



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

- $BV_{CEO} > 120V$
- $I_C = 1A$ Continuous Collector Current
- $V_{CE(SAT)} < 1.5V @ 1A$
- $R_{CE(SAT)} = 38m\Omega$
- 1.5W Power Dissipation
- Complementary PNP Type: NK-ZXTP05120FF

Description

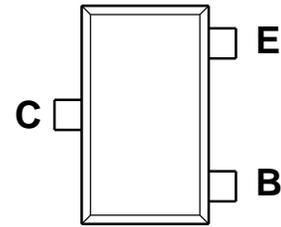
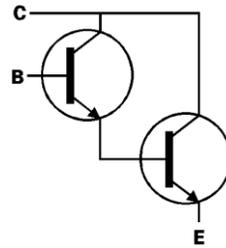
This high performance NPN Darlington transistor is housed in the small outline SOT23 flat package for applications where space is at a premium.

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 208②③
- Weight: 0.012 grams (Approximate)

Applications

- Lamp, Relay and Solenoid Drive
- Lighting



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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	140	V
Collector-Emitter Voltage	V_{CEO}	120	V
Emitter-Base Voltage	V_{EBO}	10	V
Continuous Collector Current	I_C	1	A
Peak Pulse Current	I_{CM}	4	A
Base Current	I_B	0.5	A

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

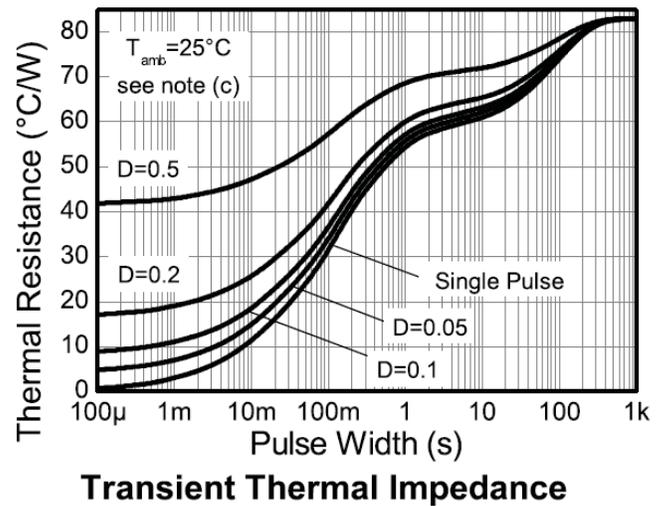
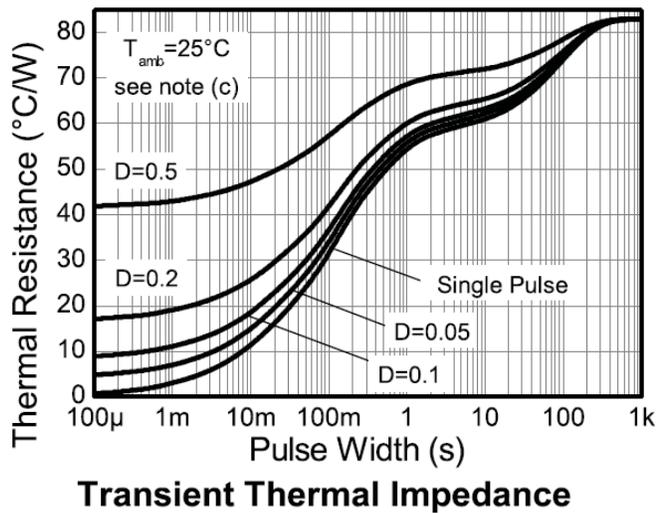
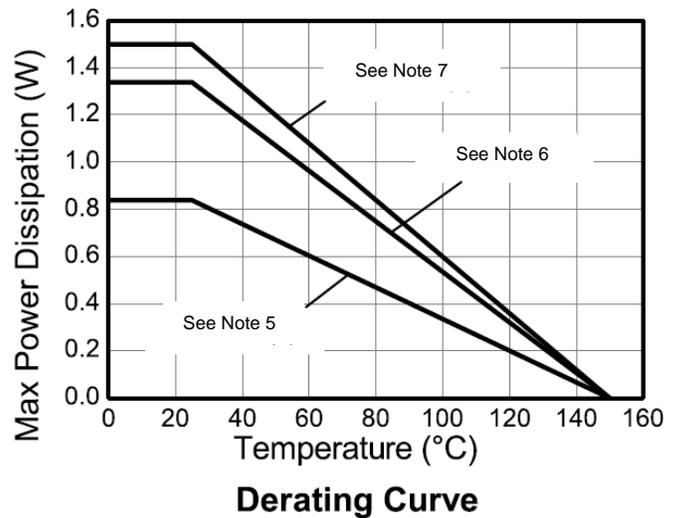
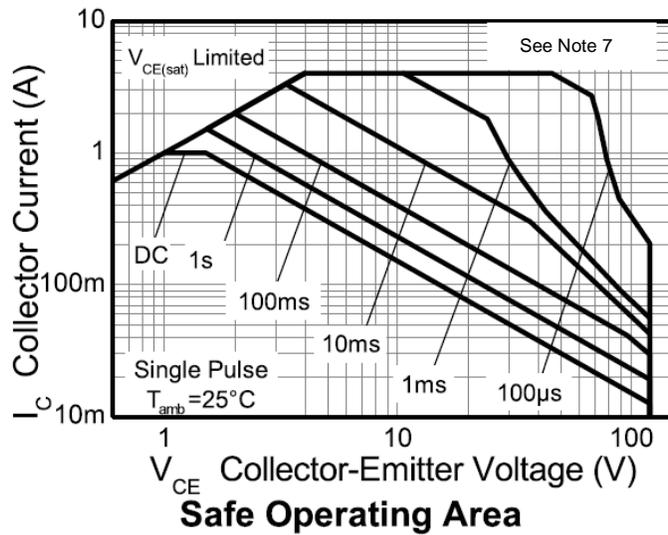
Characteristic	Symbol	Value	Unit
Power Dissipation Linear Derating Factor	P_D	0.84	W mW/°C
		6.72	
		1.34	
		10.72	
		1.50	
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	12.0	°C/W
		2.0	
		16.0	
		60	
Thermal Resistance, Junction to Lead	$R_{\theta JL}$	43.8	°C/W
Operating and Storage Temperature 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	2,000	V	2
Electrostatic Discharge – Machine Model	ESD MM	200	V	B

