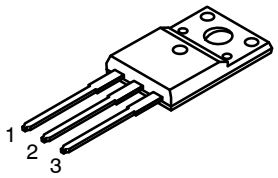
Bipolar Transistor

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

2SC6144SG



1: Base
2: Collector
3: Emitter

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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

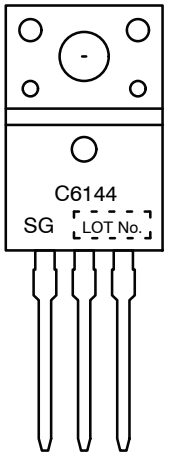
Specifications

ABSOLUTE MAXIMUM RATINGS at Ta = 25°C

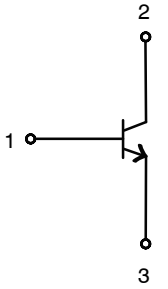
Parameter	Symbol	Conditions	Ratings	Units
Collector−to−Base Voltage	V_{CBO}		60	V
Collector−to−Emitter Voltage	V_{CEO}		50	V
Emitter−to−Base Voltage	V_{EBO}		5	V
Collector Current	I_C		10	A
Collector Current (Pulse)	I_{CP}		13	A
Base Current	I_B		2	A
Collector Dissipation	P_C	T_C = 25°C, $P_T \leq$ 1 s	25	W
Junction Temperature	T_j		150	°C
Storage Temperature	T_{stg}		−55 to +150	°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.

MARKING DIAGRAM



ELECTRICAL CONNECTION



ORDERING INFORMATION

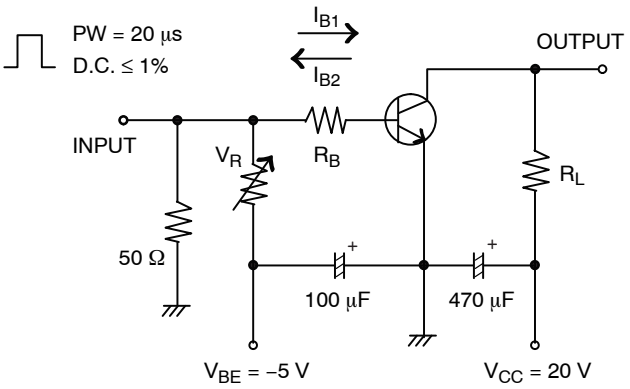
Device	Package	Shipping
2SC6144SG	TO−220F−3FS (Pb−Free)	50 Units / Tube

ELECTRICAL CHARACTERISTICS at Ta = 25°C

Parameter	Symbol	Conditions	Ratings			Units
			Min	Typ	Max	
Collector Cutoff Current	I_{CBO}	V_{CB} = 40 V, I_E = 0 A	–	–	10	μA
Emitter Cutoff Current	I_{EBO}	V_{EB} = 4 V, I_C = 0 A	–	–	10	μA
DC Current Gain	h_{FE}	V_{CE} = 2 V, I_C = 270 mA	200	–	560	
Gain−Bandwidth Product	f_T	V_{CE} = 10 V, I_C = 3 A	–	330	–	MHz
Output Capacitance	Cob	V_{CB} = 10 V, f = 1 MHz	–	60	–	pF
Collector−to−Emitter Saturation Voltage	V_{CE}(sat)	I_C = 6 A, I_B = 300 mA	–	180	360	mV
Base−to−Emitter Saturation Voltage	V_{BE}(sat)	I_C = 6 A, I_B = 300 mA	–	–	1.2	V
Collector−to−Base Breakdown Voltage	$V_{(BR)CBO}$	I_C = 100 μA, I_E = 0 A	60	–	–	V
Collector−to−Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C = 1 mA, R_{BE} = ∞	50	–	–	V
Emitter−to−Base Breakdown Voltage	$V_{(BR)EBO}$	I_E = 100 μA, I_C = 0 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



