



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

0755-83047638

ysbdt@szyoushang.cn

www.szyoushang.cn



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Description

This Bipolar Junction Transistor (BJT) is designed to meet the stringent requirement of Automotive Applications.

Features

- $BV_{CEO} > 60V$
- Maximum Continuous Collector Current $I_C = 5A$
- $V_{CE(SAT)} < 45mV @ 1A$
- $R_{CE(SAT)} = 25m\Omega$
- High Power Dissipation SOT23 (Type DN) Package
- High Peak Current
- Low Saturation Voltage
- 140V Forward Blocking Voltage
- Complementary Part Number NK-ZXTP2027FQ

Mechanical Data

- Case: SOT23
- Case 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 ②
- Weight: 0.008 grams (Approximate)

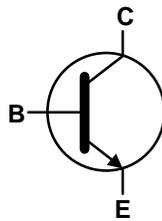
Applications

- MOSFET and IGBT Gate Driving
- Motor Drive
- Relay, Lamp and Solenoid Drive

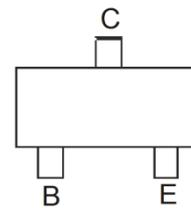
SOT23 (Type DN)



Top View



Device Symbol



Top View
Pin-Out

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CB0}	140	V
Collector-Emitter Voltage	V _{CEV}	140	V
Collector-Emitter Voltage	V _{CEO}	60	V
Emitter-Base Voltage	V _{EBO}	7	V
Continuous Collector Current	I _C	5	A
Base Current	I _B	1	A
Peak Pulse Current	I _{CM}	12	A

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

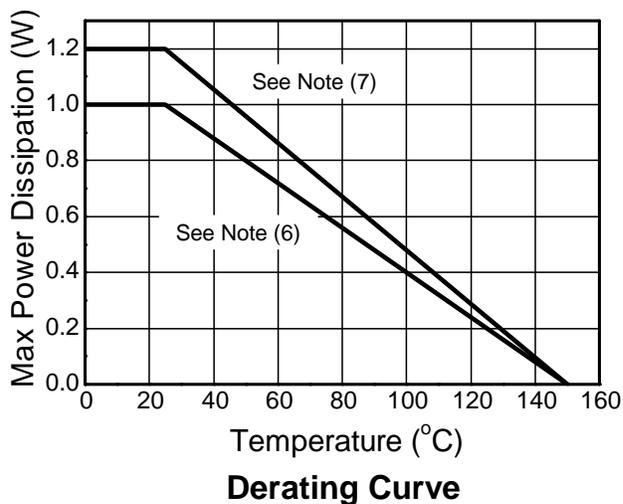
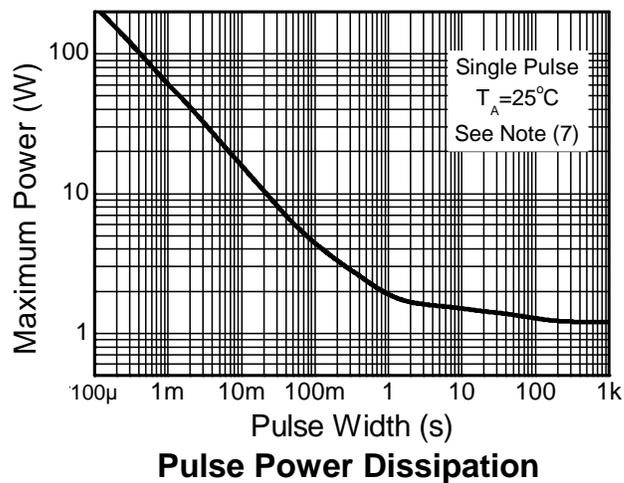
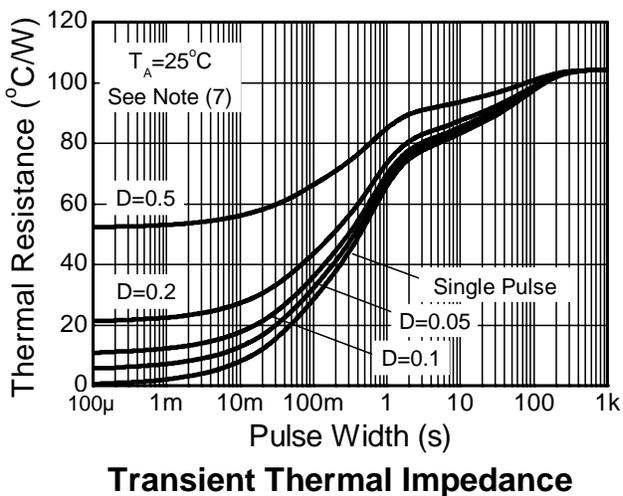
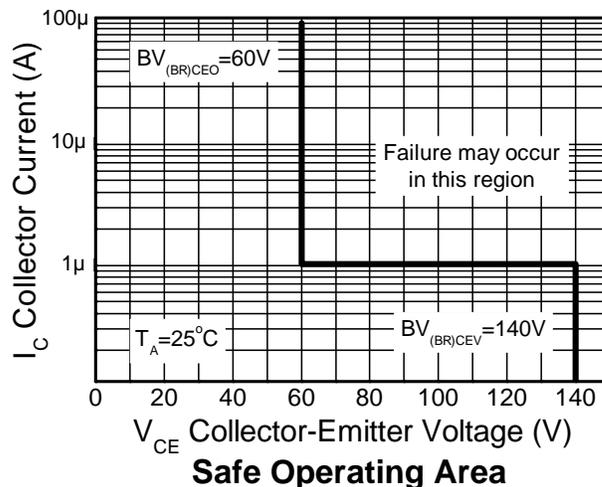
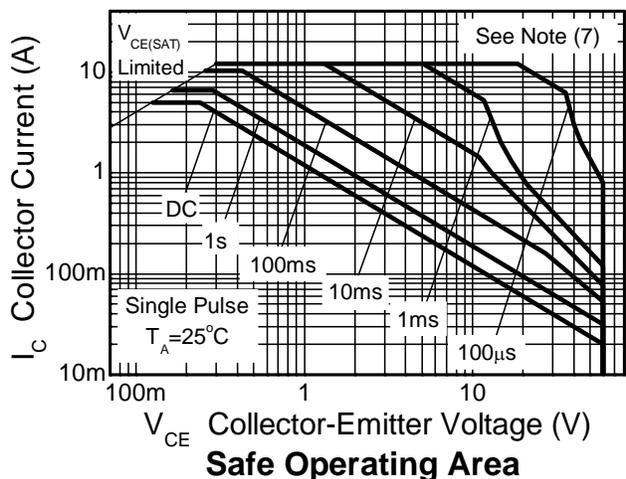
Characteristic	Symbol	Value	Unit
Power Dissipation Linear Derating Factor	P _D	1.0	W
		8.0	
		1.2	
		9.6	
Thermal Resistance, Junction to Ambient	R _{θJA}	1.56	°C/W
		12.5	
		125	
		104	
Operating and Storage Temperature Range	T _J , T _{STG}	80	°C
		-55 to +150	

