



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

- $BV_{CEO} > -40V$
- $I_C = -500mA$ High Collector Current
- $I_{CM} = -1A$ Peak Pulse Current
- $P_D = 1000mW$ Power Dissipation
- Low Collector-Emitter Saturation Voltage, $V_{CE(sat)}$
- $0.60mm^2$ Package Footprint, 13 times Smaller than SOT23
- 0.5mm Height Package Minimizing Off-Board Profile

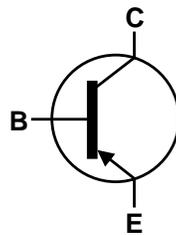
Mechanical Data

- Package: X1-DFN1006-3
- Package Material: Molded Plastic, "Green" Molding Compound.
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — NiPdAu ^(e4)
Solderable per MIL-STD-202, Method 208
- Weight: 0.0009 grams (Approximate)

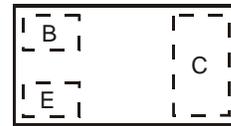
X1-DFN1006-3



Bottom View



Device Symbol



Top View
Device Schematic

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CB0}	-40	V
Collector-Emitter Voltage	V _{CEO}	-40	V
Emitter-Base Voltage	V _{EBO}	-6	V
Collector Current - Continuous	I _C	-500	mA
Peak Pulse Collector Current	I _{CM}	-1	A
Peak Base Current	I _{BM}	-100	mA

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

Characteristic	Symbol	Value	Unit
Power Dissipation	P _D	400	mW
		1000	
Thermal Resistance, Junction to Ambient	R _{θJA}	310	°C/W
		120	
Thermal Resistance, Junction to Lead	R _{θJL}	120	°C/W
Operating and Storage and Temperature Range	T _J , T _{STG}	-55 to +150	°C

ESD Ratings (Note 8)

Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Charged Device Model	ESD CDM	1000	V	C3

- Notes:
- For the device mounted on minimum recommended pad layout 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in steady state condition. The entire exposed collector pad is attached to the heatsink.
 - Same as Note 5, except the exposed collector pad is mounted on 25mm x 25mm 2oz copper.
 - Thermal resistance from junction to solder-point (on the exposed collector pad).
 - Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics

