

NCE N-Channel Enhancement Mode Power MOSFET

Description

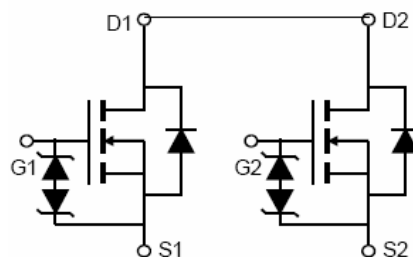
The NCE18ND11U uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

General Features

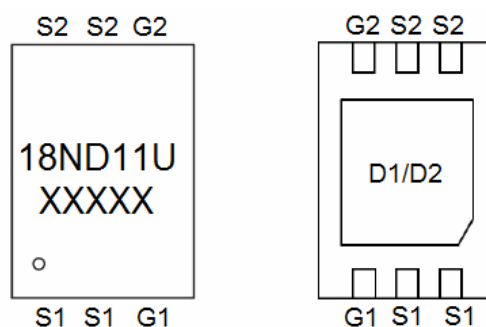
- $V_{DS} = 18V, I_D = 11A$
 $R_{DS(ON)} < 7.1m\Omega @ V_{GS}=4.5V$
 $R_{DS(ON)} < 7.3m\Omega @ V_{GS}=4V$
 $R_{DS(ON)} < 7.4m\Omega @ V_{GS}=3.8V$
 $R_{DS(ON)} < 9.0m\Omega @ V_{GS}=3.1V$
 $R_{DS(ON)} < 10m\Omega @ V_{GS}=2.5V$
- High density cell design for ultra low R_{dson}
- Fully characterized avalanche voltage and current
- 2.5V Drive
- Common-drain type

Application

- Battery protection switch
- Mobile device battery charging and discharging



Schematic diagram



Top View

Bottom View

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
18ND11U	NCE18ND11U	DFN2x3 -6L	-	-	-

Absolute Maximum Ratings ($T_C=25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	18	V
Gate-Source Voltage	V_{GS}	± 12	V
Drain Current-Continuous	I_D	11	A
Pulsed Drain Current	I_{DM}	50	A
Maximum Power Dissipation	P_D	1.5	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ C$

Thermal Characteristic

Thermal Resistance, Junction-to-Ambient ^(Note 2)	$R_{\theta JA}$	83	$^\circ C/W$
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Electrical Characteristics (TC=25°C unless otherwise noted)

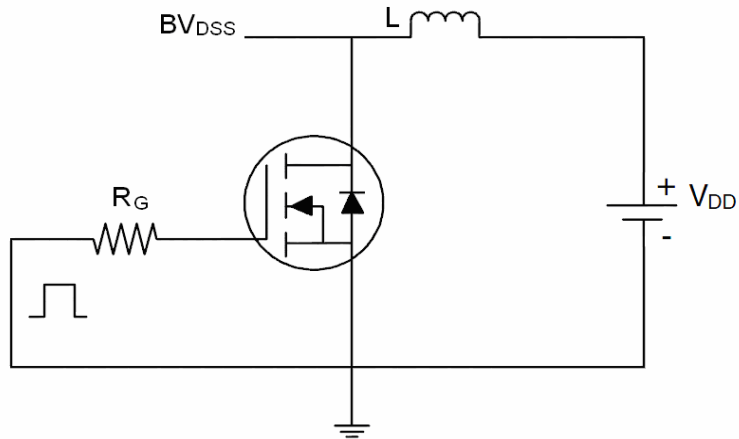
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	18		-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=16V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 12V, V_{DS}=0V$	-	-	± 10	μA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.5	0.7	1	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=3A$	-	6.2	7.1	m Ω
		$V_{GS}=4V, I_D=3A$	-	6.4	7.3	
		$V_{GS}=3.8V, I_D=3A$		6.8	7.4	
		$V_{GS}=3.1V, I_D=3A$		7.2	9.0	
		$V_{GS}=2.5V, I_D=3A$		8.2	10	
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=5A$	5	-	-	S
Dynamic Characteristics (Note 4)						
Input Capacitance	C_{iss}	$V_{DS}=10V, V_{GS}=0V,$ $F=1.0MHz$	-	1550	-	PF
Output Capacitance	C_{oss}		-	250	-	PF
Reverse Transfer Capacitance	C_{rss}		-	210	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=10V, I_D=3A$ $V_{GS}=4.5V, R_{GEN}=3\Omega$	-	2.2	-	nS
Turn-on Rise Time	t_r		-	5.9	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	40	-	nS
Turn-Off Fall Time	t_f		-	90	-	nS
Total Gate Charge	Q_g	$V_{DS}=10V, I_D=3A,$ $V_{GS}=4.5V$	-	17	-	nC
Gate-Source Charge	Q_{gs}		-	2.0	-	nC
Gate-Drain Charge	Q_{gd}		-	5.1	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	$V_{GS}=0V, I_S=11A$	-	0.85	1.2	V
Diode Forward Current (Note 2)	I_S		-	-	11	A

