Description

The HM5N15Q 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

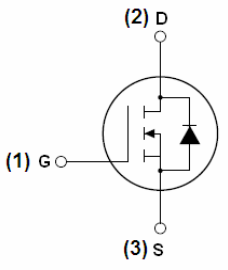
- V_{DS} = 150V,I_D =5A
  $R_{DS(ON)}$ <300mΩ @ V_{GS}=10V (Typ:70mΩ)
- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation

Application

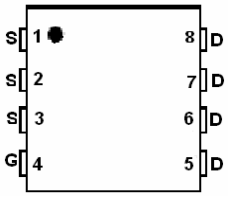
- Boost converters
- LED backlighting
- Uninterruptible power supply

100% UIS TESTED!

100% ΔVds TESTED!



Schematic diagram



Marking and pin assignment

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
HM5N15Q	HM5N15Q	DFN3X3-8L	-	-	-

Absolute Maximum Ratings (T_C=25℃unless otherwise noted)

Symbol	Parameter	Limit	Unit
V_{DS}	Drain-Source Voltage	150	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current-Continuous	5	A
I_D (100℃)	Drain Current-Continuous(TC=100℃)	3.5	A
I_{DM}	Pulsed Drain Current	15	A
P_D	Maximum Power Dissipation	75	W
	Derating factor	0.5	W/℃
E_{AS}	Single pulse avalanche energy (Note 5)	200	mJ
T_J,T_{STG}	Operating Junction and Storage Temperature Range	-55 To 175	℃

Thermal Characteristic

$R_{\theta JC}$	Thermal Resistance, Junction-to-Case (Note 2)	2.0	℃/W

Electrical Characteristics (T_C=25℃unless otherwise noted)

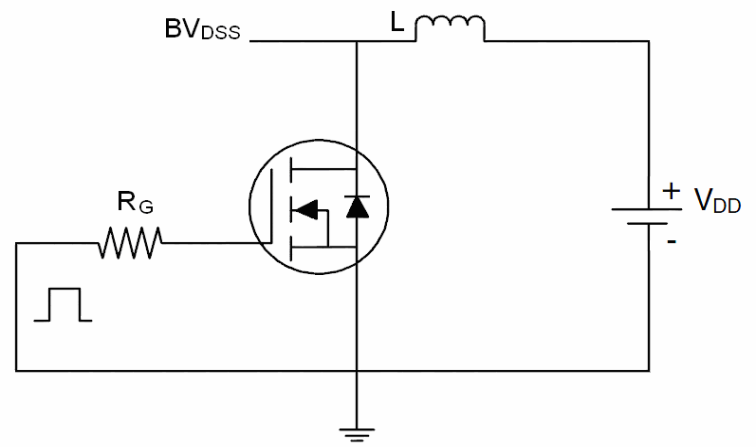
Symbol	Parameter	Condition	Min	Typ	Max	Unit
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V I_D=250μA	150	165	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=150V,V_{GS}=0V	-	-	1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics (Note 3)						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	1.5	2	2.5	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=10A	-	260	300	mΩ
g_{FS}	Forward Transconductance	V_{DS}=5V,I_D=10A	-	20	-	S
Dynamic Characteristics (Note4)						
C_{lss}	Input Capacitance	V_{DS}=25V,V_{GS}=0V, F=1.0MHz	-	2000	-	PF
C_{oss}	Output Capacitance		-	290	-	PF
C_{rss}	Reverse Transfer Capacitance		-	180	-	PF
Switching Characteristics (Note 4)						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=75V,R_L=5Ω V_{GS}=10V,R_{GEN}=3Ω	-	10.5	-	nS
t_r	Turn-on Rise Time		-	5.5	-	nS
$t_{d(off)}$	Turn-Off Delay Time		-	14.5	-	nS
t_f	Turn-Off Fall Time		-	3	-	nS
Q_g	Total Gate Charge	V_{DS}=75V,I_D=10A, V_{GS}=10V	-	17	-	nC
Q_{gs}	Gate-Source Charge		-	4	-	nC
Q_{gd}	Gate-Drain Charge		-	4.4	-	nC
Drain-Source Diode Characteristics						
V_{SD}	Diode Forward Voltage (Note 3)	V_{GS}=0V,I_S=8A	-	-	1.2	V
I_S	Diode Forward Current (Note 2)	-	-	-	5	A
t_{rr}	Reverse Recovery Time	TJ = 25°C, IF = 10A di/dt = 100A/μs (Note3)	-	32	-	nS
Qrr	Reverse Recovery Charge		-	53	-	nC
t_{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:

