

## 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	
-25V	/	-2A

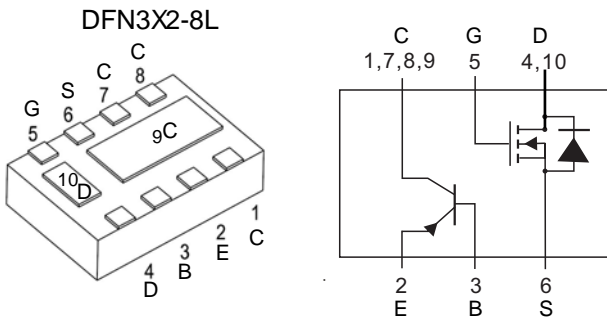
### Features

- 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 ( $T_J=25^\circ\text{C}$ Unless Otherwise Noted)

Symbol	Parameter	Value	Unit
<b>PNP Transistor</b>			
$V_{CBO}$	Collector-Base Voltage	-25	V
$V_{CEO}$	Collector-Emitter Voltage	-25	V
$V_{EBO}$	Emitter-Base Voltage	-6.5	V
$I_C$	Collector Current	-2.0	A
<b>N-MOSFET</b>			
$V_{DS}$	Drain-Source Voltage	20	V
$V_{GS}$	Gate-Source Voltage	±12	V
$I_D$	Drain Current -Continuous	0.5	A
$I_{DM}$	Drain Current - Pulse	2.0	A
<b>Power Dissipation, Temperature and Thermal Resistance</b>			
$P_D$	Power Dissipation	2.0	W
$R_{\theta JA}$	Thermal Resistance from Junction to Ambient (note1)	175	$^\circ\text{C}/\text{W}$
	Thermal Resistance from Junction to Ambient (note2)	110	$^\circ\text{C}/\text{W}$
$T_J$	Junction Temperature	150	$^\circ\text{C}$
$T_{stg}$	Storage Temperature	-55~+150	$^\circ\text{C}$
$T_L$	Lead Temperature	260	$^\circ\text{C}$

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

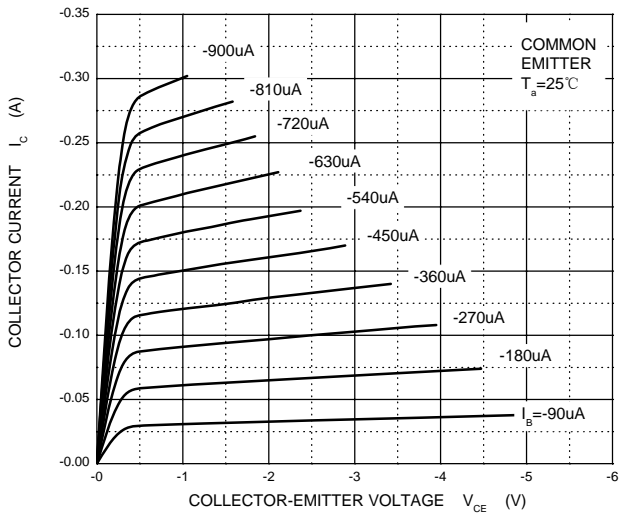
Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C=-0.1\text{mA}, I_E=0$	-25			V
Collector-emitter breakdown voltage	$V_{(BR)CEO}^*$	$I_C=-10\text{mA}, I_B=0$	-25			V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	$I_E=-0.1\text{mA}, I_C=0$	-6.5			V
Collector cut-off current	$I_{CBO}$	$V_{CB}=-20\text{V}, I_E=0$			-0.1	$\mu\text{A}$
Emitter cut-off current	$I_{EBO}$	$V_{EB}=-6\text{V}, I_C=0$			-0.1	$\mu\text{A}$
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)**

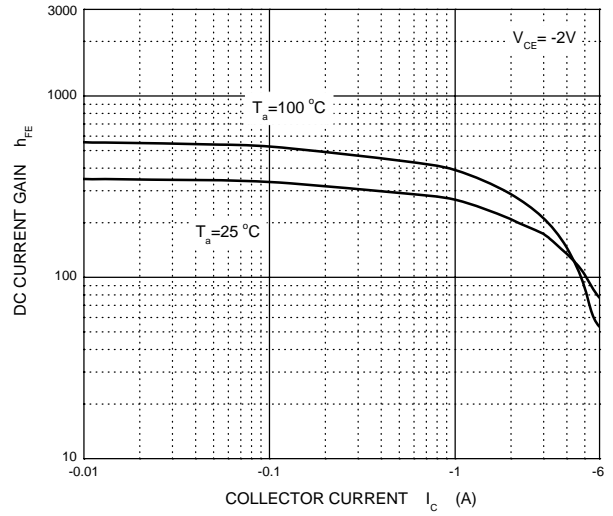
Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
<b>STATIC PARAMETERS</b>						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0\text{V}, I_D=250\mu\text{A}$	20			V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS}=16\text{V}, V_{GS}=0\text{V}$			0.1	$\mu\text{A}$
Gate-body leakage current	$I_{GSS}$	$V_{GS}=\pm 4.5\text{V}, V_{DS}=0\text{V}$			$\pm 1$	$\mu\text{A}$
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	0.45	0.75	1.2	V
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS}=4.5\text{V}, I_D=0.6\text{A}$			0.3	$\Omega$
		$V_{GS}=2.5\text{V}, I_D=0.5\text{A}$			0.6	$\Omega$
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

