优尚

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

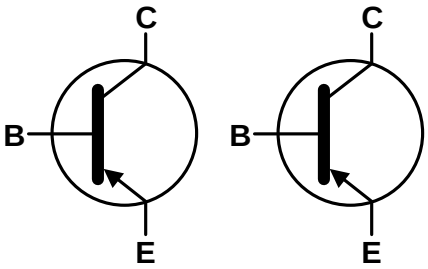
- BV_{CEO} > -40V
- I_C = -200mA High Collector Current
- Epitaxial Planar Die Construction
- Ideal for Medium Power Amplification and Switching
- Ultra-Small Surface Mount Package
- Complementary NPN Type: NK-MMDT3904

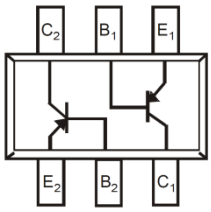
Mechanical Data

- Case: SOT363
- Case Material: Molded Plastic, “Green” Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Finish; Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.006 grams (Approximate)

SOT363

Top View





Device Schematic
Top View

Absolute Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	-40	V
Collector-Emitter Voltage	V_{CEO}	-40	V
Emitter-Base Voltage	V_{EBO}	-5	V
Collector Current	I_C	-200	mA

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P_D	200	mW
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	625	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

ESD Ratings (Note 6)

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. For the device mounted on minimum recommended pad layout FR-4 PCB with high coverage of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
6. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristic and Derating Information

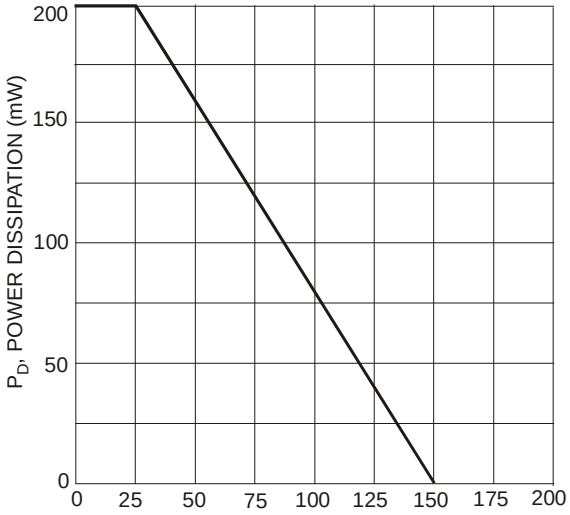


Fig. 1, Power Dissipation vs. Ambient Temperature (Total Device)

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Max	Unit	Test Condition
OFF CHARACTERISTICS					
Collector-Base Breakdown Voltage	BV_{CBO}	-40	—	V	I_C = -10μA, I_E = 0
Collector-Emitter Breakdown Voltage (Note 7)	BV_{CEO}	-40	—	V	I_C = -1mA, I_B = 0
Emitter-Base Breakdown Voltage	BV_{EBO}	-5	—	V	I_E = -10μA, I_C = 0
Collector Cut-Off Current	I_{CEX}	—	-50	nA	V_{CE} = -30V, $V_{EB(OFF)}$ = -3.0V
Base Cut-Off Current	I_{BL}	—	-50	nA	V_{CE} = -30V, $V_{EB(OFF)}$ = -3.0V
ON CHARACTERISTICS (Note 7)					
DC Current Gain	h_{FE}	60 80 100 60 30	— — 300 — —	—	I_C = -100μA, V_{CE} = -1V I_C = -1.0mA, V_{CE} = -1V I_C = -10mA, V_{CE} = -1V I_C = -50mA, V_{CE} = -1V I_C = -100mA, V_{CE} = -1V
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	—	-0.25 -0.40	V	I_C = -10mA, I_B = -1mA I_C = -50mA, I_B = -5mA
Base-Emitter Saturation Voltage	$V_{BE(SAT)}$	-0.65 —	-0.85 -0.95	V	I_C = -10mA, I_B = -1mA I_C = -50mA, I_B = -5mA
SMALL SIGNAL CHARACTERISTICS					
Output Capacitance	C_{OBO}	—	4.5	pF	V_{CB} = -5.0V, f = 1.0MHz, I_E = 0
Input Capacitance	C_{IBO}	—	10	pF	V_{EB} = -0.5V, f = 1.0MHz, I_C = 0
Input Impedance	h_{ie}	2	12	kΩ	V_{CE} = -10V, I_C = -1.0mA, f = 1.0kHz
Voltage Feedback Ratio	h_{re}	0.1	10	x 10^{-4}	
Small Signal Current Gain	h_{fe}	100	400	—	
Output Admittance	h_{oe}	3	60	μS	
Current Gain-Bandwidth Product	f_T	250	—	MHz	V_{CE} = -20V, I_C = -10mA, f = 100MHz
Noise Figure	N_F	—	4.0	dB	V_{CE} = -5.0V, I_C = -100μA, R_S = 1.0kΩ, f = 1.0kHz
SWITCHING CHARACTERISTICS					
Delay Time	t_D	—	35	ns	V_{CC} = -3.0V, I_C = -10mA, I_{B1} = I_{B2} = -1.0mA
Rise Time	t_R	—	35	ns	
Storage Time	t_S	—	200	ns	
Fall Time	t_F	—	50	ns	

