

N-Channel 20V (D-S) MOSFET with PNP Transistor

$V_{(BR)DSS}/V_{CEO}$	$R_{DS(on)MAX}$	I_D/I_C
20V	0.3Ω@-4.5V	0.5A
	0.6Ω@-2.5V	
-30V	/	-2.0A

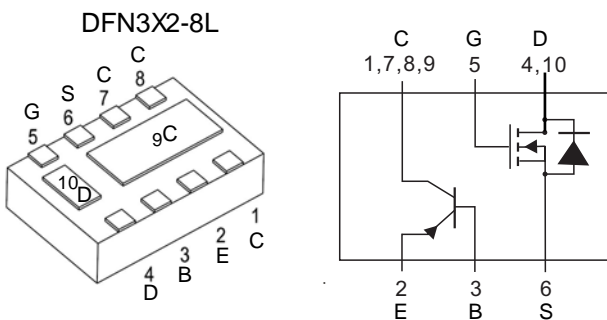
Features

- Small package DFN3x2-8L
- Low collector-emitter saturation voltage V_{CEsat}
- High DC current gain
- RoHS and Halogen-Free Compliant

Applications

- Charging Switch for Portable Devices
- Power management

Pin Configuration



Packing Information

Device	Marking	Reel Size	Tape Width	Quantity
EC5312	31B .XXX	7"	8mm	3000pcs

Absolute Maximum Ratings (TA=25 °C Unless Otherwise Noted)

Symbol	Parameter	Value	Unit
PNP Transistor			
V_{CBO}	Collector-Base Voltage	-40	V
V_{CEO}	Collector-Emitter Voltage	-30	V
V_{EBO}	Emitter-Base Voltage	-6.5	V
I_C	Collector Current	-2.0	A
N-MOSFET			
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	±12	V
I_D	Drain Current -Continuous ^A	0.5	A
I_{DM}	Drain Current - Pulse ^B	2.0	A
Power Dissipation, Temperature and Thermal Resistance			
P_D	Power Dissipation ^A	2.5	W
$R_{θJA}$	Thermal Resistance from Junction to Ambient ^A	50	°C/W
T_j	Junction Temperature	150	°C
T_{stg}	Storage Temperature	-55~+150	°C
T_L	Lead Temperature	260	°C

PNP TRANSISTOR ELECTRICAL CHARACTERISTICS ($T_J=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C=-0.1\text{mA}, I_E=0$	-40			V
Collector-emitter breakdown voltage	$V_{(BR)CEO}^*$	$I_C=-10\text{mA}, I_B=0$	-30			V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	$I_E=-0.1\text{mA}, I_C=0$	-6.5			V
Collector cut-off current	I_{CBO}	$V_{CB}=-20\text{V}, I_E=0$			-0.1	μA
Emitter cut-off current	I_{EBO}	$V_{EB}=-6\text{V}, I_C=0$			-0.1	μA
DC current gain	h_{FE}^*	$V_{CE}=-2\text{V}, I_C=-0.01\text{A}$	300			
		$V_{CE}=-2\text{V}, I_C=-0.1\text{A}$	300			
		$V_{CE}=-2\text{V}, I_C=-2\text{A}$	150			
		$V_{CE}=-2\text{V}, I_C=-6\text{A}$	15			
Collector-emitter saturation voltage	$V_{CE(sat)}^*$	$I_C=-0.1\text{A}, I_B=-10\text{mA}$			-30	mV
		$I_C=-1\text{A}, I_B=-20\text{mA}$			-220	mV
		$I_C=-1.5\text{A}, I_B=-50\text{mA}$			-250	mV
		$I_C=-2.5\text{A}, I_B=-150\text{mA}$			-350	mV
		$I_C=-3.5\text{A}, I_B=-350\text{mA}$			-380	mV
Base-emitter saturation voltage	$V_{BE(sat)}^*$	$I_C=-3.5\text{A}, I_B=-350\text{mA}$			-1.075	V
Base-emitter voltage	$V_{BE(on)}^*$	$V_{CE}=-2\text{V}, I_C=-3.5\text{A}$			-0.95	V
Transition frequency	f_T	$V_{CE}=-10\text{V}, I_C=-50\text{mA}, f=100\text{MHz}$	150			MHz

