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

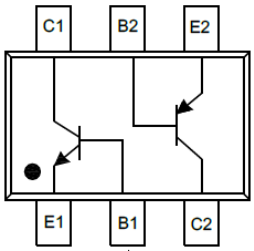
- BV_{CEO} >40V
- I_C = 200mA High Collector Current
- Ultra-Small Surface Mount Package
- Ideal for Low Power Amplification and Switching

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 e3
- Weight: 0.006 grams (Approximate)

SOT363

Top View



Device Schematic and Pinout
Top View

E2, B2, C2 = PNP
E1, B1, C1 = NPN

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	60	V
Collector-Emitter Voltage	V_{CEO}	40	V
Emitter-Base Voltage	V_{EBO}	6	V
Collector Current	I_C	200	mA

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

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

Note: 5. For a device mounted on minimum recommended pad layout with 1oz copper that is on a single-sided 1.6mm FR4 PCB; the device is measured under still air conditions whilst operating in a steady-state.

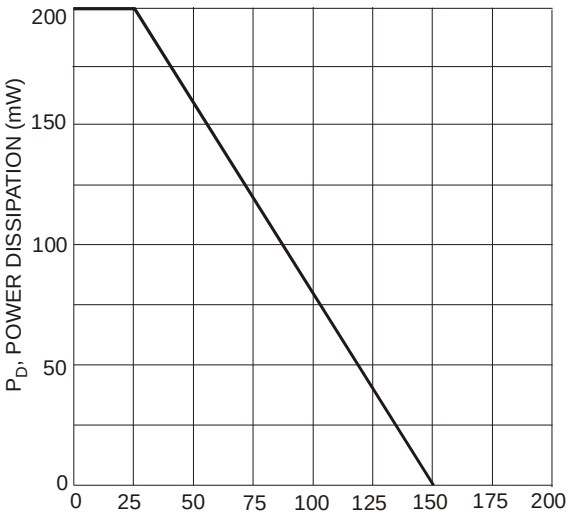


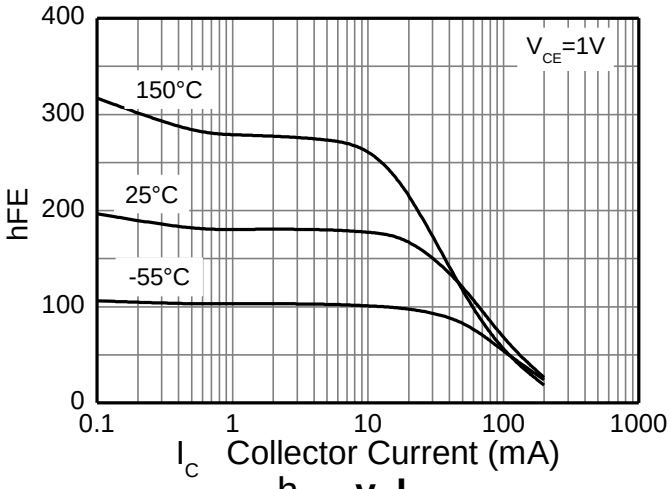
Fig. 1, Power Dissipation vs. Ambient Temperature (Total Device)