Notes:

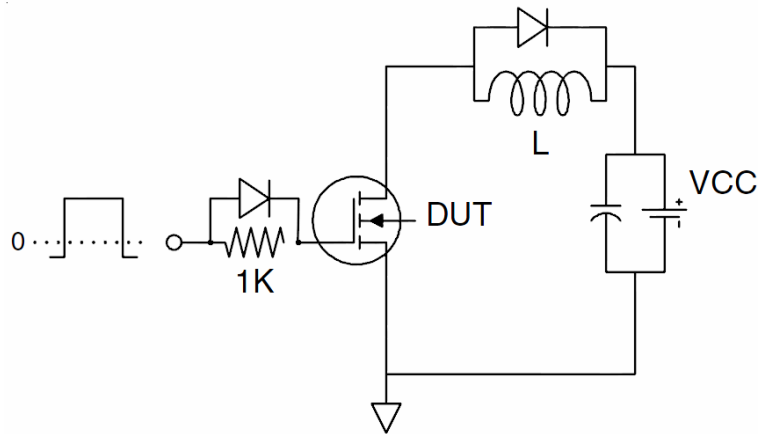
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

Test Circuit

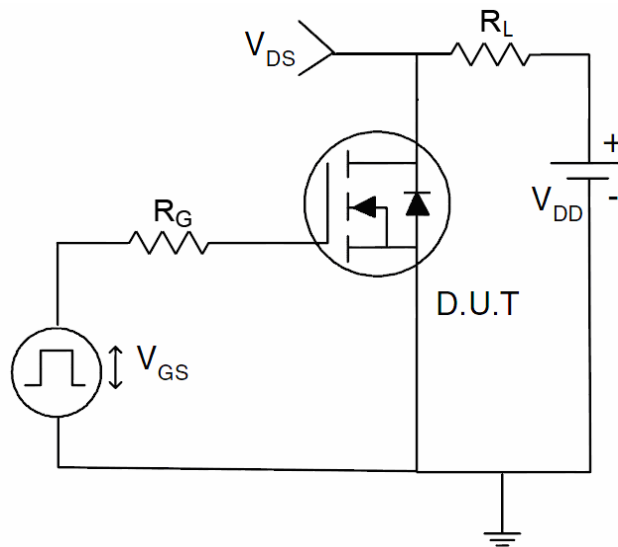
1) E_{AS} Test Circuits



2) Gate Charge Test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics (Curves)

