



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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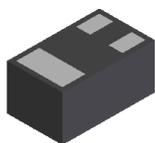
Features

- $BV_{CEO} > -50V$
- $I_C = -100mA$ High Collector Current
- $P_D = 1000mW$ Power Dissipation
- $0.60mm^2$ Package Footprint, 13 Times Smaller than SOT23
- 0.4mm Height Package Minimizing Off-Board Profile
- Complementary NPN Type: DN0150BLP4
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

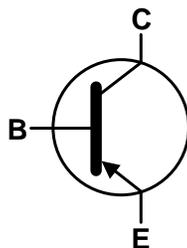
Mechanical Data

- Case: X2-DFN1006-3
- Case 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 ^(e4)
- Weight: 0.0008 grams (Approximate)

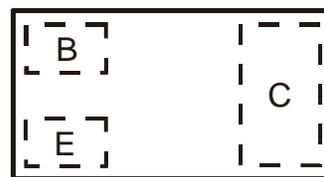
X2-DFN1006-3



Bottom View



Device Symbol



Top View
Pin Configuration

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CB0}	-50	V
Collector-Emitter Voltage	V_{CEO}	-50	V
Emitter-Base Voltage	V_{EBO}	-5	V
Collector Current - Continuous	I_C	-100	mA
Peak Pulse Collector Current	I_{CM}	-200	mA
Base Current	I_B	-30	mA

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

Characteristic	Symbol	Value	Unit
Power Dissipation	P_D	(Note 5) 400	mW
		(Note 6) 1000	
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	(Note 5) 310	$^\circ\text{C/W}$
		(Note 6) 120	
Thermal Resistance, Junction to Lead	$R_{\theta JL}$	120	$^\circ\text{C/W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

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	400	V	C

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_{CB0}	-50	-100	—	V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage	BV_{CEO}	-50	-79	—	V	$I_C = -1\text{mA}$
(Note 8) Emitter-Base Breakdown Voltage	BV_{EBO}	-6	-8.3	—	V	$I_E = -100\mu\text{A}$
Collector Cut-Off Current	I_{CBO}	—	-1	-50	nA	$V_{CB} = -50\text{V}$
Collector Cut-Off Current	I_{CEX}	—	-1	-50	nA	$V_{CE} = -50\text{V}, V_{EB} = -3\text{V}$
Emitter Cut-Off Current	I_{EBO}	—	-1	-20	nA	$V_{EB} = -5\text{V}$
Base Cutoff Current	I_{BL}	—	-1	-50	nA	$V_{CE} = -50\text{V}, V_{EB} = -3\text{V}$
ON CHARACTERISTICS (Note 9)						
DC Current Gain	h_{FE}	200	300	400	—	$V_{CE} = -6\text{V}, I_C = -2\text{mA}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	—	-150	-300	mV	$I_C = -100\text{mA}, I_B = -10\text{mA}$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	-650	-740	-850	mV	$I_C = -10\text{mA}, I_B = -1\text{mA}$ $I_C = -50\text{mA}, I_B = -5\text{mA}$
SMALL SIGNAL CHARACTERISTICS						
Transition Frequency	f_T	80	—	—	MHz	$V_{CE} = -10\text{V}, I_E = -1\text{mA}$ $f = 30\text{MHz}$
Output Capacitance	C_{obo}	—	1.6	—	pF	$V_{CB} = -10\text{V}, I_E = 0,$ $f = 1\text{MHz}$

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

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

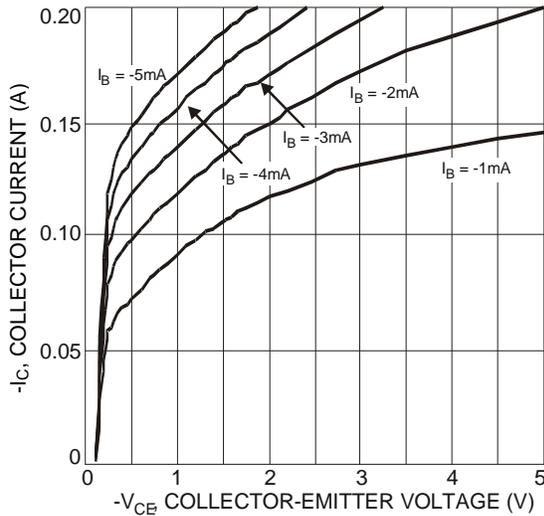


Fig. 1 Typical Collector Current vs. Collector-Emitter Voltage (NK-DP0150BLP4)