I_C = 20 I_{B1} = −20 I_{B2} = 5 A

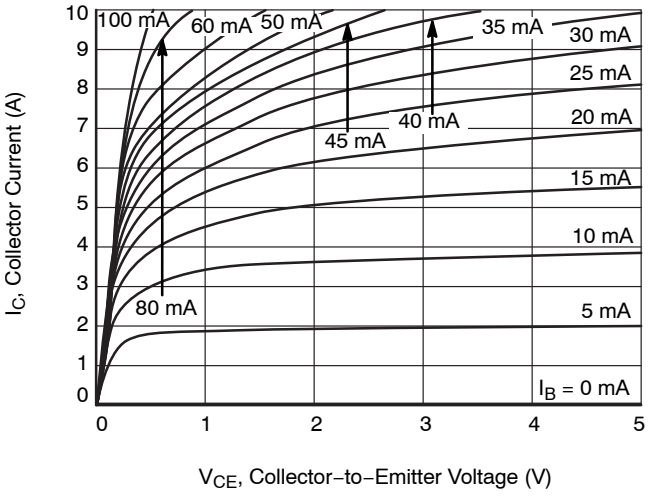


Figure 1. $I_C - V_{CE}$

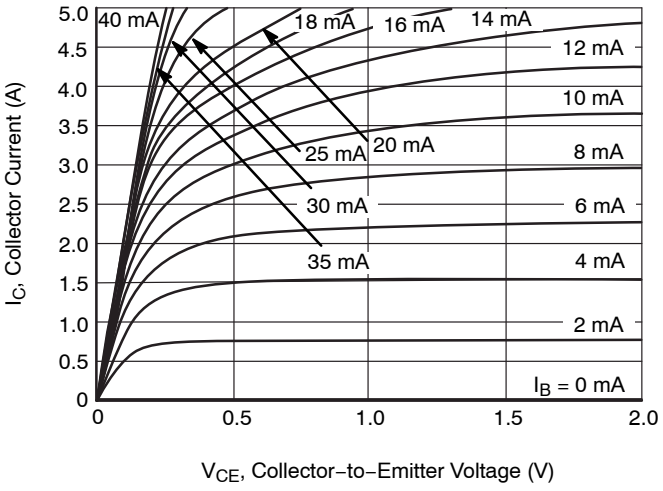


Figure 2. $I_C - V_{CE}$

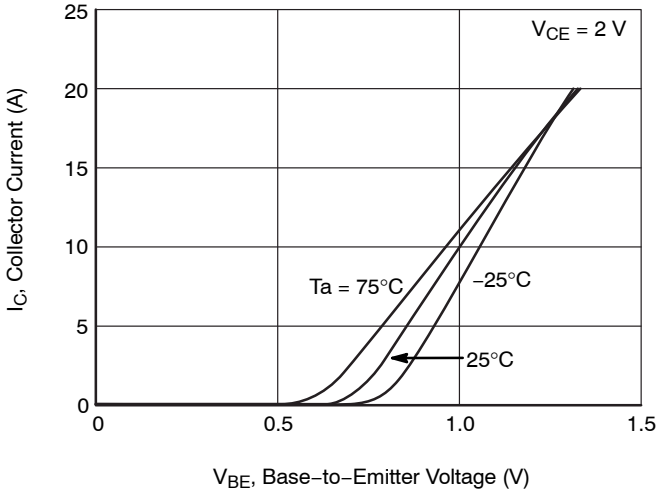


Figure 3. $I_C - V_{BE}$

