



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
- Pair of NPN Transistors that are Intrinsically Matched (Note 1)
- 2% Matching on Current Gain (h_{FE})
- 2mV Matching on Base-Emitter Voltage (V_{BE})
- Fully Internally Isolated in a Small Surface Mount Package

Mechanical Data

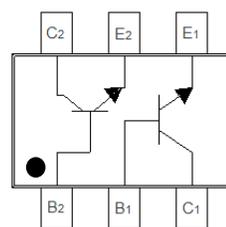
- Package: SOT363
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin Finish. Solderable per MIL-STD-202, Method 208 
- Weight: 0.006 grams (Approximate)

Applications

- Current mirrors
- Differential and instrumentation amplifiers
- Comparators



Top View



Device Schematic and Pin-Out
Top View

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CB0}	60	V
Collector-Emitter Voltage	V_{CEO}	40	V
Emitter-Base Voltage	V_{EBO}	6.0	V
Collector Current	I_C	200	mA

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

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6) Total Device	P_D	200	mW
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	625	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-65 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:
6. For a device mounted on minimum recommended pad layout with 1oz copper that is on a single-sided 1.6mm FR-4 PCB; the device is measured under still air conditions whilst operating in a steady-state.
 7. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics – Total Device

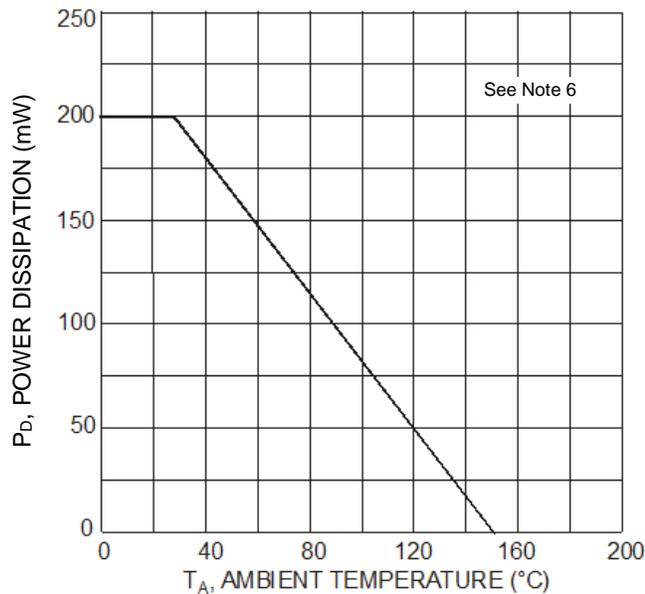


Figure 1. Power Derating Curve (Total Device)

