



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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## Summary

$BV_{(BR)CEX} > -180V$ ;  $BV_{(BR)CEO} > -140V$

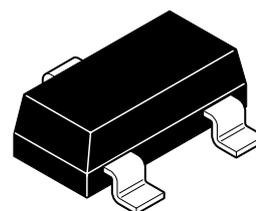
$BV_{(BR)ECO} > -7V$  ;

$I_{C(cont)} = -1A$

$R_{ce(sat)} = 180\text{ m}\Omega$  typical

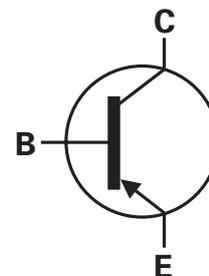
$V_{ce(sat)} < -260\text{mV @ } 1A$  ;

$P_D = 1.25W$



## Description

Advanced process capability and package design have been used to maximize the power handling and performance of this small outline transistor. The compact size and ratings of this device make it ideally suited to applications where space is at a premium.

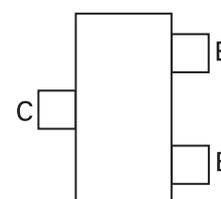


## Features

- High power dissipation SOT23 package
- 180V forward blocking voltage
- Low saturation voltage

## Applications

- DC-DC converters
- High side switching



Pinout - top view

### Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Collector-base voltage	$V_{CBO}$	-180	V
Collector-emitter voltage (forward blocking)	$V_{CEX}$	-180	V
Collector-emitter voltage	$V_{CEO}$	-140	V
Emitter-collector voltage (reverse blocking)	$V_{ECO}$	-7	V
Emitter-base voltage	$V_{EBO}$	-7	V
Continuous collector current <sup>(a)</sup>	$I_C$	-1	A
Peak pulse current	$I_{CM}$	-3	A
Power dissipation at $T_A=25^{\circ}C$ <sup>(a)</sup> Linear derating factor	$P_D$	0.73 5.84	W mW/ $^{\circ}C$
Power dissipation at $T_A=25^{\circ}C$ <sup>(b)</sup> Linear derating factor	$P_D$	1.05 8.4	W mW/ $^{\circ}C$
Power dissipation at $T_A=25^{\circ}C$ <sup>(c)</sup> Linear derating factor	$P_D$	1.25 9.6	W mW/ $^{\circ}C$
Power dissipation at $T_A=25^{\circ}C$ <sup>(d)</sup> Linear derating factor	$P_D$	1.81 14.5	W mW/ $^{\circ}C$
Operating and storage temperature range	$T_j, T_{stg}$	-55 to 150	$^{\circ}C$