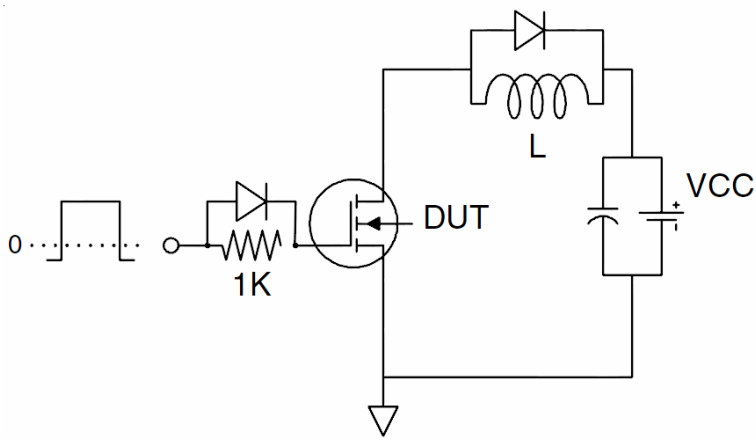
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. EAS condition:Tj=25℃,V_{DD}=50V,V_G=10V,L=0.5mH,Rg=25Ω

Test Circuit

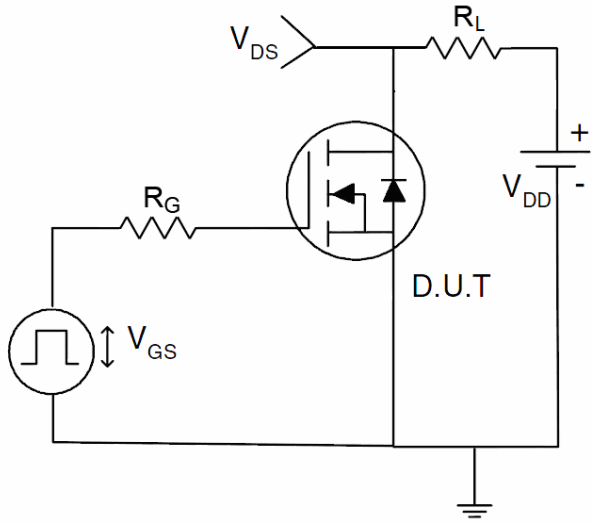
1) E_{AS} Test Circuit



2) Gate Charge Test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics (Curves)

