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

0755-83047638
ysbdt@szyoushang.cn
www.szyoushang.cn

企业微信二维码

企业QQ二维码

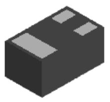
Features

- BV_{CEO} > 40V
- I_C = 200mA High Collector Current
- P_D = 1000mW Power Dissipation
- 0.60mm^2 Package Footprint, 13 Times Smaller than SOT23
- 0.5mm Height Package Minimizing Off-Board Profile
- Complementary PNP Type: NK-MMBT3906LP

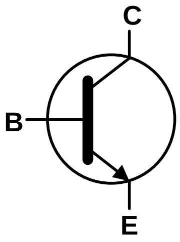
Mechanical Data

- 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, Solderable per MIL-STD-202, Method 208 ⓔ4
- Weight: 0.0008 grams (Approximate)

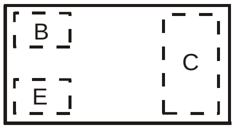
X1-DFN1006-3



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_{CBO}	60	V
Collector-Emitter Voltage	V_{CEO}	40	V
Emitter-Base Voltage	V_{EBO}	6.0	V
Collector Current	I_C	200	mA
Peak Collector Current	I_{CM}	200	mA

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

Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P_D	400	mW
	(Note 6)		1000	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	310	°C/W
	(Note 6)		120	
Thermal Resistance, Junction to Lead	(Note 7)	$R_{\theta JL}$	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 - Machine Model	ESD MM	200	V	B