N-ch MOSFET ELECTRICAL CHARACTERISTICS ($T_J=25^{\circ}\text{C}$ unless otherwise specified)

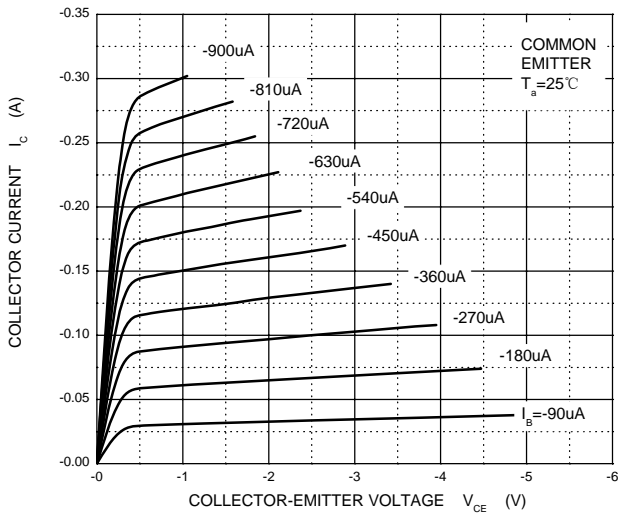
Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
STATIC PARAMETERS						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0\text{V}, I_D=250\mu\text{A}$	20			V
Zero gate voltage drain current	I_{DSS}	$V_{DS}=16\text{V}, V_{GS}=0\text{V}$			0.1	μA
Gate-body leakage current	I_{GSS}	$V_{GS}=\pm 4.5\text{V}, V_{DS}=0\text{V}$			± 1	μA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	0.45	0.65	1.2	V
Drain-source on-resistance	$R_{DS(on)}^B$	$V_{GS}=4.5\text{V}, I_D=0.6\text{A}$			0.3	Ω
		$V_{GS}=2.5\text{V}, I_D=0.5\text{A}$			0.6	Ω
Forward transconductance	g_{fs}	$V_{DS}=10\text{V}, I_D=0.4\text{A}$	0.5			S
Diode forward voltage	V_{SD}^*	$I_S=0.15\text{A}, V_{GS}=0\text{V}$		0.7	1.3	V

A. The data tested by surface mounted on a 1 inch x 1 inch FR-4 board with 20Z copper.

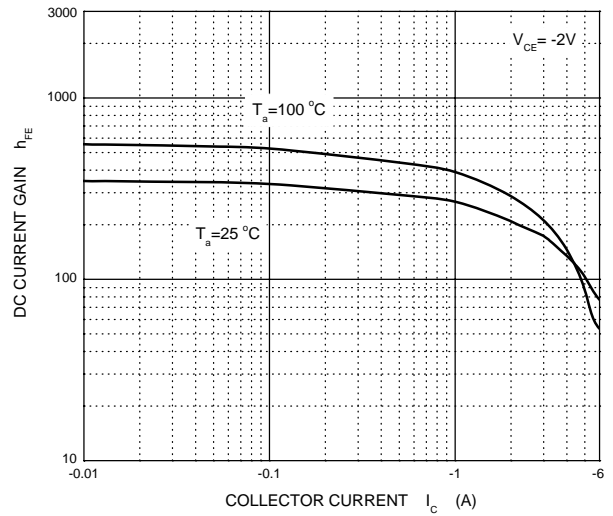
B. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

