



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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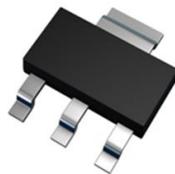
Features

- Ideally Suited for Automated Assembly Processes
- Ultra Low Collector-Emitter Saturation Voltage
- Complementary NPN Type Available: DIODES™ NK- DSS60601MZ4
- Ideal for Medium Power Switching or Amplification Applications

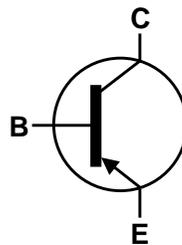
Mechanical Data

- Package: SOT223
- Package 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 (G3)
- Weight: 0.112 grams (Approximate)

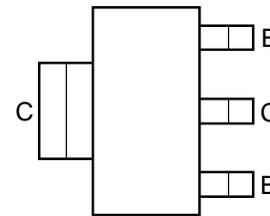
SOT223



Top View



Device Symbol



Top View
Pin-Out

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CB0}	-100	V
Collector-Emitter Voltage	V_{CE0}	-60	V
Emitter-Base Voltage	V_{EB0}	-7	V
Continuous Collector Current	I_C	-6	A
Peak Pulse Current	I_{CM}	-12	A

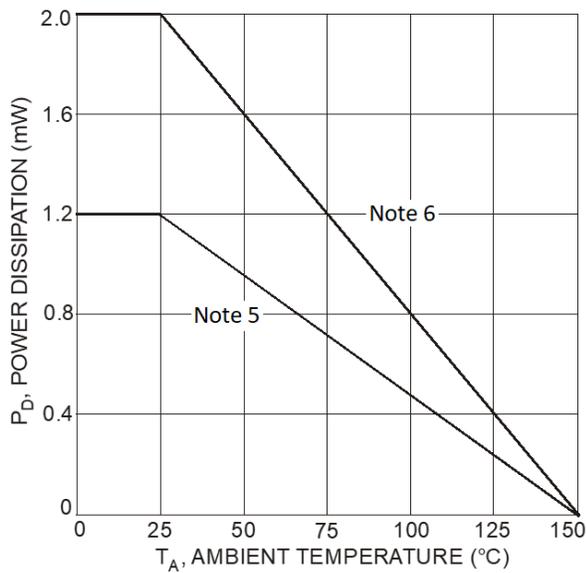
Thermal Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation	P_D	1.2	W
		2	W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	104	$^\circ\text{C/W}$
		62.5	$^\circ\text{C/W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

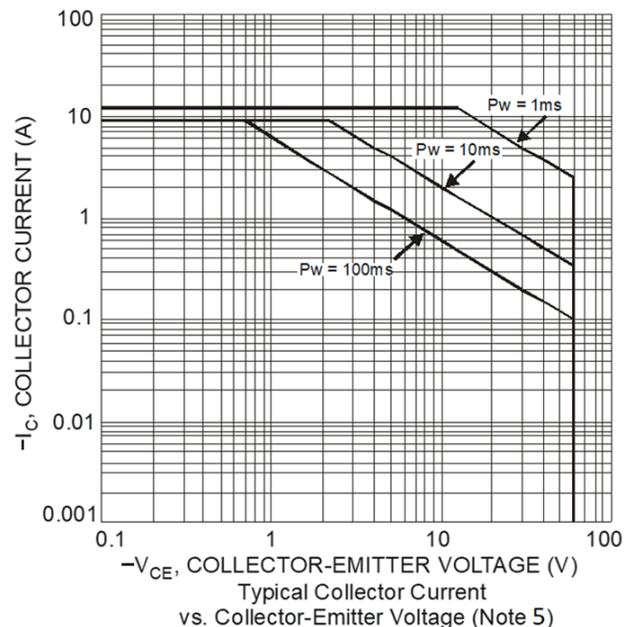
ESD Ratings (Note 7)

Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

Notes: 5. Device mounted on FR-4 PCB with minimum recommended pad layout.
 6. Device mounted on Polyimide PCB with 330mm² 2oz. copper pad layout.
 7. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics and Derating Information