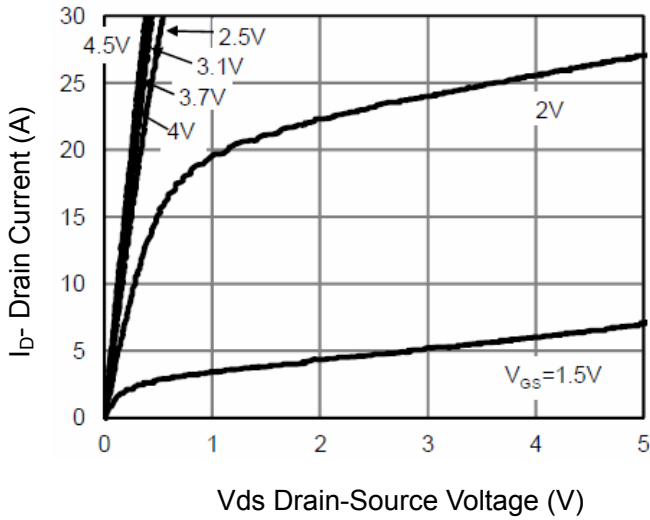


Figure 1 Output Characteristics

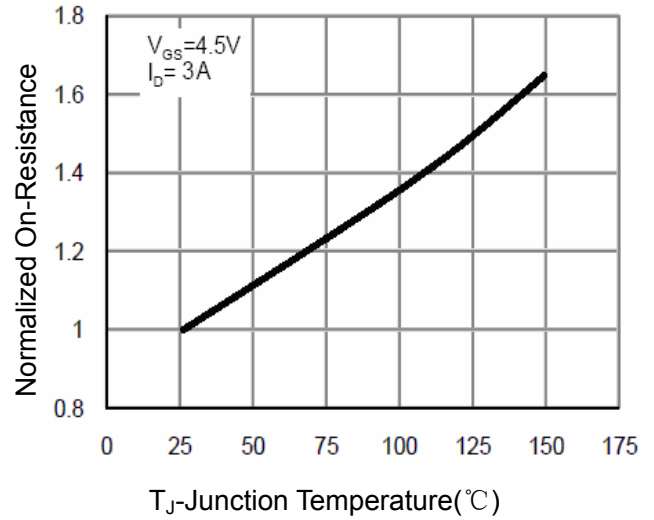


Figure 4 Rdson-Junction Temperature

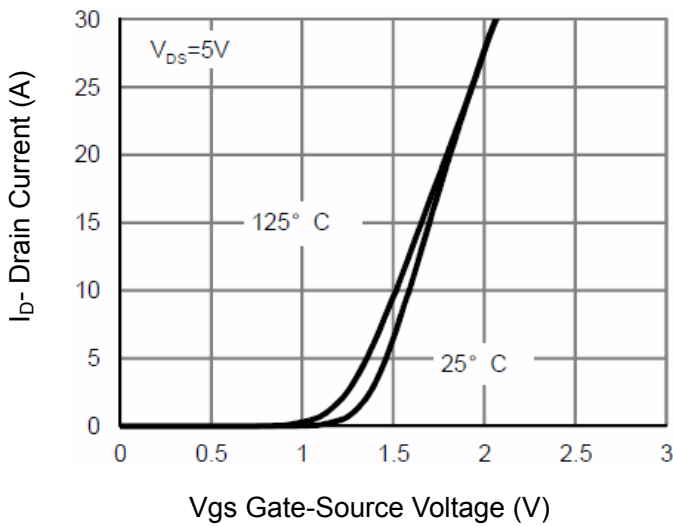


Figure 2 Transfer Characteristics

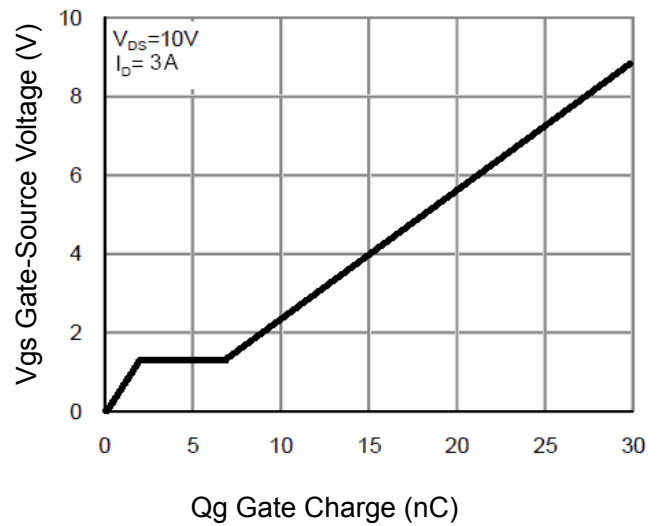


Figure 5 Gate Charge

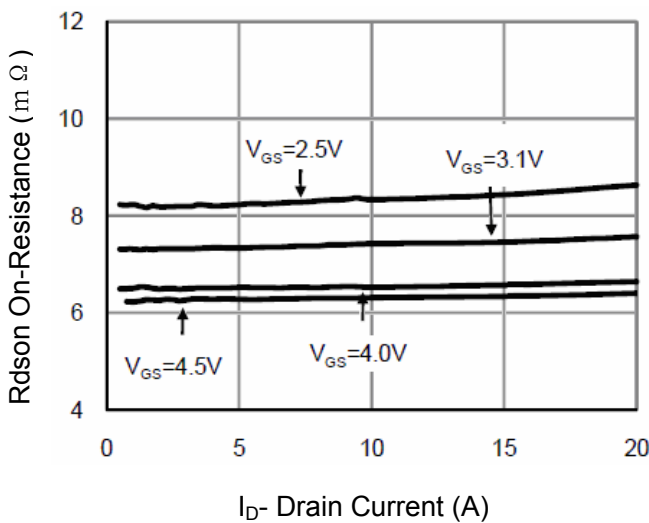


Figure 3 Rdson- Drain Current

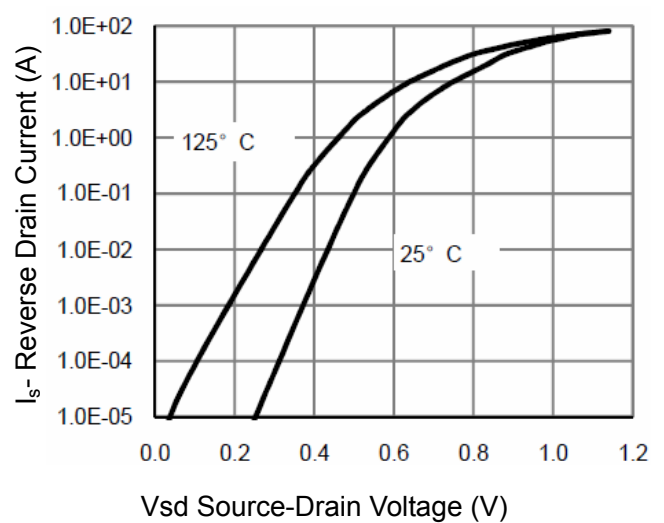