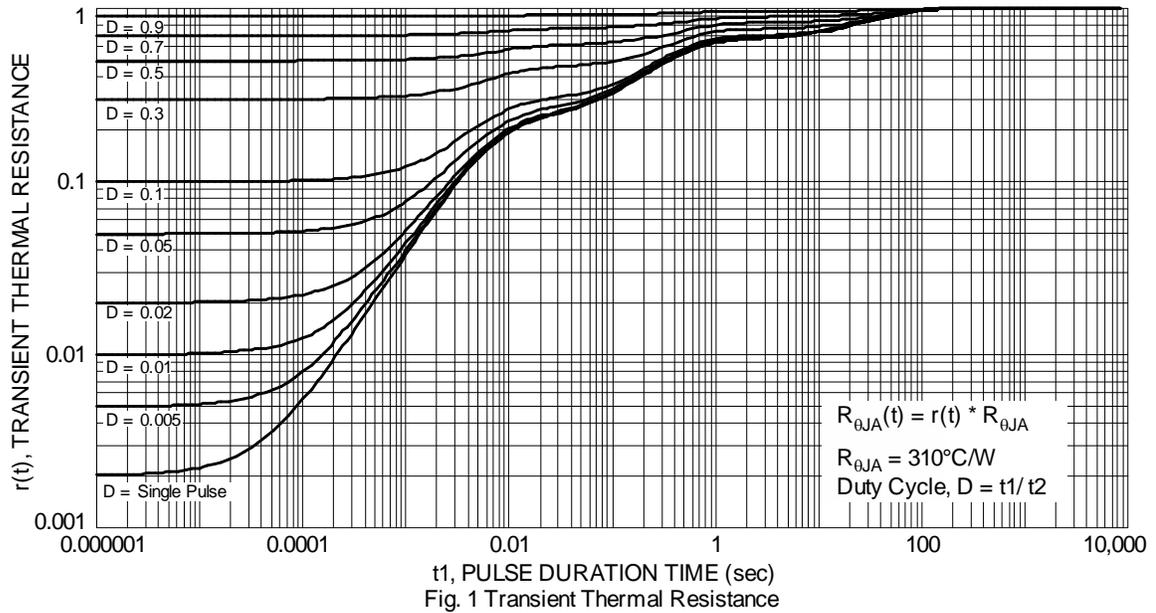


Fig. 1 Transient Thermal Resistance

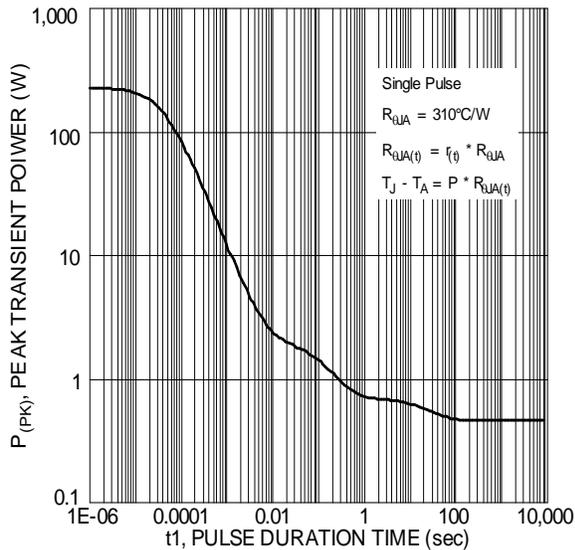


Fig. 2 Single Pulse Maximum Power Dissipation

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}	-40	—	—	V	I _C = -100μA, I _E = 0
Collector-Emitter Breakdown Voltage (Note 9)	BV _{CEO}	-40	—	—	V	I _C = -10mA, I _B = 0
Emitter-Base Breakdown Voltage	BV _{EBO}	-6	—	—	V	I _E = -100μA, I _C = 0
Collector-Base Cutoff Current	I _{CBO}	—	—	-100 -50	nA μA	V _{CB} = -30V, I _E = 0 V _{CB} = -30V, I _E = 0, T _A = +150°C
Emitter-Base Cutoff Current	I _{EBO}	—	—	-100	nA	V _{EB} = -5V, I _C = 0
Collector-Emitter Cutoff Current	I _{CEX}	—	—	-100	nA	V _{CE} = -30V, V _X = ±0.25V
Collector-Emitter Cutoff Current	I _{CES}	—	—	-100	nA	V _{CE} = -30V, V _X = 3V
Collector-Emitter Cutoff Current	I _{CES}	—	—	-100	nA	V _{CE} = -30V
ON CHARACTERISTICS (Note 9)						
DC Current Gain	h _{FE}	200 150 40	— — —	— — —	—	V _{CE} = -2V, I _C = -10mA V _{CE} = -2V, I _C = -100mA V _{CE} = -2V, I _C = -500mA
Collector-Emitter Saturation Voltage	V _{CE(sat)}	— — — —	— — — —	-50 -130 -200 -350	mV	I _C = -10mA, I _B = -0.5mA I _C = -100mA, I _B = -5mA I _C = -200mA, I _B = -10mA I _C = -500mA, I _B = -50mA
Collector-Emitter Saturation Resistance	R _{CE(sat)}	—	—	700	mΩ	I _C = -500mA, I _B = -50mA
Base-Emitter Saturation Voltage	V _{BE(sat)}	—	—	-1.2	V	I _C = -500mA, I _B = -50mA
Base-Emitter Turn On Voltage	V _{BE(on)}	—	—	-1.1	V	V _{CE} = -2V, I _C = -100mA
SMALL SIGNAL CHARACTERISTICS						
Output Capacitance	C _{obo}	—	—	10	pF	V _{CB} = -10V, f = 1.0MHz
Current Gain-Bandwidth Product	f _t	100	—	—	MHz	V _{CE} = -5V, I _C = -100mA, f = 100MHz

Note: 9. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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

