

Description

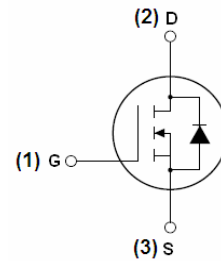
The HM25N06Q uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

General Features

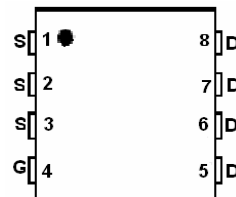
- $V_{DS} > 60V, I_D = 25A$
 $R_{DS(ON)} = 12.6m\Omega$ (Typ) @ $V_{GS}=10V$
 $R_{DS(ON)} = 16m\Omega$ (Typ) @ $V_{GS}=4.5V$
- High density cell design for ultra low R_{dson}
- Fully characterized avalanche voltage and current
- Low gate to drain charge to reduce switching losses

Application

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply



Schematic diagram



Marking and pin assignment

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
HM25N06Q	HM25N06Q	DFN3X3-8L	--	--	--

Absolute Maximum Ratings ($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	25	A
Drain Current-Continuous($T_C=100^\circ\text{C}$)	$I_D(100^\circ\text{C})$	17	A
Pulsed Drain Current	I_{DM}	85	A
Maximum Power Dissipation	P_D	40	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ\text{C}$

Thermal Characteristic

Thermal Resistance, Junction-to-Ambient ^(Note 2)	$R_{\theta JA}$	3.75	$^\circ\text{C/W}$
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Electrical Characteristics ($T_A=25^\circ\text{C}$ unless otherwise noted)

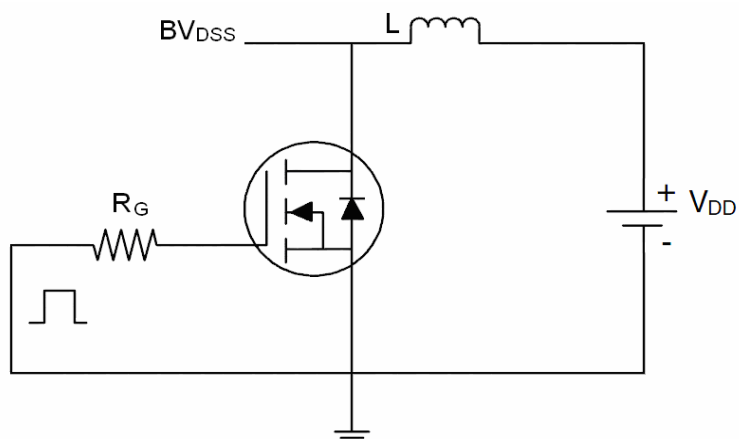
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BVDSS	VGS=0V ID=250μA	60	69	-	V
Zero Gate Voltage Drain Current	IDSS	VDS=60V, VGS=0V	-	-	1	μA
Gate-Body Leakage Current	IGSS	VGS=±20V, VDS=0V	-	-	±100	nA
On Characteristics ^(Note 3)						
Gate Threshold Voltage	VGS(th)	VDS=VGS, ID=250μA	1.0	1.5	2.2	V
Drain-Source On-State Resistance	RDS(ON)	VGS=10V, ID=5A		12.6	17	mΩ
		VGS=4.5V, ID=5A		16	22	mΩ
Forward Transconductance	gFS	VDS=5V, ID=5A	11	-	-	S
Dynamic Characteristics ^(Note4)						
Input Capacitance	Ciss	VDS=30V, VGS=0V, F=1.0MHz		1000		PF
Output Capacitance	Coss			100		PF
Reverse Transfer Capacitance	Crss			67		PF
Switching Characteristics ^(Note 4)						
Turn-on Delay Time	td(on)	VDS=30V, ID=5A VGS=10V, RGEN=3Ω	-	4.7	-	nS
Turn-on Rise Time	tr		-	2.3	-	nS
Turn-Off Delay Time	td(off)		-	15.7	-	nS
Turn-Off Fall Time	tf		-	1.9	-	nS
Total Gate Charge	Qg	VDS=30V, ID=5A, VGS=10V	-	30	-	nC
Gate-Source Charge	Qgs		-	10	-	nC
Gate-Drain Charge	Qgd		-	5	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ^(Note 3)	VSD	VGS=0V, IS=6A	-	-	1.2	V
Diode Forward Current ^(Note 2)	IS		-	-	6	A
Reverse Recovery Time	trr	TJ = 25°C, IF =5A di/dt = 100A/μs ^(Note3)	-	25	-	nS
Reverse Recovery Charge	Qrr		-	35	-	nC
Forward Turn-On Time	ton	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:

