



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 requirements of automotive applications.

Features

- $BV_{CE0} > -60V$
- $I_C = -4A$ High Continuous Collector Current
- $I_{CM} = -10A$ Peak Pulse Current
- Low Saturation Voltage -60mV Max @ $I_C = -1A$.
- $R_{CE(sat)} = 45m\Omega$ at 1A for a Low Equivalent On-Resistance
- 1.2W Power Dissipation
- Complimentary NPN Type: NK-ZXTN2018FQ

Mechanical Data

- Case: SOT23
- 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 Plated Leads, Solderable per MIL-STD-202, Method 208 
- Weight 0.008 grams (Approximate)

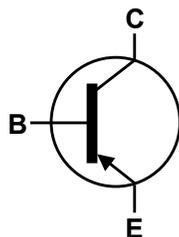
Application

- Gate Driving MOSFETs and IGBTs
- Motor Drive
- Relay, Lamp and Solenoid Drive
- High Side Switches

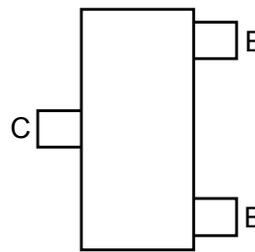
SOT23 (Type DN)



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_{CBO}	-100	V
Collector-Emitter Voltage	V_{CEV}	-100	V
