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} > 45V
- I_C = 4A Continuous Collector Current
- Low Saturation Voltage $V_{CE(sat)}$ < 80mV @ 1A
- $R_{CE(sat)}$ = 50mΩ
- h_{FE} Characterised up to 4A
- High h_{FE} Min 400 @ 1A
- 1.5W Power Dissipation
- Complementary PNP Type: NK-ZXTP07040DFF

Mechanical Data

- Case: SOT23F
- 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 e3
- Weight: 0.012 grams (Approximate)

Description

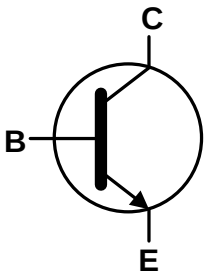
This low voltage NPN transistor has been designed for applications requiring high gain and very low saturation voltage. The SOT23F package is pin compatible with the industry standard SOT23 footprint but offers lower profile and higher dissipation for applications where power density is of utmost importance.

Applications

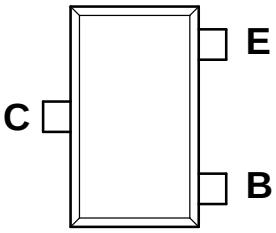
- Boost Converters
- MOSFET and IGBT Gate Drivers
- Lamp and Relay Driver
- Motor Drive
- Siren Driver

SOT23F

Top View



Device Symbol



Top View
Pin Configuration

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	45	V
Collector-Emitter Voltage	V_{CEO}	45	V
Emitter-Collector Voltage (Reverse Blocking)	V_{ECO}	6	V
Emitter-Base Voltage	V_{EBO}	7	V
Continuous Collector Current	I_C	4	A
Peak Pulse Current	I_{CM}	6	A
Base Current	I_B	1	A

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

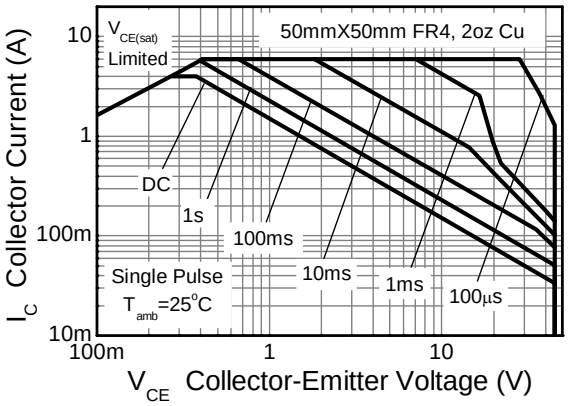
Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Note 5)	P_D	0.84 6.72	W mW/°C
	(Note 6)		1.34 10.72	
	(Note 7)		1.50 12.0	
	(Note 8)		2.0 16.0	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	149	°C/W
	(Note 6)		93	
	(Note 7)		83	
	(Note 8)		60	
Thermal Resistance, Junction to Lead	(Note 9)	$R_{\theta JL}$	43.77	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

ESD Ratings (Note 10)

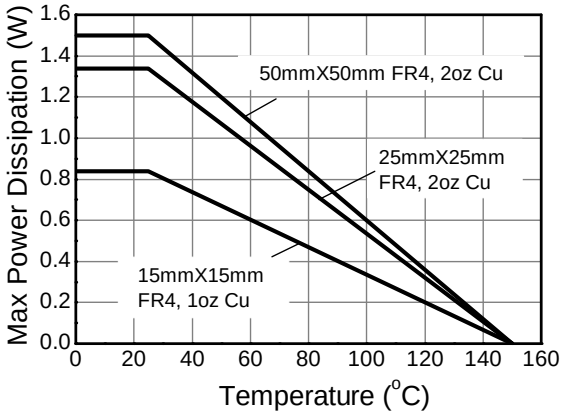
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

Notes:
5. For a device mounted with the exposed collector pad on 15mm x 15mm 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
6. Same as Note 5, except the device is mounted on 25mm x 25mm 2oz copper.
7. Same as Note 5, except the device is mounted on 50mm x 50mm 2oz copper.
8. Same as Note 7, whilst measured at t < 5 seconds.
9. Thermal resistance from junction to solder-point (at the end of the collector lead).
10. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

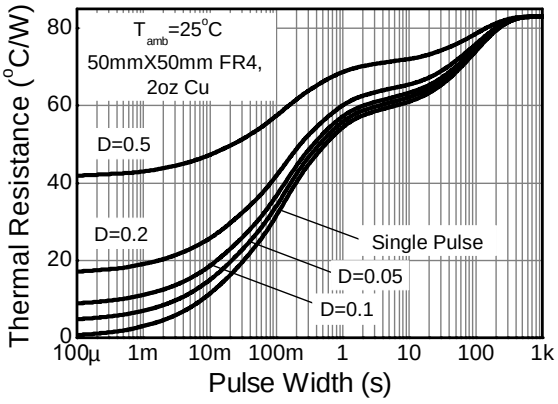
Thermal Characteristics and Derating Information