PNP TRANSISTOR TYPICAL CHARACTERISTICS

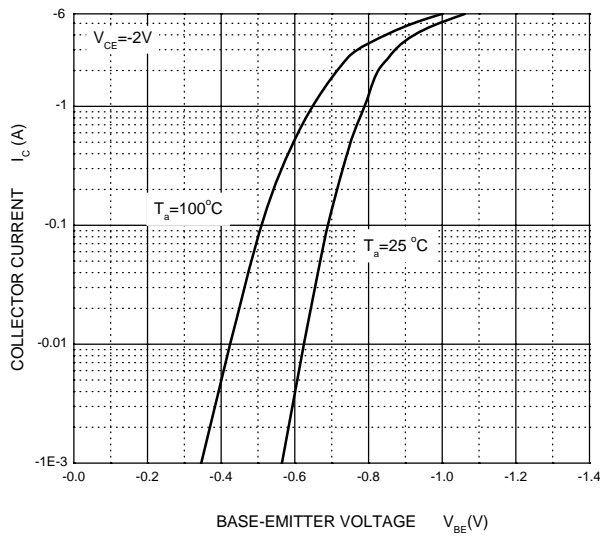
Static Characteristic



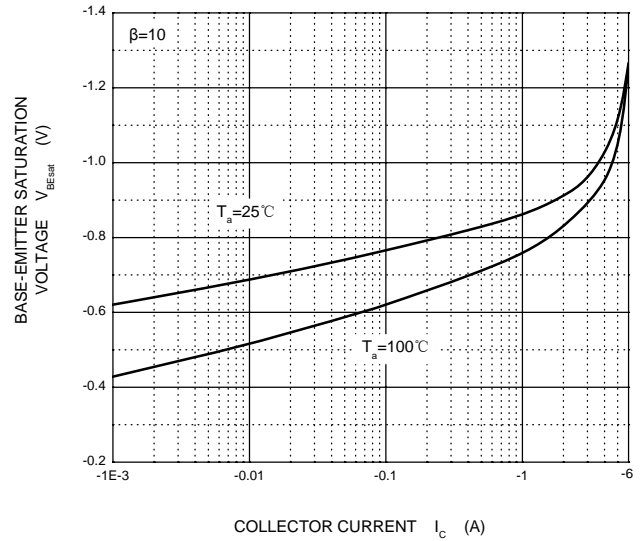
$h_{FE} - I_c$



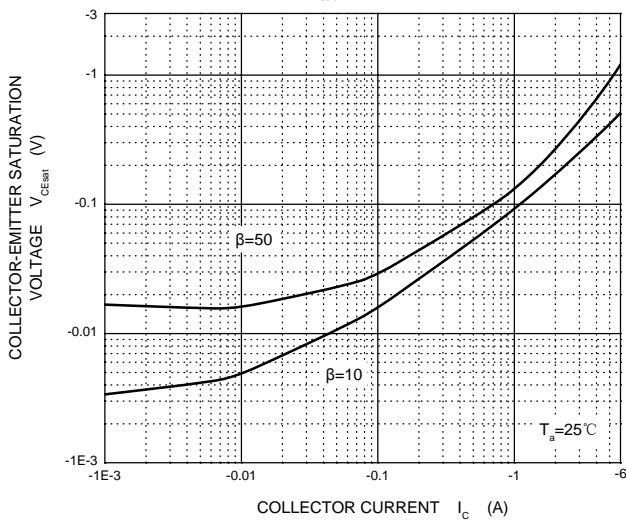
