



YOUSHANG SEMICONDUCTOR

设计研发新型功率器件

各类小信号开关

中低压及高压大电流等场效应管

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Description

This Bipolar Junction Transistor (BJT) is designed to meet the stringent requirements of automotive applications.

Features

- $BV_{CEO} > -60V$
- $I_C = -3A$ High Continuous Collector Current
- I_{CM} up to $-6A$ Peak Pulse Current
- 2W Power Dissipation
- Complementary PNP Type: NK-DXT651Q

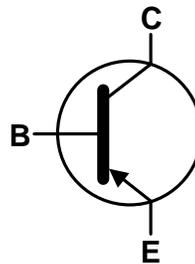
Mechanical Data

- Case: SOT89
- Case Material: Molded Plastic. "Green" Molding Compound.
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 ③
- Weight: 0.052 grams (Approximate)

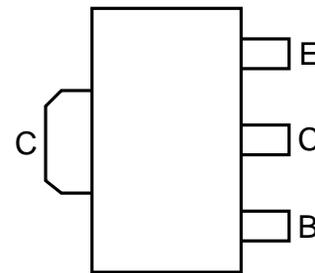
SOT89



Top View



Device Symbol



Top View
Pinout

Absolute Maximum Ratings (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

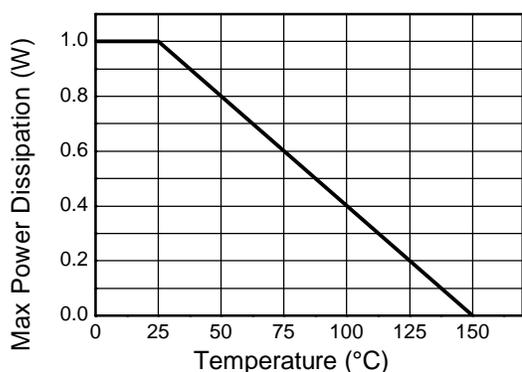
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	-80	V
Collector-Emitter Voltage	V_{CEO}	-60	V
Emitter-Base Voltage	V_{EBO}	-5	V
Collector Current	I_C	-3	A
Peak Pulse Collector Current	I_{CM}	-6	A

Thermal Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

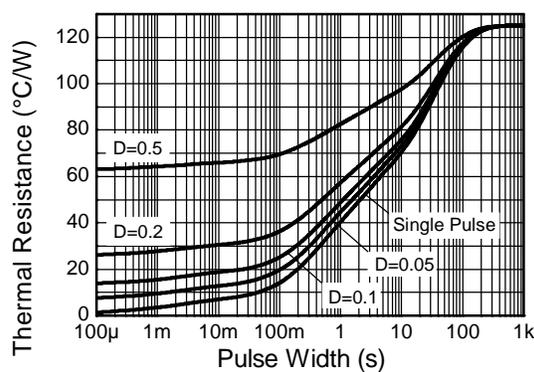
Characteristic	Symbol	Value	Unit
Power Dissipation	P_D	1	W
		2	
Thermal Resistance, Junction to Ambient Air	$R_{\theta JA}$	125	$^\circ\text{C/W}$
		62.5	
Thermal Resistance, Junction to Leads	$R_{\theta JL}$	6.0	$^\circ\text{C/W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

- Notes:
6. For a device surface mounted on 15mm x 15mm x 0.6mm FR4 PCB with high coverage of single sided 1 oz copper, in still air conditions; the device is measured when operating in steady state condition.
 7. Same as note (5), except the device is mounted on 40mm x 40mm x 1.6mm FR4 PCB.
 8. Thermal resistance from junction to solder-point (on the exposed collector pad).

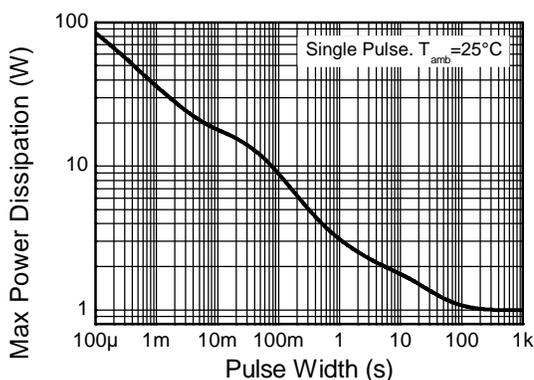
Thermal Characteristics and Derating Information