- Notes:
- 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.
 - Same as Note 5, except the device is mounted on 25mm x 25mm 2oz copper.
 - Same as Note 5, except the device is mounted on 50mm x 50mm 2oz copper.
 - Same as Note 7, whilst measured at $t < 5$ seconds.
 - Thermal resistance from junction to solder-point (at the end of the collector lead).
 - Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics and Derating Information

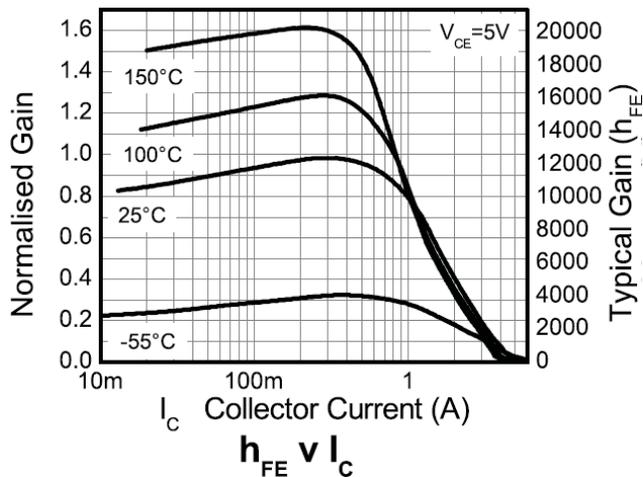
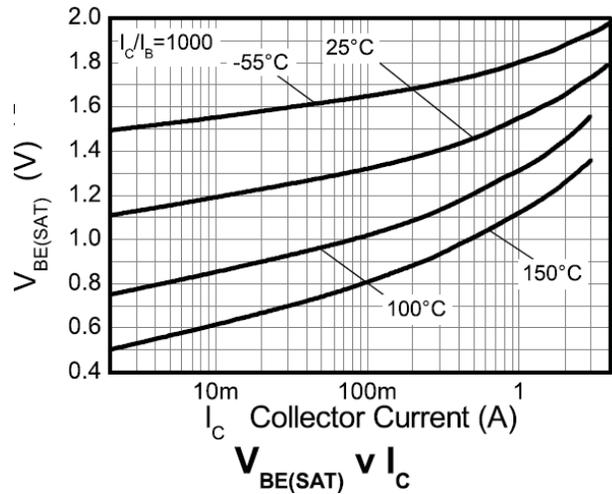
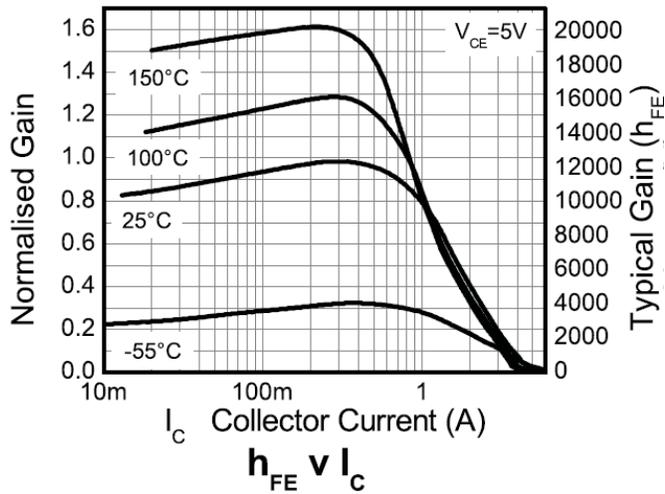
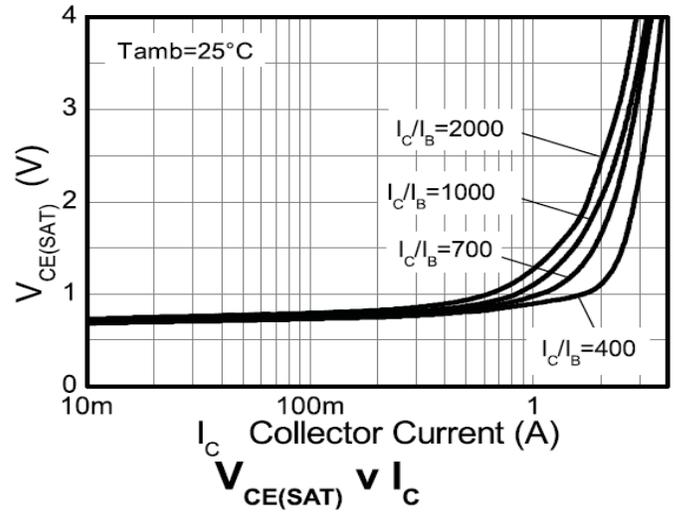
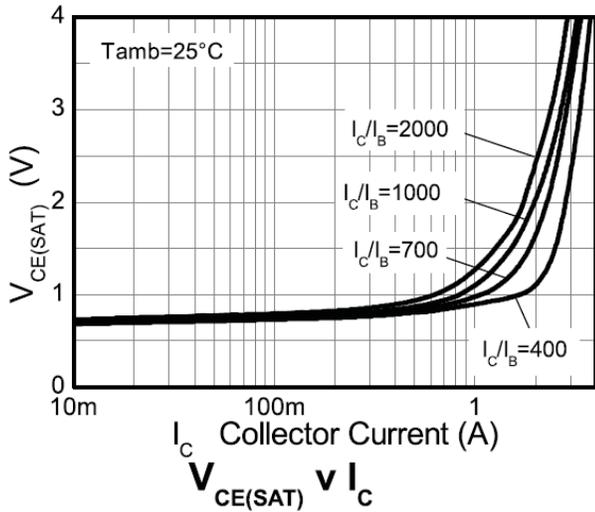


Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

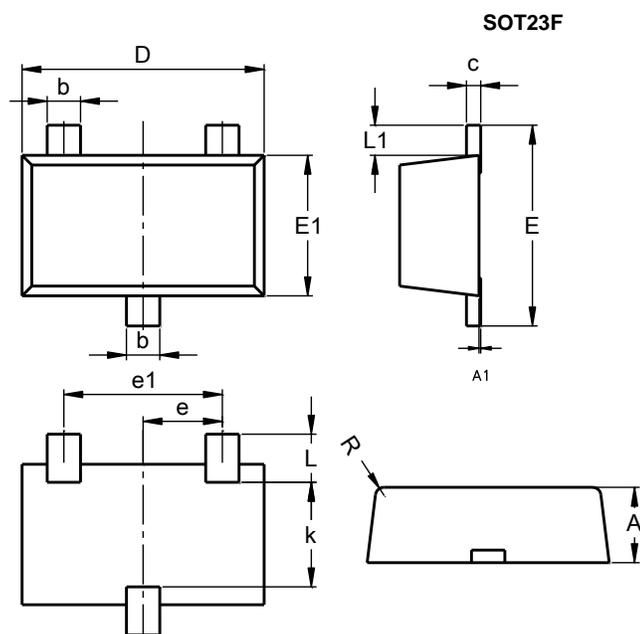
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV _{CBO}	140	300	—	V	I _C = 100μA
Collector-Emitter Breakdown Voltage (Base Open) (Note 11)	BV _{CEO}	120	140	—	V	I _C = 10mA
Emitter-Base Breakdown Voltage	BV _{EBO}	10	16	—	V	I _E = 100μA
Collector-Base Cutoff Current	I _{CBO}	—	<1	100	nA	V _{CB} = 120V
Collector-Emitter Cutoff Current	I _{CES}	—	<0.1	10	μA	V _{CB} = 120V, T _A = +100°C
Emitter-Base Cutoff Current	I _{EBO}	—	<1	100	nA	V _{EB} = 8V
ON CHARACTERISTICS (Note 11)						
Static Forward Current Transfer Ratio	h _{FE}	3k 3k 3k 1k	11k 12k 10k 5k	— — 30k —	—	I _C = 50mA, V _{CE} = 5V I _C = 500mA, V _{CE} = 5V I _C = 1A, V _{CE} = 5V I _C = 2A, V _{CE} = 5V
Collector-Emitter Saturation Voltage	V _{CE(SAT)}	—	0.8 1.1 1.1	0.9 1.5 1.5	V	I _C = 250mA, I _B = 25mA I _C = 1A, I _B = 1mA I _C = 2A, I _B = 5mA
Base-Emitter Saturation Voltage	V _{BE(SAT)}	—	1.55	1.7	V	I _C = 1A, I _B = 1mA
Base-Emitter On Voltage	V _{BE(ON)}	—	1.45	1.7	V	I _C = 1A, V _{CE} = 5V
SMALL SIGNAL CHARACTERISTICS						
Transition Frequency	f _T	—	120	—	MHz	I _C = 100mA, V _{CE} = 10V, f = 20MHz
Input Capacitance	C _{I(BO)}	—	68	90	pF	V _{EB} = 500mV, f = 1MHz
Output Capacitance	C _{O(BO)}	—	12.8	25	pF	V _{CB} = 10V, f = 1MHz
Delay Time	t _D	—	507	—	ns	V _{CC} = 10V, I _C = 500mA, I _{B1} = -I _{B2} = 0.5mA
Rise Time	t _R	—	136	—	ns	
Storage Time	t _S	—	910	—	ns	
Fall Time	t _F	—	369	—	ns	

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

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

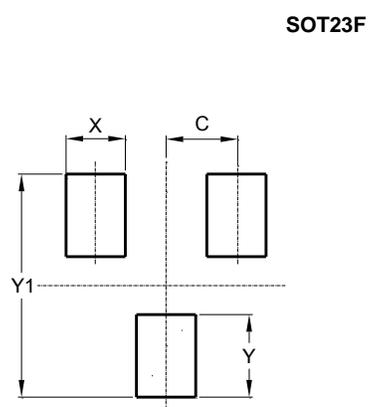


Package Outline Dimensions



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



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