Power Dissipation vs. Ambient Temperature



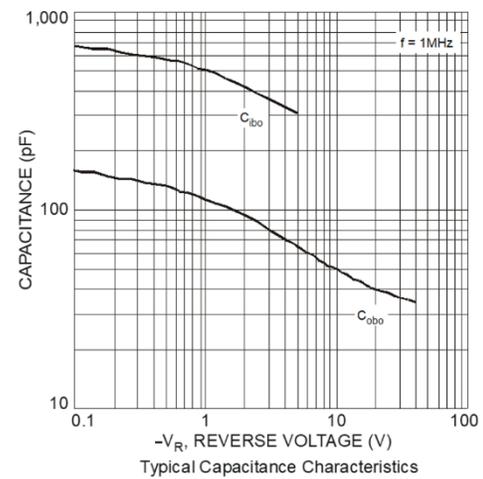
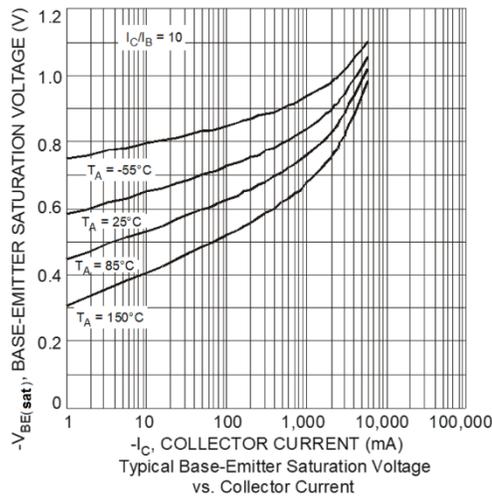
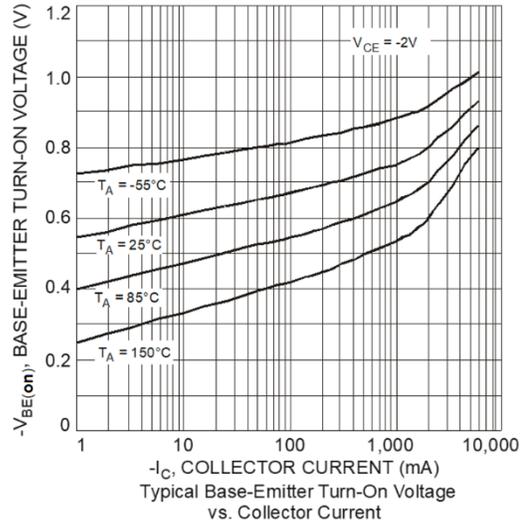
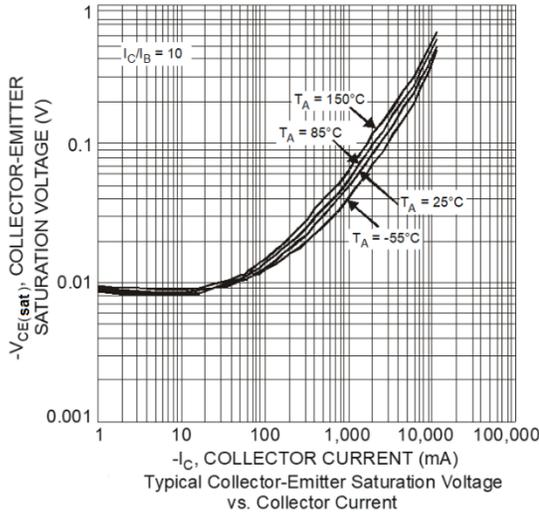
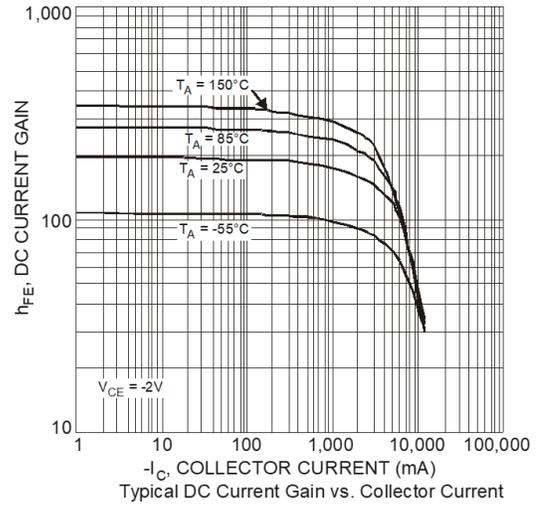
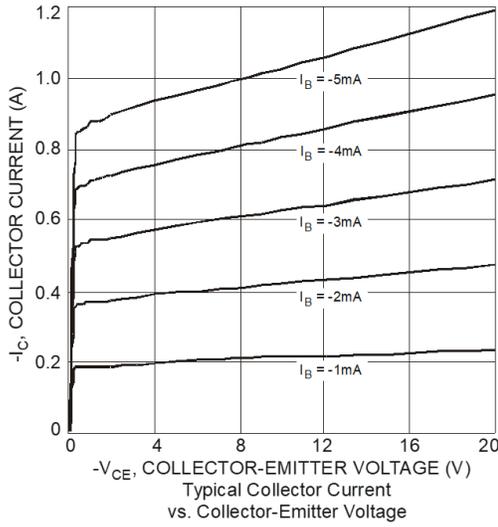
Typical Collector Current vs. Collector-Emitter Voltage (Note 5)

