

NCE N-Channel Super Trench Power MOSFET

Description

The NCEP15T10V uses **Super Trench** technology that is uniquely optimized to provide the most efficient high frequency switching performance. Both conduction and switching power losses are minimized due to an extremely low combination of $R_{DS(ON)}$ and Q_g . This device is ideal for high-frequency switching and synchronous rectification.

Application

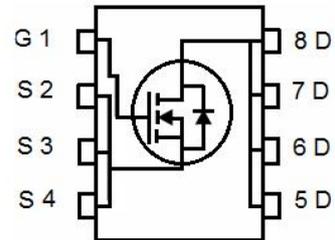
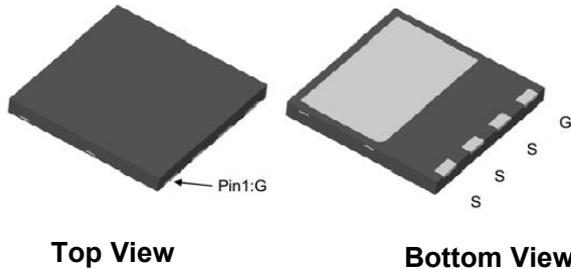
- DC/DC Converter
- Ideal for high-frequency switching and synchronous rectification

General Features

- $V_{DS} = 150V, I_D = 100A$
 $R_{DS(ON)} = 5.7m\Omega$ (typical) @ $V_{GS} = 10V$
- Excellent gate charge x $R_{DS(on)}$ product(FOM)
- Very low on-resistance $R_{DS(on)}$
- 150 °C operating temperature
- Pb-free lead plating

100% UIS TESTED!
100% ΔVds TESTED!

DFN 8X8



Schematic Diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
NCEP15T10V	NCEP15T10V	DFN8X8-4L	-	-	-

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	150	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	100	A
Drain Current-Continuous($T_c = 100^\circ C$)	$I_D(100^\circ C)$	70.7	A
Pulsed Drain Current	I_{DM}	400	A
Maximum Power Dissipation	P_D	200	W
Derating factor		1.6	W/°C
Single pulse avalanche energy (Note 5)	E_{AS}	1100	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	°C

Thermal Characteristic

Thermal Resistance, Junction-to-Case (Note 2)	$R_{\theta JC}$	0.63	°C/W
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Electrical Characteristics ($T_c = 25^\circ C$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						

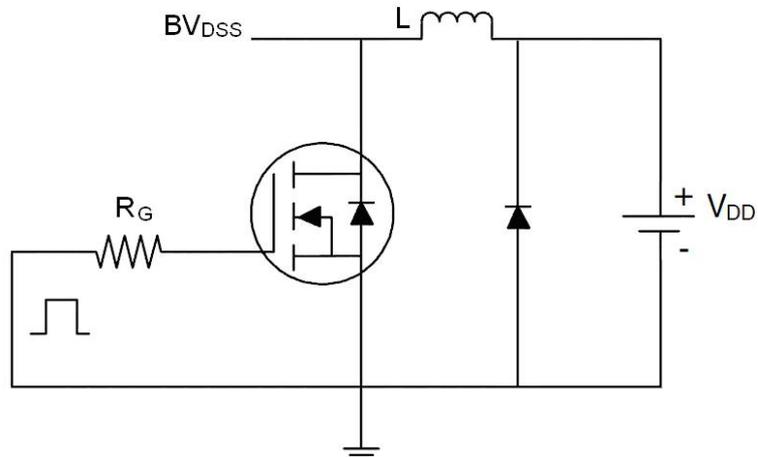
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	150	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=150V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0	3.0	4.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=50A$	-	5.7	6.2	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=50A$	70	-	-	S
Dynamic Characteristics (Note 4)						
Input Capacitance	C_{iss}	$V_{DS}=75V, V_{GS}=0V,$ $F=1.0MHz$	-	5900	-	PF
Output Capacitance	C_{oss}		-	690	-	PF
Reverse Transfer Capacitance	C_{rss}		-	7	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=75V, I_D=50A$ $V_{GS}=10V, R_G=4.7\Omega$	-	26	-	nS
Turn-on Rise Time	t_r		-	36	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	47	-	nS
Turn-Off Fall Time	t_f		-	15	-	nS
Total Gate Charge	Q_g	$V_{DS}=75V, I_D=50A,$ $V_{GS}=10V$	-	80		nC
Gate-Source Charge	Q_{gs}		-	32		nC
Gate-Drain Charge	Q_{gd}		-	13		nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	$V_{GS}=0V, I_F=I_S$	-		1.2	V
Diode Forward Current (Note 2)	I_S		-	-	100	A
Reverse Recovery Time	t_{rr}	$T_J = 25^\circ C, I_F = I_S$	-	140		nS
Reverse Recovery Charge	Q_{rr}	$di/dt = 100A/\mu s$ (Note 3)	-	350		nC