**PNP TRANSISTOR TYPICAL CHARACTERISTICS**

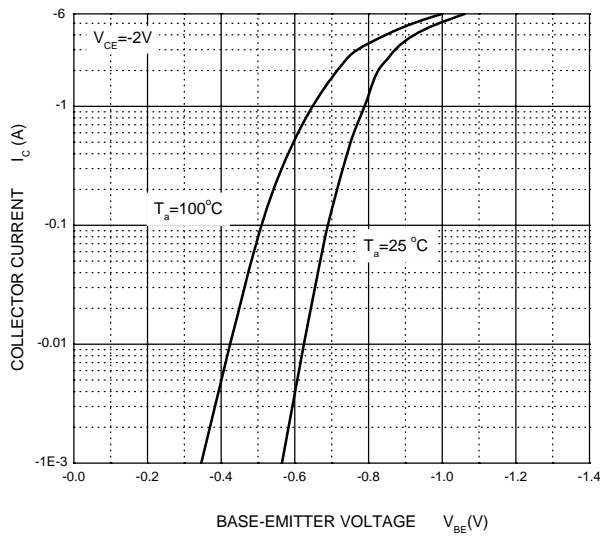
**Static Characteristic**



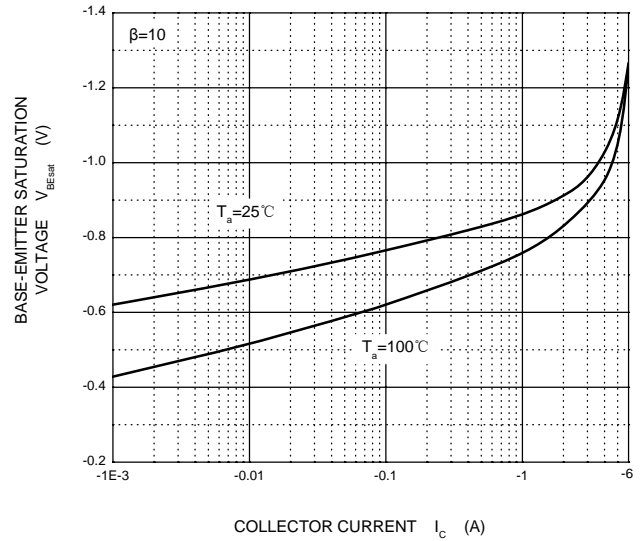
**$h_{FE} - I_c$**



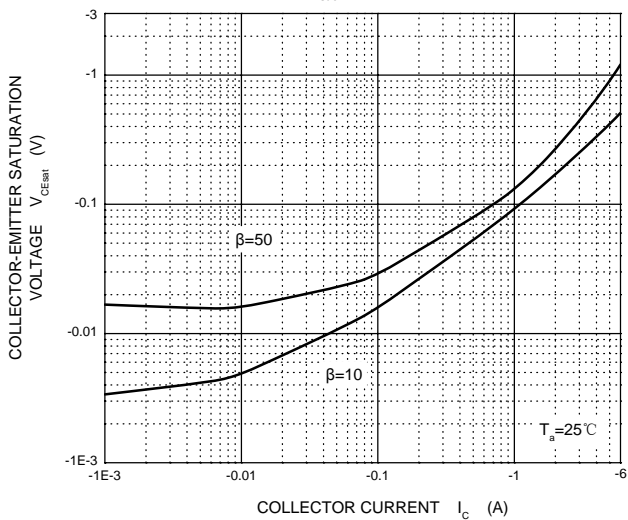