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

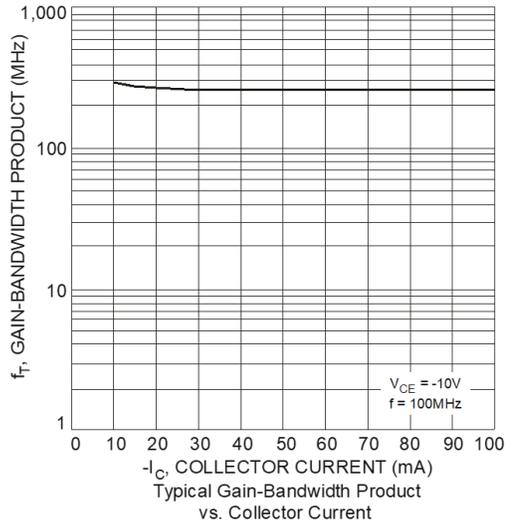
Characteristic	Symbol	Min	Typ	Max	Unit	Test Conditions
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV_{CBO}	-100	—	—	V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 8)	BV_{CEO}	-60	—	—	V	$I_C = -10\text{mA}$
Emitter-Base Breakdown Voltage	BV_{EBO}	-7	—	—	V	$I_E = -100\mu\text{A}$
Collector-Base Cutoff Current	I_{CBO}	—	—	-100	nA	$V_{CB} = -100\text{V}$
		—	—	-50	μA	$V_{CB} = -100\text{V}, T_A = +150^\circ\text{C}$
Emitter-Base Cutoff Current	I_{EBO}	—	—	-100	nA	$V_{EB} = -6\text{V}$
ON CHARACTERISTICS (Note 8)						
DC Current Gain	h_{FE}	150	—	—	—	$V_{CE} = -2\text{V}, I_C = -0.5\text{A}$
		120	—	360		$V_{CE} = -2\text{V}, I_C = -1\text{A}$
		100	—	—		$V_{CE} = -2\text{V}, I_C = -2\text{A}$
		70	—	—		$V_{CE} = -2\text{V}, I_C = -6\text{A}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	—	—	-50	mV	$I_C = -0.1\text{A}, I_B = -2\text{mA}$
		—	-50	-70		$I_C = -1\text{A}, I_B = -100\text{mA}$
		—	-90	-120		$I_C = -2\text{A}, I_B = -200\text{mA}$
		—	—	-250		$I_C = -3\text{A}, I_B = -60\text{mA}$
		—	—	-350		$I_C = -6\text{A}, I_B = -600\text{mA}$
Equivalent On-Resistance	$R_{CE(sat)}$	—	45	60	m Ω	$I_C = -2\text{A}, I_B = -200\text{mA}$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	—	—	-1.0	V	$I_C = 1\text{A}, I_B = -100\text{mA}$
Base-Emitter Turn-on Voltage	$V_{BE(on)}$	—	—	-0.9	V	$V_{CE} = -2\text{V}, I_C = -1\text{A}$
SMALL SIGNAL CHARACTERISTICS						
Transition Frequency	f_T	100	—	—	MHz	$V_{CE} = -10\text{V}, I_C = -100\text{mA}, f = 100\text{MHz}$
Output Capacitance	C_{obo}	—	50	—	pF	$V_{CB} = -10\text{V}, f = 1\text{MHz}$
Input Capacitance	C_{ibo}	—	300	—	pF	$V_{EB} = -5\text{V}, f = 1\text{MHz}$
SWITCHING CHARACTERISTICS						
Turn-On Time	t_{on}	—	350	—	ns	$V_{CC} = -30\text{V}, I_C = -750\text{mA}, I_{B1} = -15\text{mA}$
Delay Time	t_d	—	180	—	ns	
Rise Time	t_r	—	170	—	ns	
Turn-Off Time	t_{off}	—	400	—	ns	$V_{CC} = -30\text{V}, I_C = -750\text{mA}, I_{B1} = -I_{B2} = -15\text{mA}$
Storage Time	t_s	—	300	—	ns	
Fall Time	t_f	—	100	—	ns	

