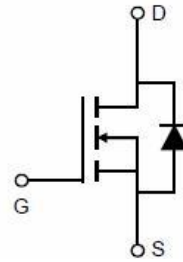




N-Channel Enhancement Mode Power MOSFET

Description

The MXN3016M uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. This device can be used for a variety of applications

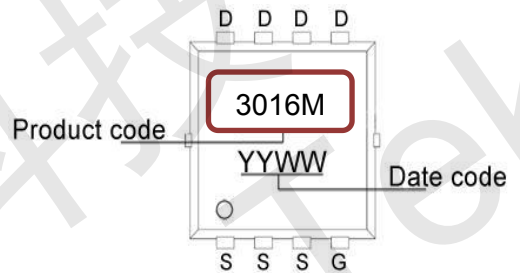


General Features

- ◆ $V_{DS} = 30V$, $I_D = 45A$
- ◆ @ $V_{GS} = 10V$ $R_{DS(ON)}$ (Typ.)=5m Ω
- ◆ @ $V_{GS} = 4.5V$ $R_{DS(ON)}$ (Typ.)=7m Ω

High density cell design for ultra low R_{dson}
 Fully characterized Avalanche voltage and current
 Good stability and uniformity with high E_{AS}
 Excellent package for good heat dissipation
 Special process technology for high ESD capability

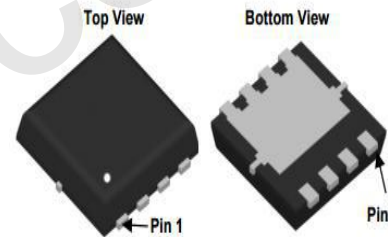
Schematic diagram



Marking and pin assignmen

Application

DC/DC Converters in Computing, Servers, and POL
 Isolated DC/DC Converters in Telecom and Industrial
 Uninterruptible Power Supply



PDFN3X3-8L

Absolute Maximum Ratings (TA=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous ($T_C = 25^\circ C$)	I_D	45	A
Drain Current-Continuous ($T_A = 25^\circ C$)	I_{DSM}	16	A
Pulsed Drain Current (Note 1)	I_{DM}	110	A
Maximum Power Dissipation	P_D	3.1	W
Avalanche Current	I_{AS}	26	A
Single pulse avalanche energy (Note 5)	E_{AS}	169	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ C$



Thermal Characteristic

Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	40	$^{\circ}\text{C}/\text{W}$
Thermal Resistance, Junction-to-Case, Steady State	$R_{\theta JC}$	4.2	$^{\circ}\text{C}/\text{W}$

Electrical Characteristics (TA=25 $^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=30V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.6	2	2.7	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=12A$	-	5	6.5	m Ω
		$V_{GS}=4.5V, I_D=10A$	-	7	10	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=11A$	-	24	-	S
Dynamic Characteristics (Note 4)						
Input Capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V,$ $F=1.0\text{MHz}$	-	1350	-	PF
Output Capacitance	C_{oss}		-	132	-	PF
Reverse Transfer Capacitance	C_{rss}		-	261	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DS}=15V, R_L=0.75\Omega$ $V_{GS}=10V, R_G=3\Omega$	-	8.8	-	nS
Turn-on Rise Time	t_r		-	12.2	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	29.5	-	nS
Turn-Off Fall Time	t_f		-	8.6	-	nS
Total Gate Charge	Q_g	$V_{DS}=25V, I_D=11A,$ $V_{GS}=10V$	-	20.7	-	nC
Gate-Source Charge	Q_{gs}		-	3.7	-	nC
Gate-Drain Charge	Q_{gd}		-	2.9	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	$V_{GS}=0V, I_S=1A$	-	-	1.2	V
Diode Forward Current (Note 2)	I_S		-	-	16	A
Reverse Recovery Time	t_{rr}	$T_J = 25^{\circ}\text{C}, I_F = 20A$	-	22.4	-	nS
Reverse Recovery Charge	Q_{rr}	$di/dt = 100A/\mu s$ (Note 3)	-	14	-	nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

