



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

- $BV_{CEO} > 20V$
- $BV_{CEX} > 65V$
- $BV_{ECO} > 4.5V$
- $I_C = 7A$ Continuous Collector Current
- Very Low $V_{CE(SAT)} < 30mV @ 1A$
- $R_{CE(SAT)} = 18m\Omega$
- 1.5W Power Dissipation
- High Forward Blocking Voltage
- High Gain
- Complementary PNP Type: NK-ZXTP19020CFF

Description

Advanced process capability has been used to maximize the performance of this transistor. The SOT23F package is compatible with the industry standard SOT23 footprint but offers lower profile and higher dissipation for applications where power density is of utmost importance.

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 @3
- Weight: 0.012 grams (Approximate)

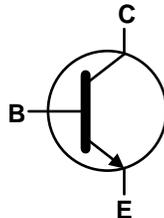
Applications

- MOSFET and IGBT Gate Driving
- LED Driving
- Strobe Flash
- Motor Drive
- Micro Buffers

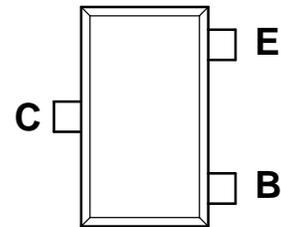
SOT23F



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}	65	V
Collector-Emitter Voltage (Forward Blocking)	V _{CEX}	65	V
Collector-Emitter Voltage (Base Open)	V _{CEO}	20	V
Emitter-Collector Voltage (Reverse Blocking)	V _{ECO}	4.5	V
Emitter-Base Voltage	V _{EBO}	7	V
Continuous Collector Current	I _C	7	A
Peak Pulse Current	I _{CM}	15	A
Base Current	I _B	1	A