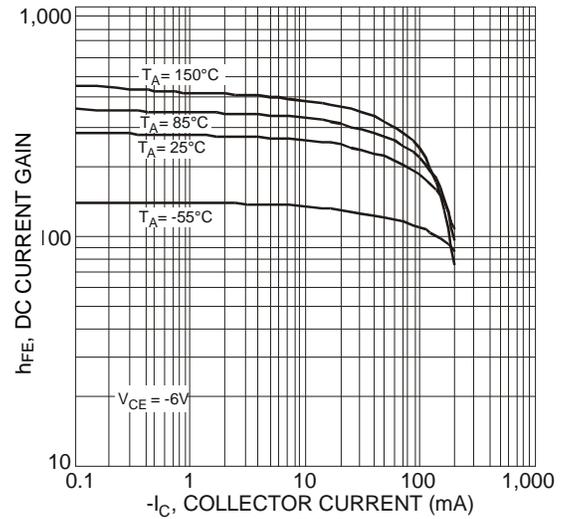


Fig. 2 Typical DC Current Gain vs. Collector Current (NK-DP0150BLP4)

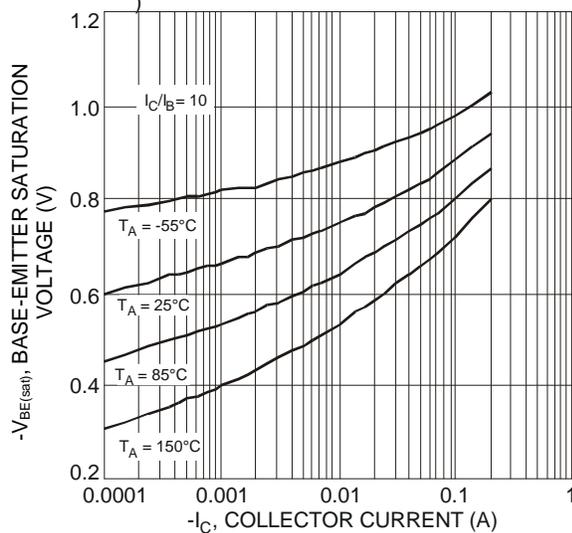


Fig. 3 Typical Base-Emitter Saturation Voltage vs. Collector Current

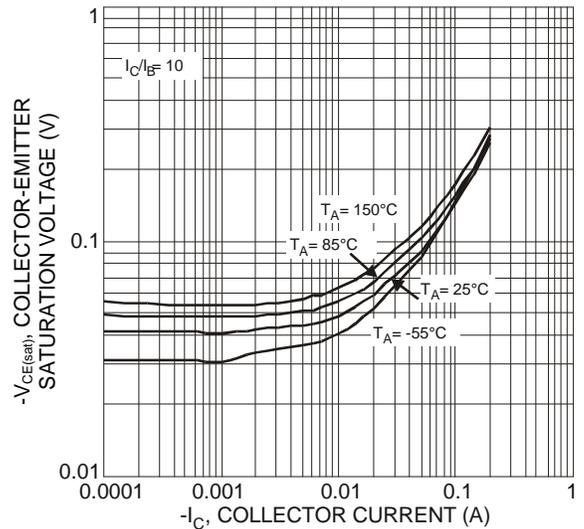


Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

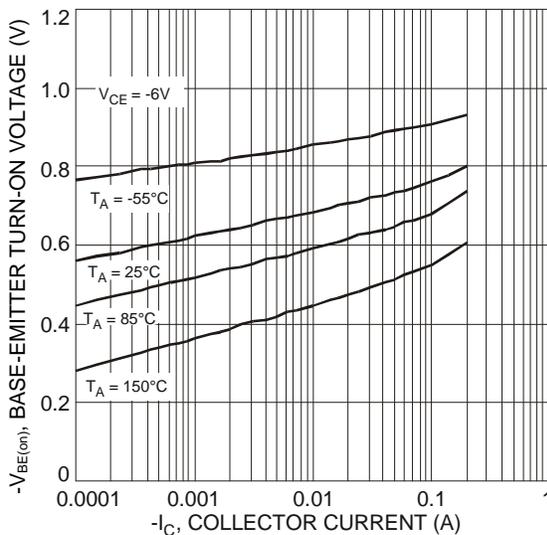


Fig. 5 Typical Base-Emitter Turn-On Voltage vs. Collector Current

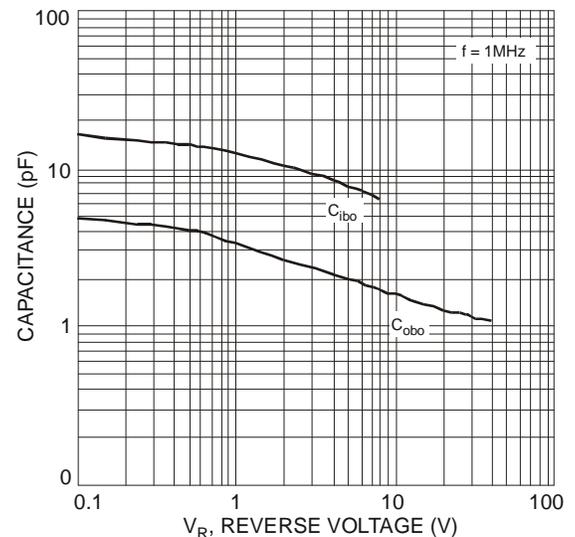


Fig. 6 Typical Capacitance Characteristics

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

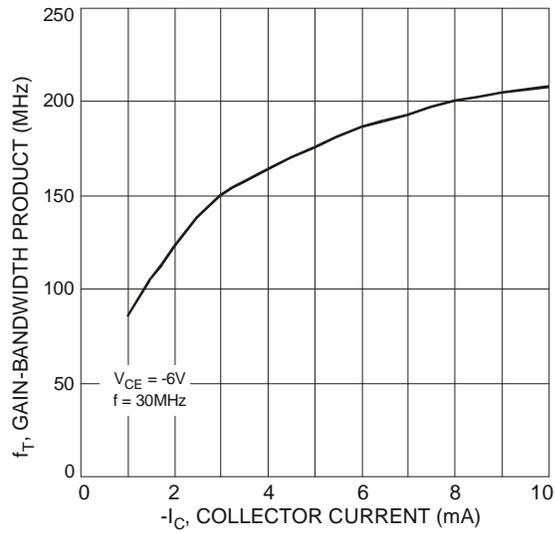