ESD Ratings (Note 9)

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 with the collector lead on 18mm × 18mm 2oz copper that is on a single-sided 1.6mm FR-4 PCB; device is measured under still air conditions whilst operating in steady-state.
 7. Same as note (6), except the device is mounted on 30mm × 30mm 2oz copper.
 8. Same as note (6), except measured at t < 5 seconds.
 9. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

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

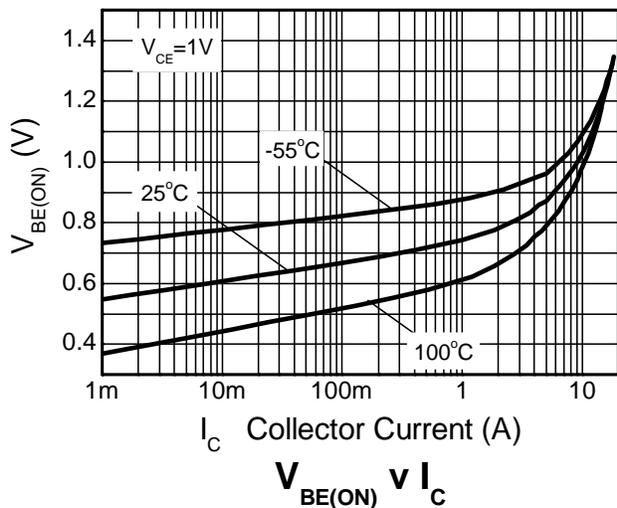
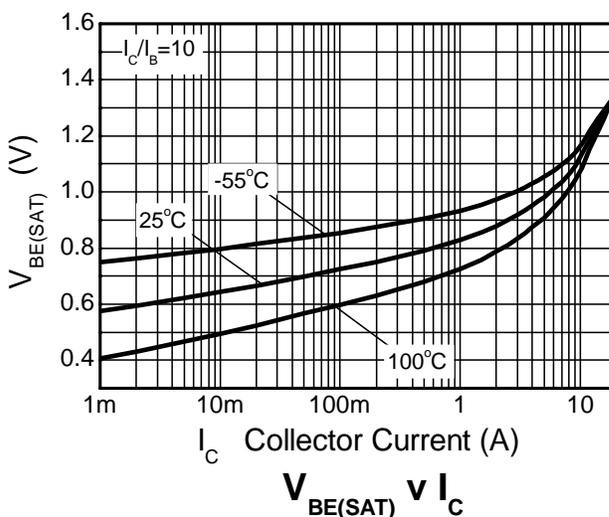
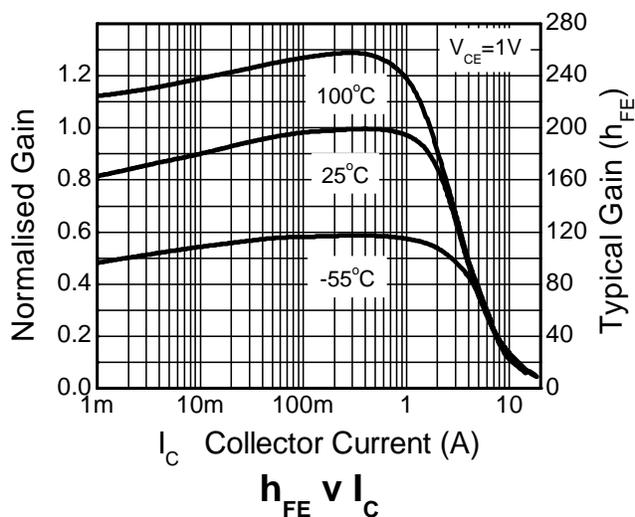
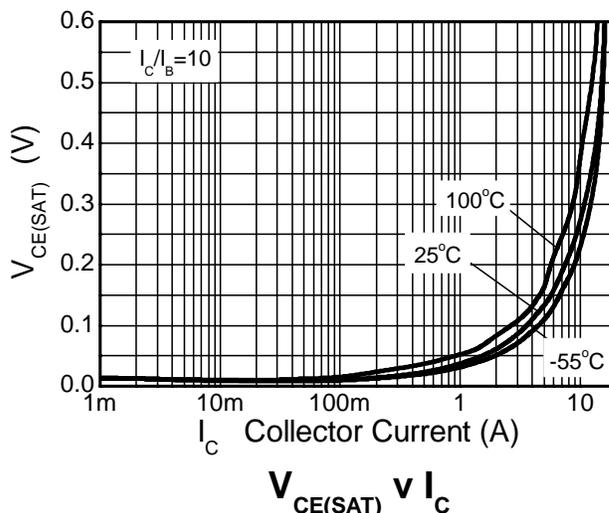
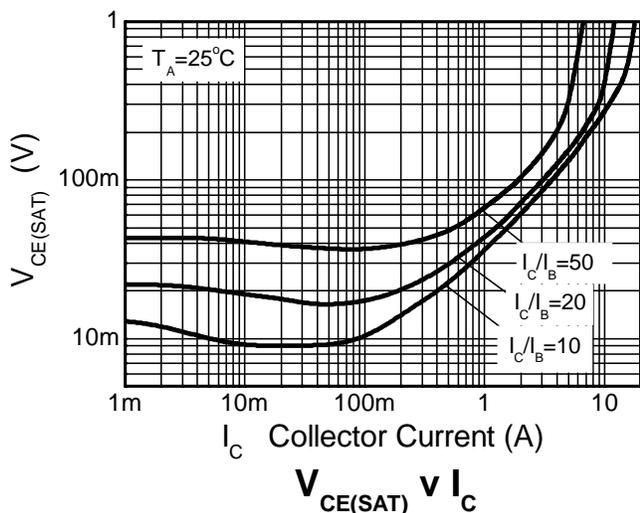


Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV _{CBO}	140	180	—	V	I _C = 100μA
Collector-Emitter Breakdown Voltage	BV _{CEV}	140	180	—	V	I _C = 1μA, -1V < V _{BE} < +0.3V
Collector-Emitter Breakdown Voltage (Note 10)	BV _{CEO}	60	80	—	V	I _C = 10mA
Emitter-Base Breakdown Voltage	BV _{EBO}	7	8	—	V	I _E = 100μA
Collector-Base Cutoff Current	I _{CBO}	—	< 1	50	nA	V _{CB} = 110V
Collector-Emitter Cutoff Current	I _{CEV}	—	< 1	100	nA	V _{CB} = 110V, V _{BE} = -1V
Emitter-Base Cutoff Current	I _{EBO}	—	< 1	10	nA	V _{EB} = 6V
Static Forward Current Transfer Ratio (Note 10)	h _{FE}	100	220	—	—	I _C = 10mA, V _{CE} = 1V
		100	200	300		I _C = 2A, V _{CE} = 1V
		40	65	—		I _C = 5A, V _{CE} = 1V
		15	25	—		I _C = 10A, V _{CE} = 1V
Collector-Emitter Saturation Voltage (Note 10)	V _{CE(SAT)}	—	15	30	mV	I _C = 0.1A, I _B = 5mA
		—	35	45		I _C = 1A, I _B = 100mA
		—	40	55		I _C = 1A, I _B = 50mA
		—	85	110		I _C = 2A, I _B = 50mA
		—	145	170		I _C = 5A, I _B = 250mA
		—	170	210		I _C = 6A, I _B = 300mA
Base-Emitter Saturation Voltage (Note 10)	V _{BE(SAT)}	—	0.92	1.00	V	I _C = 5A, I _B = 250mA
Base-Emitter Saturation Voltage (Note 10)	V _{BE(ON)}	—	0.85	0.95	V	I _C = 5A, V _{CE} = 1V
Output Capacitance	C _{OBO}	—	28	—	pF	V _{CB} = 10V, f = 1MHz
Transition Frequency	f _T	—	130	—	MHz	V _{CE} = 10V, I _C = 100mA, f = 50MHz
Turn-On Time	t _{ON}	—	33	—	ns	V _{CC} = 10V, I _C = 1A,
Turn-Off Time	t _{OFF}	—	668	—	ns	I _{B1} = -I _{B2} = 100mA

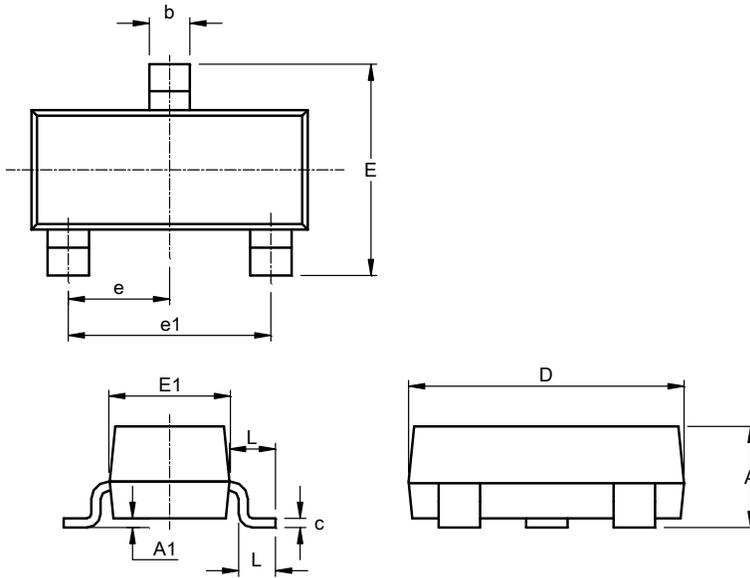
Note: 10. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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



Package Outline Dimensions

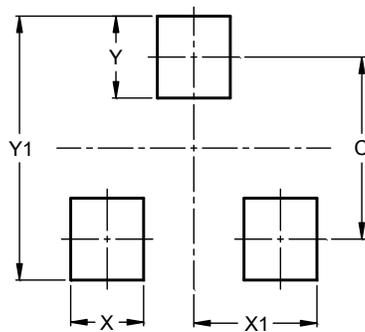
SOT23 (Type DN)



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Dim	Min	Max	Typ
A	0.89	1.12	1.00
A1	0.01	0.10	0.05
b	0.30	0.51	0.45
c	0.08	0.20	0.10
D	2.80	3.04	3.00
E	2.10	2.64	2.42
E1	1.20	1.40	1.37
e	0.95 REF		
e1	1.90 REF		
L	0.25	0.60	0.30
L1	0.45	0.62	0.54
All Dimensions in mm			

Suggested Pad Layout

SOT23 (Type DN)



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9