$I_c - V_{BE}$



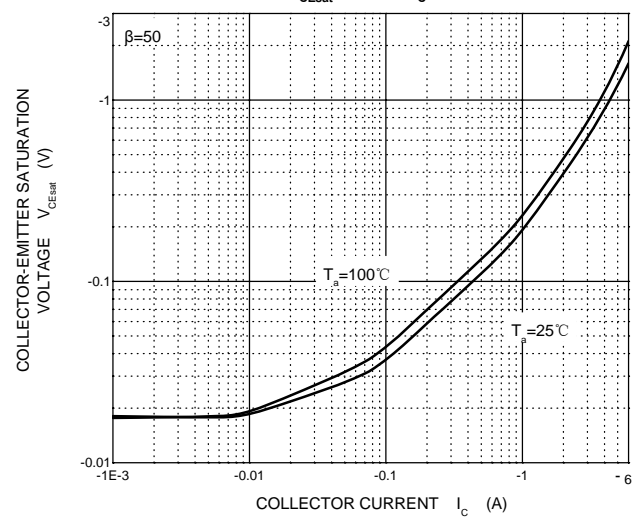
$V_{BEsat} - I_c$



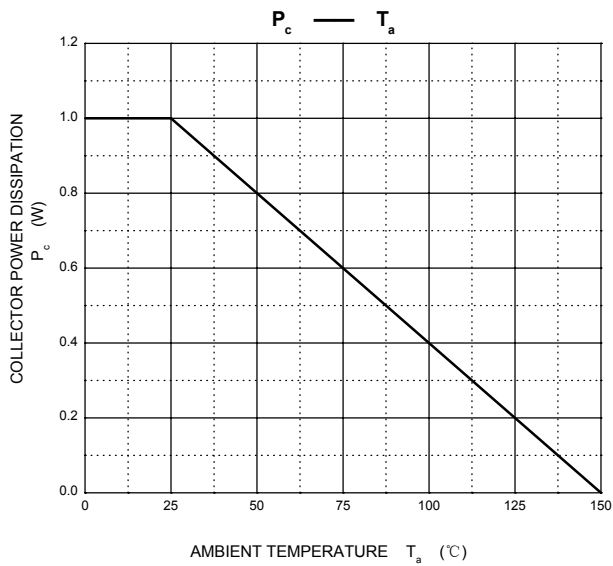
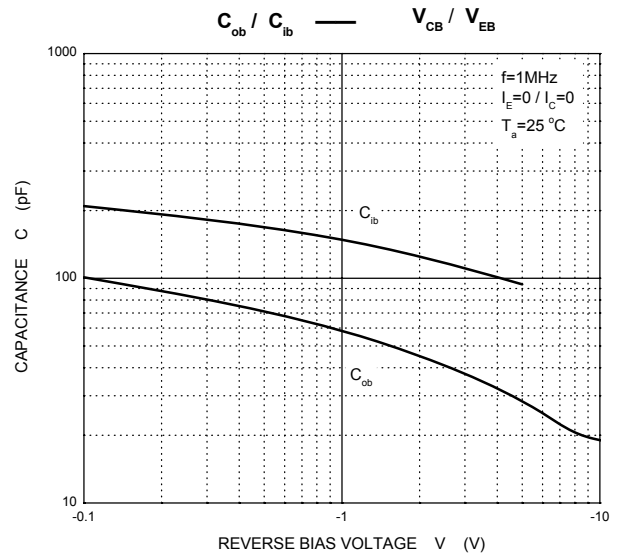
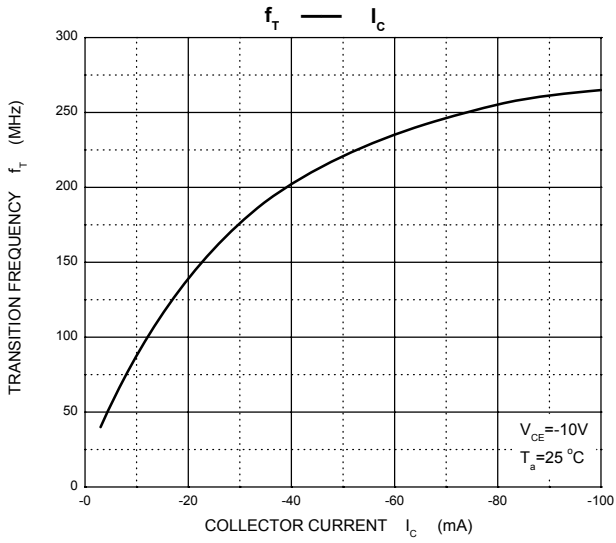
$V_{CEsat} - I_c$