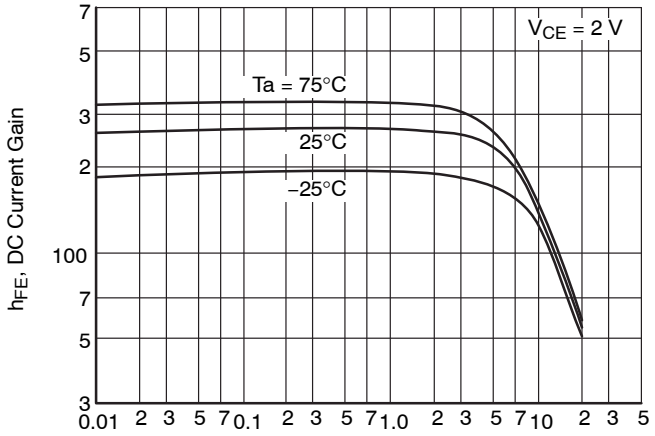


Figure 4. $h_{FE} - I_C$

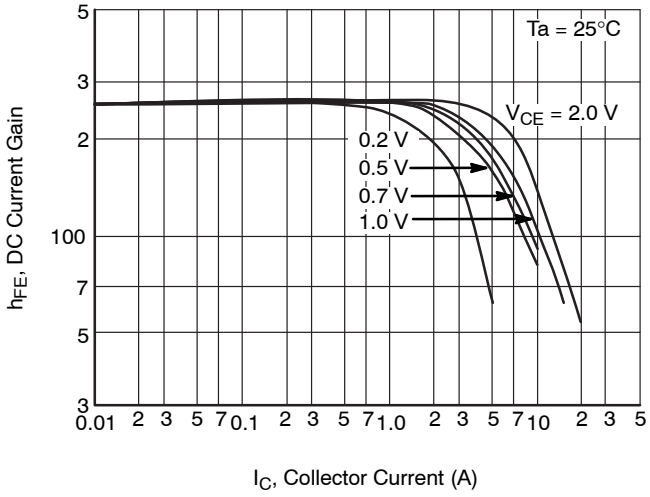


Figure 5. $h_{FE} - I_C$

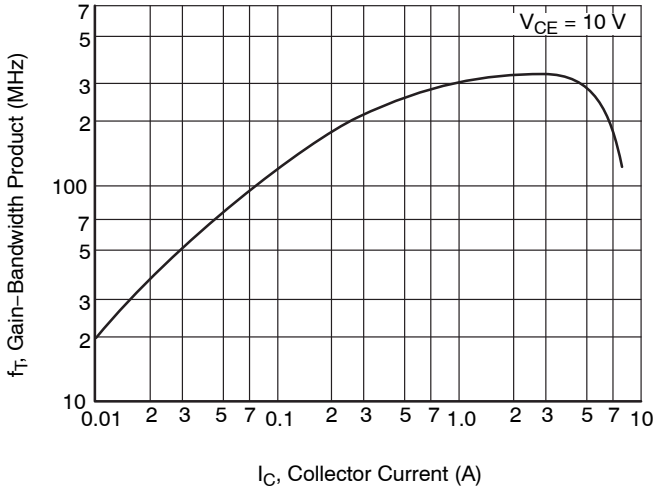


Figure 6. $f_T - I_C$

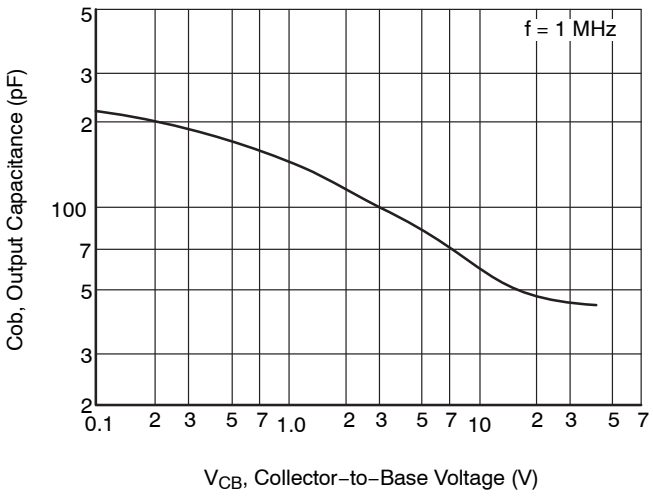


Figure 7. Cob – V_{CB}