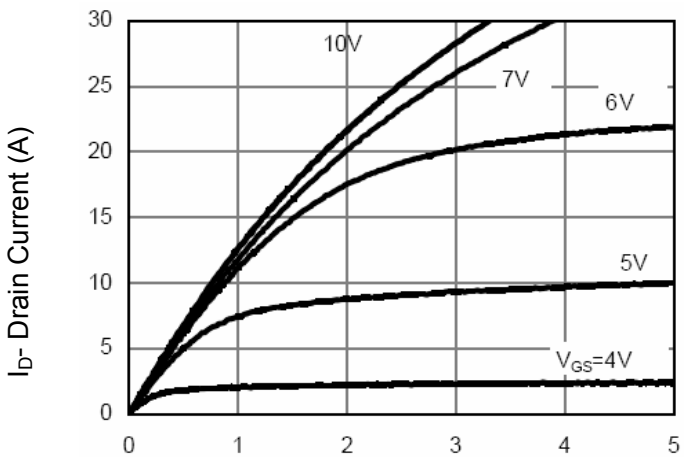


Figure 1 Output Characteristics

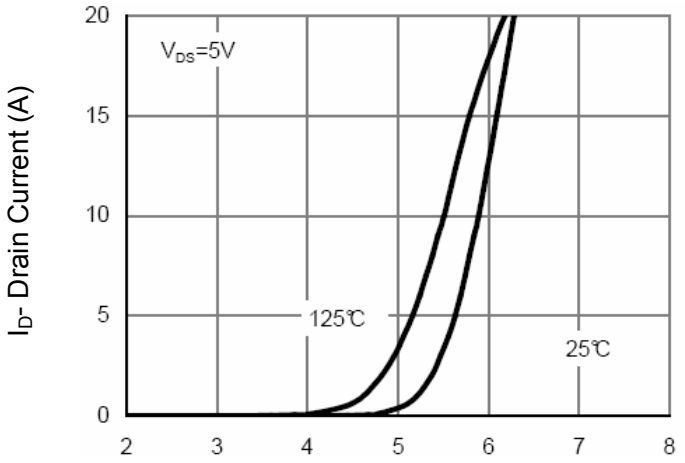


Figure 2 Transfer Characteristics

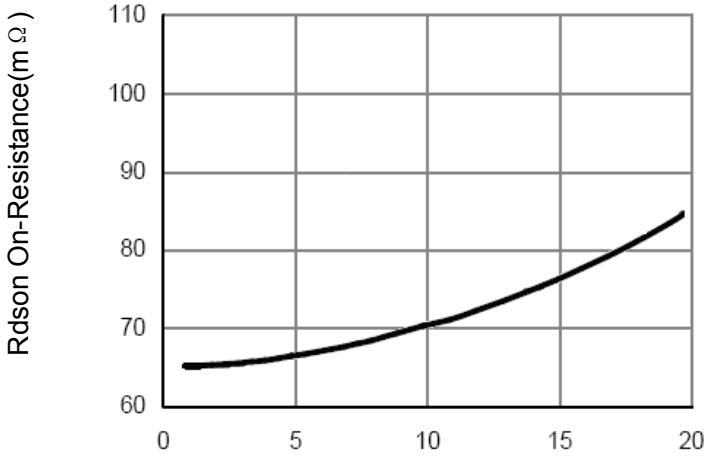


Figure 3 Rdson- Drain Current