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

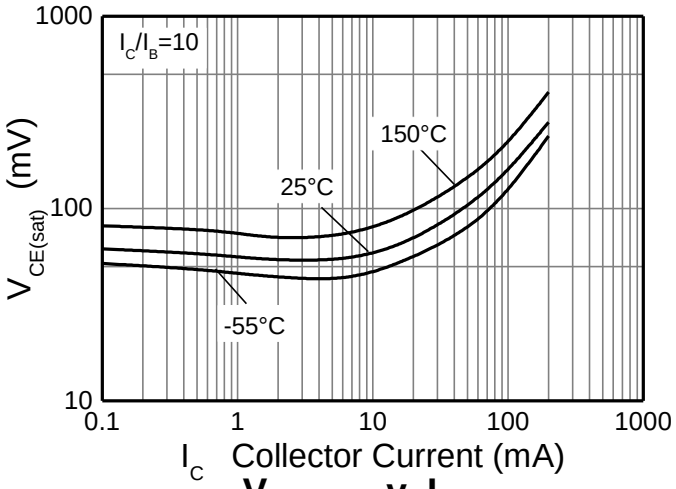
Characteristic	Symbol	Min	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 6)					
Collector-Base Breakdown Voltage	BV_{CBO}	60	—	V	I_C = 10μA, I_E = 0
Collector-Emitter Breakdown Voltage	BV_{CEO}	40	—	V	I_C = 1mA, I_B = 0
Emitter-Base Breakdown Voltage	BV_{EBO}	6	—	V	I_E = 10μA, I_C = 0
Collector Cutoff Current	I_{CEX}	—	50	nA	V_{CE} = 30V, $V_{EB(OFF)}$ = 3V
Base Cutoff Current	I_{BL}	—	50	nA	V_{CE} = 30V, $V_{EB(OFF)}$ = 3V
ON CHARACTERISTICS (Note 6)					
Static Forward Current Transfer Ratio	h_{FE}	40 70 100 60 30	— — 300 — —	—	I_C = 100μA, V_{CE} = 1V I_C = 1mA, 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	$V_{CE(sat)}$	—	0.20 0.30	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	pF	V_{CB} = 5V, f = 1MHz, I_E = 0
Input Capacitance	C_{ibo}	—	8	pF	V_{EB} = 0.5V, f = 1MHz, I_C = 0
Input Impedance	h_{ie}	1	10	kΩ	V_{CE} = 10V, I_C = 1mA, f = 1kHz
Voltage Feedback Ratio	h_{re}	0.5	8	x 10^{-4}	
Small Signal Current Gain	h_{fe}	100	400	—	
Output Admittance	h_{oe}	1	40	μS	
Current Gain-Bandwidth Product	f_T	300	—	MHz	V_{CE} = 20V, I_C = 20mA, f = 100MHz
Noise Figure	NF	—	5.0	dB	V_{CE} = 5V, I_C = 100μA, R_S = 1kΩ, f = 1kHz
SWITCHING CHARACTERISTICS					
Delay Time	t_d	—	35	ns	V_{CC} = 3V, I_C = 10mA, $V_{BE(off)}$ = 0.5V, I_{B1} = 1mA
Rise Time	t_r	—	35	ns	
Storage Time	t_s	—	200	ns	V_{CC} = 3V, I_C = 10mA, I_{B1} = -I_{B2} = 1mA
Fall Time	t_f	—	50	ns	

Note: 6. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%

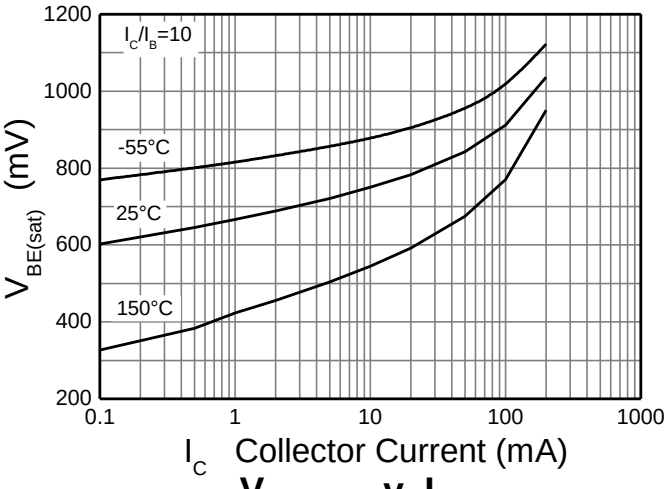
Typical Electrical Characteristics, NPN (@ T_A = +25°C unless otherwise specified.)