Note: 7. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

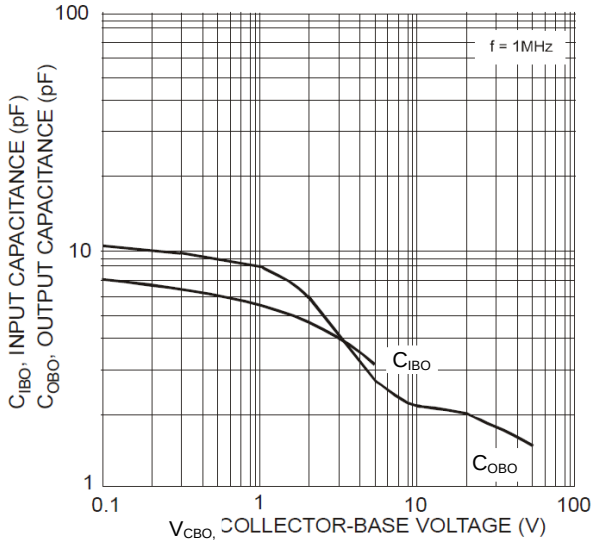


Fig. 2, Input and Output Capacitance vs. Collector-Base Voltage

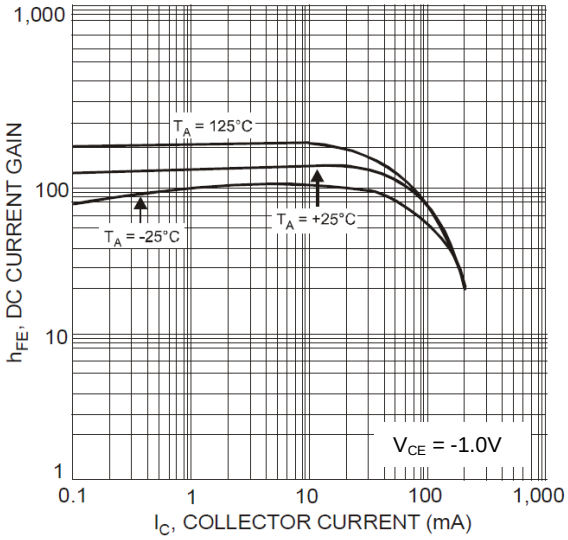


Fig. 3, Typical DC Current Gain vs. Collector Current

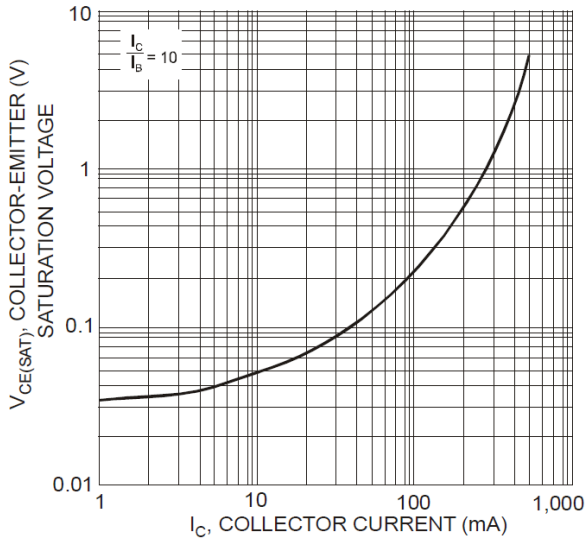


Fig. 4, Typical Collector-Emitter Saturation Voltage vs. Collector Current

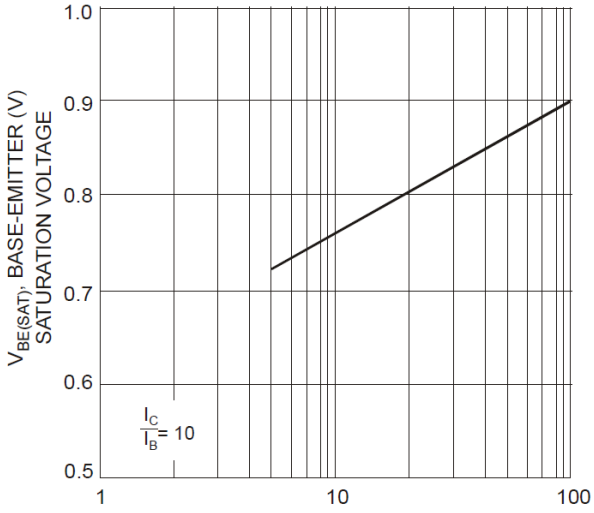


Fig. 5, Typical Base-Emitter Saturation Voltage vs. Collector Current

Package Outline Dimensions