Notes:

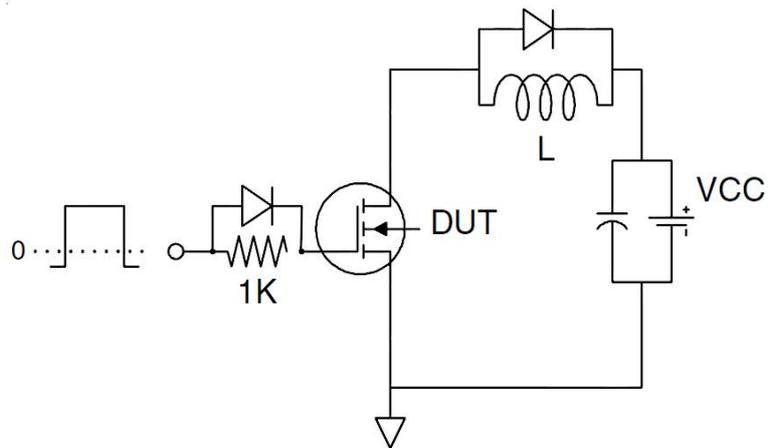
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production
5. EAS condition : $T_J=25^\circ C, V_{DD}=50V, V_G=10V, L=0.5mH, R_g=25\Omega$