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

Thermal Characteristics

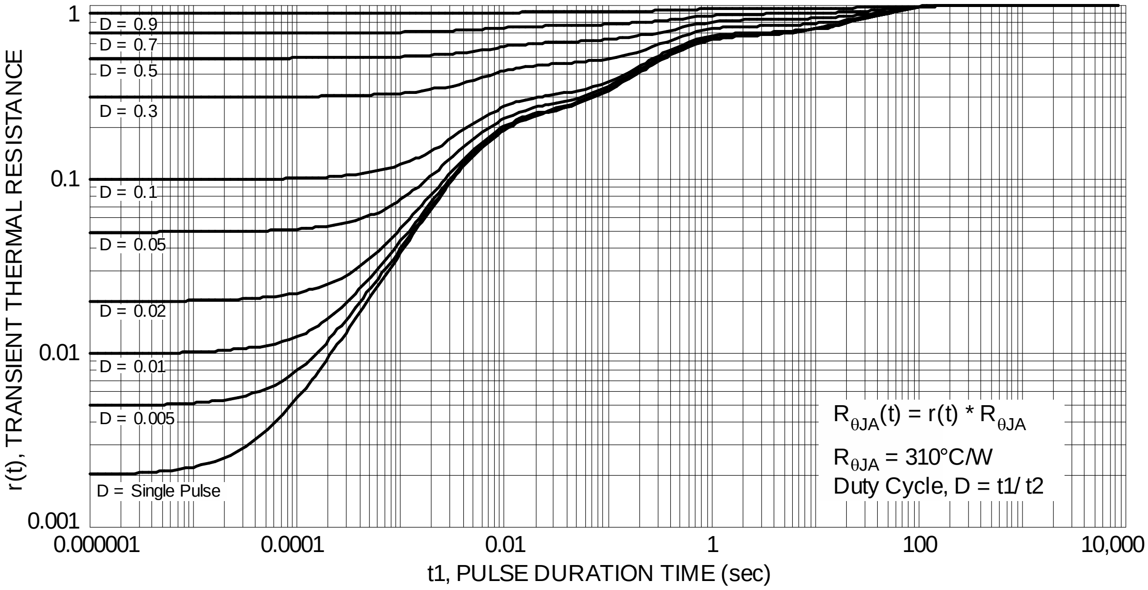


Fig. 1 Transient Thermal Resistance

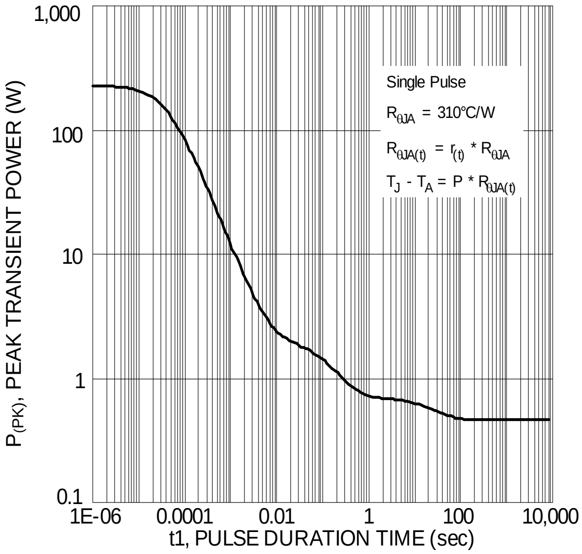


Fig. 2 Single Pulse Maximum Power Dissipation

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

Characteristic	Symbol	Min	Max	Unit	Test Condition
OFF CHARACTERISTICS					
Collector-Base Breakdown Voltage	BV_{CBO}	60	—	V	I_C = 10µA, I_E = 0A
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	40	—	V	I_C = 1.0mA, I_B = 0A
Emitter-Base Breakdown Voltage	BV_{EBO}	6.0	—	V	I_E = 10µA, I_C = 0A
Collector Cutoff Current	I_{CEX}	—	50	nA	V_{CE} = 30V, $V_{EB(off)}$ = 3.0V
Base Cutoff Current	I_{BL}	—	50	nA	V_{CE} = 30V, $V_{EB(off)}$ = 3.0V
ON CHARACTERISTICS (Note 9)					
DC Current Gain	h_{FE}	40	—	—	I_C = 100µA, V_{CE} = 1.0V
		70	—		I_C = 1.0mA, V_{CE} = 1.0V
		100	300		I_C = 10mA, V_{CE} = 1.0V
		60	—		I_C = 50mA, V_{CE} = 1.0V
		30	—		I_C = 100mA, V_{CE} = 1.0V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	—	0.20	V	I_C = 10mA, I_B = 1.0mA
			0.30		I_C = 50mA, I_B = 5.0mA
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	0.65	0.85	V	I_C = 10mA, I_B = 1.0mA
		—	0.95		I_C = 50mA, I_B = 5.0mA
SMALL SIGNAL CHARACTERISTICS					
Output Capacitance	C_{obo}	—	4.0	pF	V_{CB} = 5.0V, f = 1.0MHz, I_E = 0A
Input Capacitance	C_{ibo}	—	8.5	pF	V_{EB} = 0.5V, f = 1.0MHz, I_C = 0A
Input Impedance	h_{ie}	1.0	10	kΩ	V_{CE} = 10V, I_C = 1.0mA f = 1.0kHz
Voltage Feedback Ratio	h_{re}	0.5	8.0	x 10^{-4}	
Small Signal Current Gain	h_{fe}	100	400	—	
Output Admittance	h_{oe}	1.0	40	µs	
Current Gain-Bandwidth Product	f_T	300	—	MHz	V_{CE} = 20V, I_C = 10mA f = 100MHz
SWITCHING CHARACTERISTICS					
Delay Time	t_d	—	35	ns	V_{CC} = 3.0V, I_C = 10mA $V_{BE(off)}$ = 0.5V, I_{B1} = 1.0mA
Rise Time	t_r	—	35	ns	
Storage Time	t_s	—	200	ns	V_{CC} = 3.0V, I_C = 10mA I_{B1} = -I_{B2} = 1.0mA
Fall Time	t_f	—	50	ns	