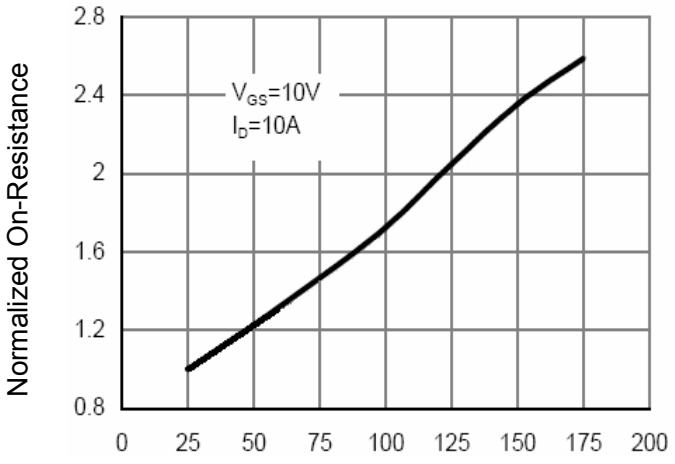


Figure 4 Rdson-JunctionTemperature

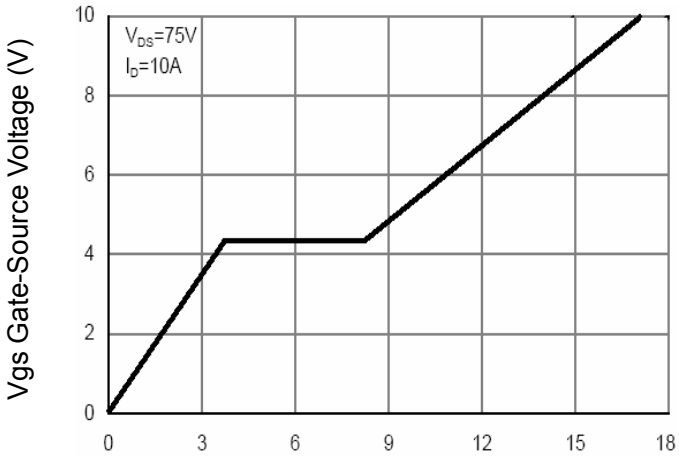


Figure 5 Gate Charge

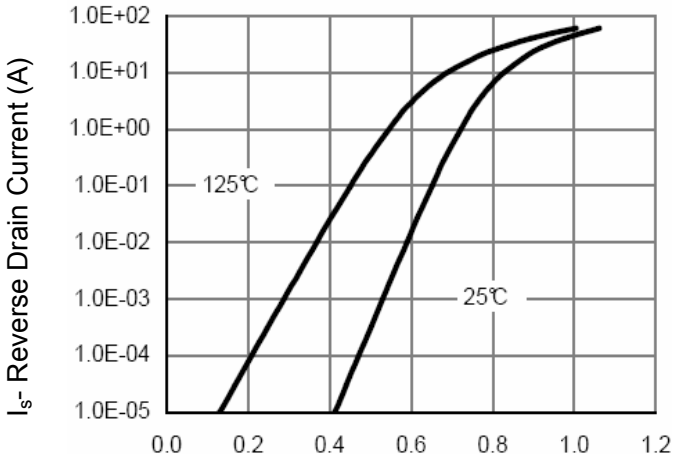


Figure 6 Source- Drain Diode Forward

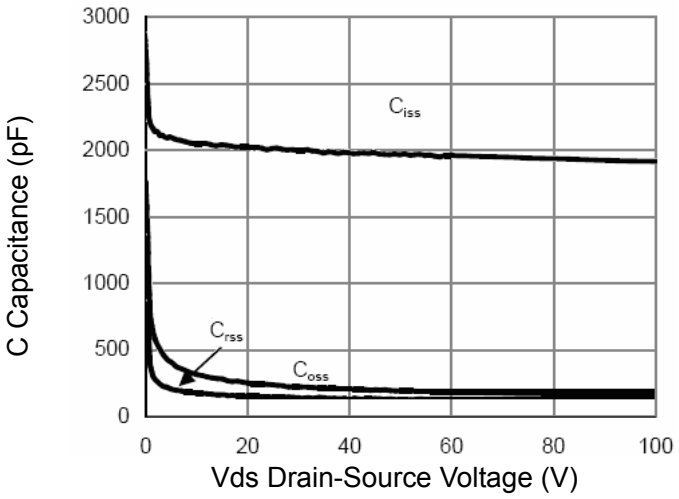