Test Circuit

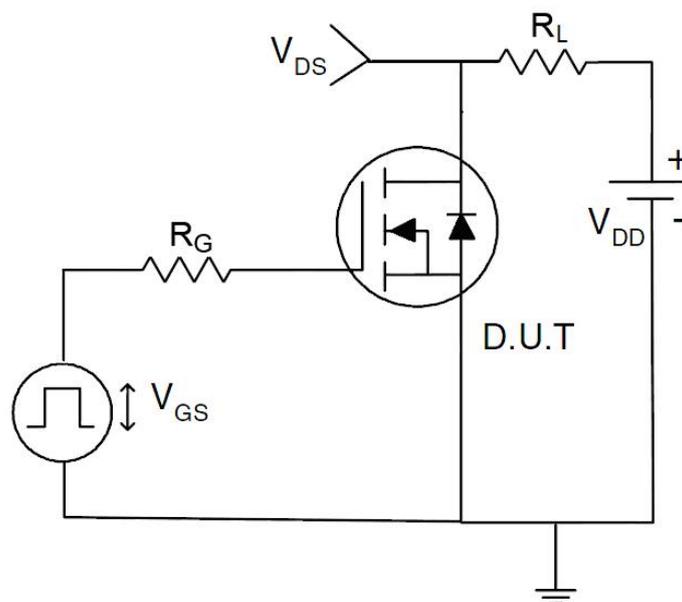
1) E_{AS} test Circuit



2) Gate charge test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics

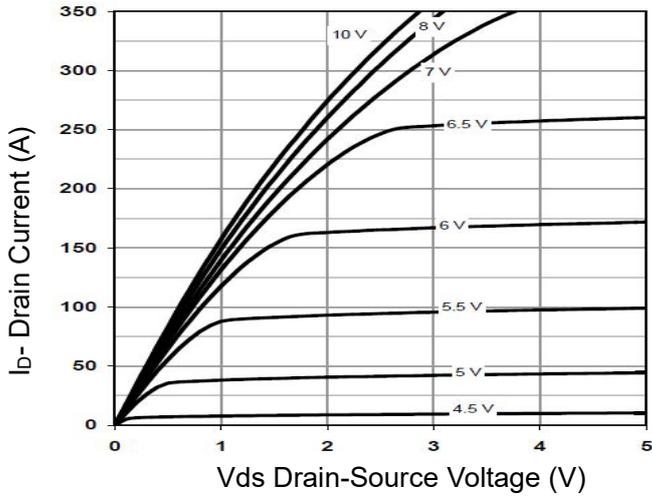


Figure 1 Output Characteristics

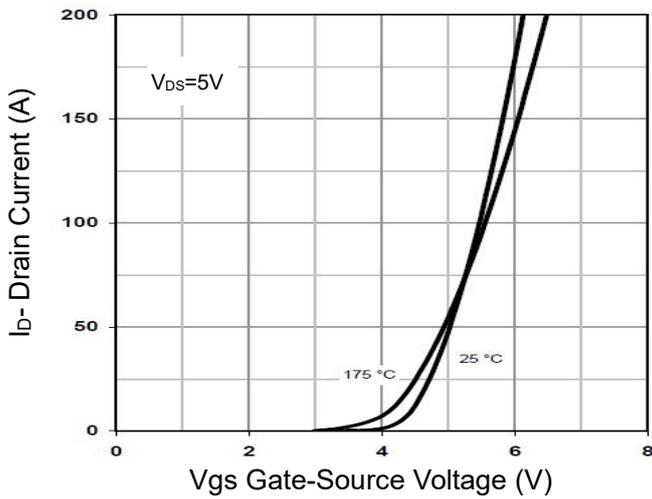


Figure 2 Transfer Characteristics

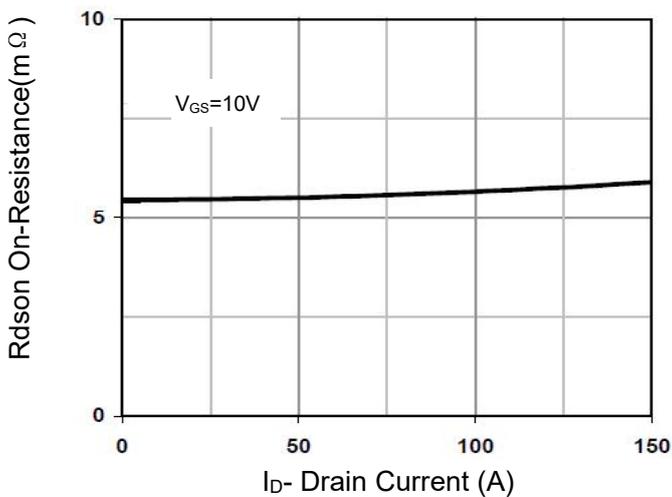


