

# NPN Silicon General Purpose Amplifier Transistor

This NPN transistor is designed for general purpose amplifier applications. This device is housed in the SOT-723 package which is designed for low power surface mount applications, where board space is at a premium.

### Features

- Reduces Board Space
- High  $h_{FE}$ , 210–460 (typical)
- Low  $V_{CE(sat)}$ , < 0.5 V
- ESD Performance: Human Body Model; > 2000 V, Machine Model; > 200 V
- Available in 8 mm, 7-inch/3000 Unit Tape and Reel
- These are Pb-Free Devices

### MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ )

Rating	Symbol	Value	Unit
Collector-Base Voltage	$V_{(BR)CBO}$	50	Vdc
Collector-Emitter Voltage	$V_{(BR)CEO}$	50	Vdc
Emitter-Base Voltage	$V_{(BR)EBO}$	5.0	Vdc
Collector Current – Continuous	$I_C$	100	mA <sub>dc</sub>

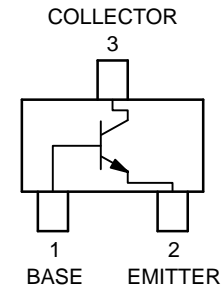
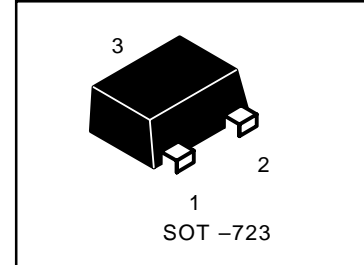
### THERMAL CHARACTERISTICS

Rating	Symbol	Max	Unit
Power Dissipation (Note 1)	$P_D$	260	mW
Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	-55 ~ +150	$^\circ\text{C}$

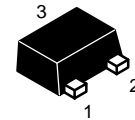
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. Device mounted on a FR-4 glass epoxy printed circuit board using the minimum recommended footprint.