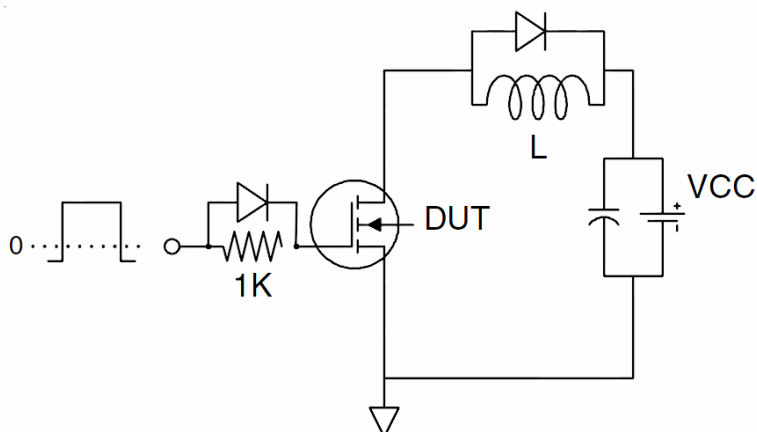
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

Test Circuit

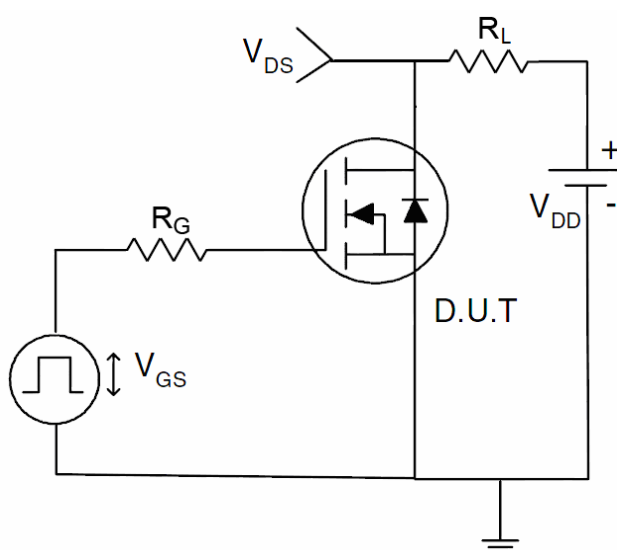
1) E_{AS} test Circuits



2) Gate charge test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics (Curves)