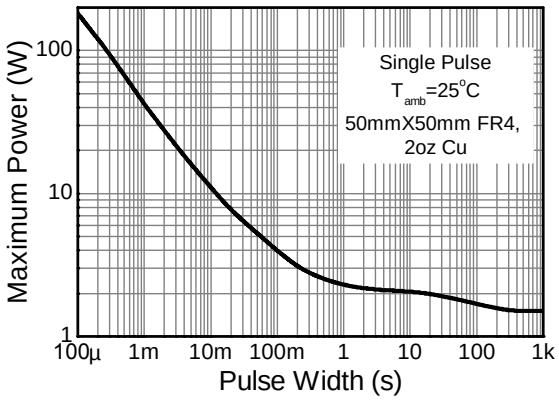
Safe Operating Area



Derating Curve



Transient Thermal Impedance



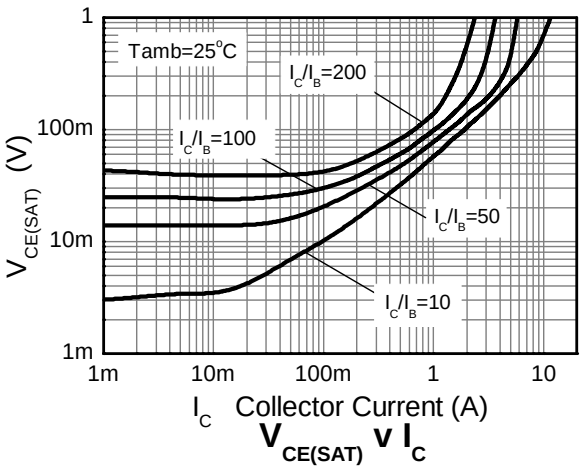
Pulse Power Dissipation

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

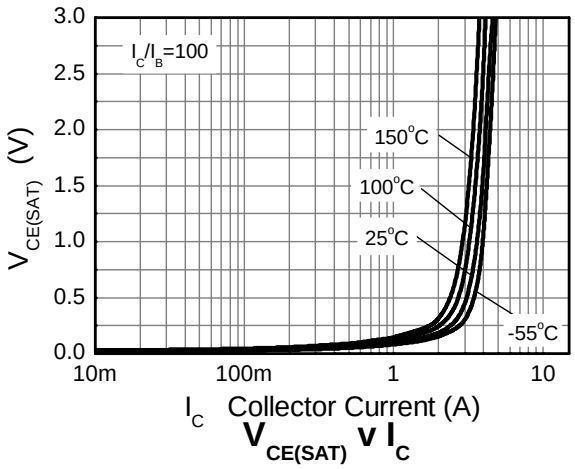
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV_{CBO}	45	160	—	V	I_C = 100μA
Collector-Emitter Breakdown Voltage (Base Open) (Note 11)	BV_{CEO}	45	60	—	V	I_C = 10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	7	8.3	—	V	I_E = 100μA
Emitter-Collector Breakdown Voltage (Reverse Blocking)	BV_{ECX}	6	8.2	—	V	I_E = 100μA; R_{BC} < 1kΩ or -0.25V < V_{BC} < 0.25V
Emitter-Collector Breakdown Voltage (Base Open)	BV_{ECO}	6	7.2	—	V	I_E = 100μA
Collector-Base Cut-Off Current	I_{CBO}	—	<1 —	50 20	nA μA	V_{CB} = 35V V_{CB} = 35V, T_A = +100°C
Emitter-Base Cut-Off Current	I_{EBO}	—	<1	50	nA	V_{EB} = 5.6V
ON CHARACTERISTICS (Note 11)						
Static Forward Current Transfer Ratio	h_{FE}	500 400 250 70	800 710 530 125	1500 — — —	—	I_C = 100mA, V_{CE} = 2V I_C = 1A, V_{CE} = 2V I_C = 2A, V_{CE} = 2V I_C = 4A, V_{CE} = 2V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	—	45 160 60 200 230	70 230 80 270 280	mV	I_C = 0.1A, I_B = 0.5mA I_C = 1A, I_B = 5mA I_C = 1A, I_B = 100mA I_C = 2A, I_B = 20mA I_C = 4A, I_B = 200mA
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	—	1000	1100	mV	I_C = 4A, I_B = 200mA
Base-Emitter On Voltage	$V_{BE(on)}$	—	875	1000	mV	I_C = 4A, V_{CE} = 2V
SMALL SIGNAL CHARACTERISTICS						
Transition Frequency	f_T	150	190	—	MHz	I_C = 50mA, V_{CE} = 5V, f = 50MHz
Input Capacitance	C_{ibo}	—	225	—	pF	V_{EB} = 0.5V, f = 1MHz
Output Capacitance	C_{obo}	—	18.4	25	pF	V_{CB} = 10V, f = 1MHz
Delay Time	t_d	—	22.3	—	ns	V_{CC} = 10V, I_C = 500mA, I_{B1} = I_{B2} = 50mA
Rise Time	t_r	—	10.6	—	ns	
Storage Time	t_s	—	613	—	ns	
Fall Time	t_f	—	146	—	ns	