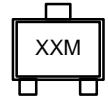
**2SC5658QM**  
**2SC5658RM**



### MARKING DIAGRAM



SOT-723



XX = Specific Device Code  
(QM = 2SC5658QM  
RM = 2SC5658RM)  
M = Date Code

### ORDERING INFORMATION

Device	Package	Shipping
2SC5658Q/RM	SOT-723 (Pb-Free)	8000/Tape & Reel

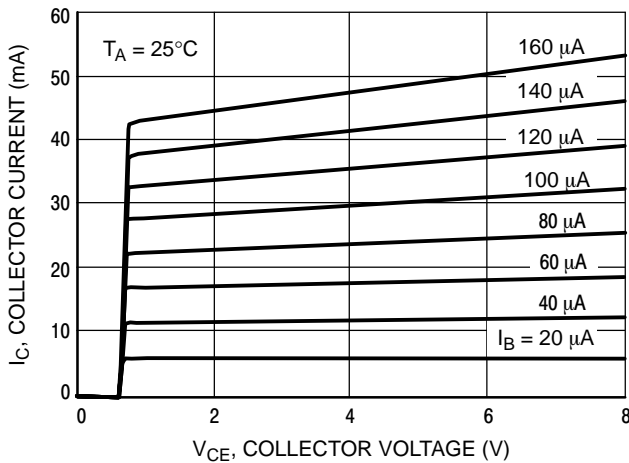


**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$ )

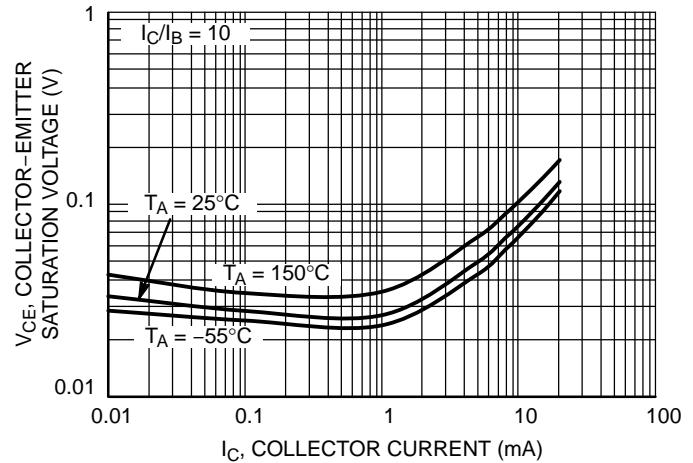
Characteristic	Symbol	Min	Typ	Max	Unit
Collector-Base Breakdown Voltage ( $I_C = 50 \mu\text{Adc}$ , $I_E = 0$ )	$V_{(BR)CBO}$	50	–	–	Vdc
Collector-Emitter Breakdown Voltage ( $I_C = 1.0 \text{ mAdc}$ , $I_B = 0$ )	$V_{(BR)CEO}$	50	–	–	Vdc
Emitter-Base Breakdown Voltage ( $I_E = 50 \mu\text{Adc}$ , $I_C = 0$ )	$V_{(BR)EBO}$	5.0	–	–	Vdc
Collector-Base Cutoff Current ( $V_{CB} = 30 \text{ Vdc}$ , $I_E = 0$ )	$I_{CBO}$	–	–	0.5	$\mu\text{A}$
Emitter-Base Cutoff Current ( $V_{EB} = 4.0 \text{ Vdc}$ , $I_B = 0$ )	$I_{EBO}$	–	–	0.5	$\mu\text{A}$
Collector-Emitter Saturation Voltage (Note 2) ( $I_C = 50 \text{ mAdc}$ , $I_B = 5.0 \text{ mAdc}$ )	$V_{CE(sat)}$	–	–	0.4	Vdc
DC Current Gain (Note 2) ( $V_{CE} = 6.0 \text{ Vdc}$ , $I_C = 1.0 \text{ mAdc}$ ) ( $V_{CE} = 6.0 \text{ Vdc}$ , $I_C = 1.0 \text{ mAdc}$ )	$h_{FE}$	120 180	– –	270 390	–
Transition Frequency ( $V_{CE} = 12 \text{ Vdc}$ , $I_C = 2.0 \text{ mAdc}$ , $f = 30 \text{ MHz}$ )	$f_T$	–	180	–	MHz
Output Capacitance ( $V_{CB} = 12 \text{ Vdc}$ , $I_C = 0 \text{ Adc}$ , $f = 1.0 \text{ MHz}$ )	$C_{OB}$	–	2.0	–	pF