Derating Curve



Transient Thermal Impedance



Pulse Power Dissipation

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Conditions
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV_{CBO}	-80	—	—	V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	-60	—	—	V	$I_C = -10\text{mA}$
Emitter-Base Breakdown Voltage	BV_{EBO}	-5	—	—	V	$I_E = -100\mu\text{A}$
Collector-Base Cutoff Current	I_{CBO}	—	—	-0.1 -10	μA	$V_{CB} = -60\text{V}$ $V_{CB} = -60\text{V}, T_A = +100^\circ\text{C}$
Emitter-Base Cutoff Current	I_{EBO}	—	—	-0.1	μA	$V_{EB} = -4\text{V}$
ON CHARACTERISTICS (Note 9)						
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	—	-0.08 -0.2	-0.3 -0.6	V	$I_C = -1\text{A}, I_B = 100\text{mA}$ $I_C = -3\text{A}, I_B = 300\text{mA}$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	—	-0.90	-1.25	V	$I_C = -1\text{A}, I_B = -100\text{mA}$
Base-Emitter Turn-On Voltage	$V_{BE(on)}$	—	-0.8	-1	V	$V_{CE} = -2\text{V}, I_C = -1\text{A}$
DC Current Gain	h_{FE}	70 100 80 40	200 180 160 140	— 300 — —	—	$V_{CE} = -2\text{V}, I_C = -50\text{mA}$ $V_{CE} = -2\text{V}, I_C = -500\text{mA}$ $V_{CE} = -2\text{V}, I_C = -1\text{A}$ $V_{CE} = -2\text{V}, I_C = -2\text{A}$
SMALL-SIGNAL CHARACTERISTICS						
Transition Frequency	f_T	100	145	—	MHz	$V_{CE} = -10\text{V}, I_C = -50\text{mA}, f = 100\text{MHz}$
Output Capacitance	C_{obo}	—	—	30	pF	$V_{CB} = -10\text{V}, f = 1\text{MHz}$
Switching Times	t_{on} t_{off}	— —	45 200	— —	ns ns	$V_{CC} = -10\text{V}, I_C = -500\text{mA}, I_{B1} = -I_{B2} = -50\text{mA}$

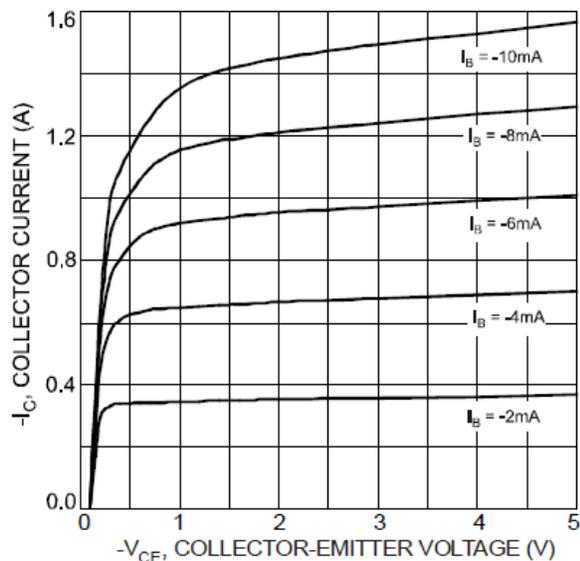
 Note: 9. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.