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

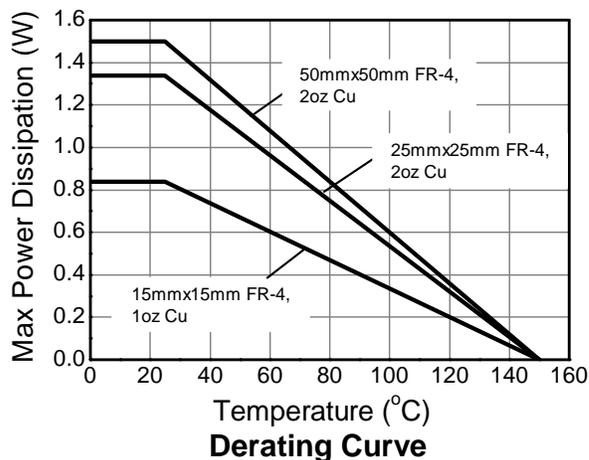
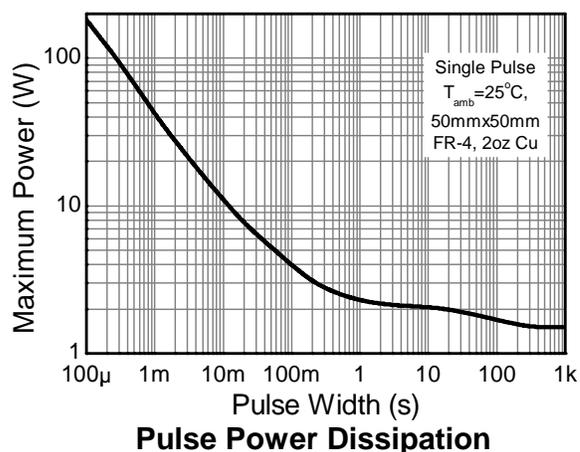
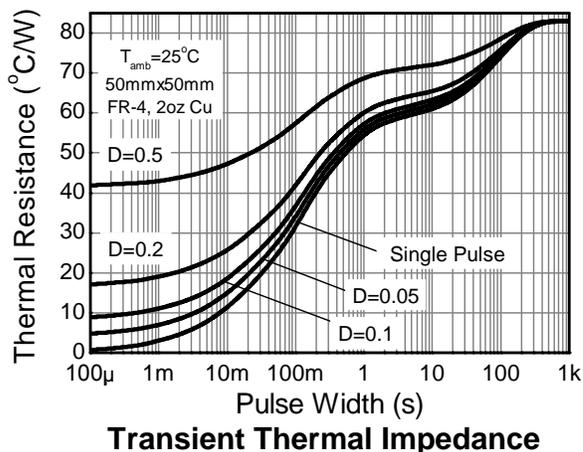
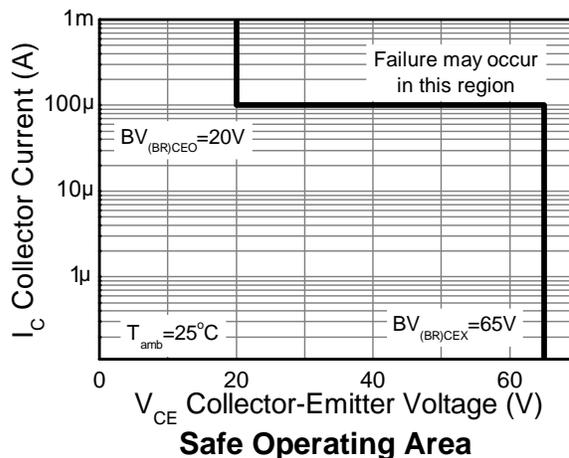
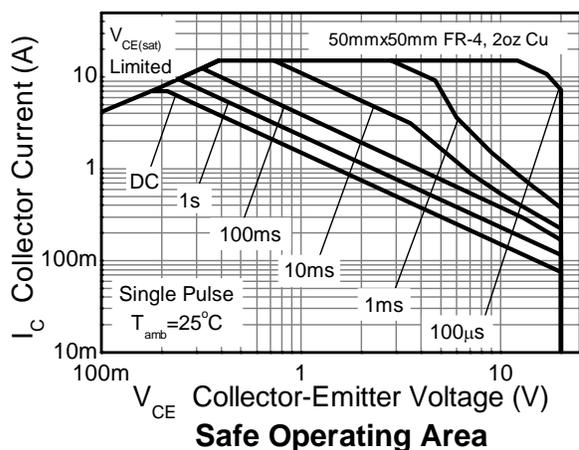
Characteristic	Symbol	Value	Unit
Power Dissipation Linear Derating Factor	P _D	0.84	W mW/°C
		6.72	
		1.34	
		10.72	
		1.50	
Thermal Resistance, Junction to Ambient	R _{θJA}	12.0	°C/W
		2.0	
		16.0	
		149	
Thermal Resistance, Junction to Ambient	R _{θJA}	93	°C/W
		83	
		60	
Thermal Resistance, Junction to Lead	R _{θJL}	43.8	°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 FR-4 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

