



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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## Features

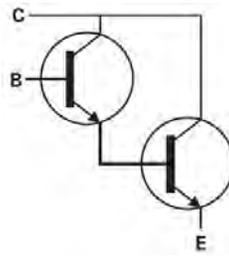
- 40V Darlington Transistor
- Epitaxial Planar Die Construction
- Ideal for Low Power Amplification and Switching
- High Current Gain
- Ultra-Small Surface Mount Package

## Mechanical Data

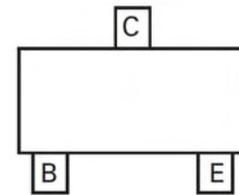
- Case: SOT-323
- Case Material: Molded Plastic, "Green" Molding Compound, Note 4. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Solderable per MIL-STD-202, Method 208
- Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe).
- Weight: 0.006 grams (approximate)



Top View



Device symbol



Pin-out Top view

**Maximum Ratings** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CB0}$	40	V
Collector-Emitter Voltage	$V_{CEO}$	40	V
Emitter-Base Voltage	$V_{EBO}$	12	V
Collector Current - Continuous (Note 4)	$I_C$	500	mA
Power Dissipation (Note 4)	$P_d$	200	mW
Thermal Resistance, Junction to Ambient (Note 4)	$R_{\theta JA}$	625	$^\circ\text{C/W}$
Operating and Storage Temperature Range	$T_j, T_{STG}$	-55 to +150	$^\circ\text{C}$

**Electrical Characteristics** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic	Symbol	Min	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 5)</b>					
Collector-Base Breakdown Voltage	$BV_{CB0}$	40	—	V	$I_C = 100\mu\text{A}, I_E = 0$
Collector-Emitter Breakdown Voltage	$BV_{CEO}$	40	—	V	$I_C = 10\text{mA}, I_B = 0$
Emitter-Base Breakdown Voltage	$BV_{EBO}$	12	—	V	$I_E = 10\mu\text{A}, I_C = 0$
Collector Cutoff Current	$I_{CB0}$	—	50	nA	$V_{CB} = 30\text{V}, I_E = 0$
Collector Cutoff Current	$I_{CEO}$	—	1.0	$\mu\text{A}$	$V_{CE} = 25\text{V}, I_B = 0$
Emitter Cutoff Current	$I_{EBO}$	—	50	nA	$V_{EB} = 10\text{V}, I_C = 0$
<b>ON CHARACTERISTICS (Note 5)</b>					
DC Current Gain	$h_{FE}$	10,000 20,000 14,000	100,000 200,000 140,000	—	$I_C = 10\text{mA}, V_{CE} = 5.0\text{V}$ $I_C = 100\text{mA}, V_{CE} = 5.0\text{V}$ $I_C = 500\text{mA}, V_{CE} = 5.0\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	—	1.2 1.5	V	$I_C = 50\text{mA}, I_B = 0.5\text{mA}$ $I_C = 500\text{mA}, I_B = 0.5\text{mA}$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	—	2.0	V	$I_C = 500\text{mA}, I_B = 0.5\text{mA}$
Base-Emitter On Voltage	$V_{BE(on)}$	—	1.75	V	$I_C = 50\text{mA}, V_{CE} = 5.0\text{V}$
<b>SMALL SIGNAL CHARACTERISTICS</b>					
Output Capacitance	$C_{obo}$	8.0 Typical		pF	$V_{CB} = 10\text{V}, f = 1.0\text{MHz}, I_E = 0$
Input Capacitance	$C_{ibo}$	15 Typical		pF	$V_{EB} = 0.5\text{V}, f = 1.0\text{MHz}, I_C = 0$

- Notes: 4. Device mounted on 25mm x 22 mm x 1.6mm FR4 PCB, 1oz copper, singled sided  
 5. Short duration pulse test used to minimize self-heating effect.