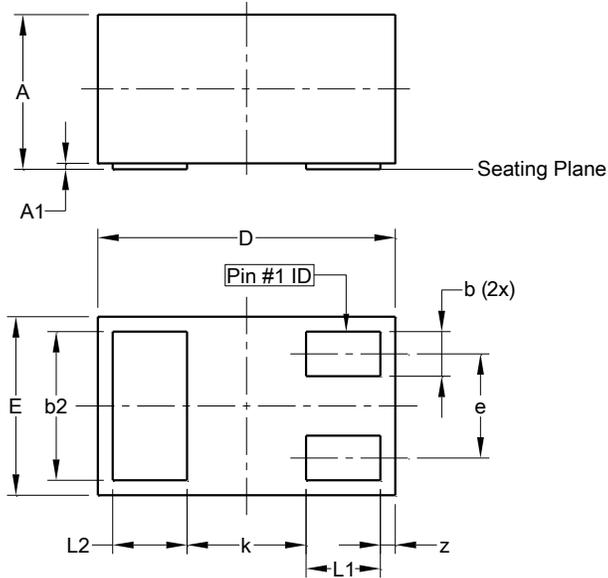


Fig. 7 Typical Gain-Bandwidth Product vs. Collector Current

Package Outline Dimensions

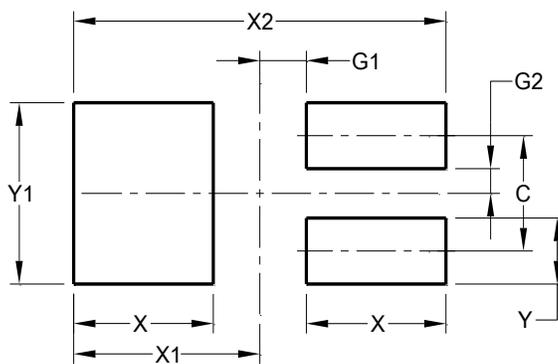
X2-DFN1006-3



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Dim	Min	Max	Typ
A	—	0.40	—
A1	0.00	0.05	0.03
b	0.10	0.20	0.15
b2	0.45	0.55	0.50
D	0.95	1.05	1.00
E	0.55	0.65	0.60
e	—	—	0.35
L1	0.20	0.30	0.25
L2	0.20	0.30	0.25
k	—	—	0.40
z	0.02	0.08	0.05
All Dimensions in mm			

Suggested Pad Layout

X2-DFN1006-3



Dimensions	Value (in mm)
C	0.350
G1	0.150
G2	0.075
X	0.450
X1	0.600
X2	1.200
Y	0.200
Y1	0.550