Note: 11. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

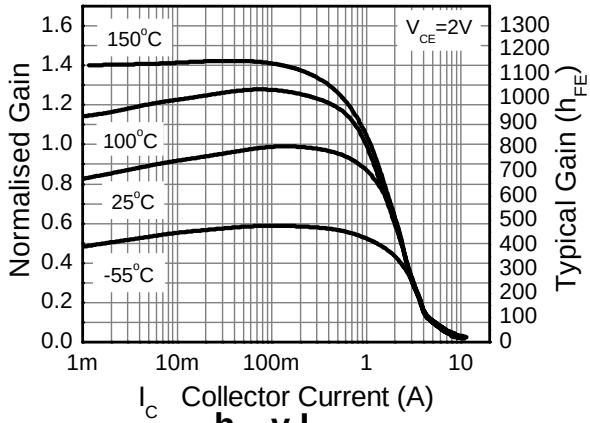
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



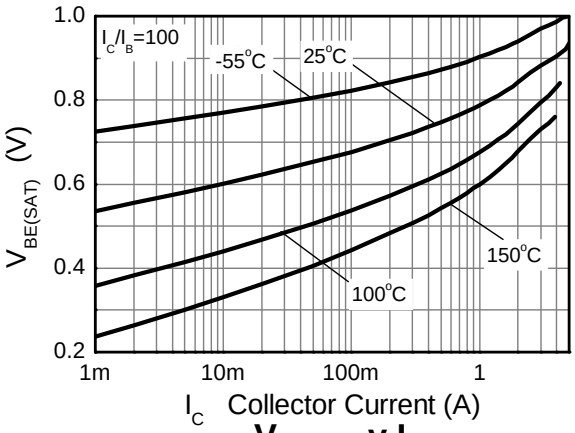
$V_{CE(SAT)}$ v I_C



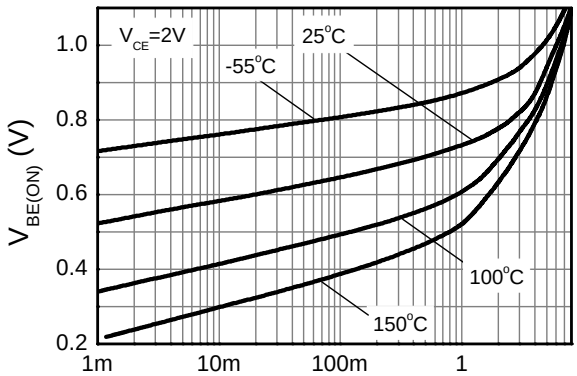
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C



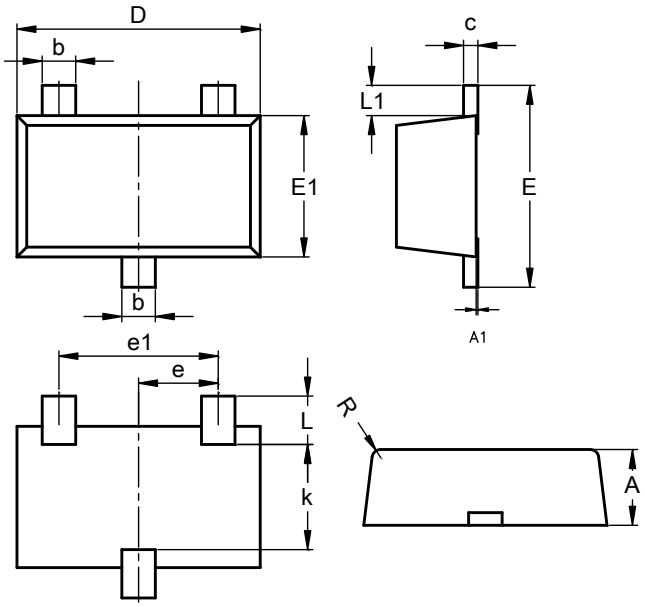
$V_{BE(SAT)}$ v I_C



$V_{BE(ON)}$ v I_C

Package Outline Dimensions

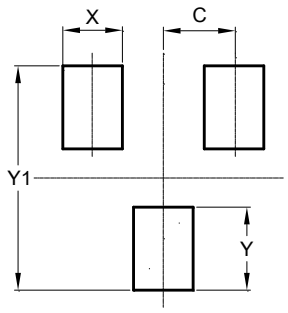
SOT23F



SOT23F			
Dim	**Min**	**Max**	**Typ**
A	0.80	1.00	0.90
b	0.35	0.50	0.44
c	0.10	0.20	0.16
D	2.80	3.00	2.90
e	0.95 REF		
e1	0.190 REF		
E	2.30	2.50	2.40
E1	1.50	1.70	1.65
k	1.20	-	-
L	0.30	0.65	0.50
L1	0.30	0.50	0.40
R	0.05	0.15	-
All Dimensions in mm			

Suggested Pad Layout

SOT23F



Dimensions	Value (in mm)
C	0.95
X	0.80
Y	1.110
Y1	3.000