Fig. 2 Typical Collector Current vs. Collector-Emitter Voltage

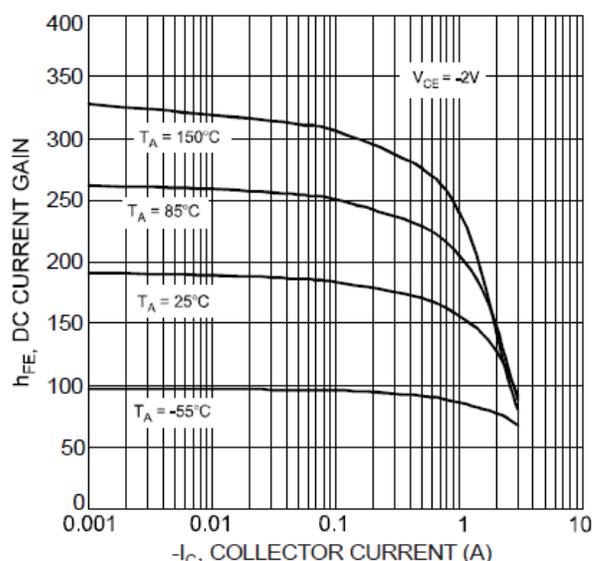


Fig. 3 Typical DC Current Gain vs. Collector Current

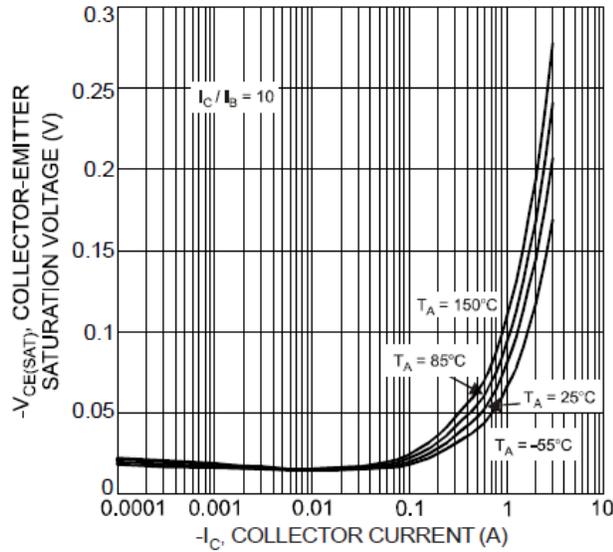


Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

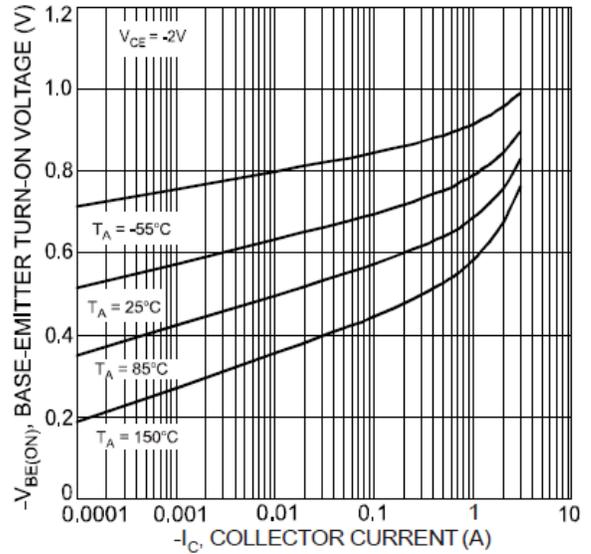


Fig. 5 Typical Base-Emitter Turn-On Voltage vs. Collector Current

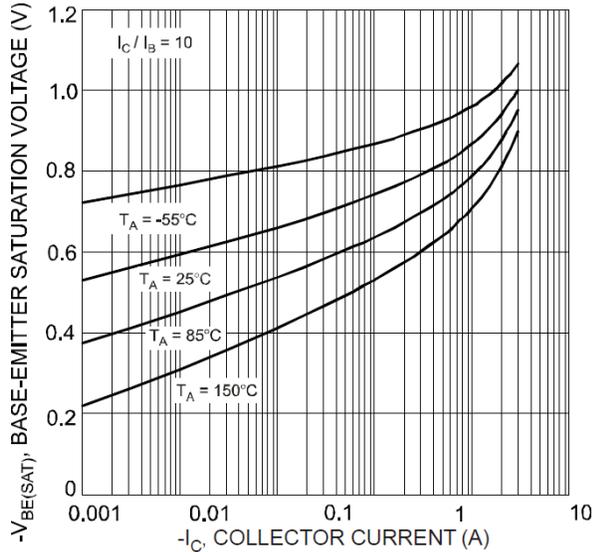


Fig. 6 Typical Base-Emitter Saturation Voltage vs. Collector Current

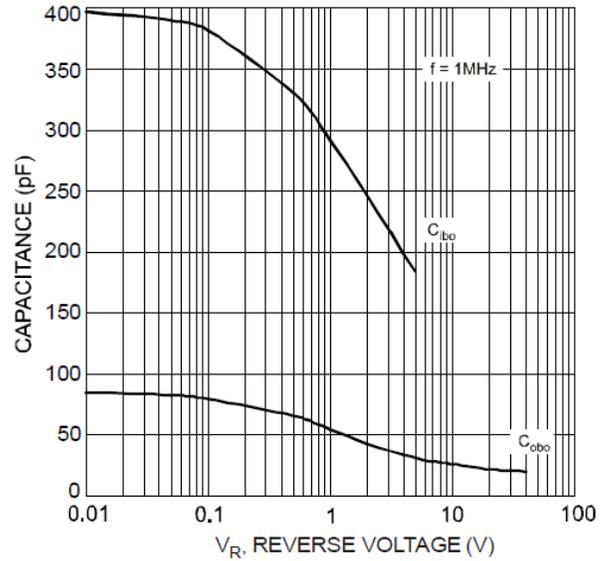


Fig. 7 Typical Capacitance Characteristics

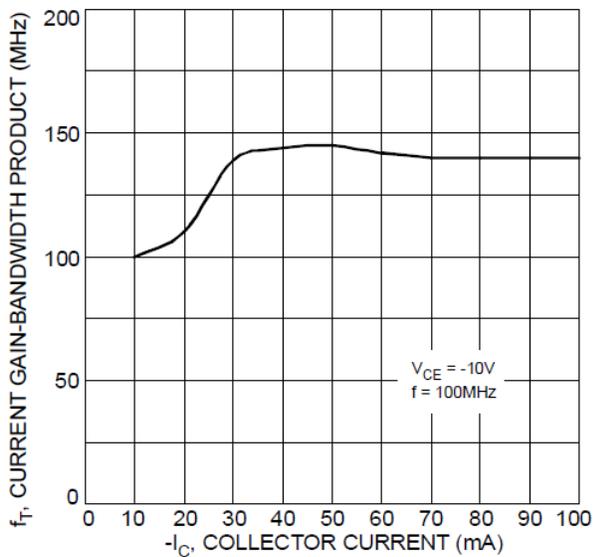