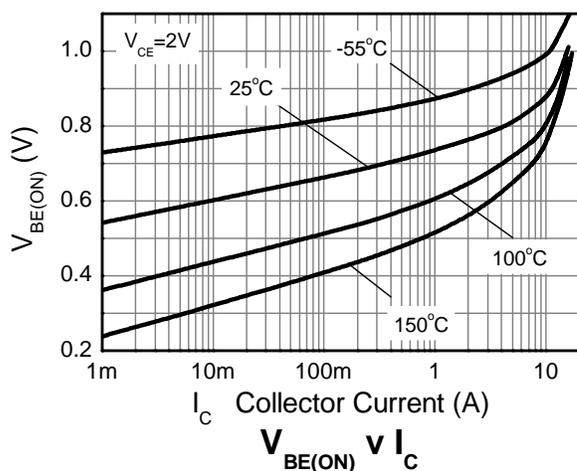
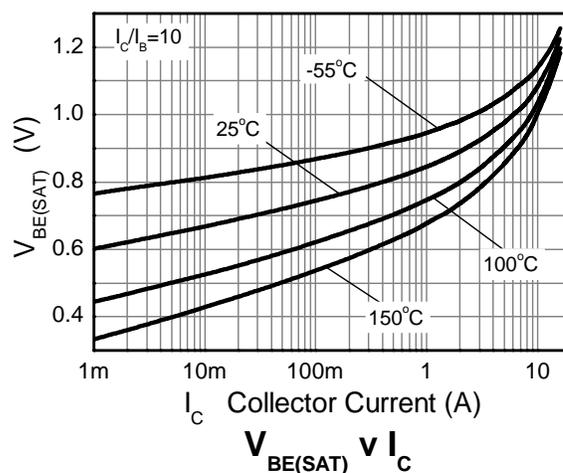
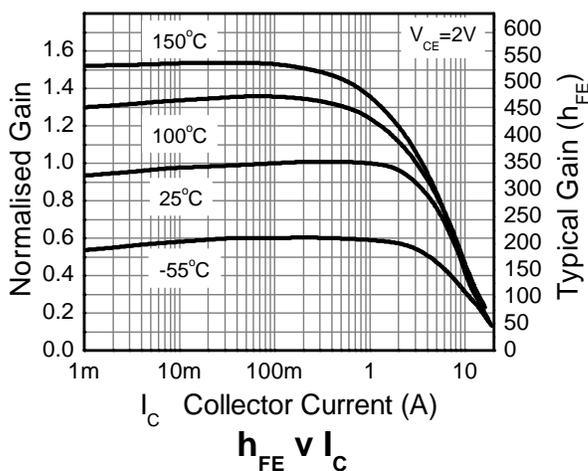
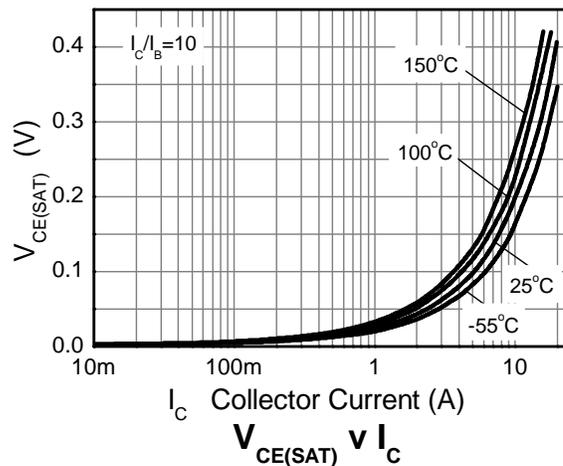
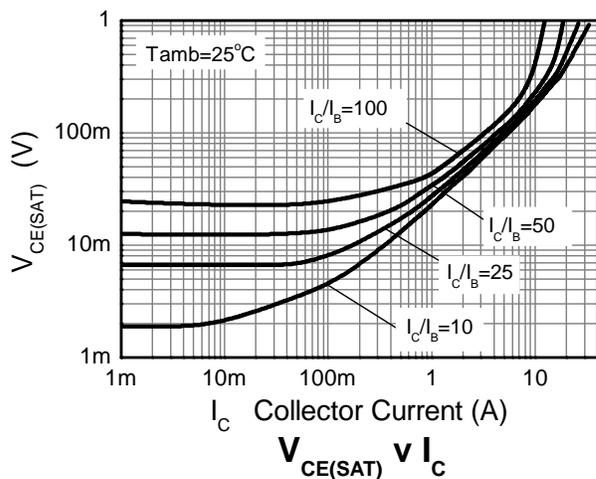


Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV_{CBO}	65	85	—	V	$I_C = 100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Forward Blocking)	BV_{CEX}	65	85	—	V	$I_C = 100\mu\text{A}$, $R_{BE} < 1\text{k}\Omega$, or $-1\text{V} < V_{BE} < 0.25\text{V}$
Collector-Emitter Breakdown Voltage (Base Open) (Note 11)	BV_{CEO}	20	25	—	V	$I_C = 10\text{mA}$
Emitter-Base Breakdown Voltage	BV_{EBO}	7	8.3	—	V	$I_E = 100\mu\text{A}$
Emitter – Collector Breakdown Voltage (Reverse Blocking)	BV_{ECX}	6	8.2	—	V	$I_E = 100\mu\text{A}$, $R_{BC} < 1\text{k}\Omega$, or $V_{BC} = \pm 0.25\text{V}$
Emitter – Collector Breakdown Voltage (Base Open)	BV_{ECO}	4.5	5.3	—	V	$I_E = 100\mu\text{A}$
Collector-Base Cut-off Current	I_{CBO}	—	<1	50	nA	$V_{CB} = 50\text{V}$ $V_{CB} = 50\text{V}$, $T_A = +100^\circ\text{C}$
Collector-Base Cut-off Current	I_{CEX}	—	<1	100	nA	$V_{CE} = 50\text{V}$, $R_{BE} < 1\text{k}\Omega$ or $-1\text{V} < V_{BE} < 0.25\text{V}$
Emitter-Base Cut-off Current	I_{EBO}	—	<1	50	nA	$V_{EB} = 5.6\text{V}$
ON CHARACTERISTICS (Note 11)						
Static Forward Current Transfer Ratio	h_{FE}	200 180 100 45	350 340 220 95	500 — — —	—	$I_C = 0.1\text{A}$, $V_{CE} = 2\text{V}$ $I_C = 2\text{A}$, $V_{CE} = 2\text{V}$ $I_C = 7\text{A}$, $V_{CE} = 2\text{V}$ $I_C = 15\text{A}$, $V_{CE} = 2\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	—	23 45 55 135	30 65 70 175	mV	$I_C = 1\text{A}$, $I_B = 100\text{mA}$ $I_C = 1\text{A}$, $I_B = 10\text{mA}$ $I_C = 2\text{A}$, $I_B = 40\text{mA}$ $I_C = 7\text{A}$, $I_B = 280\text{mA}$
Base-Emitter Saturation Voltage	$V_{BE(SAT)}$	—	960	1050	mV	$I_C = 7\text{A}$, $I_B = 280\text{mA}$
Base-Emitter On Voltage	$V_{BE(ON)}$	—	840	950	mV	$I_C = 7\text{A}$, $V_{CE} = 2\text{V}$
SMALL SIGNAL CHARACTERISTICS						
Transition Frequency	f_T	—	150	—	MHz	$I_C = 50\text{mA}$, $V_{CE} = 10\text{V}$, $f = 50\text{MHz}$
Input Capacitance	C_{IBO}	—	315	—	pF	$V_{EB} = 0.5\text{V}$, $f = 1\text{MHz}$
Output Capacitance	C_{OBO}	—	40	50	pF	$V_{CB} = 10\text{V}$, $f = 1\text{MHz}$
Delay Time	t_D	—	135	—	ns	$V_{CC} = 10\text{V}$, $I_C = 1\text{A}$, $I_{B1} = -I_{B2} = 10\text{mA}$
Rise Time	t_R	—	117	—	ns	
Storage Time	t_S	—	285	—	ns	
Fall Time	t_F	—	88	—	ns	

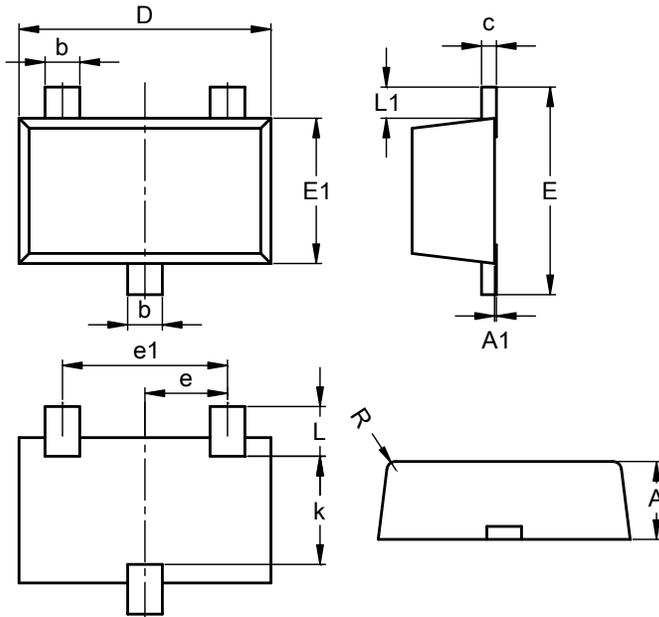
 Note: 11. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.

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



Package Outline Dimensions

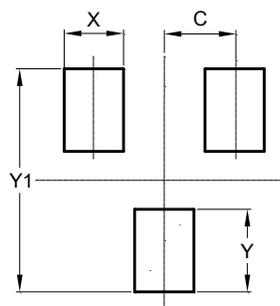
SOT23F



SOT23F			
Dim	Min	Max	Typ
A	0.80	1.00	0.90
A1	0.00	0.10	0.01
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	1.90 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