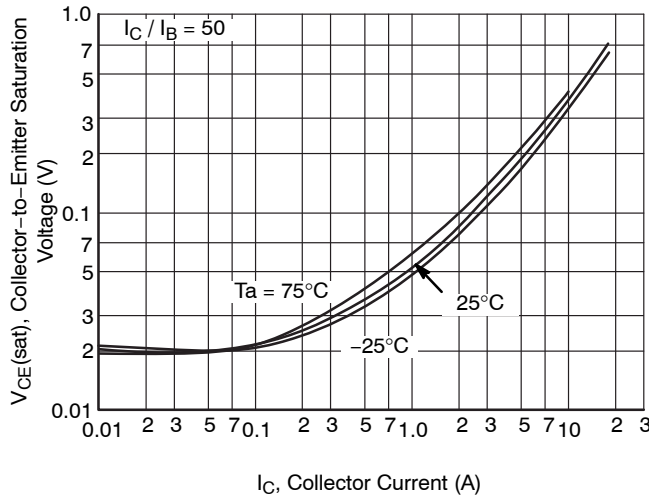


Figure 9. $V_{CE(sat)} - I_C$

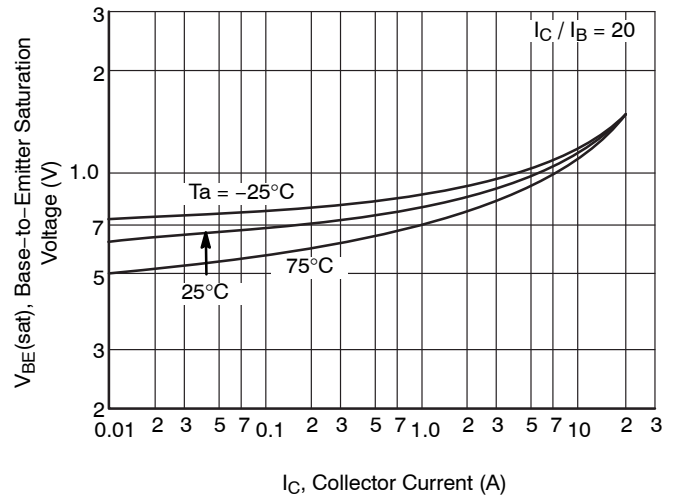


Figure 10. $V_{BE(sat)} - I_C$

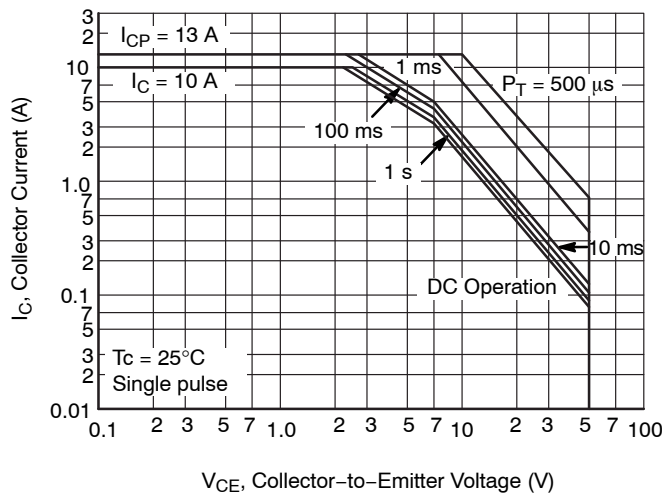


Figure 11. Forward Bias ASO

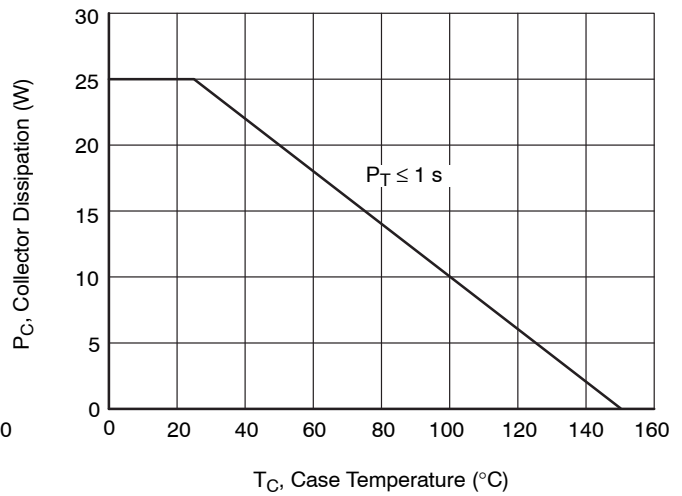