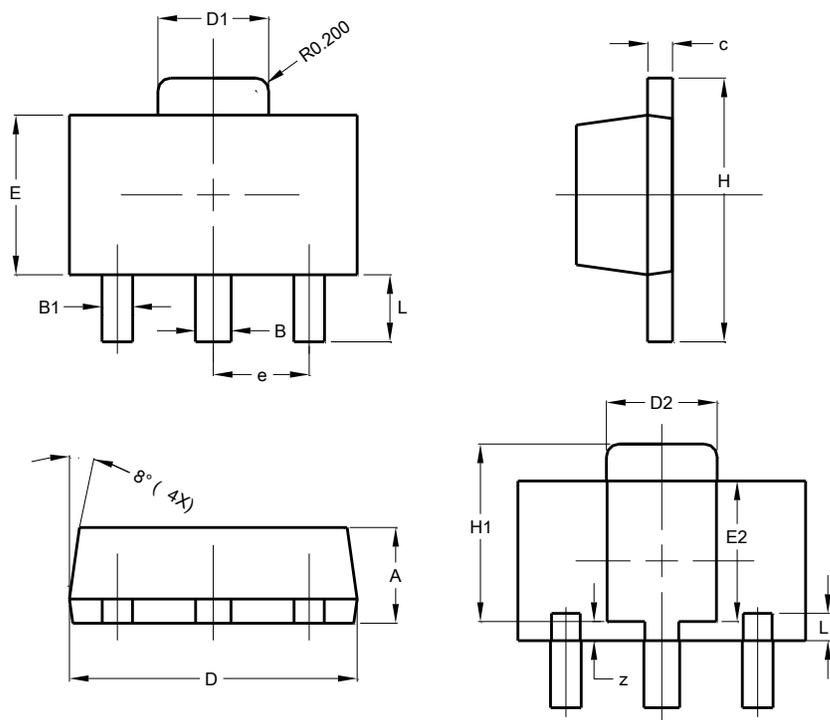


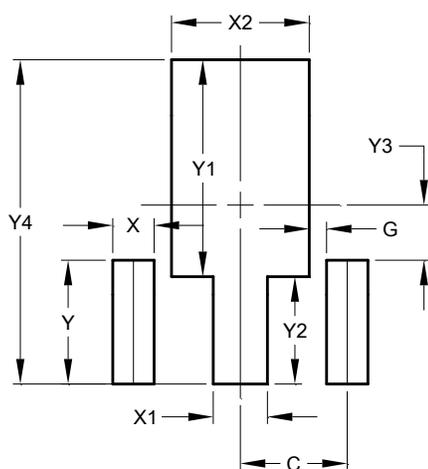
Fig. 8 Typical Gain-Bandwidth Product vs. Collector Current

Package Outline Dimensions



SOT89			
Dim	Min	Max	Typ
A	1.40	1.60	1.50
B	0.50	0.62	0.56
B1	0.42	0.54	0.48
c	0.35	0.43	0.38
D	4.40	4.60	4.50
D1	1.62	1.83	1.733
D2	1.61	1.81	1.71
E	2.40	2.60	2.50
E2	2.05	2.35	2.20
e	-	-	1.50
H	3.95	4.25	4.10
H1	2.63	2.93	2.78
L	0.90	1.20	1.05
L1	0.327	0.527	0.427
z	0.20	0.40	0.30
All Dimensions in mm			

Suggested Pad Layout



Dimensions	Value (in mm)
C	1.500
G	0.244
X	0.580
X1	0.760
X2	1.933
Y	1.730
Y1	3.030
Y2	1.500
Y3	0.770
Y4	4.530