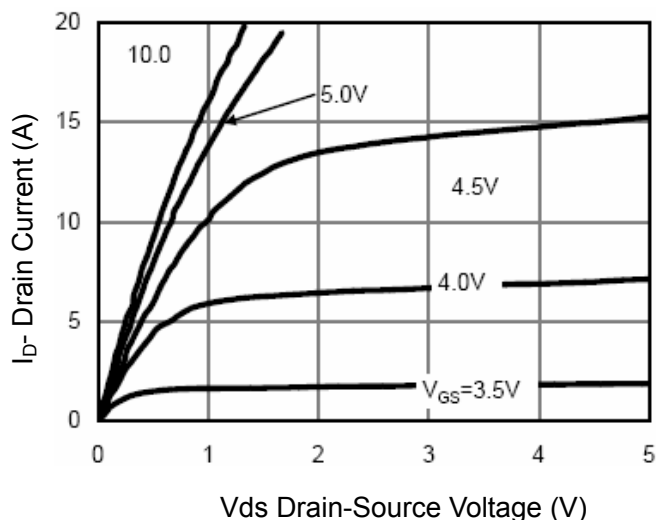


Figure 1 Output Characteristics

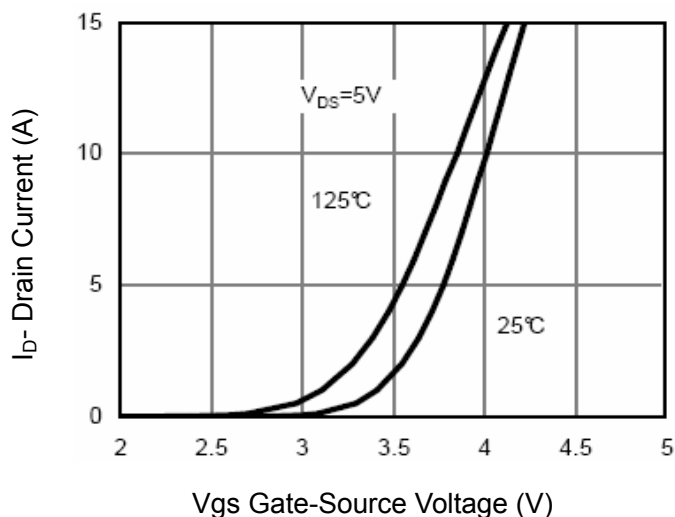


Figure 2 Transfer Characteristics

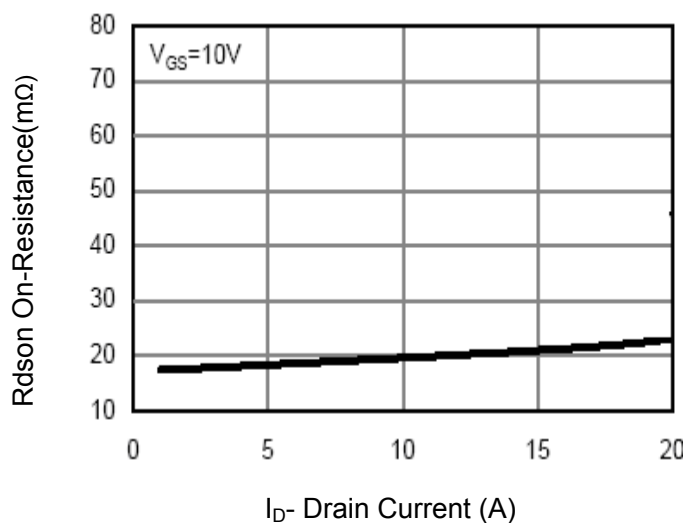


Figure 3 $R_{DS(on)}$ - Drain Current

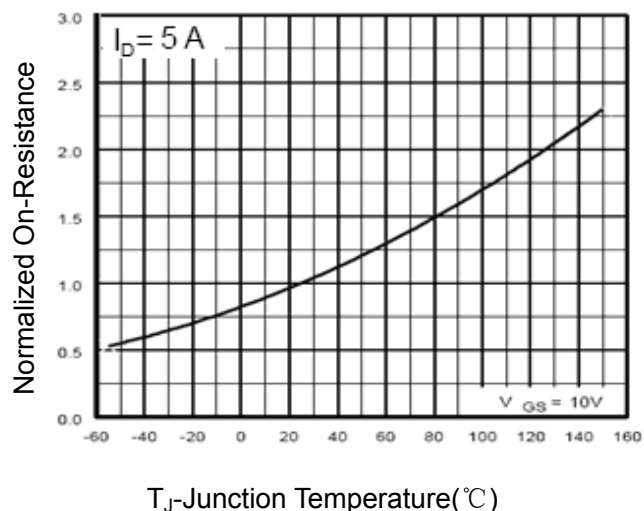


Figure 4 $R_{DS(on)}$ -Junction Temperature

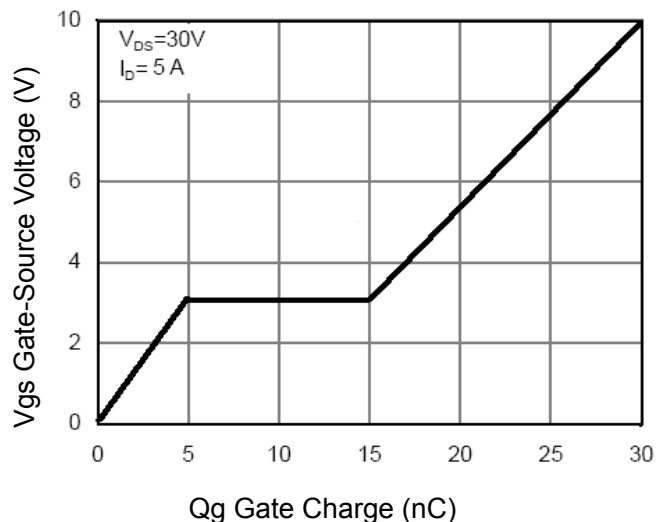


