



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

$V_{(BR)CEX} > 60V$, $V_{(BR)CEO} > 15V$

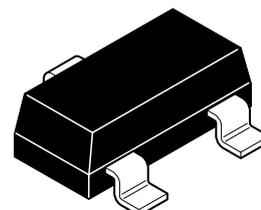
$I_{C(CONT)} = 6A$

$R_{CE(SAT)} = 19m\Omega$ typical

$V_{CE(SAT)} < 30mV @ 1A$

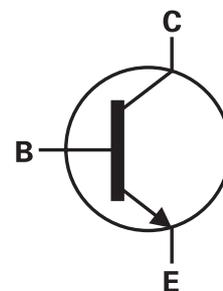
$P_D = 1.25W$

Complementary part number : NK-ZXTP23015CFH



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.

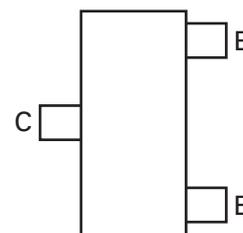


Features

- Higher power dissipation SOT23 package
- High peak current
- Low saturation voltage
- 60V forward blocking voltage

Applications

- DC - DC converters
- MOSFET and IGBT gate driving
- Motor drive
- Relay, lamp, and solenoid drive



Pinout - top view

Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Collector-base voltage	V_{CB0}	60	V
Collector-emitter voltage	$V_{(BR)CEX}$	60	V
Collector-emitter voltage	V_{CEO}	15	V
Emitter-base voltage	V_{EBO}	7.0	V
Peak pulse current	I_{CM}	12	A
Continuous collector current ^(c)	I_C	6	A
Base current	I_B	1.2	A
Power dissipation @ $T_A=25^{\circ}C^{(a)}$ Linear derating factor ^(a)	P_D	0.73 5.84	W mW/ $^{\circ}C$
Power dissipation @ $T_A=25^{\circ}C^{(b)}$ Linear derating factor ^(b)	P_D	1.05 8.4	W mW/ $^{\circ}C$
Power dissipation @ $T_A=25^{\circ}C^{(c)}$ Linear derating factor ^(c)	P_D	1.25 9.6	W mW/ $^{\circ}C$
Power dissipation @ $T_A=25^{\circ}C^{(d)}$ Linear derating factor ^(d)	P_D	1.81 14.5	W mW/ $^{\circ}C$
Operating and storage temperature	$T_j; T_{stg}$	-55 to +150	$^{\circ}C$

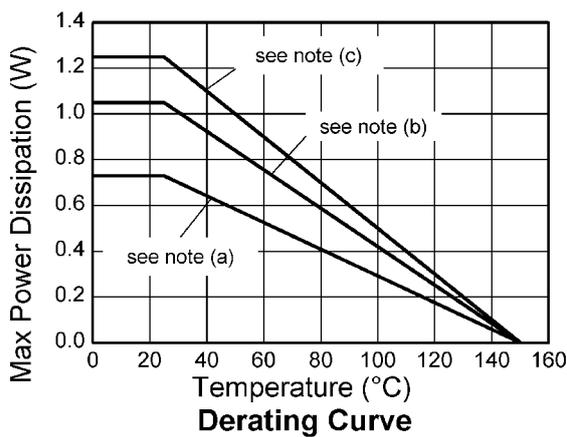
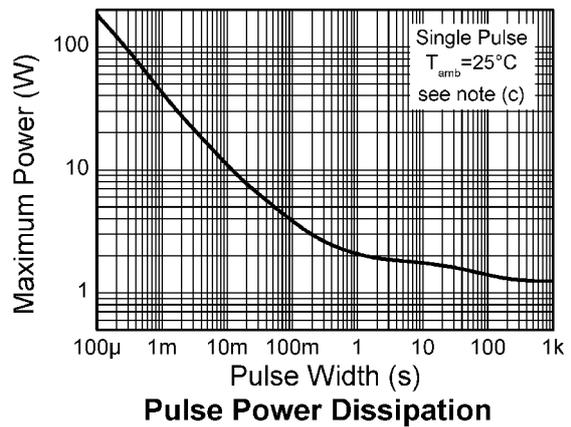
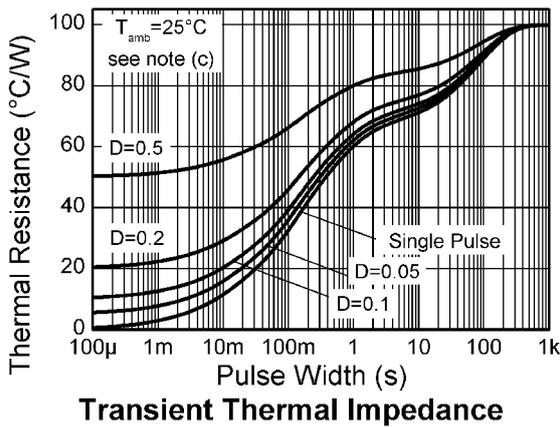
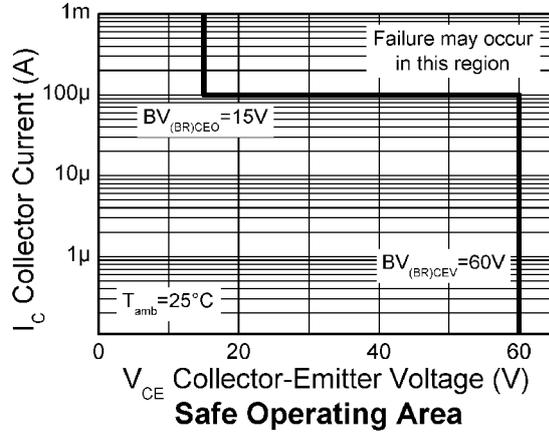
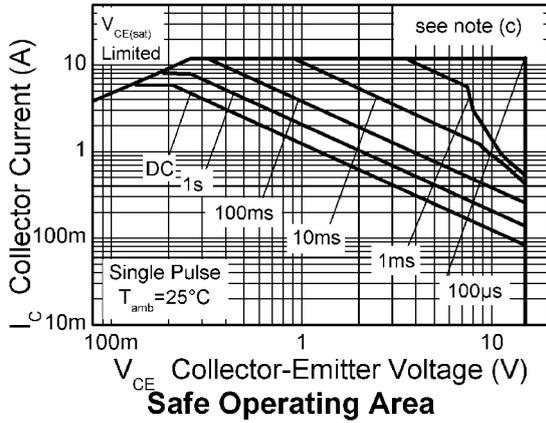
Thermal resistance