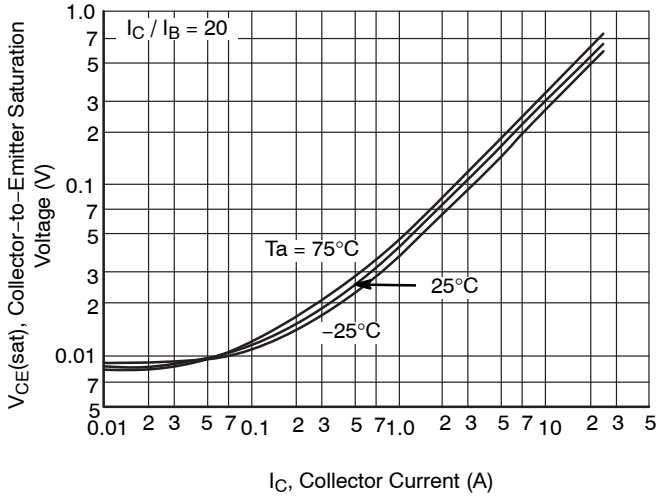


Figure 8. $V_{CE}(sat)$ – I_C

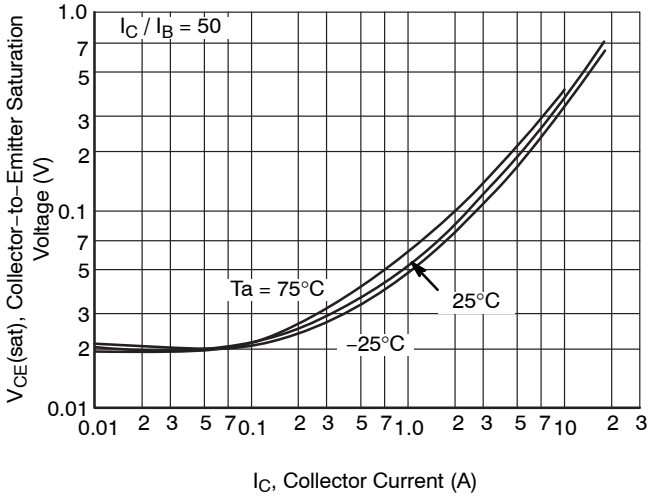


Figure 9. $V_{CE}(sat)$ – I_C

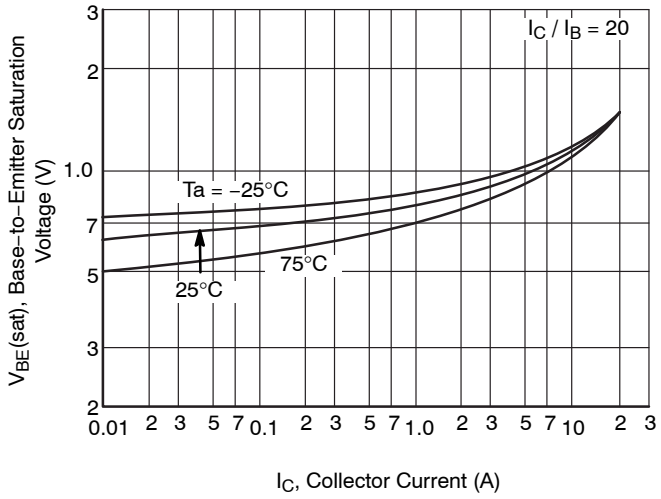


Figure 10. $V_{BE}(sat)$ – I_C

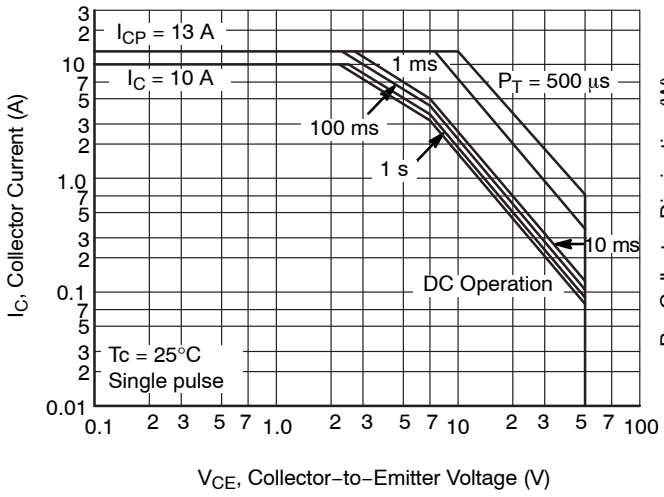