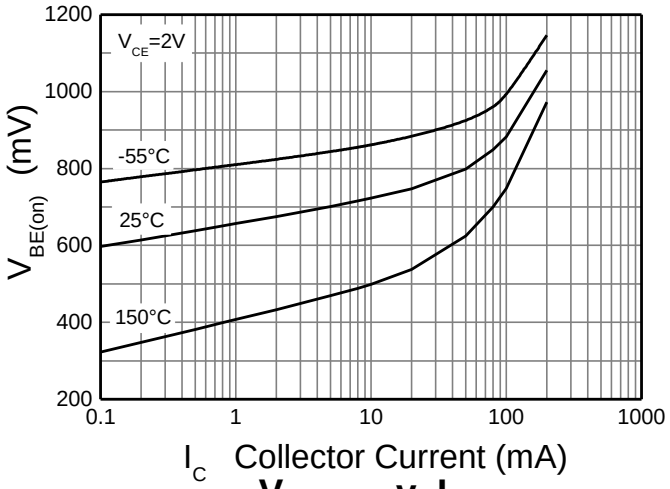
h_{FE} v I_C



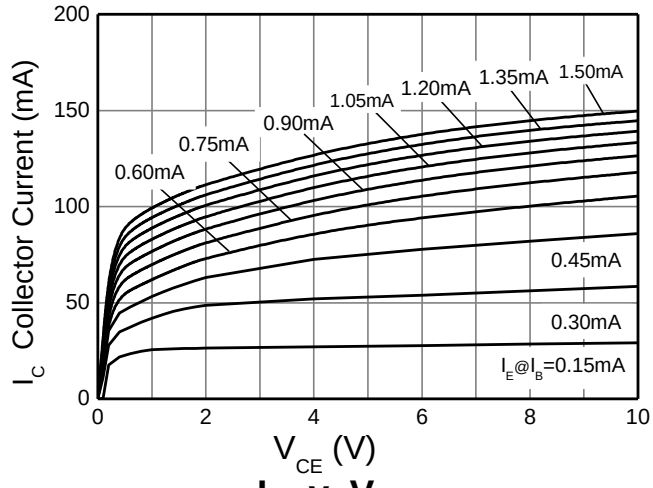
$V_{CE(sat)}$ v I_C



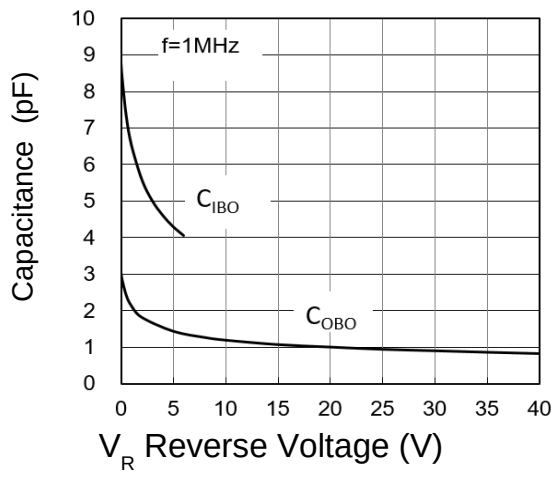
$V_{BE(sat)}$ v I_C



$V_{BE(on)}$ v I_C



I_C v V_{CE}



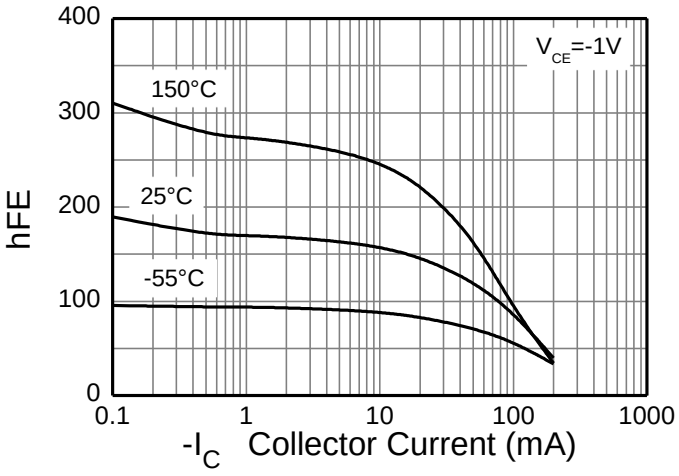
Capacitance v V_R

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

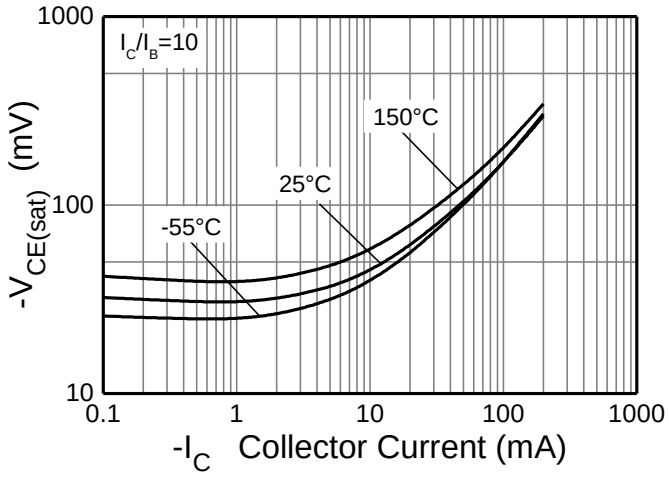
Characteristic	Symbol	Min	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 6)					
Collector-Base Breakdown Voltage	BV_{CBO}	-40	—	V	I_C = -10μA, I_E = 0
Collector-Emitter Breakdown Voltage	BV_{CEO}	-40	—	V	I_C = -1mA, I_B = 0
Emitter-Base Breakdown Voltage	BV_{EBO}	-5	—	V	I_E = -10μA, I_C = 0
Collector Cutoff Current	I_{CEX}	—	-50	nA	V_{CE} = -30V, $V_{EB(OFF)}$ = -3V
Base Cutoff Current	I_{BL}	—	-50	nA	V_{CE} = -30V, $V_{EB(OFF)}$ = -3V
ON CHARACTERISTICS (Note 6)					