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



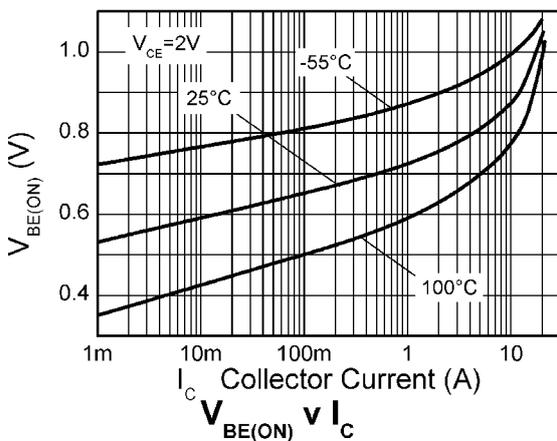
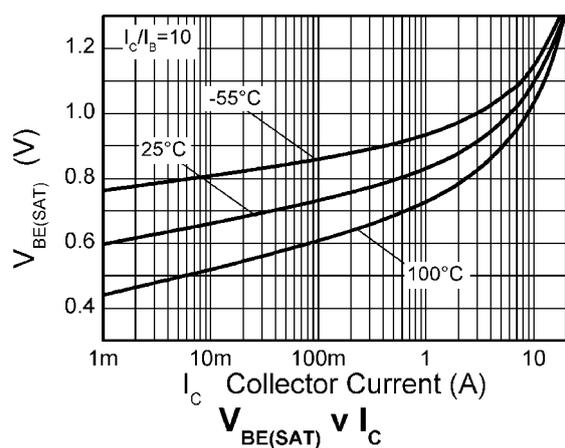
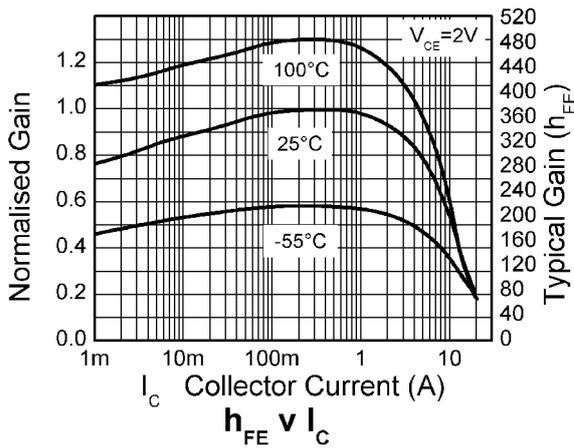
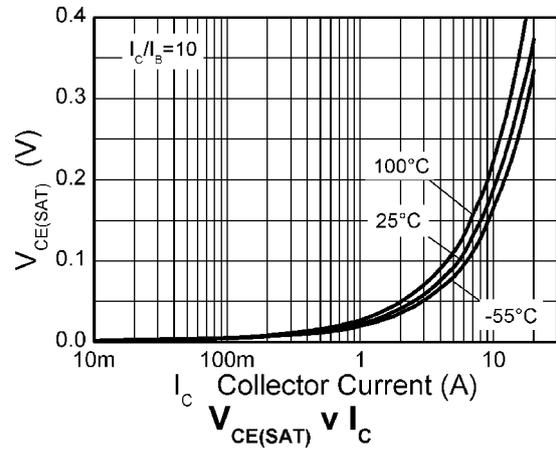
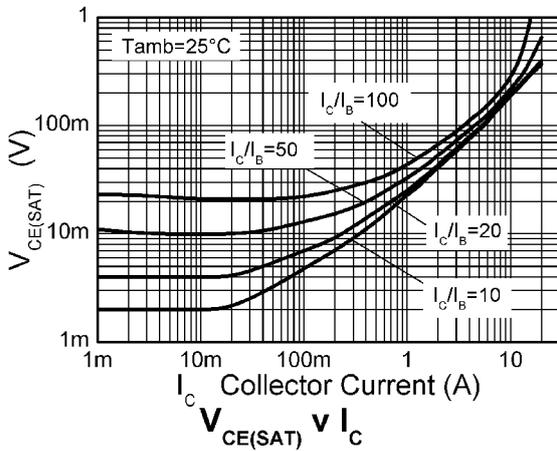
Electrical characteristics (at $T_{AMB} = 25^{\circ}C$ unless otherwise stated)

Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Collector-base breakdown voltage	$V_{(BR)CBO}$	60	85		V	$I_C=100\mu A$
Collector-emitter breakdown voltage	$V_{(BR)CEX}$	60	85		V	$I_C=100\mu A$, $R_{BE} \leq 1k\Omega$ OR $-1V < V_{BE} < 0.25V$
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	15	23		V	$I_C=10mA$ (*)
Emitter-base breakdown voltage	$V_{(BR)EBO}$	7.0	8.3		V	$I_E=100\mu A$
Collector-emitter cut-off current	I_{CEX}		-	100	nA	$V_{CE} = 48V$, $R_{BE} \leq 1k\Omega$ OR $-1V < V_{BE} < 0.25V$
Collector-base cut-off current	I_{CBO}		<1	20	nA	$V_{CB}=48V$
Emitter-base cut-off current	I_{EBO}		<1	10	nA	$V_{EB}=6V$
Static forward current transfer ratio	H_{FE}	160 200 190 150	300 350 330 280	560		$I_C=10mA, V_{CE}=2V^{(*)}$ $I_C=500mA, V_{CE}=2V^{(*)}$ $I_C=3A, V_{CE}=2V^{(*)}$ $I_C=6A, V_{CE}=2V^{(*)}$
Collector-emitter saturation voltage	$V_{CE(sat)}$		7 22 70 130	15 30 90 180	mV	$I_C=0.1A, I_B=5mA^{(*)}$ $I_C=1A, I_B=100mA^{(*)}$ $I_C=3A, I_B=60mA^{(*)}$ $I_C=6A, I_B=120mA^{(*)}$
Base-emitter saturation voltage	$V_{BE(sat)}$		0.83 0.89	0.93 0.98	V	$I_C=3A, I_B=60mA^{(*)}$ $I_C=6A, I_B=120mA^{(*)}$
Base-emitter turn-on voltage	$V_{BE(on)}$		0.81	0.91	V	$I_C=6A, V_{CE}=2V^{(*)}$
Transition frequency	f_T		235		MHz	$I_C=500mA, V_{CE}=2V$, $f=50MHz$
Output capacitance	C_{obo}		56		pF	$V_{CB}=10V, f=1MHz$
Delay time	$t_{(d)}$		15		ns	$V_{CC}=5V, I_C=3A$, $I_{B1}=I_{B2}=150mA$
Rise time	$t_{(r)}$		38.5		ns	
Storage time	$t_{(stg)}$		213		ns	
Fall time	$t_{(f)}$		19.7		ns	

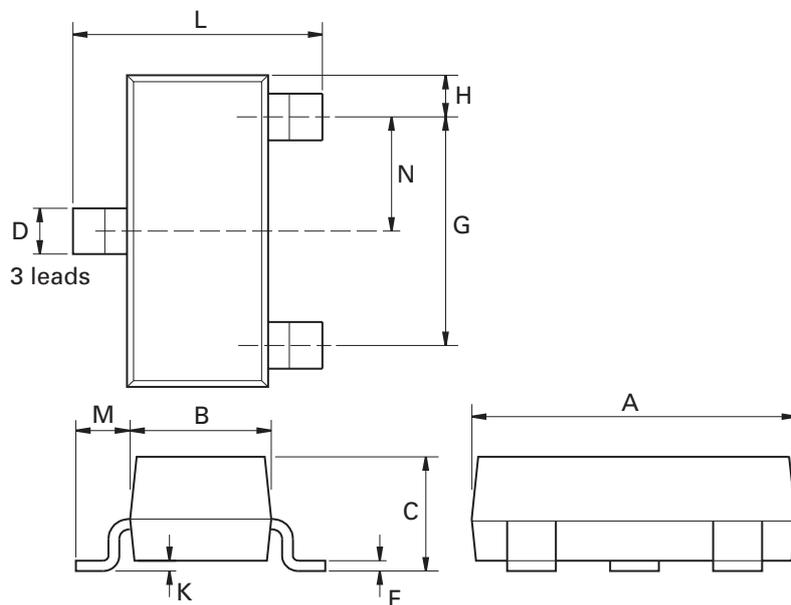
NOTES:

 (*) Measured under pulsed conditions. Pulse width = 300 μ 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