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV_{CBO}	60	—	—	V	$I_C = 100\mu\text{A}, I_E = 0$
Collector-Emitter Breakdown Voltage (Note 8)	BV_{CEO}	40	—	—	V	$I_C = 1.0\text{mA}, I_B = 0$
Emitter-Base Breakdown Voltage	BV_{EBO}	6.0	—	—	V	$I_E = 100\mu\text{A}, I_C = 0$
Collector Cutoff Current	I_{CEX}	—	—	50	nA	$V_{CE} = 30\text{V}, V_{EB(OFF)} = 3.0\text{V}$
Base Cutoff Current	I_{BL}	—	—	50	nA	$V_{CE} = 30\text{V}, V_{EB(OFF)} = 3.0\text{V}$
ON CHARACTERISTICS (Note 8)						
DC Current Gain	h_{FE}	40 70 100 60 30	—	— — 300 — —	—	$I_C = 100\mu\text{A}, V_{CE} = 1.0\text{V}$ $I_C = 1.0\text{mA}, V_{CE} = 1.0\text{V}$ $I_C = 10\text{mA}, V_{CE} = 1.0\text{V}$ $I_C = 50\text{mA}, V_{CE} = 1.0\text{V}$ $I_C = 100\text{mA}, V_{CE} = 1.0\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	—	—	200 300	mV	$I_C = 10\text{mA}, I_B = 1.0\text{mA}$ $I_C = 50\text{mA}, I_B = 5.0\text{mA}$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	650 —	—	850 950	mV	$I_C = 10\text{mA}, I_B = 1.0\text{mA}$ $I_C = 50\text{mA}, I_B = 5.0\text{mA}$
MATCHING CHARACTERISTICS						
DC Current Gain Matching (Note 9)	h_{FE1} / h_{FE2}	—	1	2	%	$I_C = 2\text{mA}, V_{CE} = 5\text{V}$
Base-Emitter Voltage Matching (Note 10)	$V_{BE1} - V_{BE2}$	—	1	2	mV	$I_C = 2\text{mA}, V_{CE} = 5\text{V}$
Collector-Emitter Saturation Voltage (Note 9)	$V_{CE(sat)1} / V_{CE(sat)2}$	—	1	2	%	$I_C = 10\text{mA}, I_B = 1.0\text{mA}$
Base-Emitter Saturation Voltage (Note 9)	$V_{BE(sat)1} / V_{BE(sat)2}$	—	1	2	%	$I_C = 10\text{mA}, I_B = 1.0\text{mA}$
SMALL SIGNAL CHARACTERISTICS						
Output Capacitance	C_{obo}	—	—	4.0	pF	$V_{CB} = 5.0\text{V}, f = 1.0\text{MHz}, I_E = 0$
Input Capacitance	C_{ibo}	—	—	8.0	pF	$V_{EB} = 0.5\text{V}, f = 1.0\text{MHz}, I_C = 0$
Input Impedance	h_{ie}	1.0	—	10	k Ω	$V_{CE} = 10\text{V}, I_C = 1.0\text{mA}, f = 1.0\text{kHz}$
Voltage Feedback Ratio	h_{re}	0.5	—	8	$\times 10^{-4}$	
Small Signal Current Gain	h_{fe}	100	—	400	—	
Output Admittance	h_{oe}	1.0	—	40	μS	
Current Gain-Bandwidth Product	f_T	300	—	—	MHz	$V_{CE} = 20\text{V}, I_C = 10\text{mA}, f = 100\text{MHz}$
Noise Figure	NF	—	—	5.0	dB	$V_{CE} = 5.0\text{V}, I_C = 100\mu\text{A}, R_S = 1.0\text{k}\Omega, f = 1.0\text{kHz}$
SWITCHING CHARACTERISTICS						
Delay Time	t_d	—	—	35	ns	$V_{CC} = 3.0\text{V}, I_C = 10\text{mA}, V_{BE(on)} = -0.5\text{V}, I_{B1} = 1.0\text{mA}$
Rise Time	t_r	—	—	35	ns	
Storage Time	t_s	—	—	200	ns	$V_{CC} = 3.0\text{V}, I_C = 10\text{mA}, I_{B1} = -I_{B2} = 1.0\text{mA}$
Fall Time	t_f	—	—	50	ns	

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

9. Is the ratio of one transistor compared to the other transistor.

10. $V_{BE1} - V_{BE2}$ is the absolute difference of one transistor compared to the other transistor.