Figure 5 Gate Charge

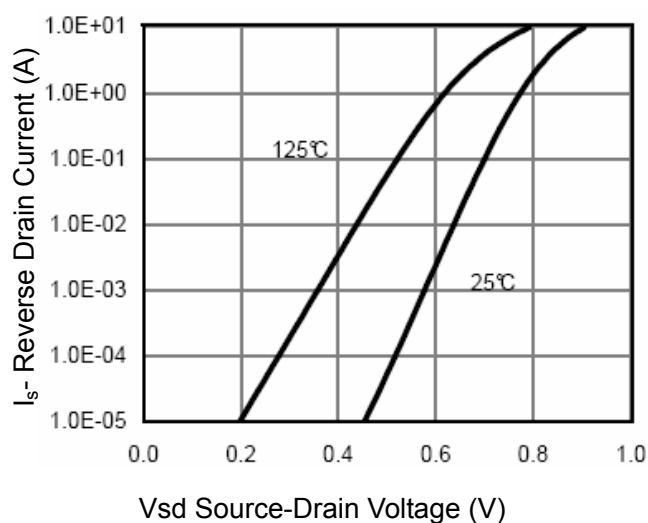


Figure 6 Source- Drain Diode Forward

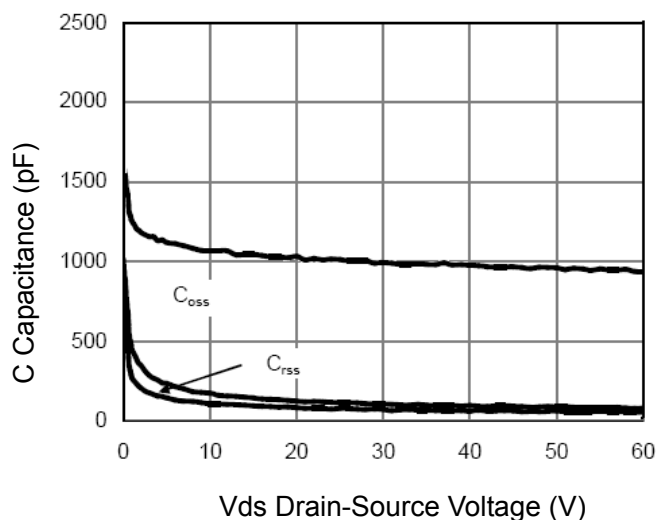


Figure 7 Capacitance vs Vds

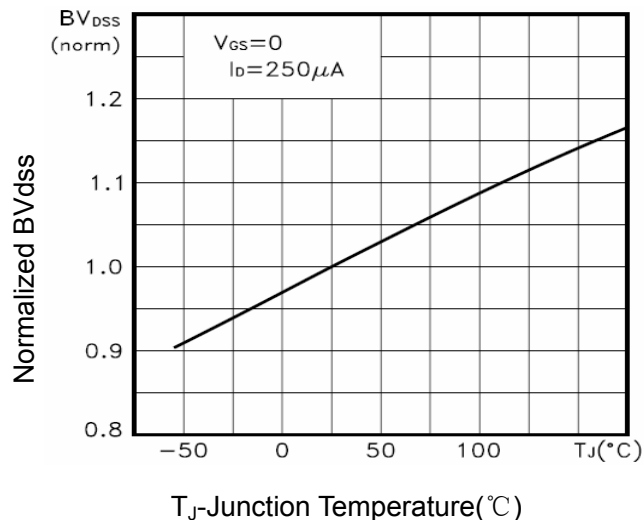


Figure 9 BV_{dss} vs Junction Temperature

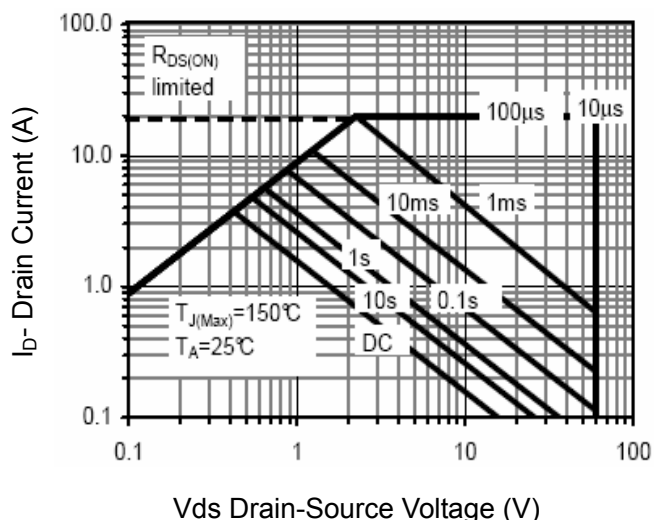


Figure 8 Safe Operation Area

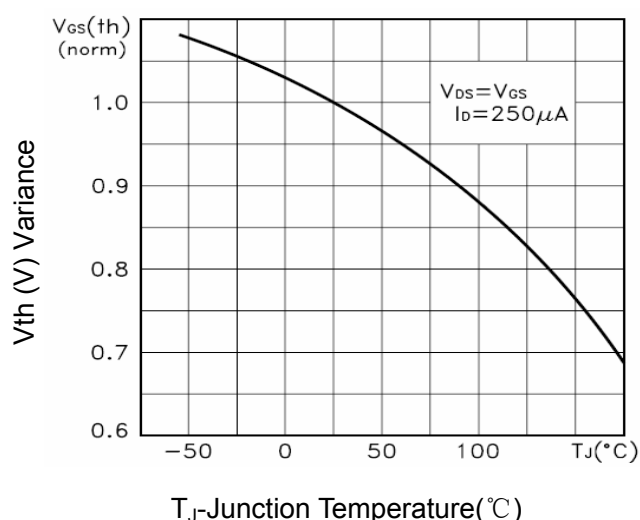