**$I_c - V_{BE}$**



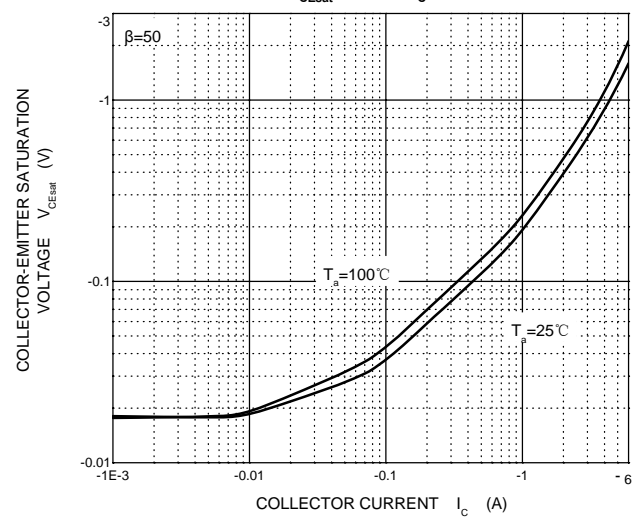
**$V_{BEsat} - I_c$**



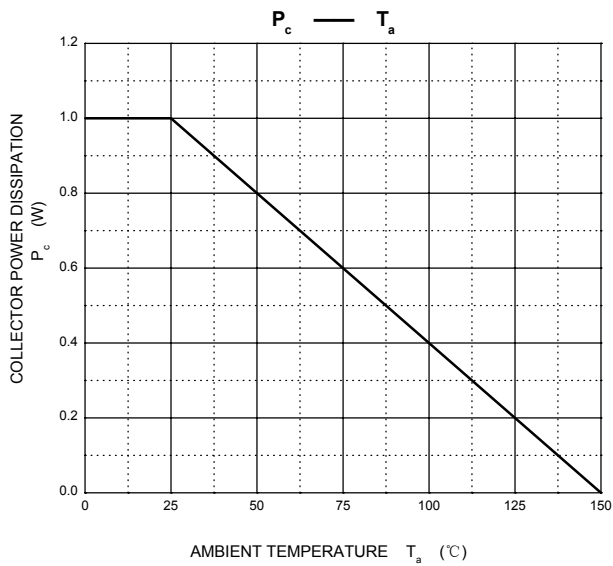
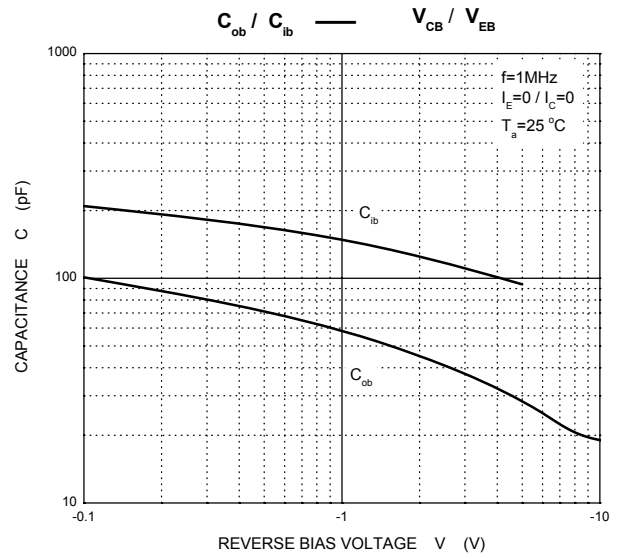
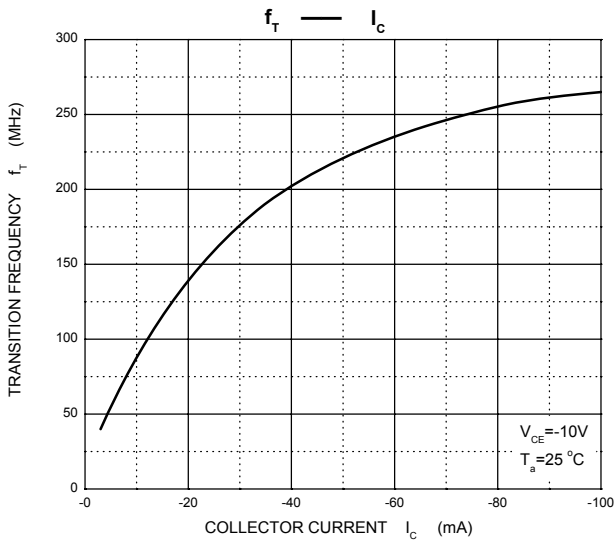
**$V_{CEsat} - I_c$**