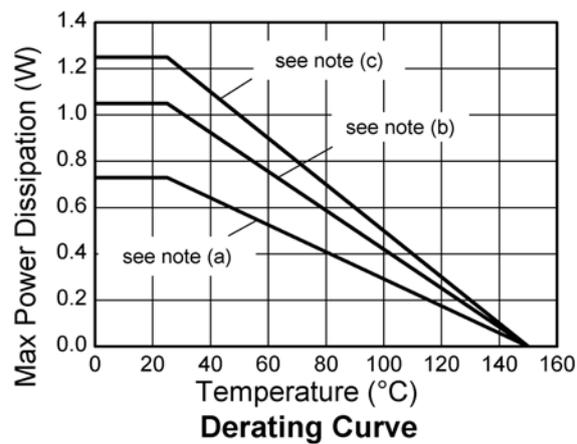
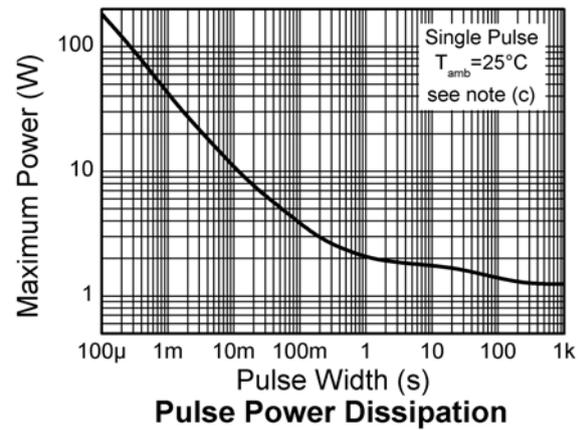
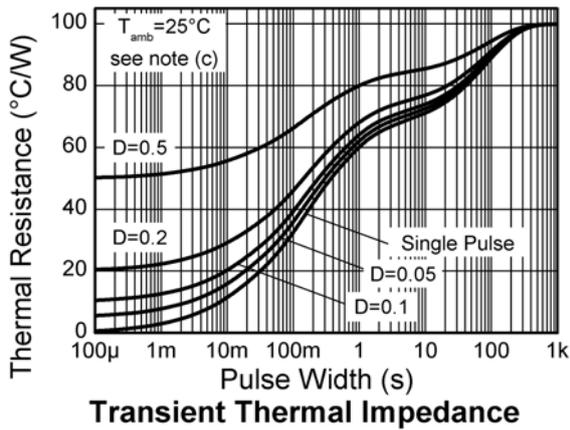
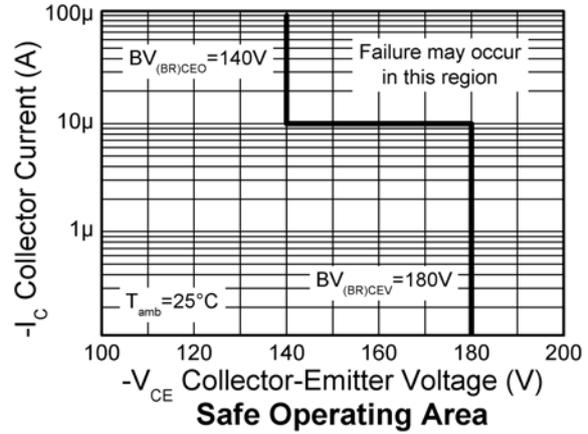
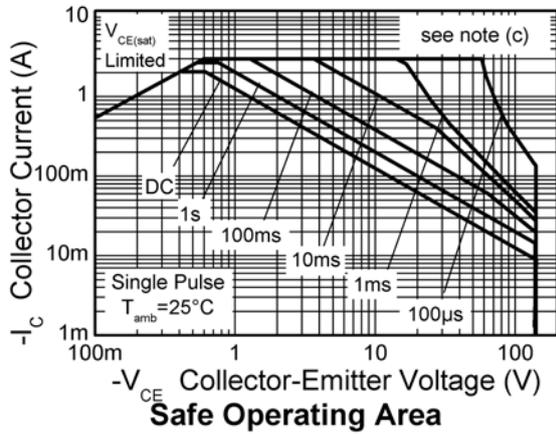
### Thermal resistance

Parameter	Symbol	Limit	Unit
Junction to ambient <sup>(a)</sup>	$R_{\theta JA}$	171	$^{\circ}C/W$
Junction to ambient <sup>(b)</sup>	$R_{\theta JA}$	119	$^{\circ}C/W$
Junction to ambient <sup>(c)</sup>	$R_{\theta JA}$	100	$^{\circ}C/W$
Junction to ambient <sup>(d)</sup>	$R_{\theta JA}$	69	$^{\circ}C/W$

#### NOTES:

- (a) For a device surface mounted on 15mm x 15mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.
- (b) Mounted on 25mm x 25mm x 1.6mm FR4 PCB with a high coverage of single sided 2 oz copper in still air conditions.
- (c) Mounted on 50mm x 50mm x 1.6mm FR4 PCB with a high coverage of single sided 2 oz copper in still air conditions.
- (d) As (c) above measured at  $t < 5$ secs.