Figure 10 $V_{GS(th)}$ vs Junction Temperature

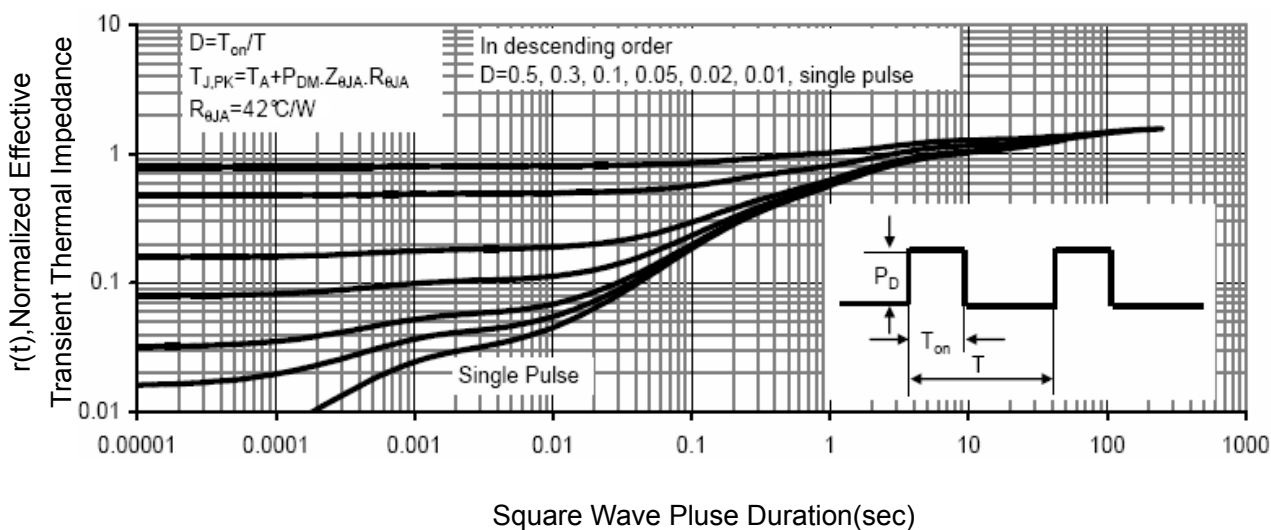
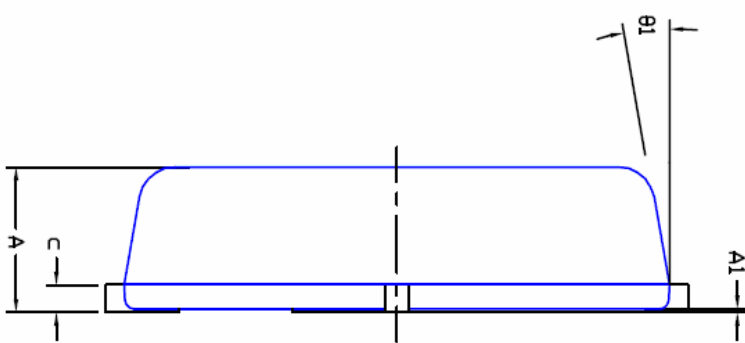
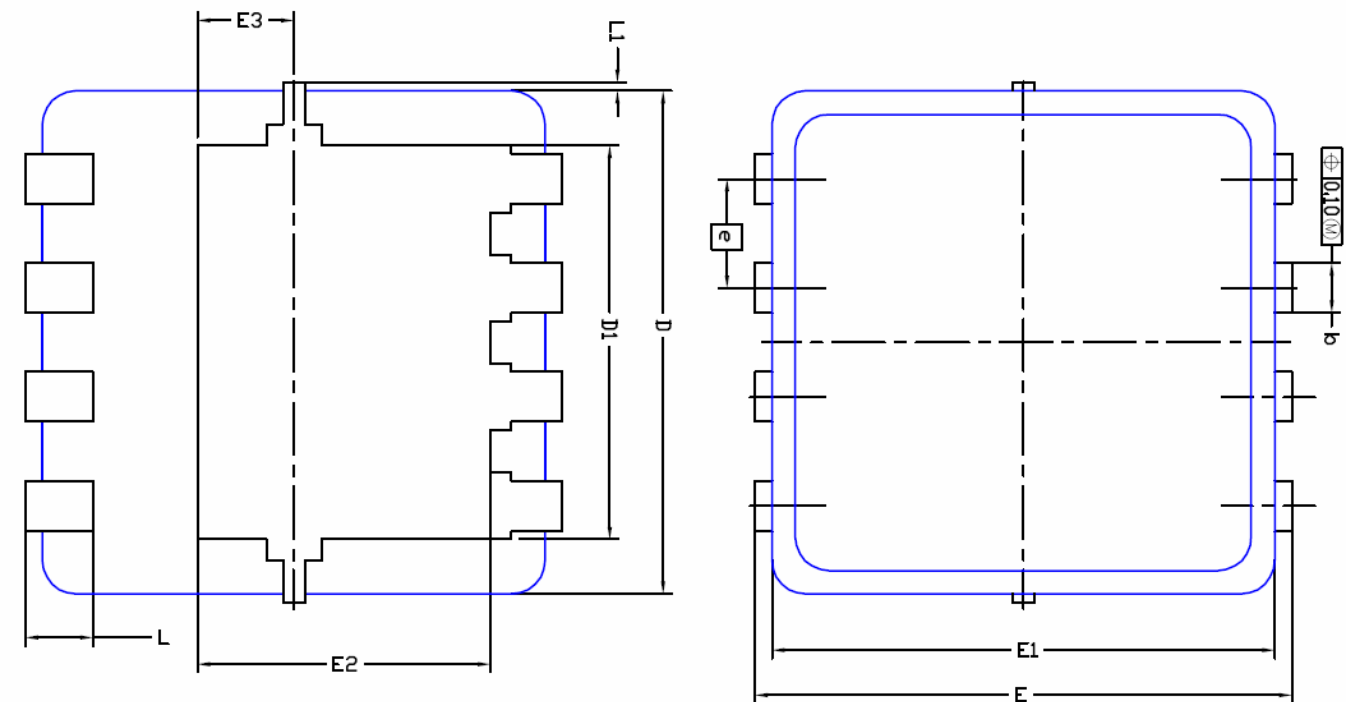


Figure 11 Normalized Maximum Transient Thermal Impedance

DFN3X3 EP Package Information



DIM.	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.700	0.80	0.900	0.0276	0.0315	0.0354
A1	0.00	---	0.05	0.000	---	0.002
b	0.24	0.30	0.35	0.009	0.012	0.014
c	0.10	0.152	0.25	0.004	0.006	0.010
D	3.00 BSC			0.118 BSC		
D1	2.35 BSC			0.093 BSC		
E	3.20 BSC			0.126 BSC		
E1	3.00 BSC			0.118 BSC		
E2	1.75 BSC			0.069 BSC		
E3	0.575 BSC			0.023 BSC		
e	0.65 BSC			0.026 BSC		
L	0.30	0.40	0.50	0.0118	0.0157	0.0197
L1	0	---	0.100	0	---	0.004
θ1	0°	10°	12°	0°	10°	12°