Collector-Emitter Voltage	V_{CEO}	-60	V
Emitter-Base Voltage	V_{EBO}	-7	V
Peak Pulse Collector Current	I_{CM}	-10	A
Continuous Collector Current	I_C	-4	A
Base Current	I_B	-1	A

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

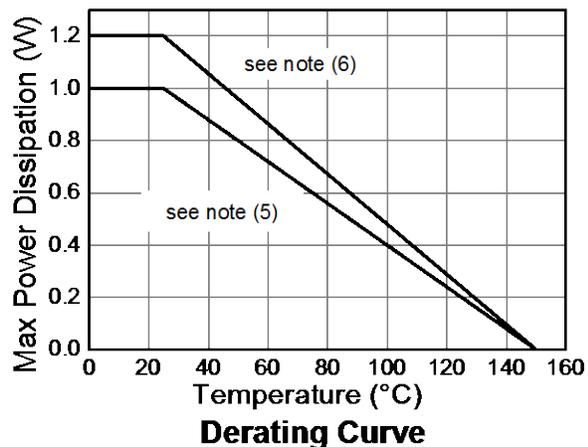
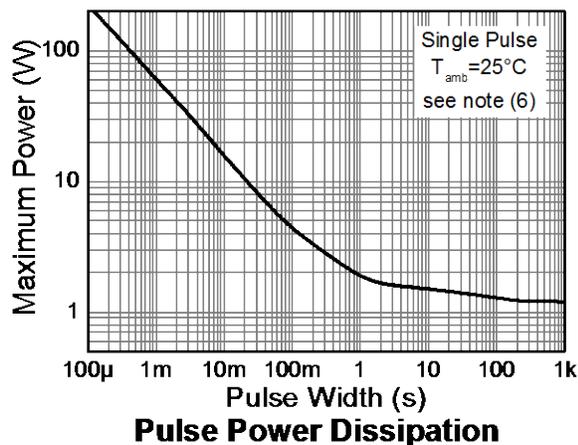
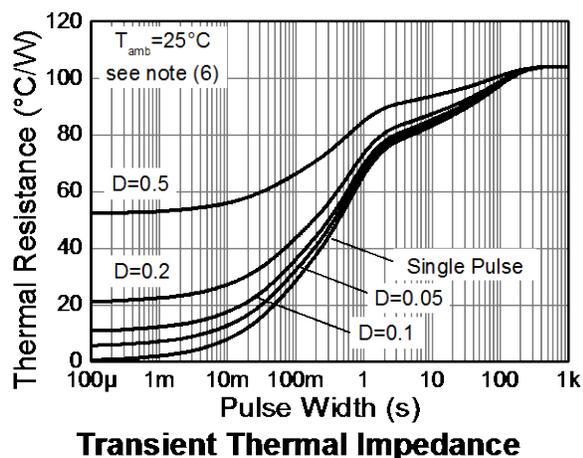
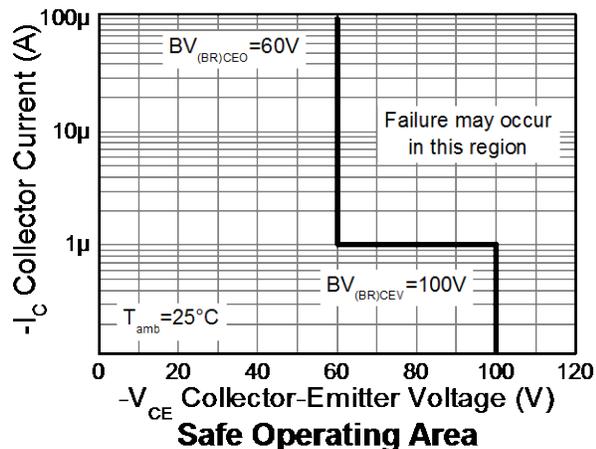
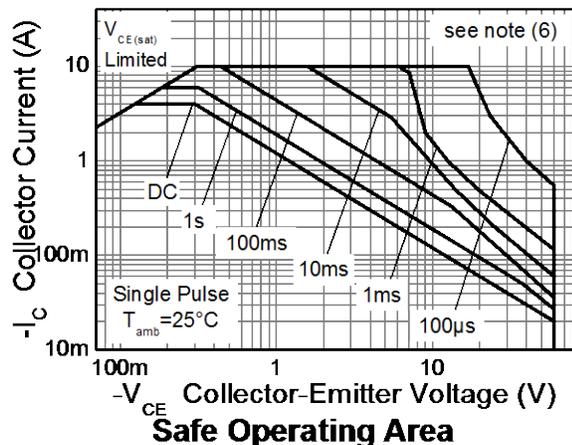
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P_D	1.0	W
Power Dissipation (Note 6)	P_D	1.2	W
Power Dissipation (Note 7)	P_D	1.56	W
Thermal Resistance, Junction to Ambient Air (Note 5)	$R_{\theta JA}$	125	$^{\circ}\text{C/W}$
Thermal Resistance, Junction to Ambient Air (Note 6)	$R_{\theta JA}$	104	$^{\circ}\text{C/W}$
Thermal Resistance, Junction to Ambient Air (Note 7)	$R_{\theta JA}$	80	$^{\circ}\text{C/W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^{\circ}\text{C}$