Figure 6 Source- Drain Diode Forward

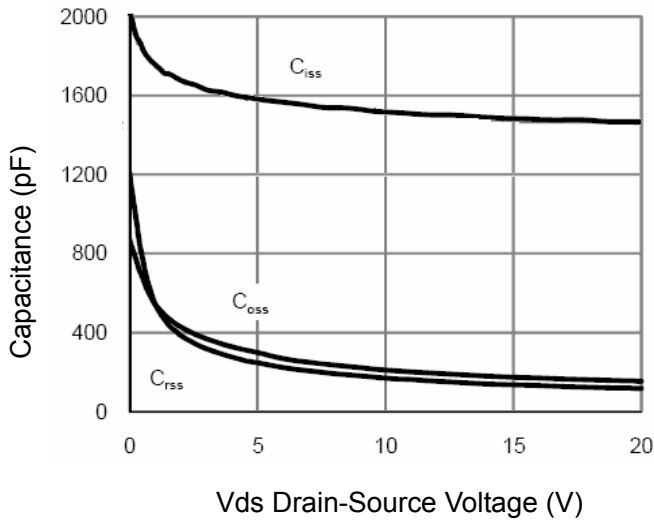


Figure 7 Capacitance vs Vds

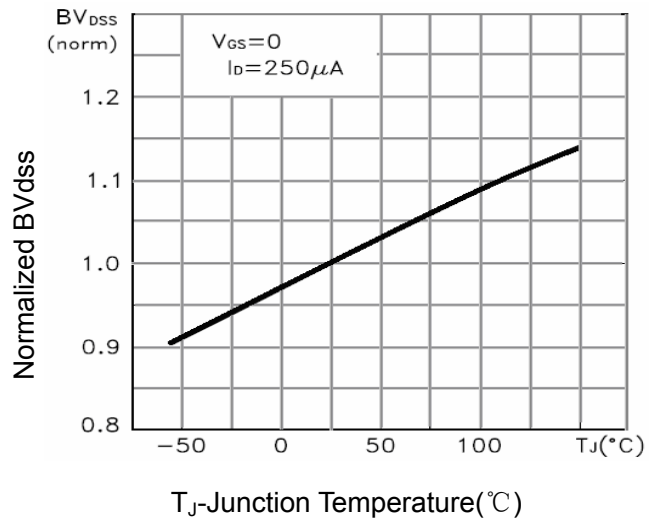


Figure 9 BV_{DSS} vs Junction Temperature

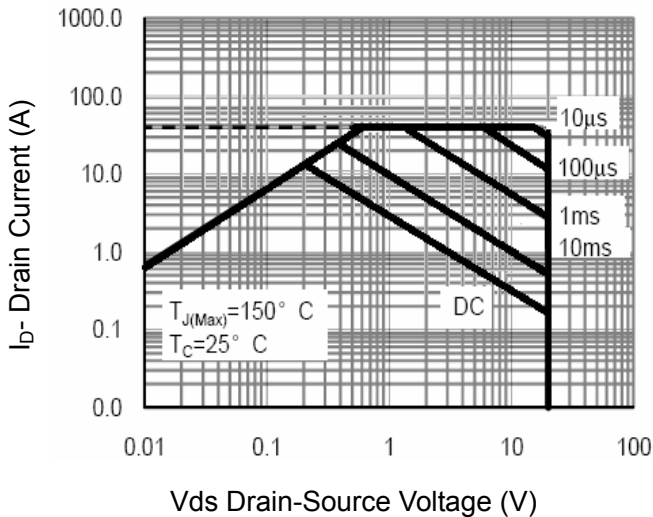


Figure 8 Safe Operation Area

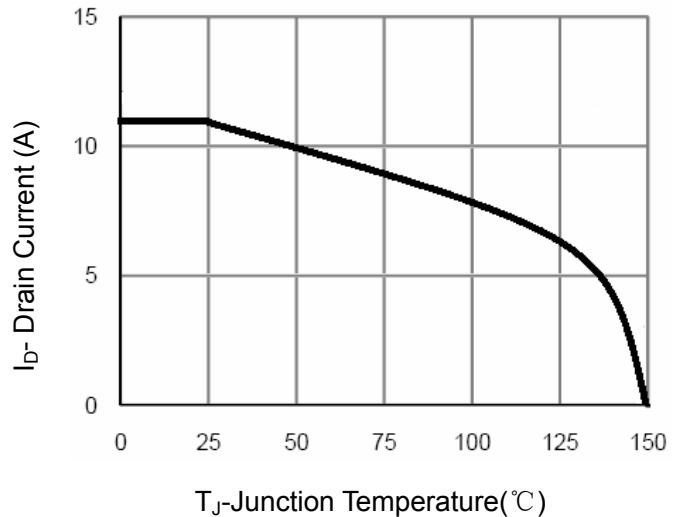


Figure 10 Current De-rating

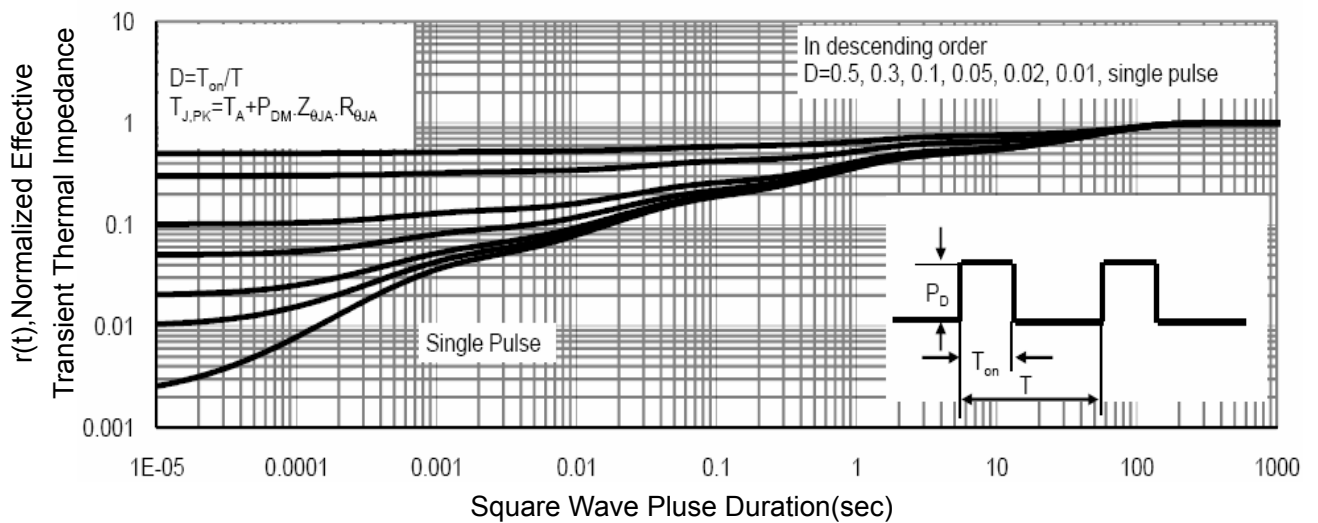