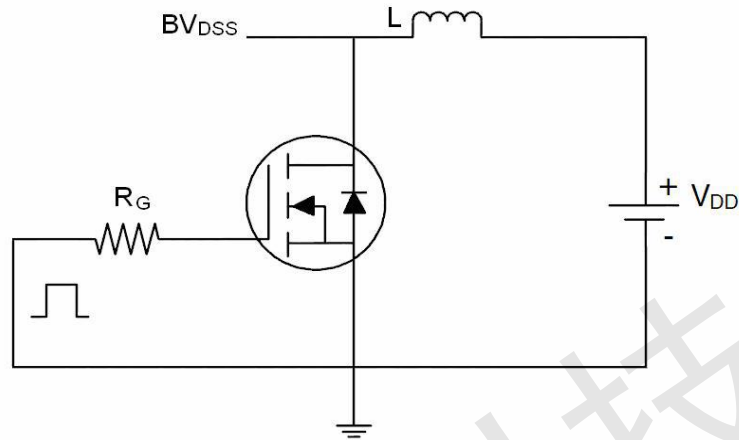
Notes:

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

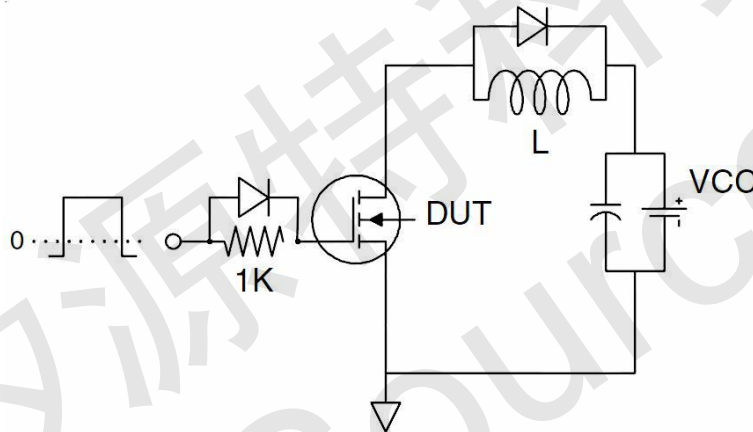


Test circuit

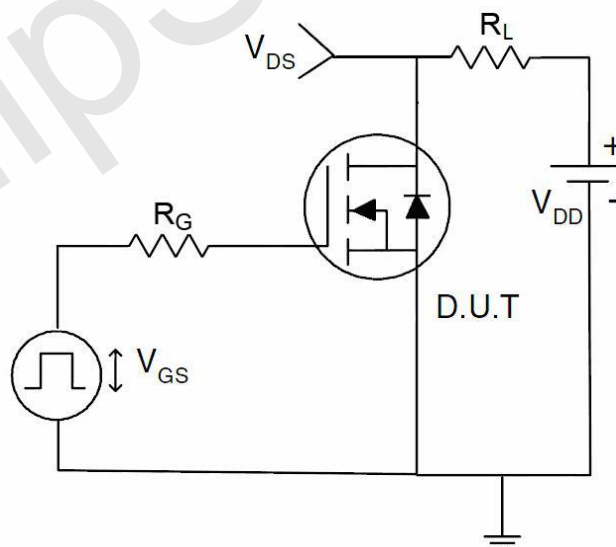
1) EAS test Circuits



2) Gate charge test Circuit:



3) Switch Time Test Circuit:





Typical Electrical and Thermal Characteristics (Curves)