Static Forward Current Transfer Ratio	h_{FE}	60 80 100 60 30	— — 300 — —	—	I_C = -100μA, V_{CE} = -1V I_C = -1mA, 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} = -5V, f = 1MHz, I_E = 0
Input Capacitance	C_{ibo}	—	10	pF	V_{EB} = -0.5V, f = 1MHz, I_C = 0
Input Impedance	h_{ie}	2	12	kΩ	V_{CE} = -10V, I_C = -1mA, f = 1kHz
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	NF	—	4	dB	V_{CE} = -5V, I_C = -100μA, R_S = 1kΩ, f = 1kHz
SWITCHING CHARACTERISTICS					
Delay Time	t_d	—	35	ns	V_{CC} = -3V, I_C = -10mA, $V_{BE(off)}$ = -0.5V, I_{B1} = -1mA
Rise Time	t_r	—	35	ns	
Storage Time	t_s	—	225	ns	V_{CC} = -3V, I_C = -10mA, I_{B1} = $-I_{B2}$ = -1mA
Fall Time	t_f	—	75	ns	

Note: 6. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%

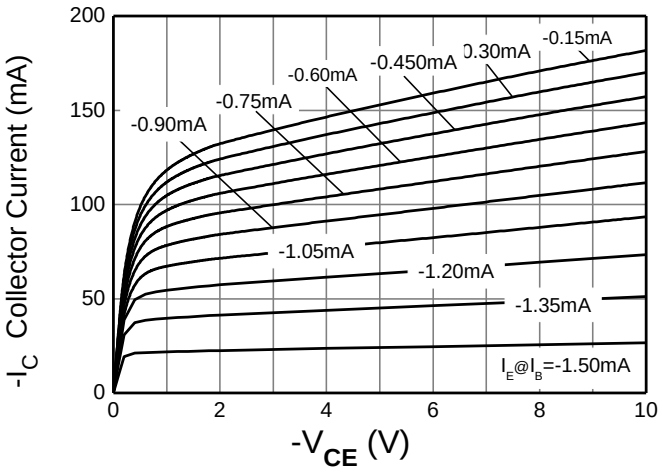
Typical Electrical Characteristics, PNP (@ T_A = +25°C unless otherwise specified.)