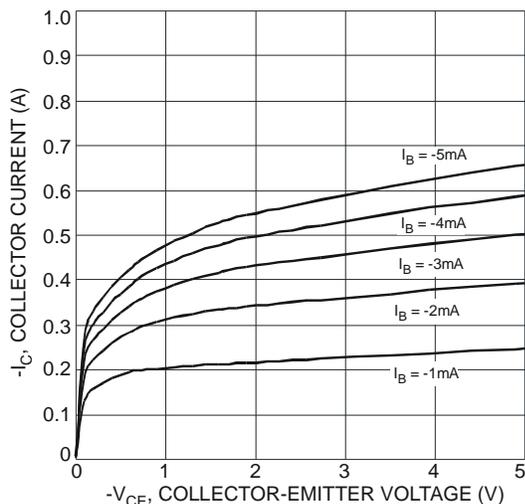


Fig. 4 Typical Collector Current vs. Collector-Emitter Voltage

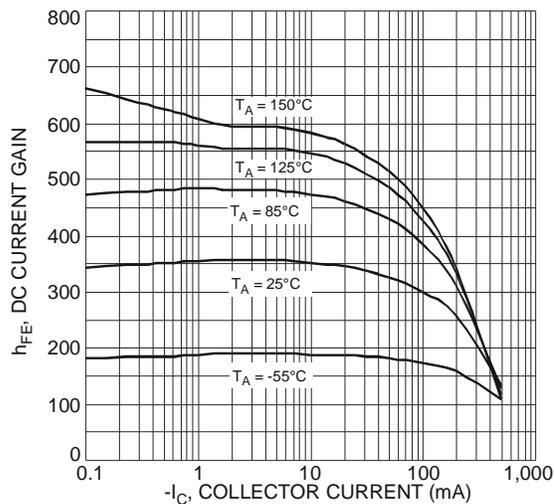


Fig. 5 Typical DC Current Gain vs. Collector Current

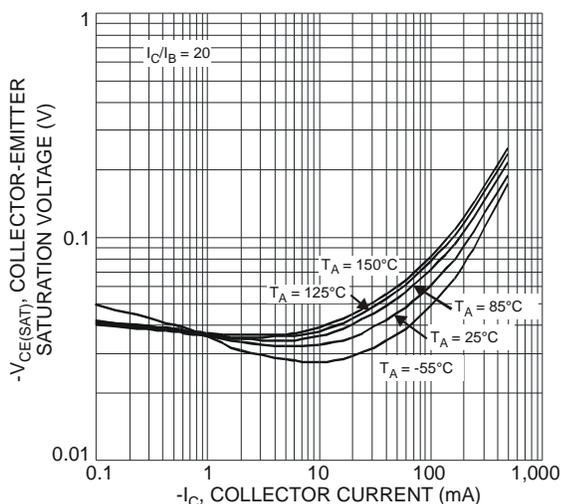


Fig. 6 Typical Collector-Emitter Saturation Voltage vs. Collector Current

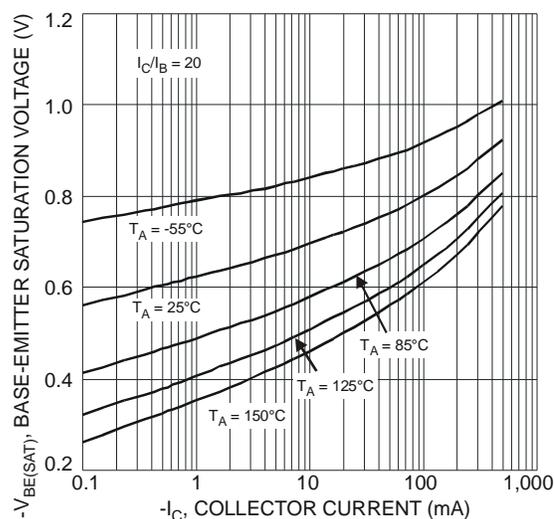


Fig. 7 Typical Base-Emitter Saturation Voltage vs. Collector Current

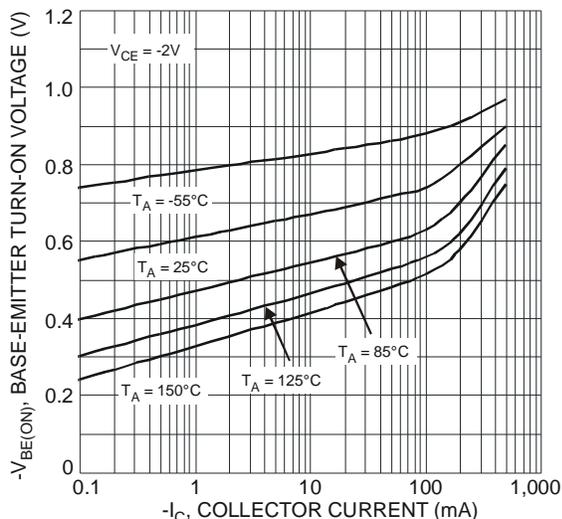


Fig. 8 Typical Base-Emitter Turn-On Voltage vs. Collector Current

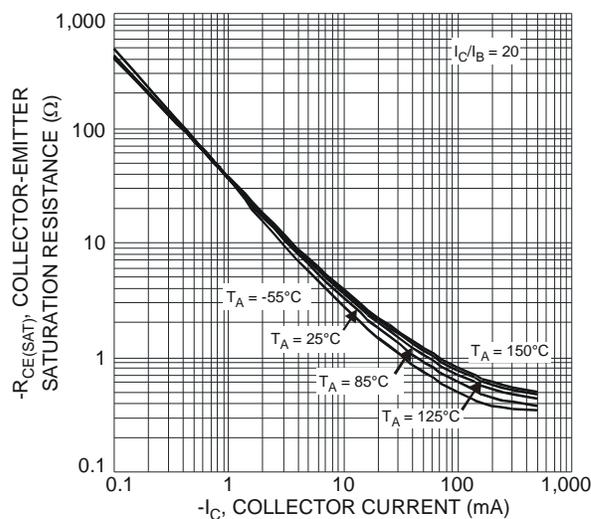


Fig. 9 Typical Collector-Emitter Saturation Resistance vs. Collector Current