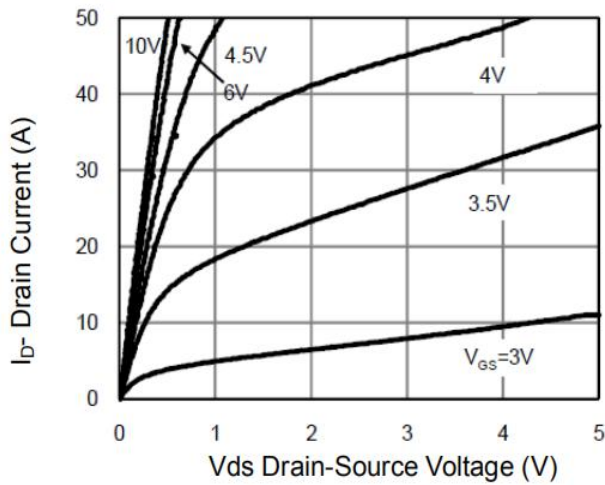


Figure 1 Output Characteristics

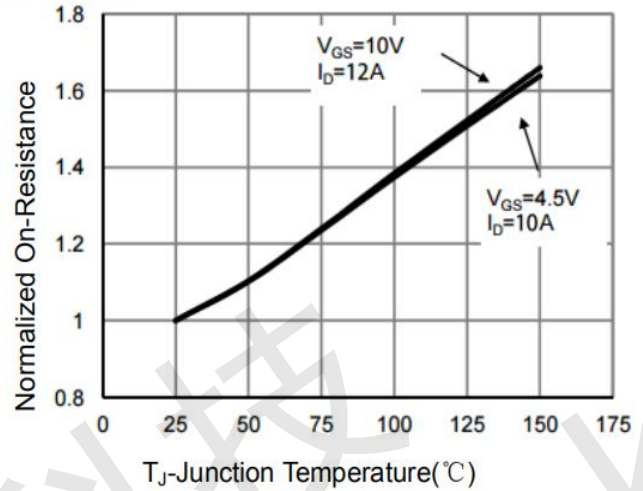


Figure 4 Rdson-Junction Temperature

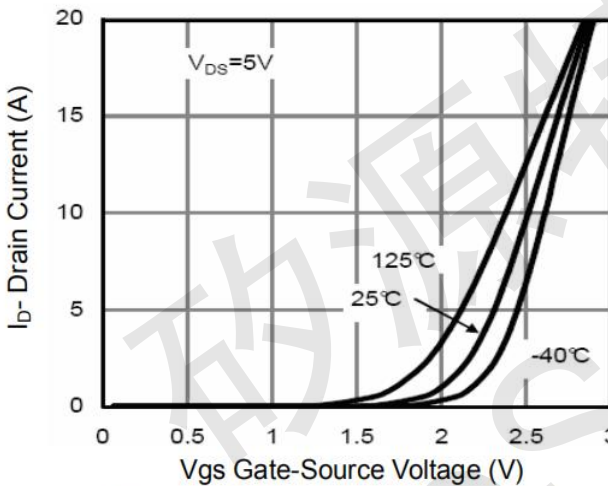


Figure 2 Transfer Characteristics

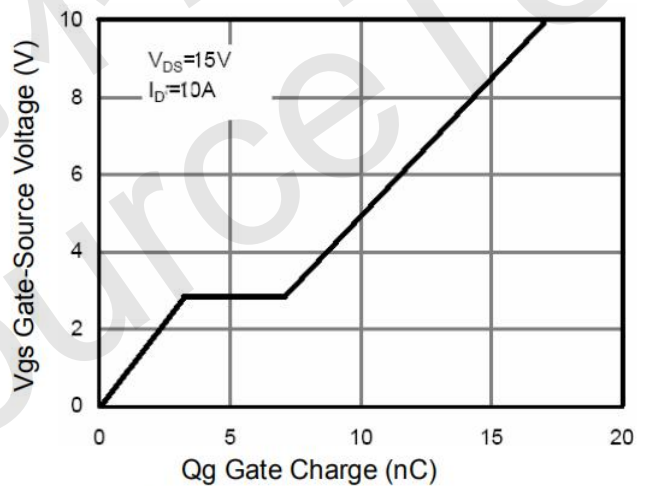


Figure 5 Gate Charge