ESD Ratings (Note 8)

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:
- For a device mounted with the collector lead on 18mm x 18mm 2oz copper that is on a single-sided 1.6mm FR-4 PCB; device is measured under still air conditions whilst operating in a steady-state.
 - Same as note (5), except the device is mounted on 30mm x 30mm 2oz copper.
 - Same as note (6), except measured at $t < 5\text{secs}$.
 - Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics and Derating Information

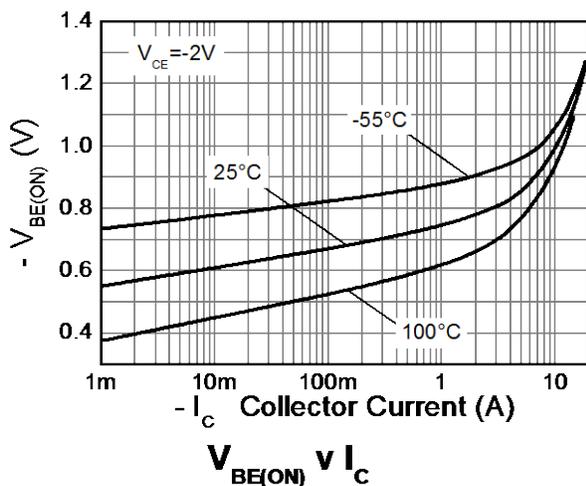
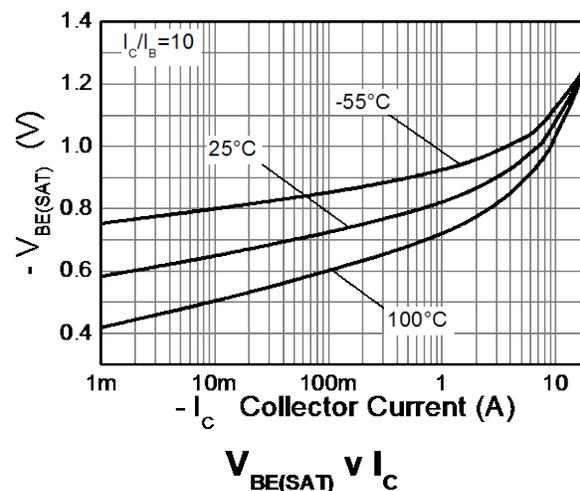
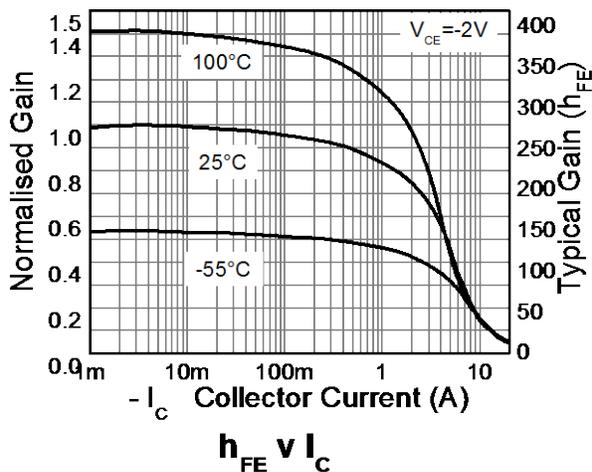
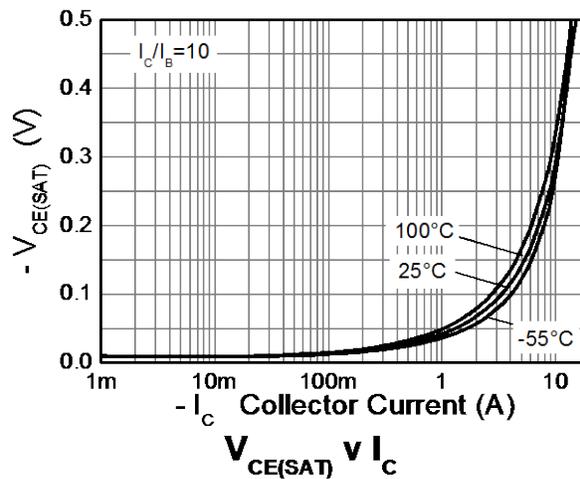
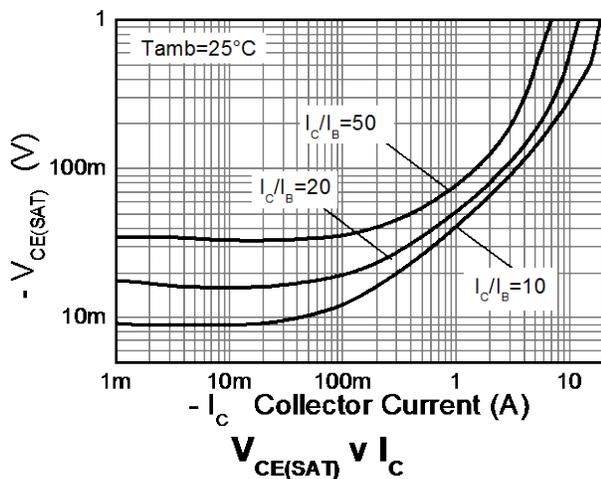


Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Conditions
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV_{CBO}	-100	-120	—	V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage	BV_{CEV}	-100	-120	—	V	$I_C = -1\mu\text{A}$, $1V > V_{BE} > -0.3V$
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	-60	-75	—	V	$I_C = -10\text{mA}$
Emitter-Base Breakdown Voltage	BV_{EBO}	-7.0	-8.2	—	V	$I_E = -100\mu\text{A}$
Collector-Emitter Cutoff Current	I_{CEV}	—	—	-20	nA	$V_{CE} = -80V$, $V_{BE} = 1V$
Collector-Base Cutoff Current	I_{CBO}	—	—	-20	nA	$V_{CB} = -80V$, $I_E = 0$
Emitter-Base Cutoff Current	I_{EBO}	—	—	-10	nA	$V_{EB} = -6V$, $I_C = 0$
ON CHARACTERISTICS (Note 9)						
DC Current Gain	h_{FE}	100	250	—	—	$V_{CE} = -2V$, $I_C = -10\text{mA}$
		100	200	300		$V_{CE} = -2V$, $I_C = -2A$
		80	145	—		$V_{CE} = -2V$, $I_C = -4A$
		20	40	—		$V_{CE} = -2V$, $I_C = -10A$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	—	-15	-25	mV	$I_C = -100\text{mA}$, $I_B = -10\text{mA}$
		—	-45	-60		$I_C = -1A$, $I_B = -100\text{mA}$
		—	-70	-95		$I_C = -2A$, $I_B = -200\text{mA}$
		—	-155	-240		$I_C = -4A$, $I_B = -200\text{mA}$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	—	-0.89	-1.0	V	$I_C = -4A$, $I_B = -200\text{mA}$
Base-Emitter Turn-On Voltage	$V_{BE(on)}$	—	-0.81	-0.95	V	$V_{CE} = -2V$, $I_C = -4A$
SMALL SIGNAL CHARACTERISTICS						
Switching times	t_d	—	12.6	—	ns	$V_{CC} = -10V$, $I_C = -2A$, $-I_{B1} = I_{B2} = -200\text{mA}$
	t_r	—	10.2	—		
	t_s	—	220	—		
	t_f	—	21	—		
Transition Frequency	f_t	—	165	—	MHZ	$V_{CE} = -10V$, $I_C = -100\text{mA}$, $f = 50\text{MHZ}$
Output Capacitance	C_{obo}	—	44	—	pF	$V_{CB} = -10V$, $f = 1\text{MHZ}$

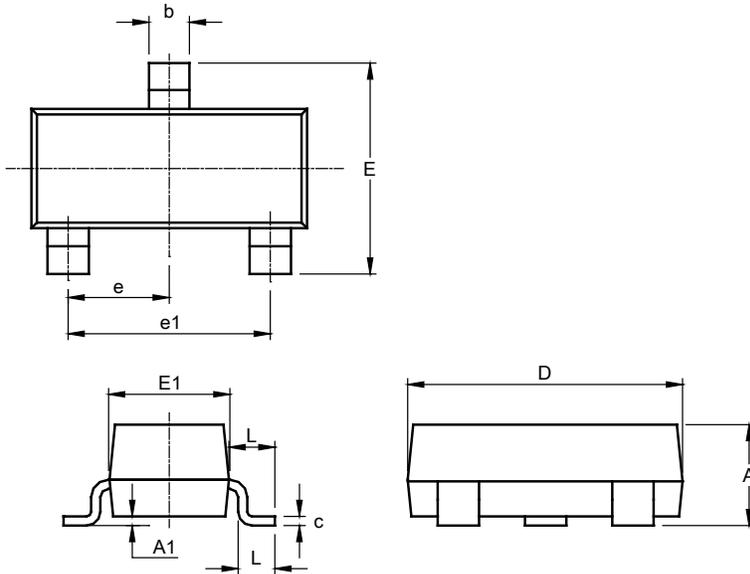
 Note: 9. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.

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



Package Outline Dimensions

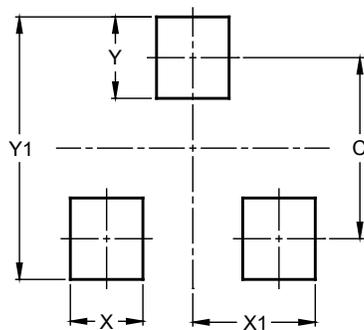
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Dim	Min	Max	Typ
A	0.89	1.12	1.00
A1	0.01	0.10	0.05
b	0.30	0.51	0.45
c	0.08	0.20	0.10
D	2.80	3.04	3.00
E	2.10	2.64	2.42
E1	1.20	1.40	1.37
e	0.95 REF		
e1	1.90 REF		
L	0.25	0.60	0.30
L1	0.45	0.62	0.54
All Dimensions in mm			

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