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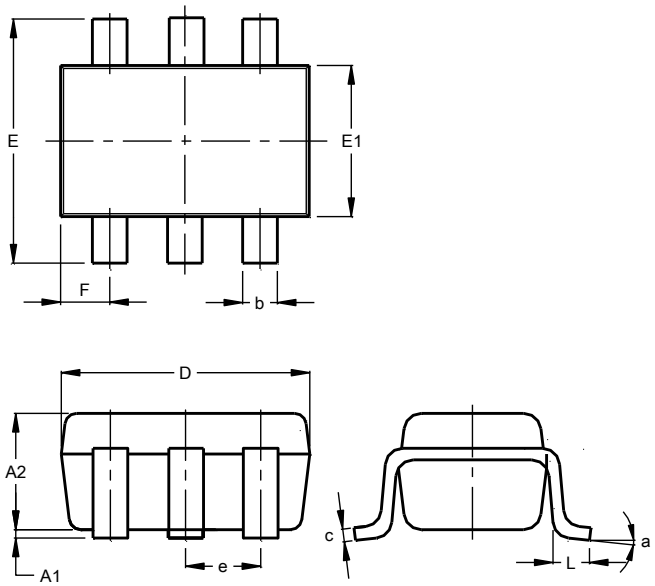

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Dim	**Min**	**Max**	**Typ**
A1	0.00	0.10	0.05
A2	0.90	1.00	1.00
b	0.10	0.30	0.25
c	0.10	0.22	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
F	0.40	0.45	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

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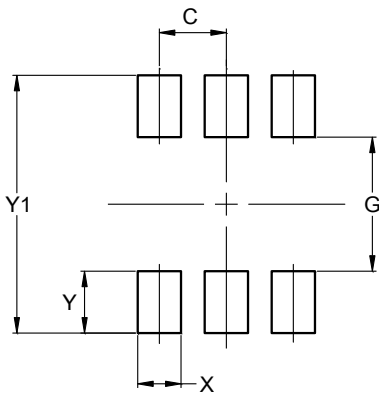

Dimensions	Value (in mm)
C	0.650
G	1.300
X	0.420
Y	0.600
Y1	2.500