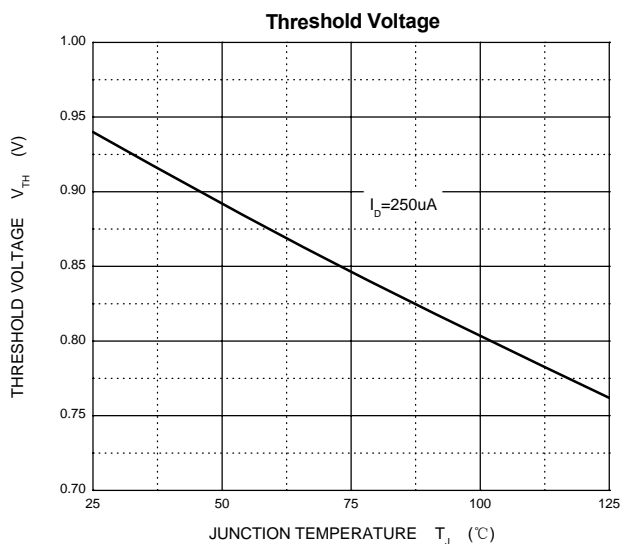
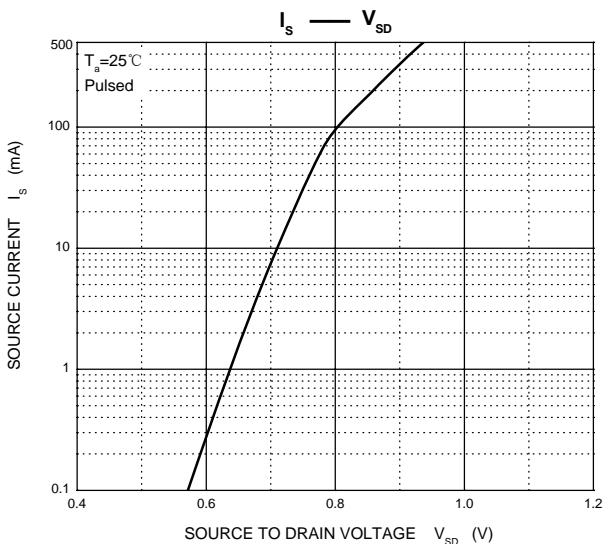
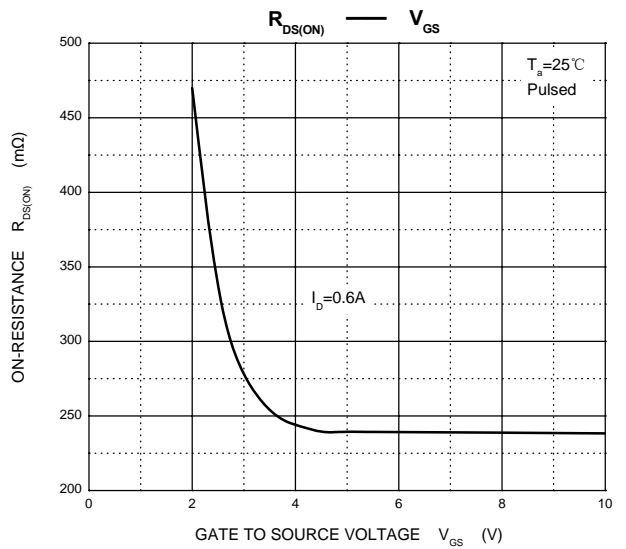
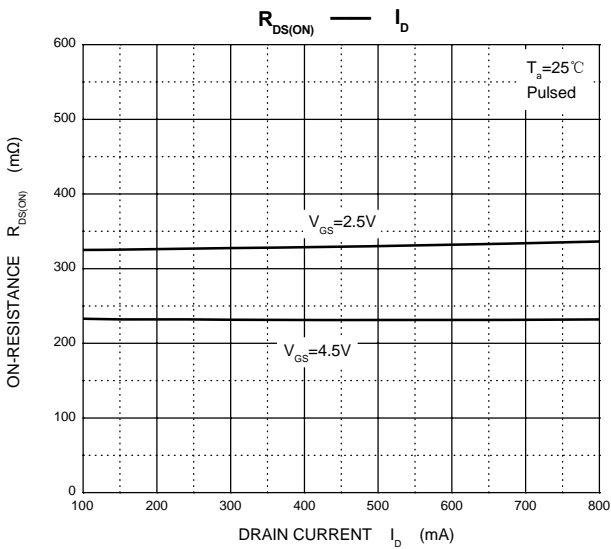
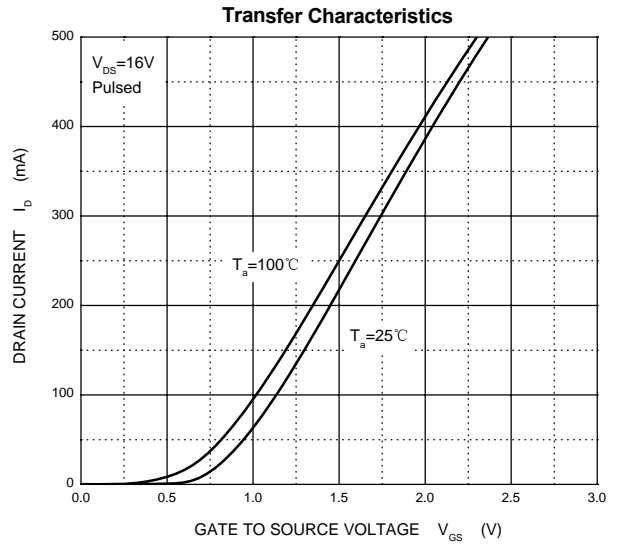
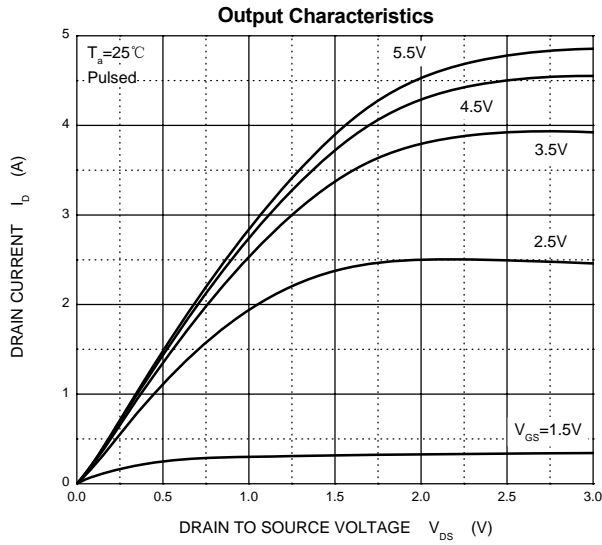
**$V_{CEsat} - I_c$**