**Characteristics**



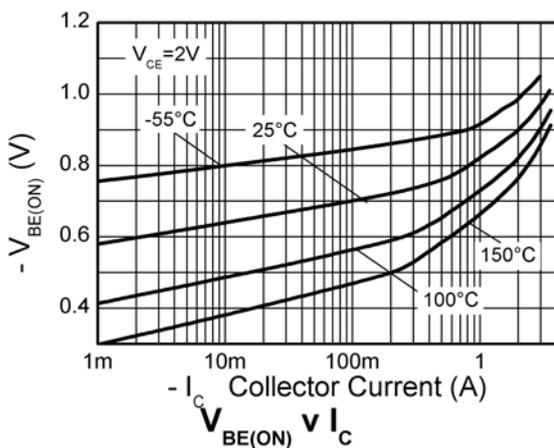
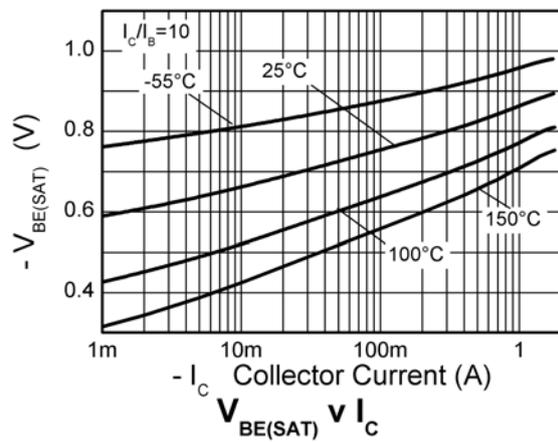
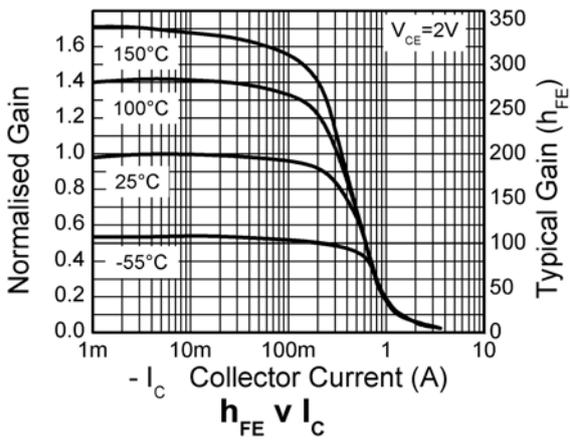
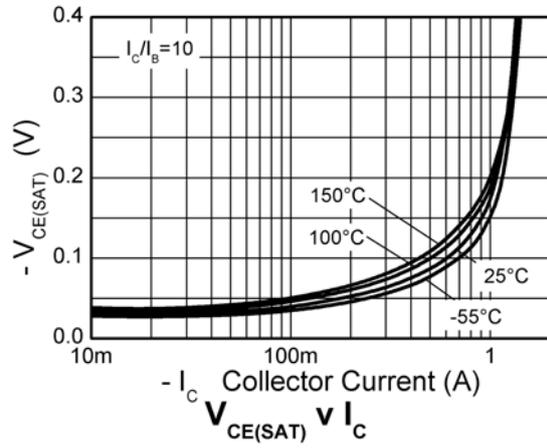
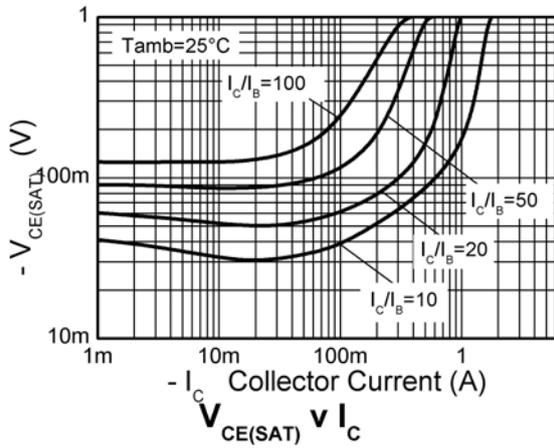
**Electrical characteristics (at  $T_{AMB} = 25^{\circ}\text{C}$  unless otherwise stated)**