Figure 7 Capacitance vs Vds

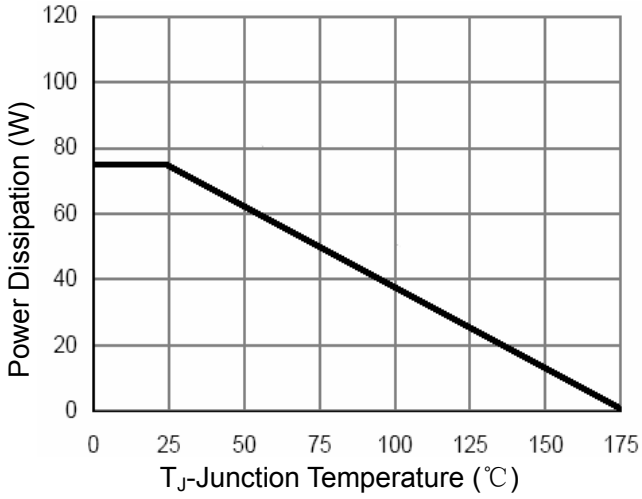


Figure 9 Power De-rating

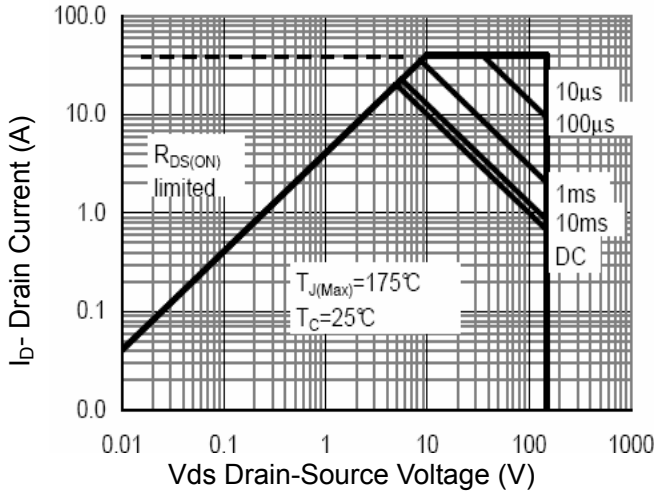


Figure 8 Safe Operation Area

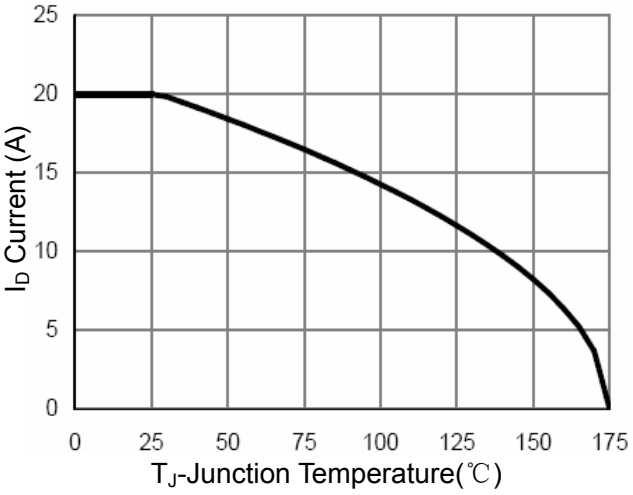


Figure 10ID Current- Junction Temperature