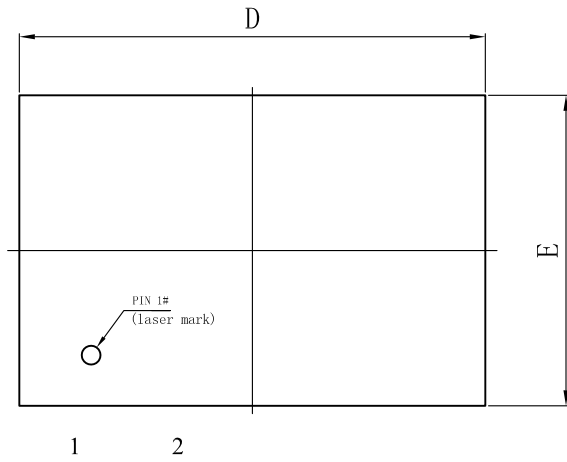
PNP TRANSISTOR TYPICAL CHARACTERISTICS



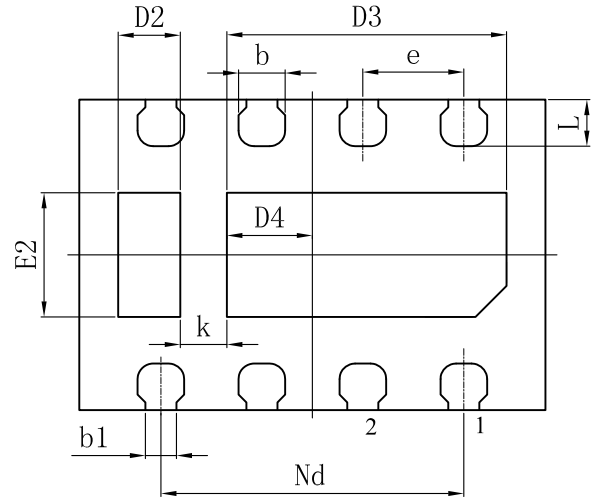
MOSFET TYPICAL CHARACTERISTICS(25°C, unless otherwise noted)



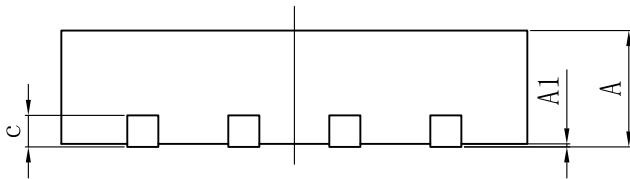
### DFN3X2-8L Package Information



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