 2. Pulse Test: Pulse Width  $\leq 300 \mu\text{s}$ , D.C.  $\leq 2\%$ .

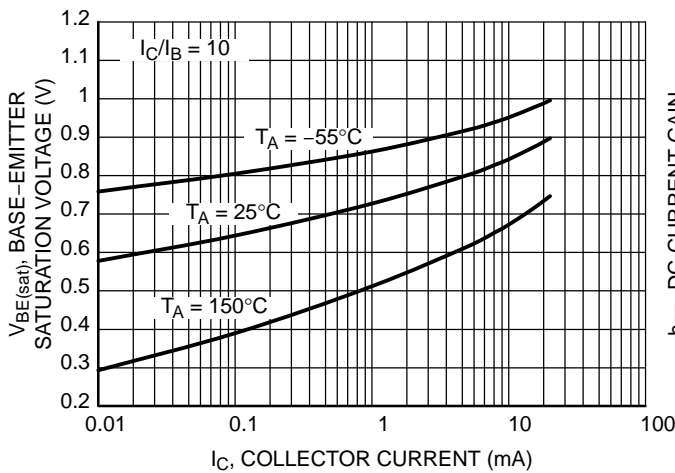

**TYPICAL ELECTRICAL CHARACTERISTICS**



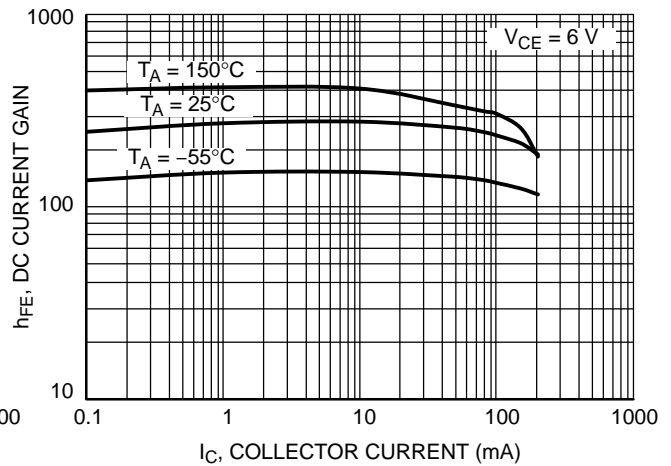
**Figure 1.  $I_C - V_{CE}$**



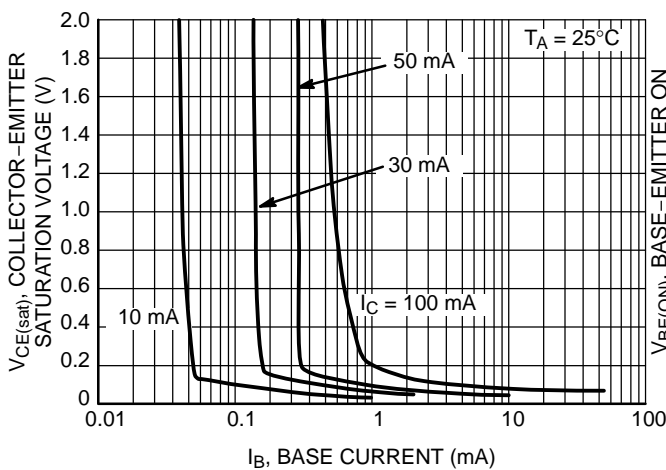
**Figure 2. Collector Emitter Saturation Voltage vs. Collector Current**



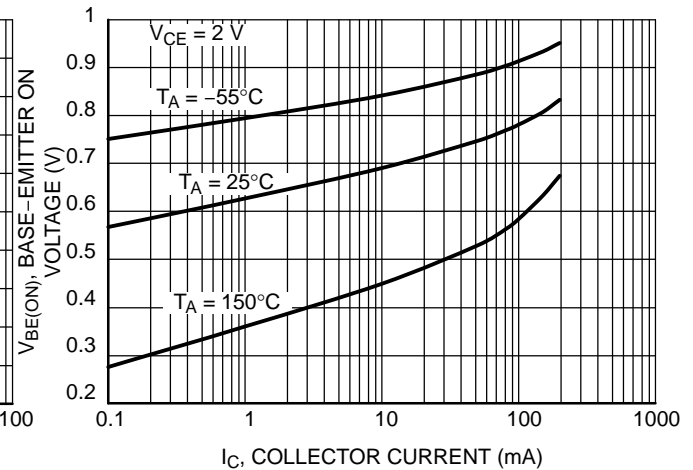
**Figure 3. Base Emitter Saturation Voltage vs. Collector Current**