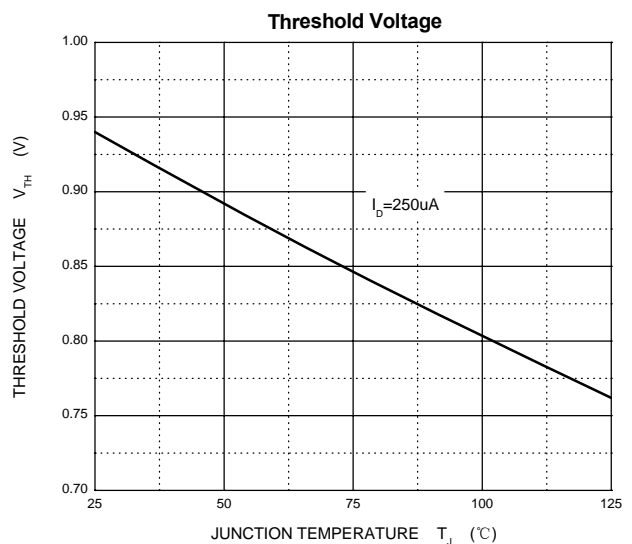
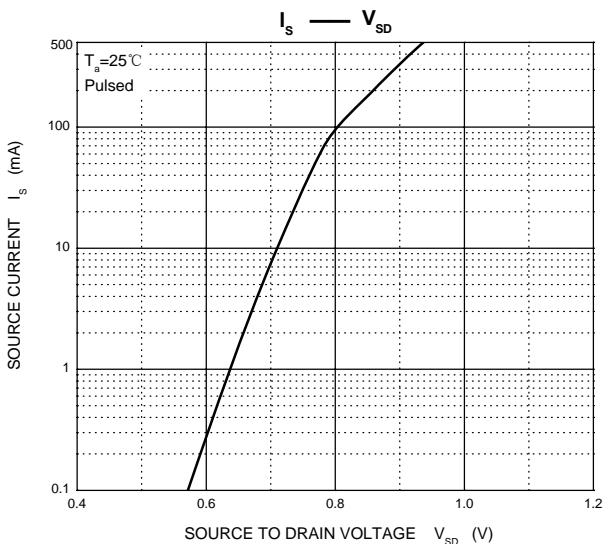
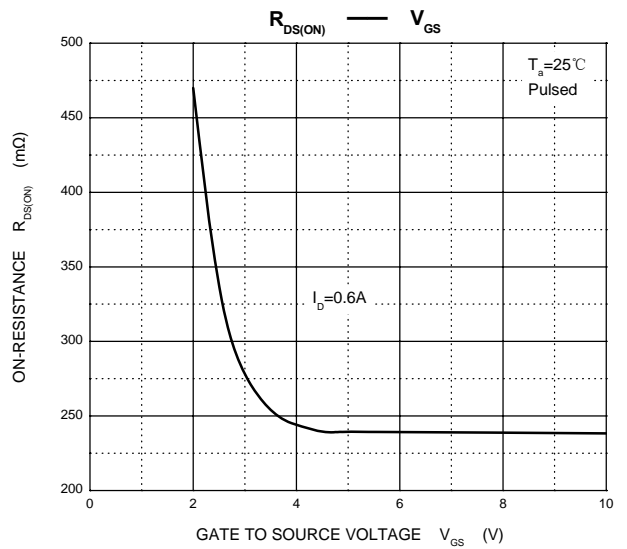
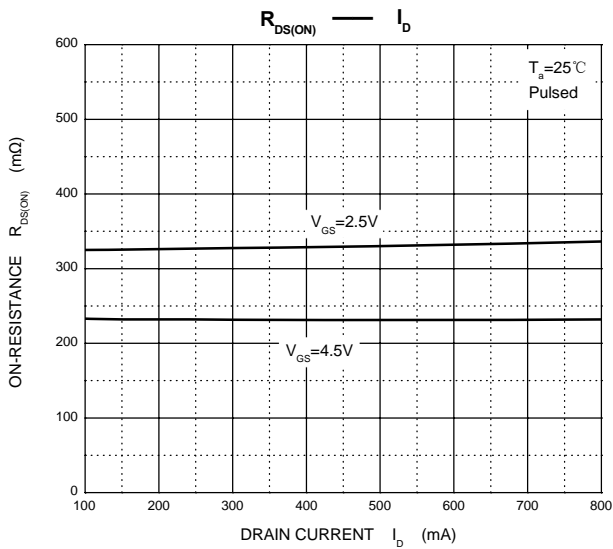
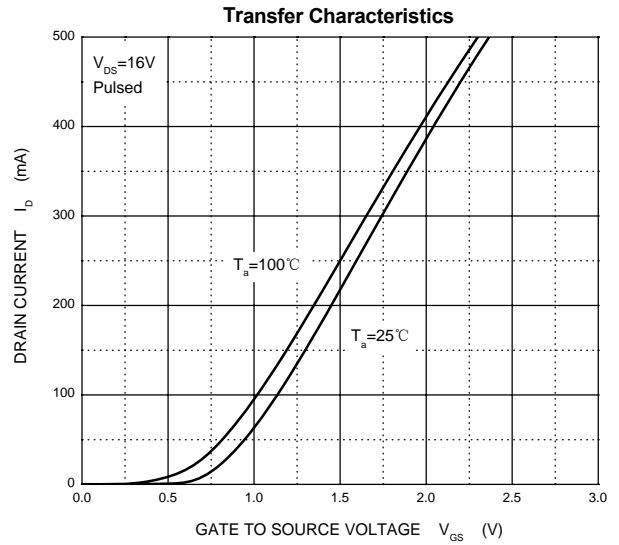
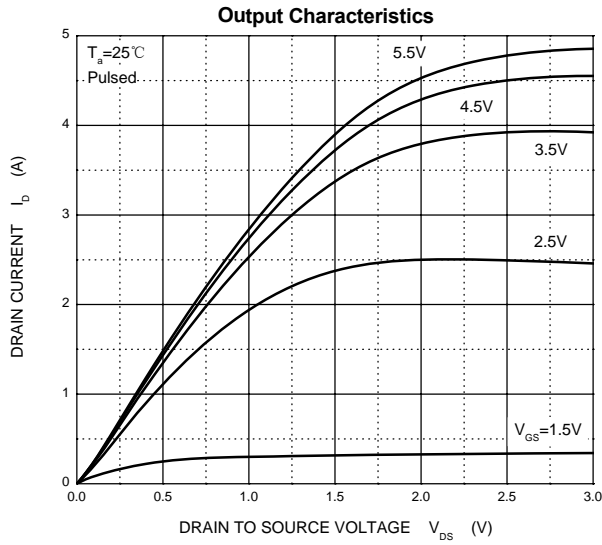
$V_{CEsat} - I_c$