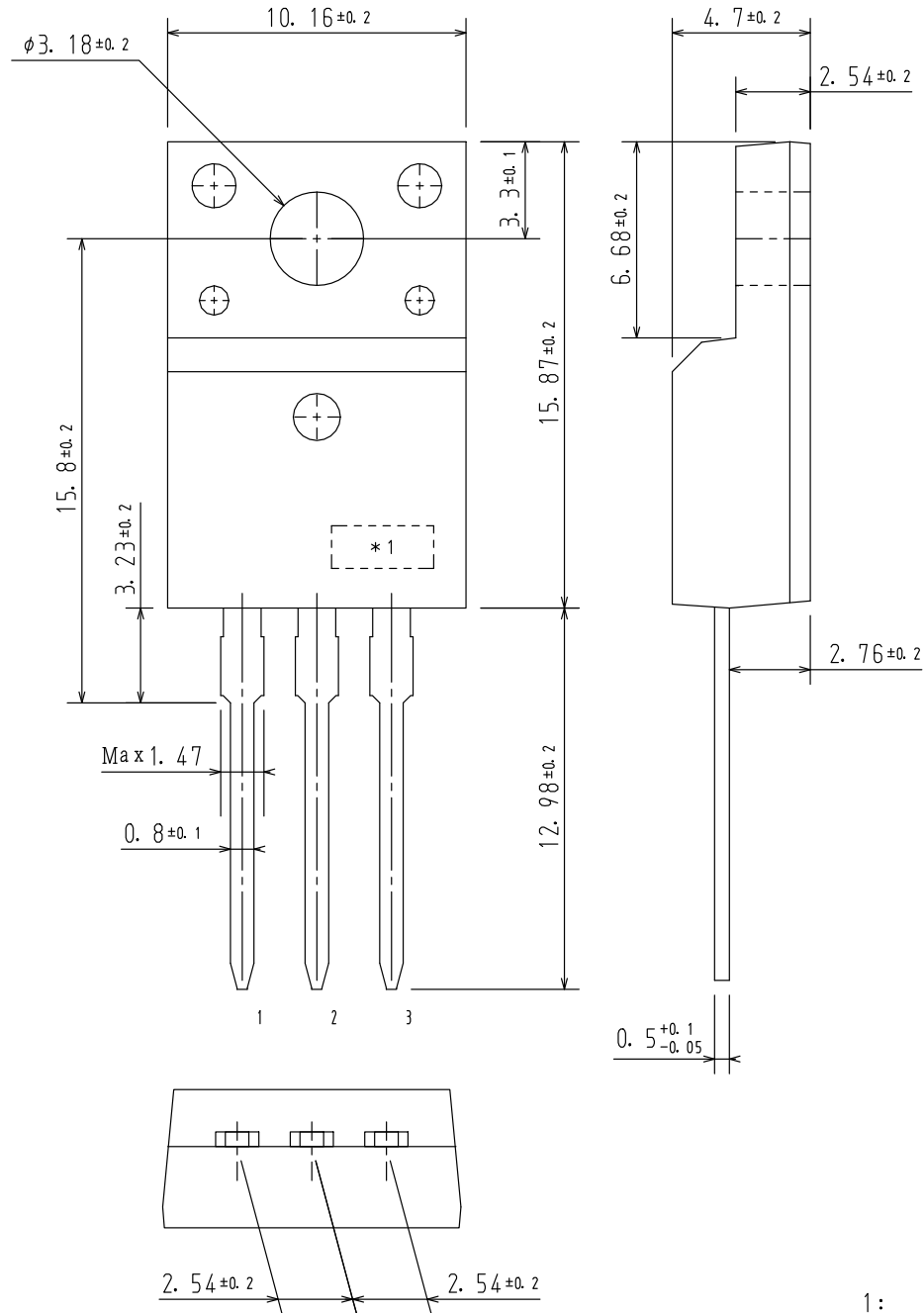


Figure 12. $P_C - T_C$

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

DATE 30 JAN 2012



*1 Lot indication

- 1:
- 2:
- 3:

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