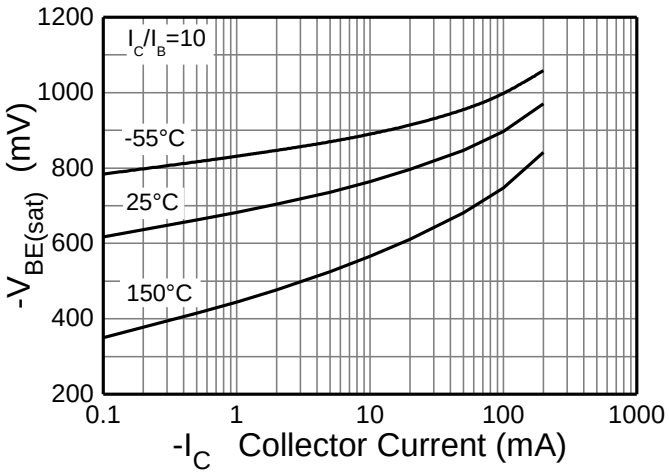
h_{FE} v I_C



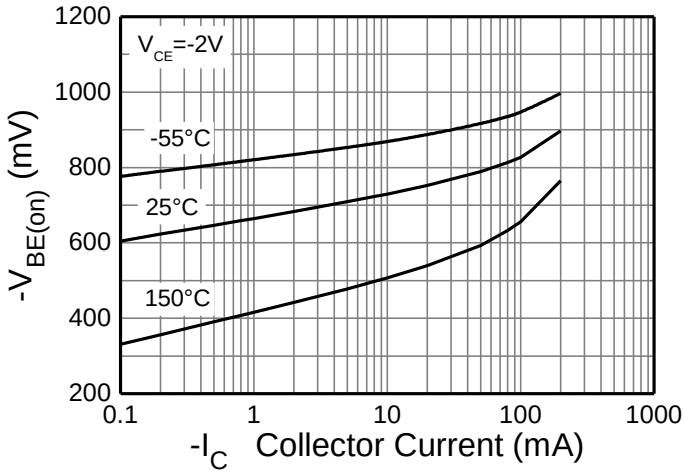
$V_{CE(sat)}$ v I_C



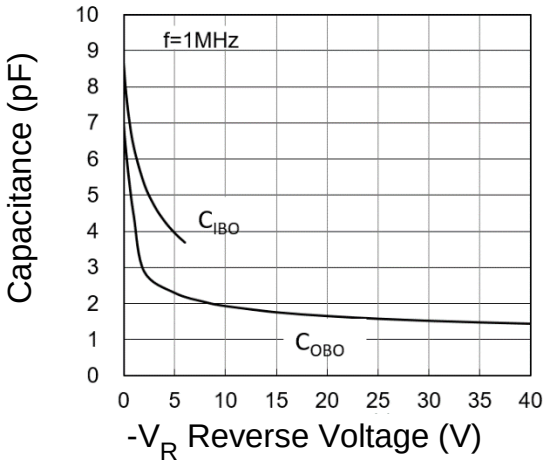
I_C v V_{CE}



$V_{BE(sat)}$ v I_C

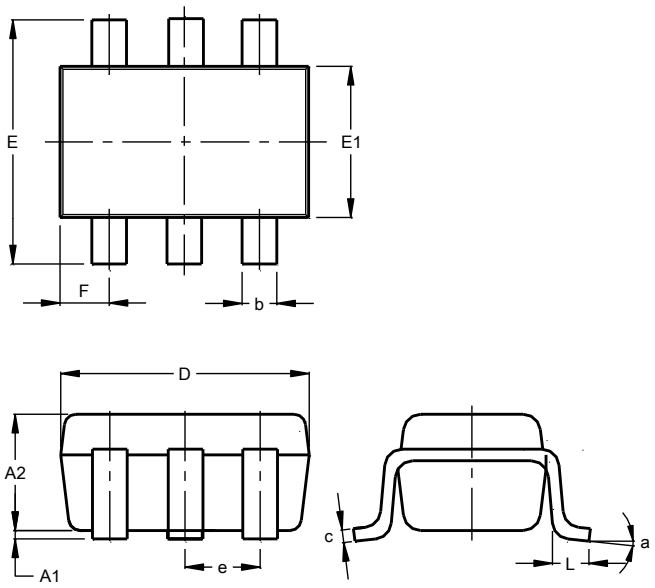


$V_{BE(on)}$ v I_C



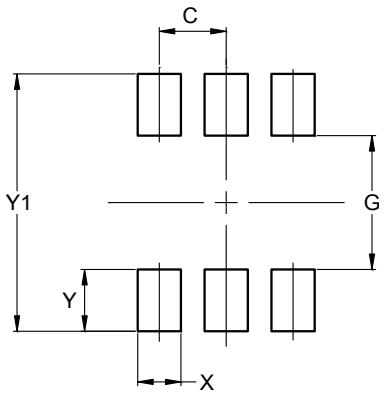
Capacitance v V_R

Package Outline Dimensions



SOT363			
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



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