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

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

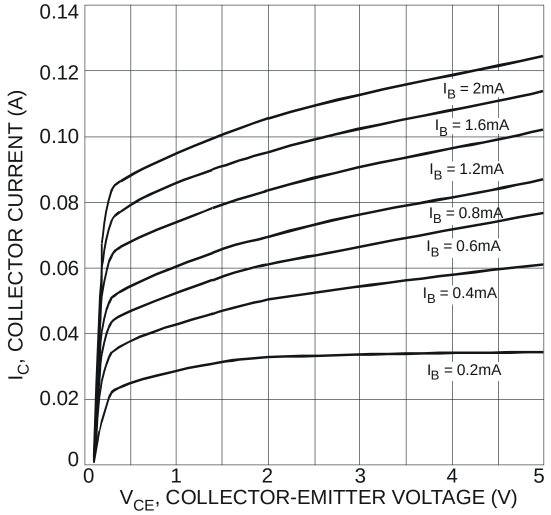


Fig. 3 Typical Collector Current
vs. Collector-Emitter Voltage

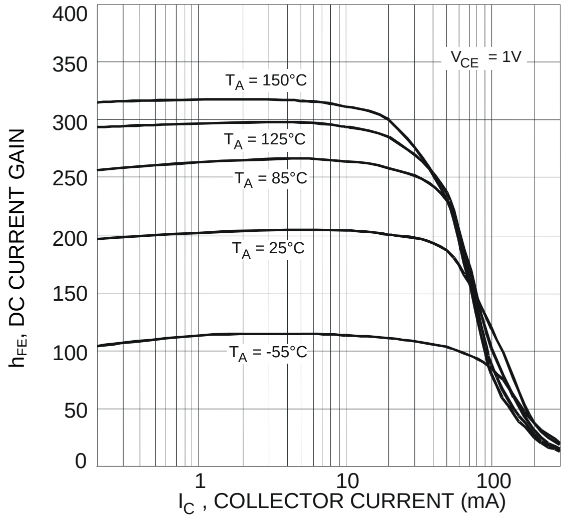


Fig. 4 Typical DC Current Gain vs. Collector Current

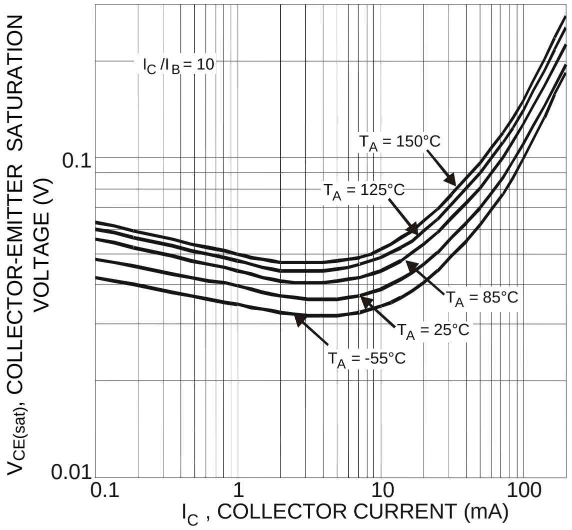


Fig. 5 Typical Collector-Emitter Saturation Voltage
vs. Collector Current

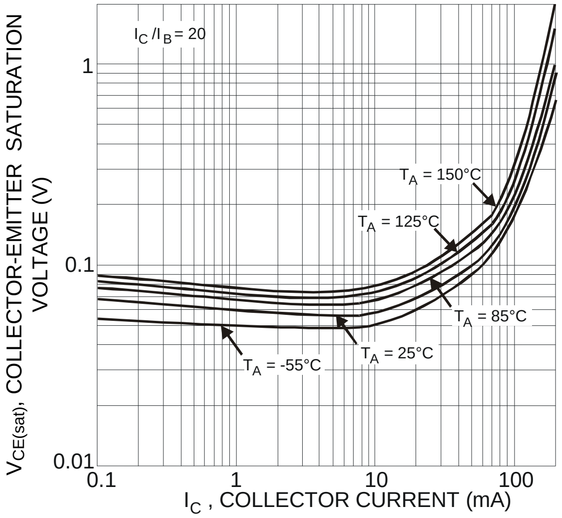


Fig. 6 Typical Collector-Emitter Saturation Voltage
vs. Collector Current

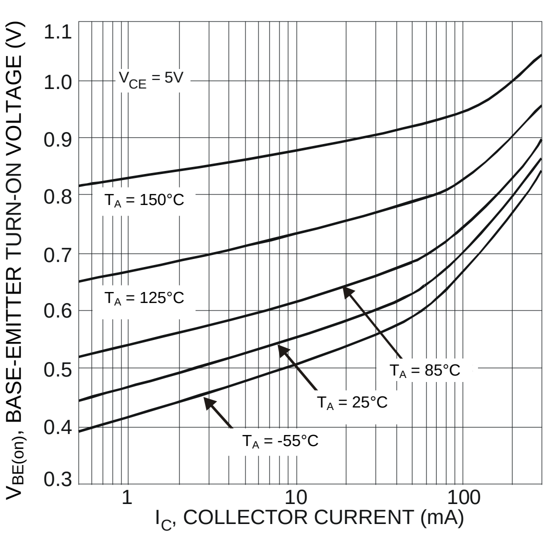


Fig. 7 Typical Base-Emitter Turn-On Voltage