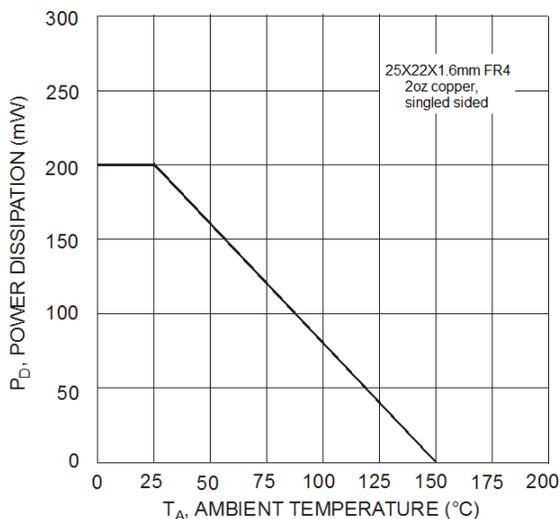


Fig. 1, Max Power Dissipation vs. Ambient Temperature

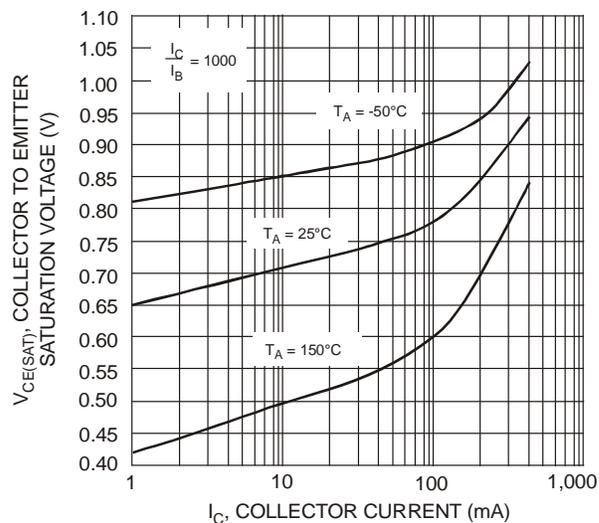


Fig. 2, Collector Emitter Saturation Voltage vs. Collector Current

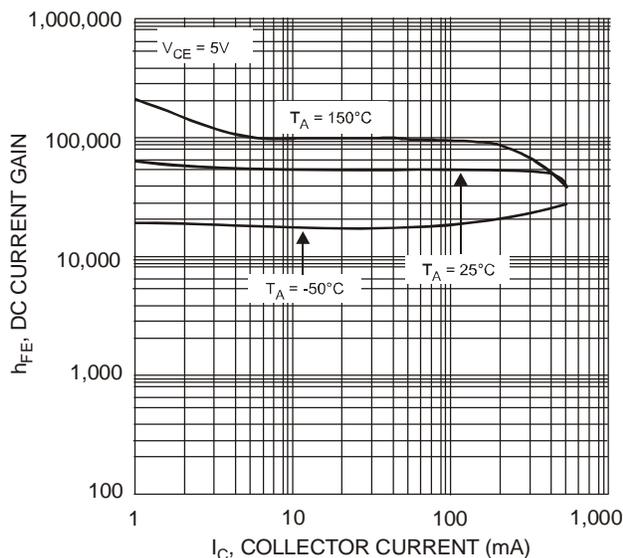


Fig. 3, DC Current Gain vs. Collector Current

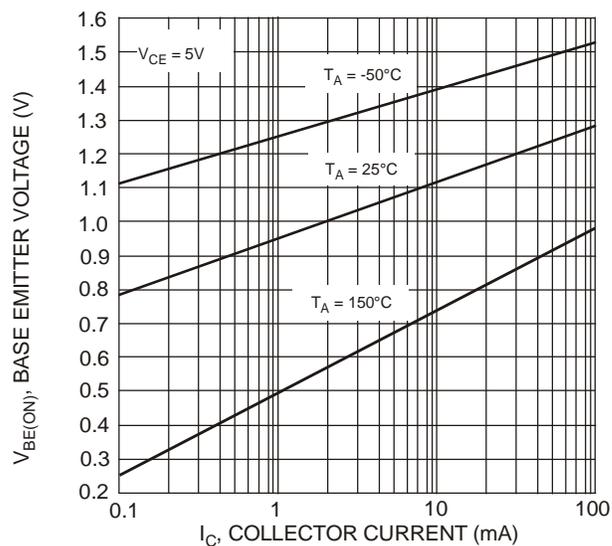


Fig. 4, Base Emitter Voltage vs. Collector Current

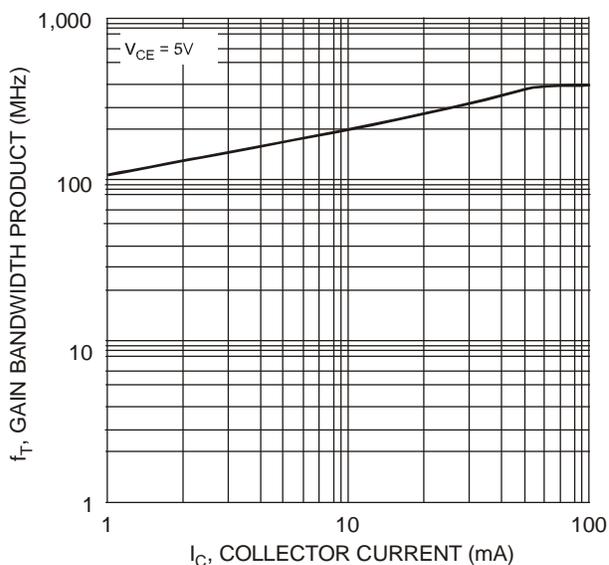
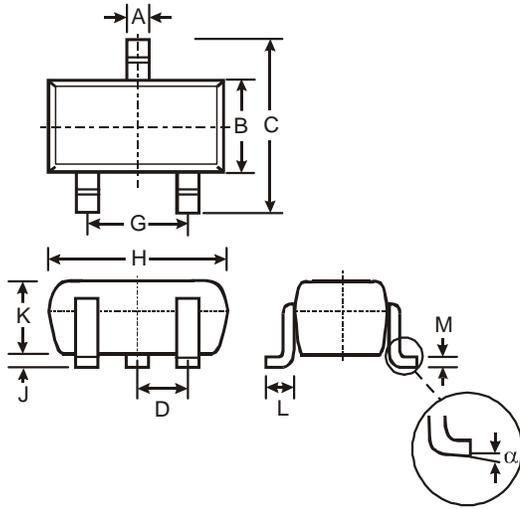


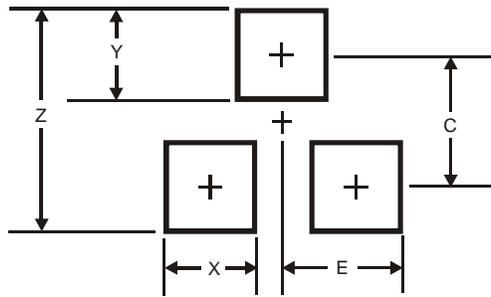
Fig. 5, Gain Bandwidth Product vs. Collector Current

**Package Outline Dimensions**



SOT323			
Dim	Min	Max	Typ
A	0.25	0.40	0.30
B	1.15	1.35	1.30
C	2.00	2.20	2.10
D	-	-	0.65
G	1.20	1.40	1.30
H	1.80	2.20	2.15
J	0.0	0.10	0.05
K	0.90	1.00	1.00
L	0.25	0.40	0.30
M	0.10	0.18	0.11
$\alpha$	0°	8°	-
All Dimensions in mm			

**Suggested Pad Layout**



Dimensions	Value (in mm)
Z	2.8
X	0.7
Y	0.9
C	1.9
E	1.0