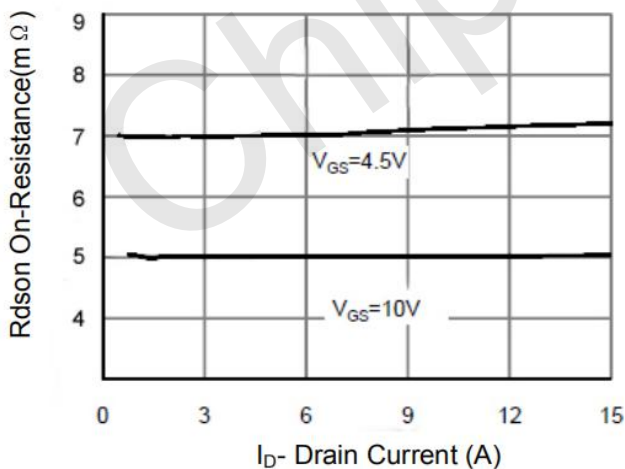


Figure 3 Rdson- Drain Current

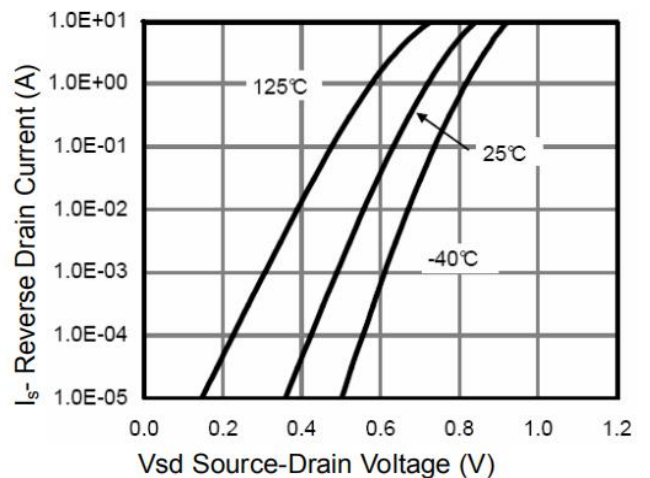


Figure 6 Source- Drain Diode Forward

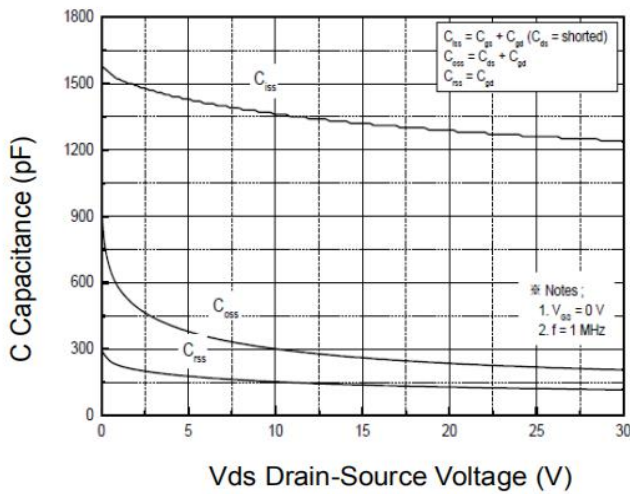


Figure 7 Capacitance vs Vds

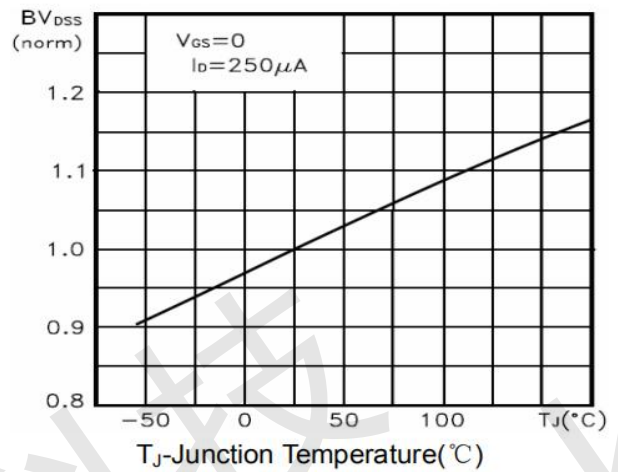


Figure 9 BV_{DSS} vs Junction Temperature