**Figure 4. DC Current Gain vs. Collector Current**



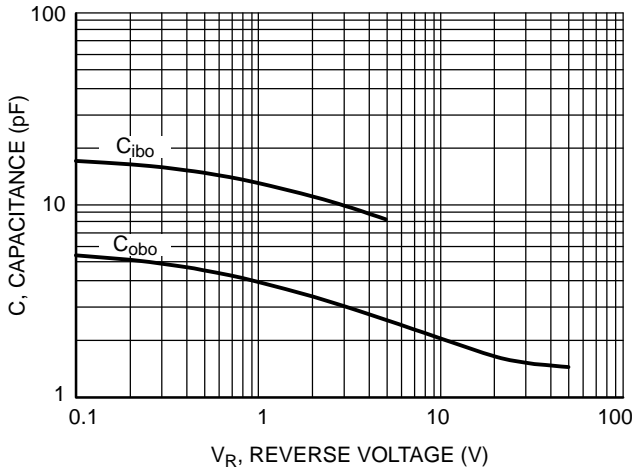
**Figure 5. Saturation Region**



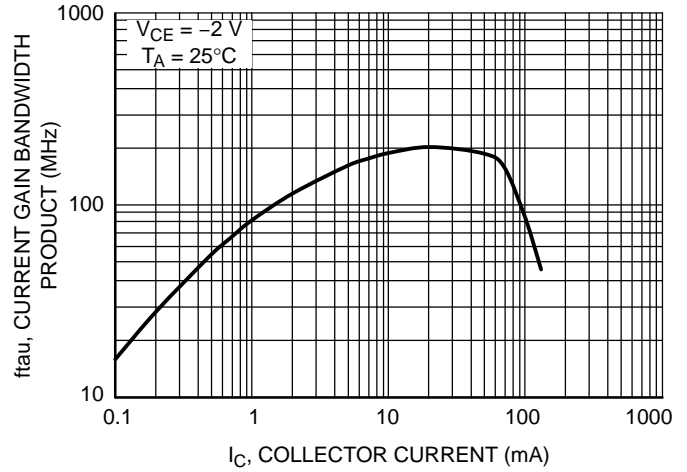
**Figure 6. Base-Emitter Turn-ON Voltage vs. Collector Current**



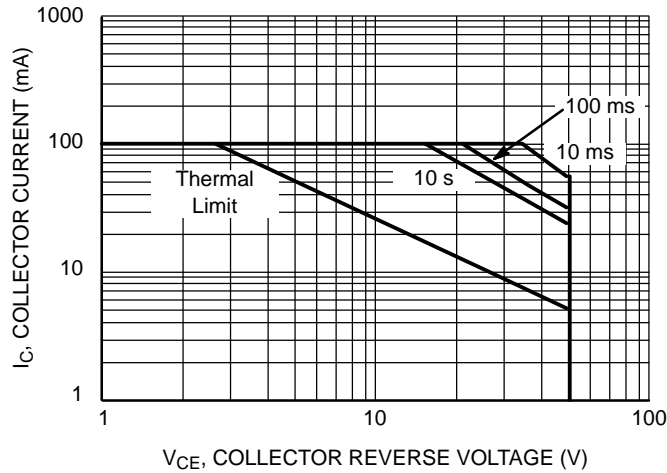
**TYPICAL ELECTRICAL CHARACTERISTICS**



**Figure 7. Capacitance**



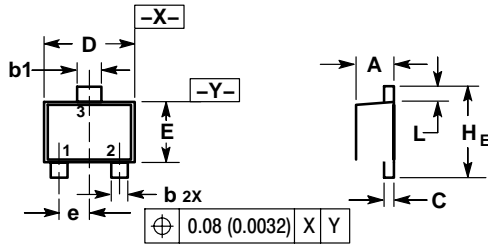
**Figure 8. Current Gain Bandwidth Product vs. Collector Current**



**Figure 9. Safe Operating Area**



**SOT-723**



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: MILLIMETERS.
  3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
  4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.45	0.50	0.55	0.018	0.020	0.022
b	0.15	0.21	0.27	0.0059	0.0083	0.0106
b1	0.25	0.31	0.37	0.010	0.012	0.015
C	0.07	0.12	0.17	0.0028	0.0047	0.0067
D	1.15	1.20	1.25	0.045	0.047	0.049
E	0.75	0.80	0.85	0.03	0.032	0.034
e	0.40 BSC			0.016 BSC		
HE	1.15	1.20	1.25	0.045	0.047	0.049
L	0.15	0.20	0.25	0.0059	0.0079	0.0098

STYLE 1:  
PIN 1. BASE  
2. EMITTER  
3. COLLECTOR

**SOLDERING FOOTPRINT\***