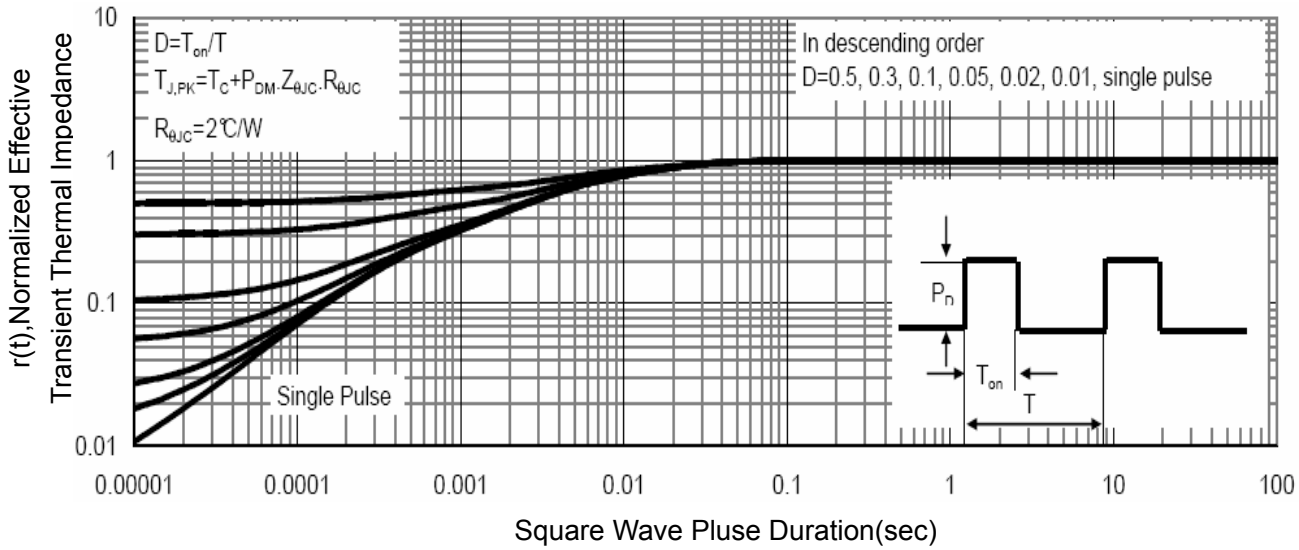
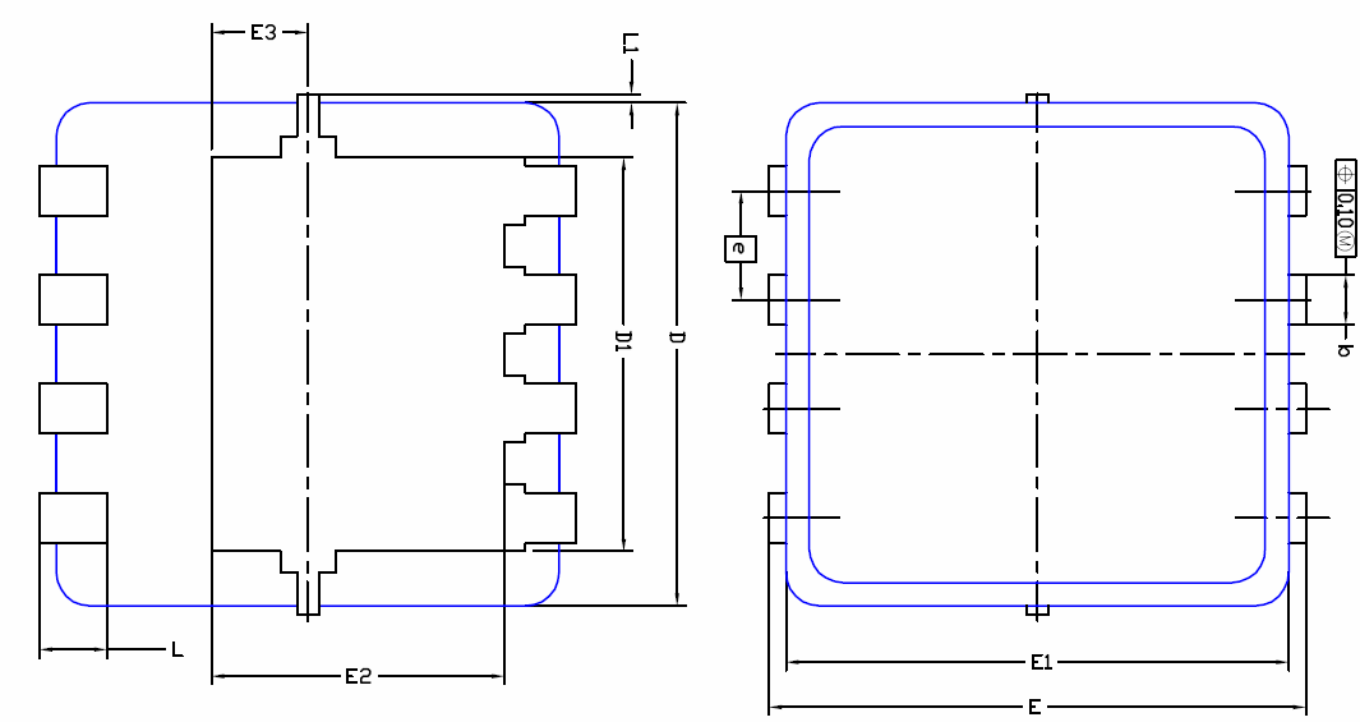
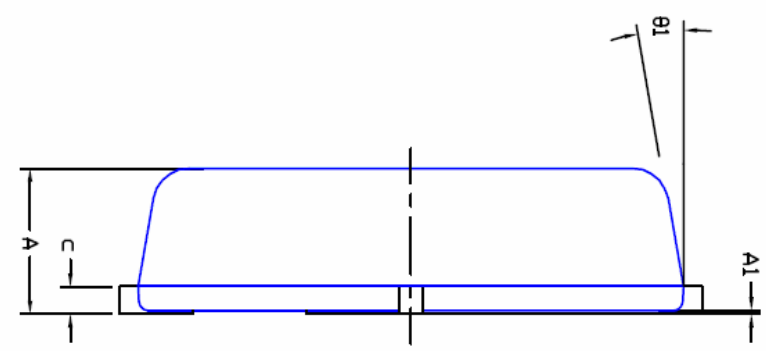


Figure 11 Normalized Maximum Transient Thermal Impedance

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°