 Note: 8. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.

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

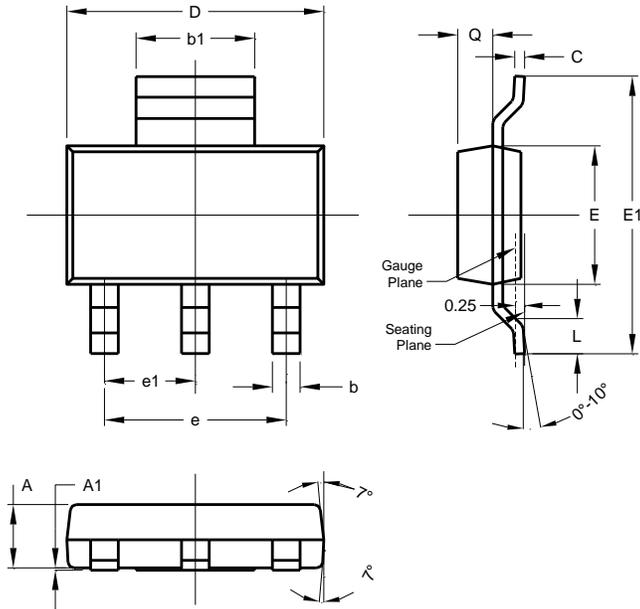


Typical Electrical Characteristics (continued)



Package Outline Dimensions

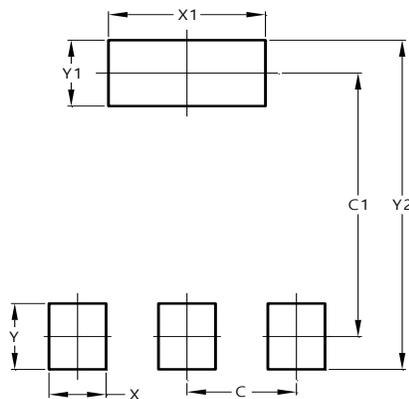
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Dim	Min	Max	Typ
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b	0.60	0.80	0.70
b1	2.90	3.10	3.00
C	0.20	0.30	0.25
D	6.45	6.55	6.50
E	3.45	3.55	3.50
E1	6.90	7.10	7.00
e	-	-	4.60
e1	-	-	2.30
L	0.85	1.05	0.95
Q	0.84	0.94	0.89
All Dimensions in mm			

Suggested Pad Layout

SOT223



Dimensions	Value (in mm)
C	2.30
C1	6.40
X	1.20
X1	3.30
Y	1.60
Y1	1.60
Y2	8.00