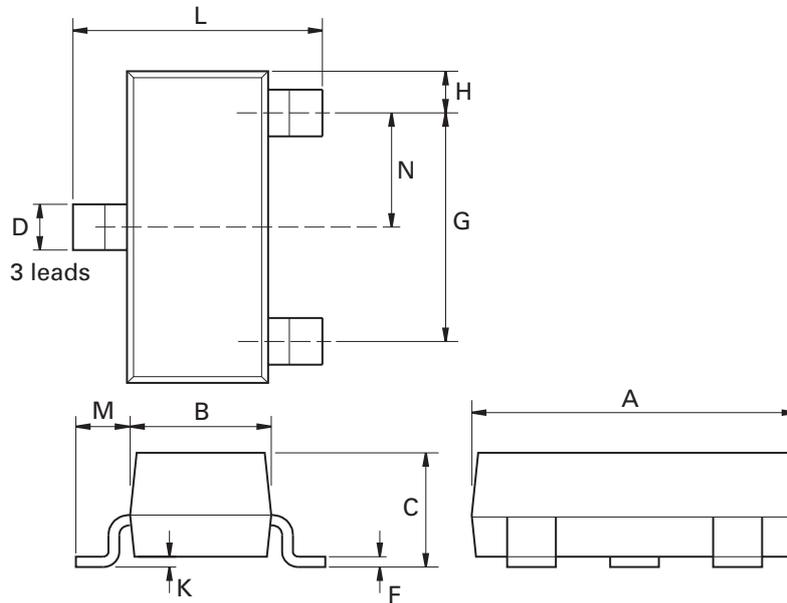
Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Collector-base breakdown voltage	$BV_{CBO}$	-180	-205		V	$I_C = -100\mu\text{A}$
Collector-emitter breakdown voltage (forward blocking)	$BV_{CEX}$	-180	-205		V	$I_C = -100\mu\text{A}$ , $R_{BE} \leq 1\text{k}\Omega$ or $-0.25\text{V} < V_{BE} < 1\text{V}$
Collector-emitter breakdown voltage (base open)	$BV_{CEO}$	-140	-160		V	$I_C = -10\text{mA}^{(*)}$
Emitter-collector breakdown voltage (reverse blocking)	$BV_{ECO}$	-7	-8.5		V	$I_E = -100\mu\text{A}^{(*)}$
Emitter-base breakdown voltage	$BV_{EBO}$	-7	-8.2		V	$I_E = -100\mu\text{A}$
Collector cut-off current	$I_{CBO}$		<-1	-50 -20	nA $\mu\text{A}$	$V_{CB} = -144\text{V}$ $V_{CB} = -144\text{V}$ , $T_{AMB} = 100^{\circ}\text{C}$
Collector emitter cut-off current	$I_{CEX}$		-	-100	nA	$V_{CE} = -144\text{V}$ ; $R_{BE} \leq 1\text{k}\Omega$ or $-0.25\text{V} < V_{BE} < 1\text{V}$
Emitter cut-off current	$I_{EBO}$		<-1	-50	nA	$V_{EB} = -5.6\text{V}$
Collector-emitter saturation voltage	$V_{ce(sat)}$		-40	-50	mV	$I_C = -0.1\text{A}$ , $I_B = -10\text{mA}^{(*)}$
			-110	-135	mV	$I_C = -0.1\text{A}$ , $I_B = -2\text{mA}^{(*)}$
			-90	-110	mV	$I_C = -0.5\text{A}$ , $I_B = -50\text{mA}^{(*)}$
			-170	-230	mV	$I_C = -0.5\text{A}$ , $I_B = -25\text{mA}^{(*)}$
			-180	-260	mV	$I_C = -1\text{A}$ , $I_B = -100\text{mA}^{(*)}$
Base-emitter saturation voltage	$V_{be(sat)}$		-850	-950	mV	$I_C = -1\text{A}$ , $I_B = -100\text{mA}^{(*)}$
Base-emitter turn-on voltage	$V_{BE(ON)}$		-800	-900	mV	$I_C = -1\text{A}$ , $V_{CE} = -2\text{V}^{(*)}$
Static forward current transfer ratio	$h_{FE}$	100	200	300		$I_C = -10\text{mA}$ , $V_{CE} = -2\text{V}^{(*)}$
		100	190			$I_C = -0.1\text{A}$ , $V_{CE} = -2\text{V}^{(*)}$
		20	30			$I_C = -1\text{A}$ , $V_{CE} = -2\text{V}^{(*)}$
Transition frequency	$f_T$		75		MHz	$I_C = -10\text{mA}$ , $V_{CE} = -20\text{V}$ $f = 20\text{MHz}$
Output capacitance	$C_{OBO}$		10		pF	$V_{CB} = -20\text{V}$ , $f = 1\text{MHz}^{(*)}$
Turn-on time	$t_{(on)}$		102		ns	$V_{CC} = -20\text{V}$ , $I_C = -100\text{mA}$ , $I_{B1} = I_{B2} = -10\text{mA}$
Turn-off time	$t_{(off)}$		854		ns	

**NOTES:**

 (\*) Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$ .

Typical characteristics



**Package outline - SOT23**


Dim	Millimeters		Inches		Dim	Millimeters		Inches	
	Min	Max	Min	Max		Min	Max	Max	Max
A	2.67	3.05	0.105	0.120	H	0.33	0.51	0.013	0.020
B	1.20	1.40	0.047	0.055	K	0.01	0.10	0.0004	0.004
C	-	1.10	-	0.043	L	2.10	2.50	0.083	0.0985
D	0.37	0.53	0.015	0.021	M	0.45	0.64	0.018	0.025
F	0.085	0.15	0.0034	0.0059	N	0.95 NOM		0.0375 NOM	
G	1.90 NOM		0.075 NOM		-	-	-	-	-

**Note:** Controlling dimensions are in millimeters. Approximate dimensions are provided in inches