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

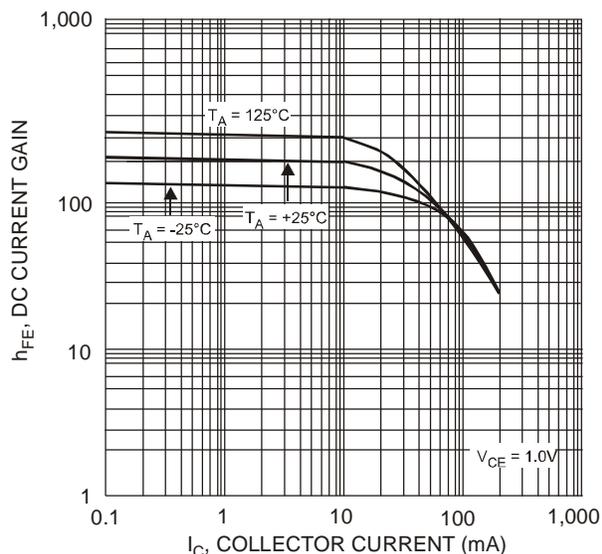


Figure 2. Typical DC Current Gain vs. Collector Current

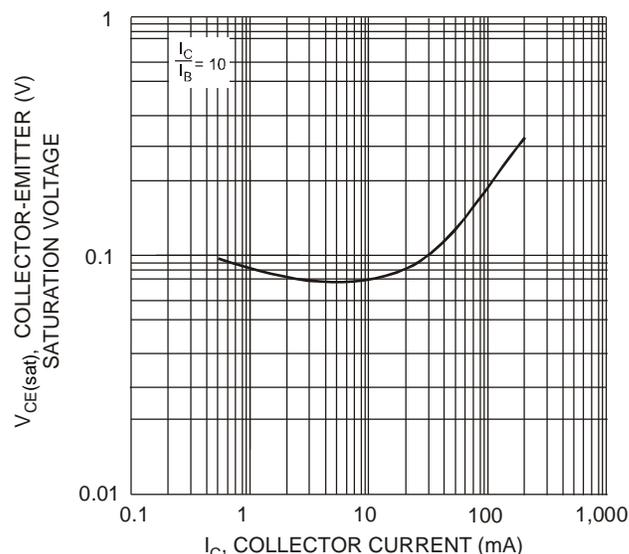


Figure 3. Typical Collector-Emitter Saturation Voltage vs. Collector Current

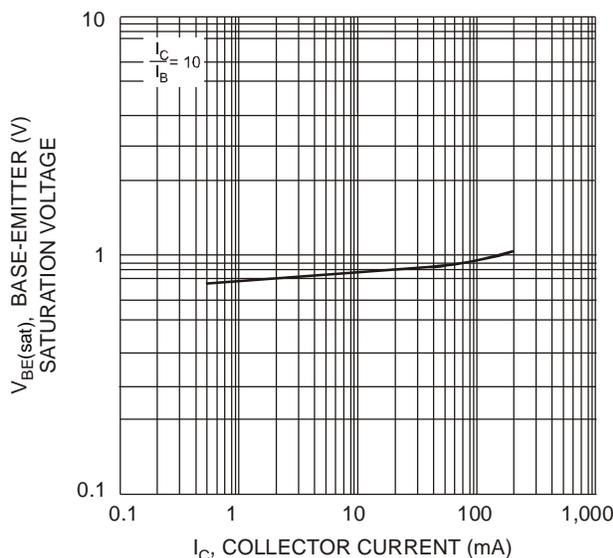


Figure 4. Typical Base-Emitter Saturation Voltage vs. Collector Current

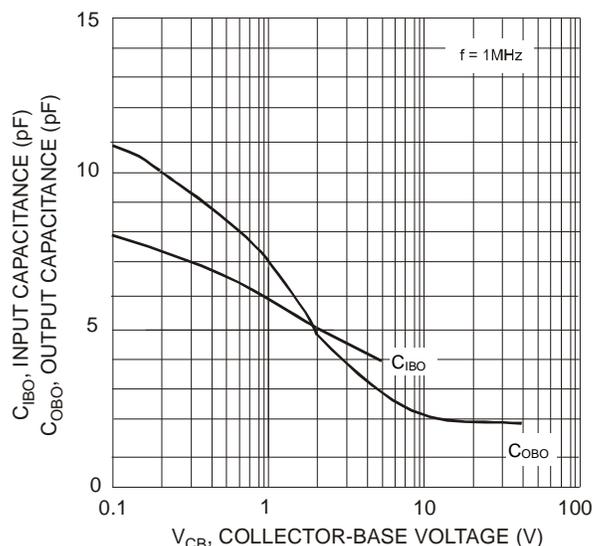
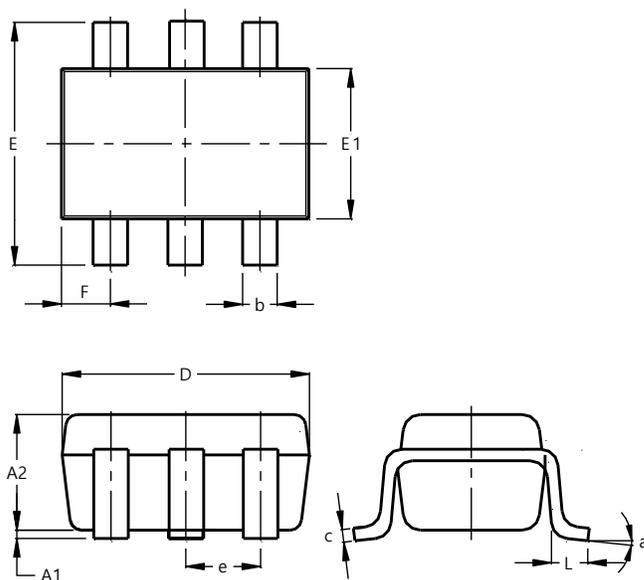


Figure 5. Input and Output Capacitance vs. Collector-Base Voltage

Package Outline Dimensions

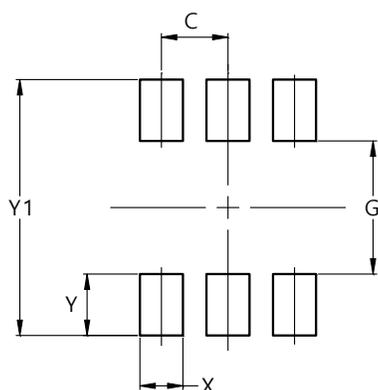
SOT363



SOT363			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
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

SOT363



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