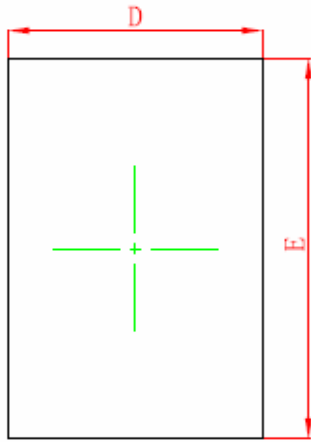
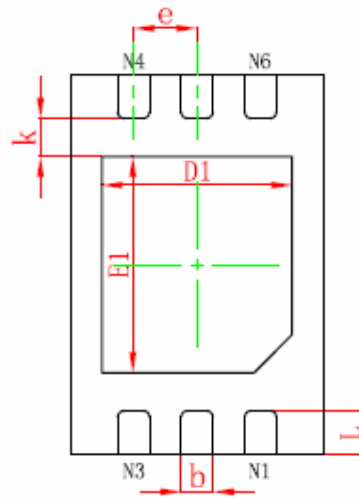


Figure 11 Normalized Maximum Transient Thermal Impedance

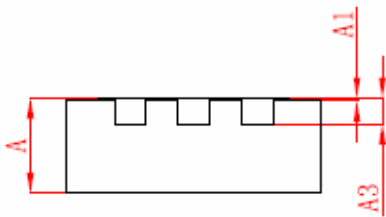
DFN2X3-6L Package Information



TOP VIEW

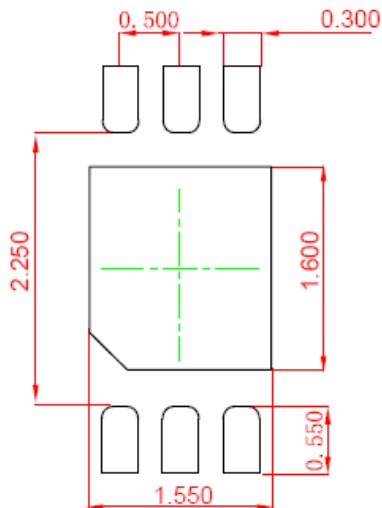


BOTTOM VIEW



SIDE VIEW

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.700	0.800	0.028	0.031
A1	0.000	0.050	0.000	0.002
A3	0.203REF.		0.008REF.	
D	1.950	2.050	0.077	0.081
E	2.950	3.050	0.116	0.120
D1	1.450	1.550	0.057	0.061
E1	1.650	1.750	0.065	0.069
k	0.200MIN.		0.008MIN.	
b	0.200	0.300	0.008	0.012
e	0.500TYP.		0.020TYP.	
L	0.300	0.400	0.012	0.016



Note:
 1. Controlling dimension: In millimeters.
 2. General tolerance: $\pm 0.050\text{mm}$.
 3. The pad layout is for reference purposes only.

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