Figure 11. Forward Bias ASO

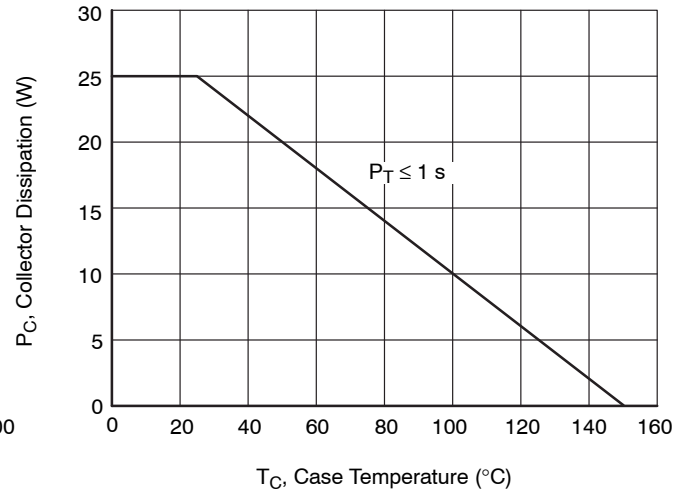


Figure 12. P_C – T_C

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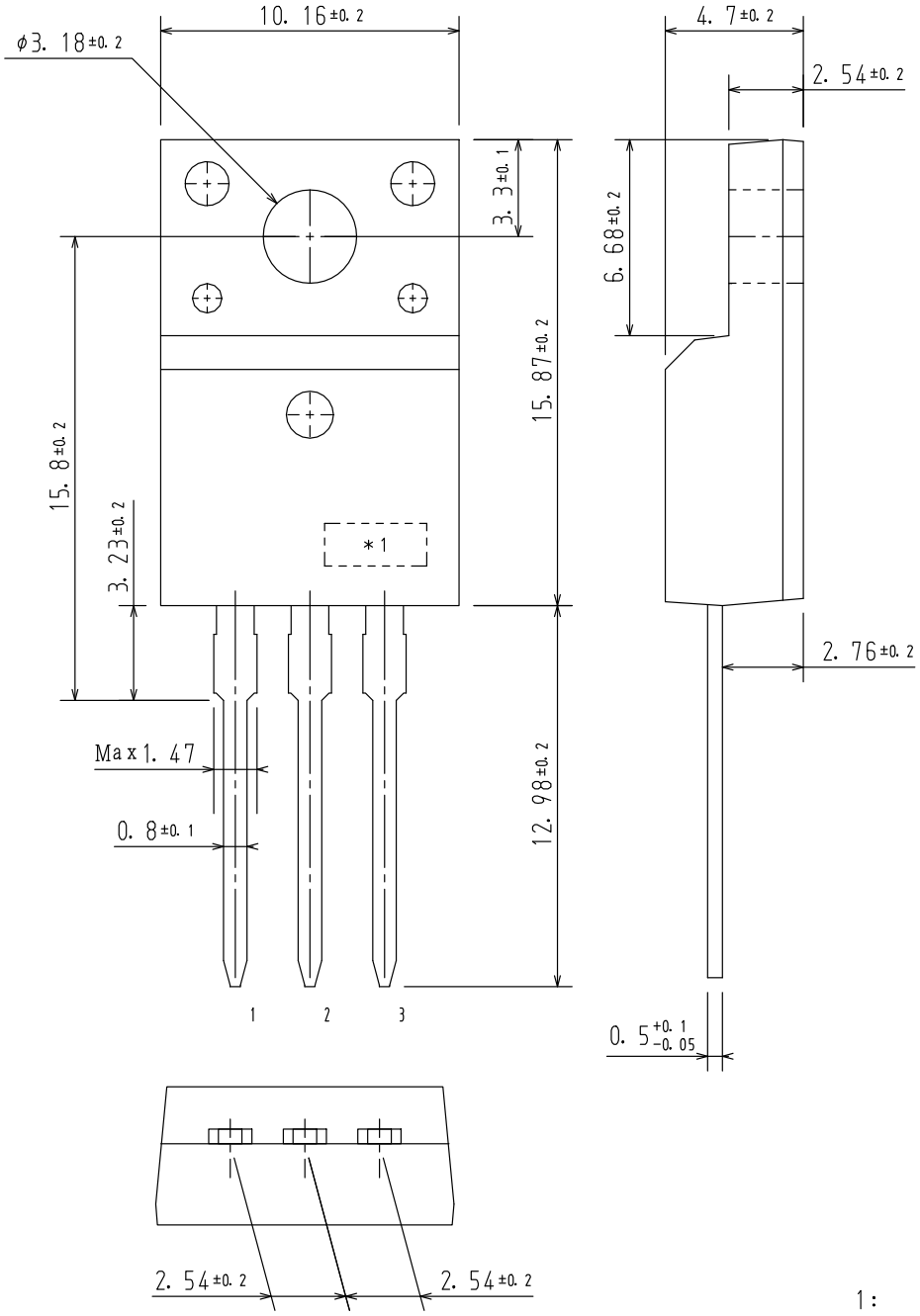

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