vs. Collector Current

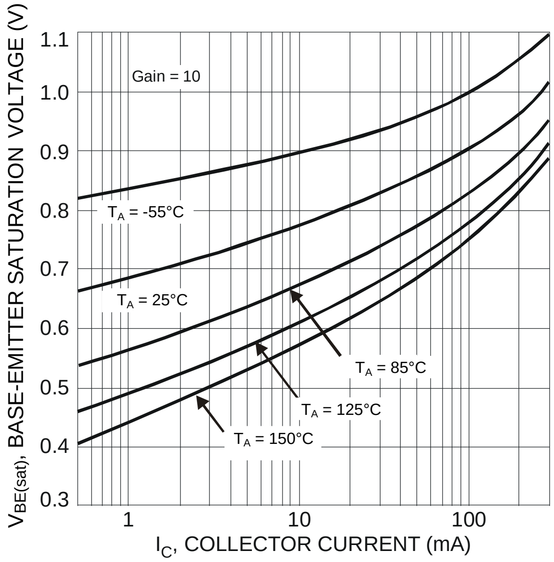
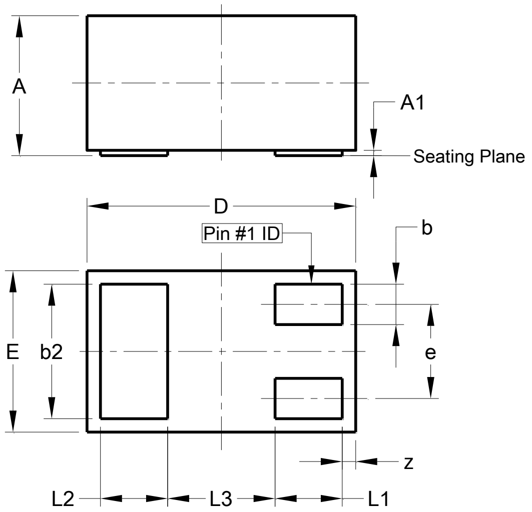


Fig. 8 Typical Base-Emitter Saturation Voltage
vs. Collector Current

Package Outline Dimensions

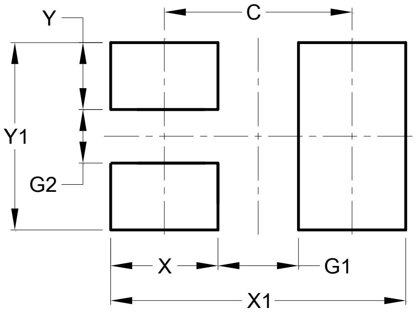
X1-DFN1006-3



X1-DFN1006-3			
Dim	**Min**	**Max**	**Typ**
A	0.47	0.53	0.50
A1	0.00	0.05	0.03
b	0.10	0.20	0.15
b2	0.45	0.55	0.50
D	0.95	1.075	1.00
E	0.55	0.675	0.60
e	-	-	0.35
L1	0.20	0.30	0.25
L2	0.20	0.30	0.25
L3	-	-	0.40
z	0.02	0.08	0.05
All Dimensions in mm			

Suggested Pad Layout

X1-DFN1006-3



Dimensions	Value (in mm)
C	0.70
G1	0.30
G2	0.20
X	0.40
X1	1.10
Y	0.25
Y1	0.70