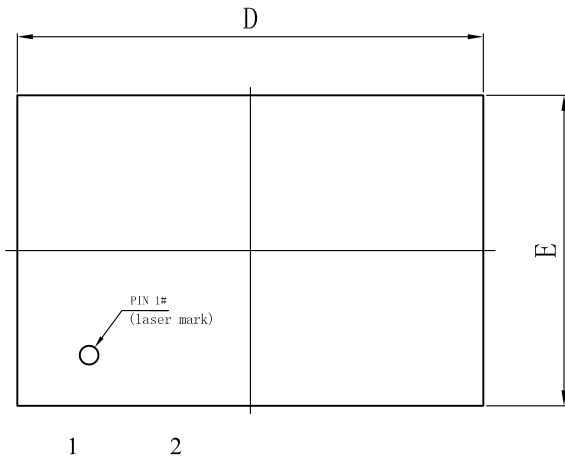
PNP TRANSISTOR TYPICAL CHARACTERISTICS



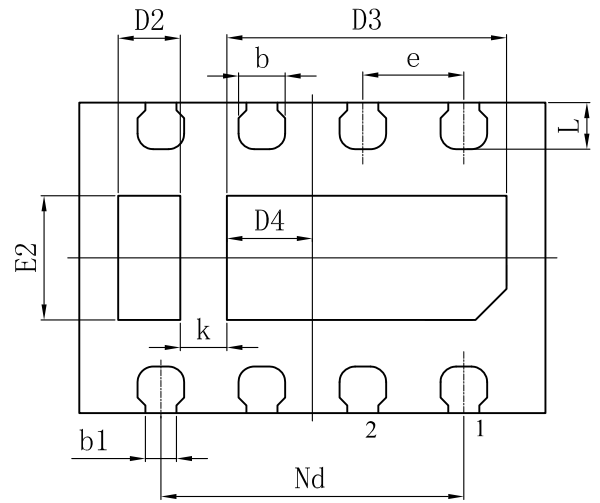
MOSFET TYPICAL CHARACTERISTICS(25°C, unless otherwise noted)



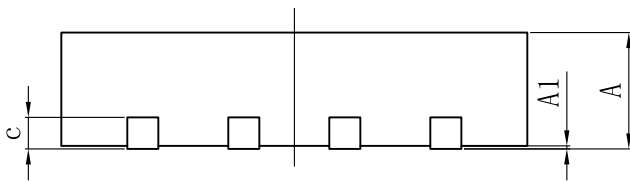
DFN3X2-8L Package Information



Top View



Bottom View



Side View

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.70	0.75	0.80
A1	0	0.02	0.05
b	0.25	0.30	0.35
b1	0.15	0.20	0.25
c	0.15	0.20	0.25
D	2.90	3.00	3.10
D2	0.30	0.40	0.50
D3	1.70	1.80	1.90
D4	0.45	0.55	0.65
e	0.65BSC		
Nd	1.95BSC		
E	1.90	2.00	2.10
E2	0.70	0.80	0.90
L	0.25	0.30	0.35
K	0.25	0.30	0.35