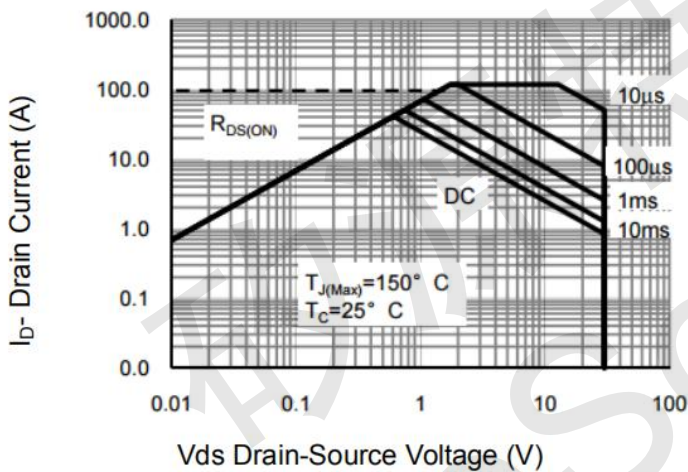


Figure 8 Safe Operation Area

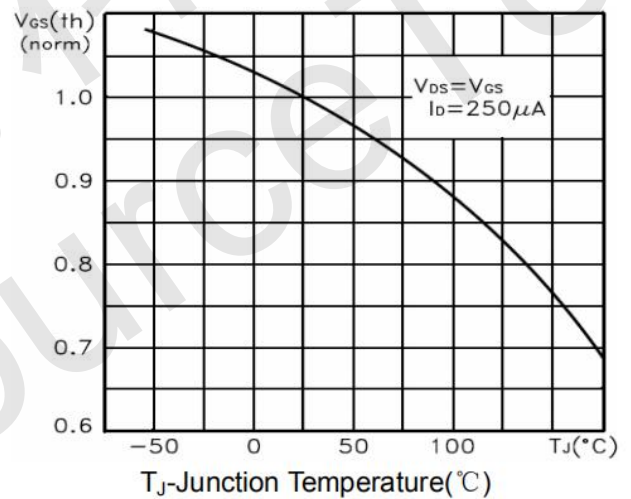


Figure 10 $V_{GS(th)}$ vs Junction Temperature

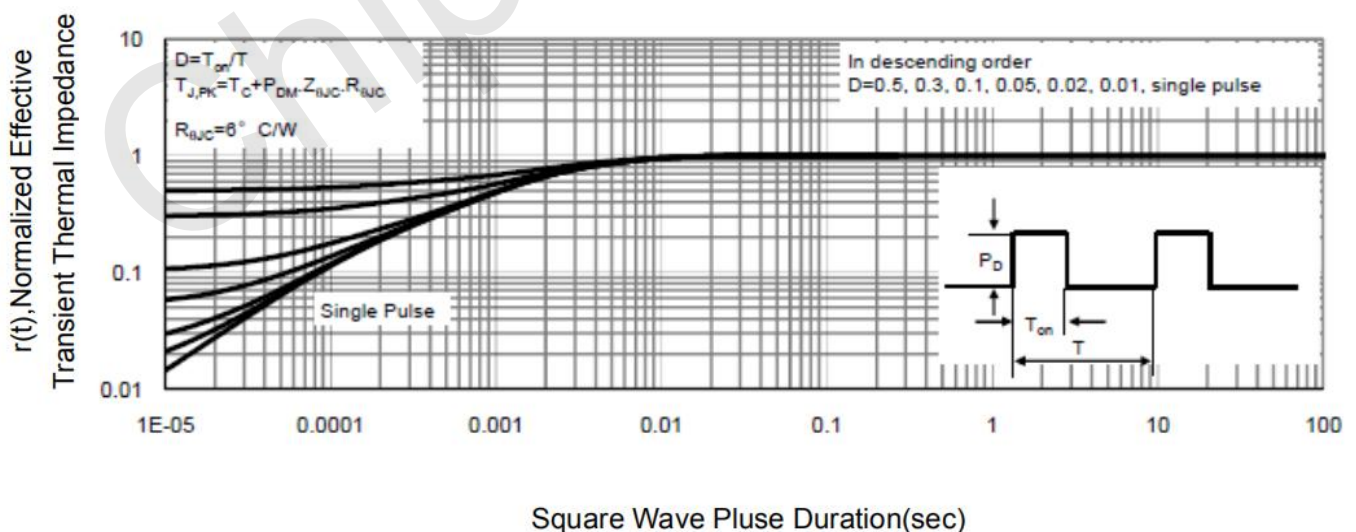
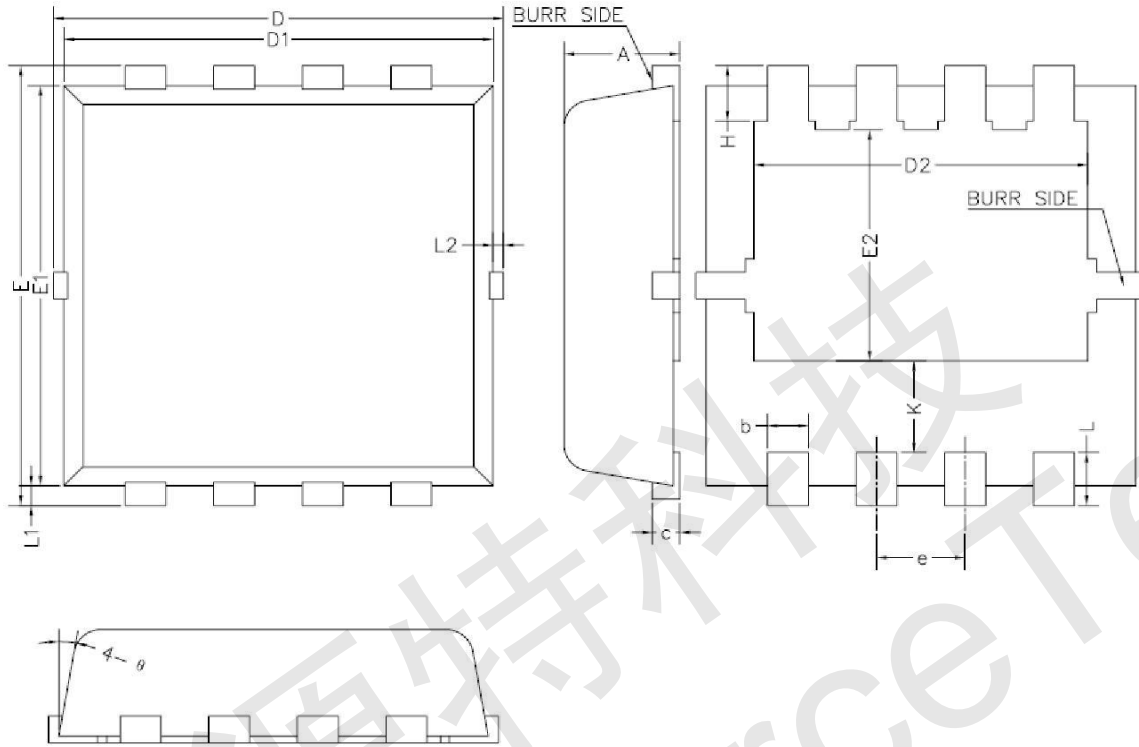


Figure 11 Normalized Maximum Transient Thermal Impedance



PDFN3x3-8L PACKAGE



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	0.70	0.80	0.90
b	0.25	0.30	0.35
c	0.14	0.15	0.20
D	3.10	3.30	3.50
D1	3.05	3.15	3.25
D2	2.35	2.45	2.55
e	0.55	0.65	0.75
E	3.10	3.30	3.50
E1	2.90	3.00	3.10
E2	1.64	1.74	1.84
H	0.32	0.42	0.52
K	0.59	0.69	0.79
L	0.25	0.40	0.55
L1	0.10	0.15	0.20
L2	-	-	0.15
θ	8°	10°	12°