Figure 3 Rdson- Drain Current

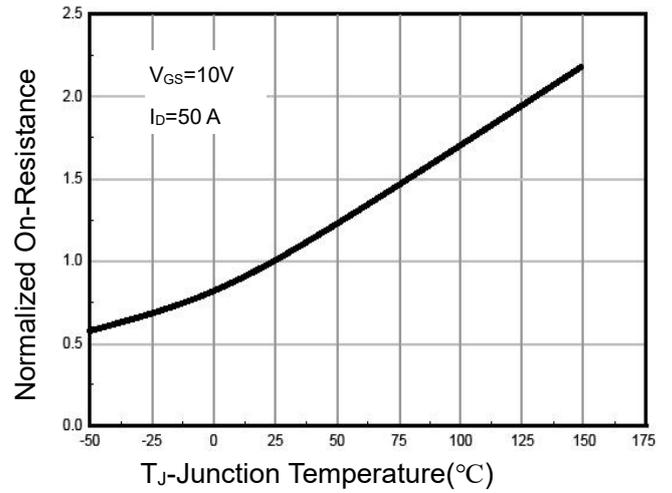


Figure 4 Rdson-Junction Temperature

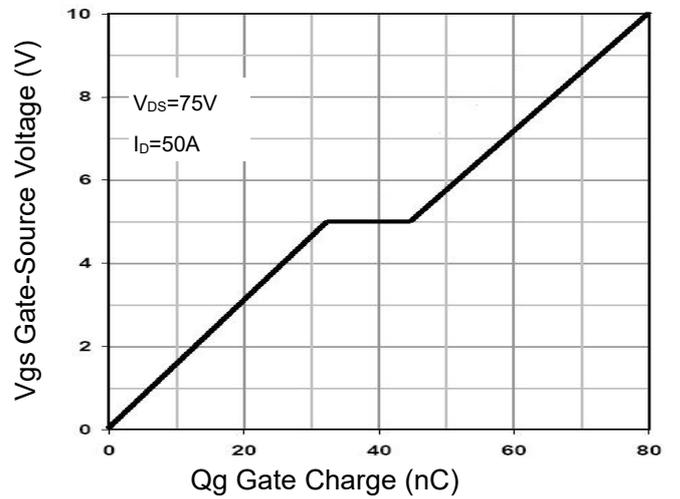


Figure 5 Gate Charge

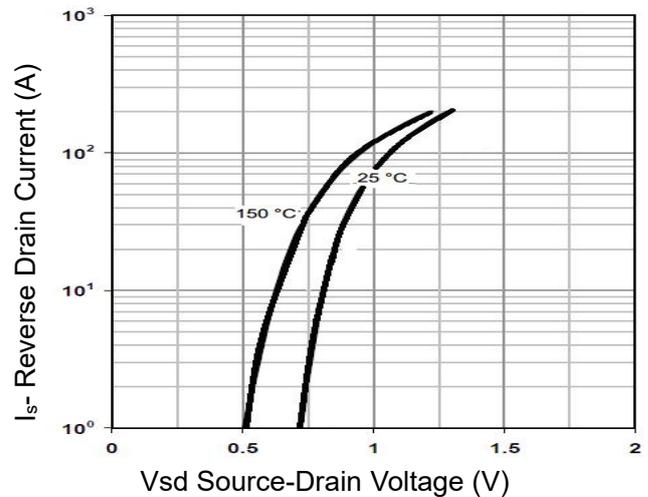


Figure 6 Source- Drain Diode Forward

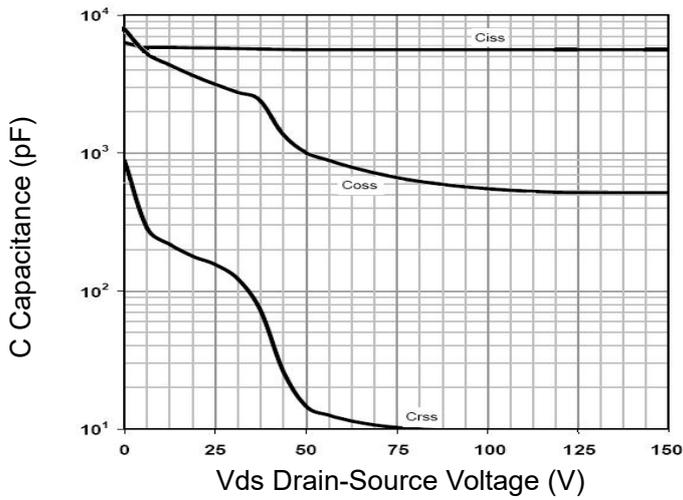


Figure 7 Capacitance vs Vds

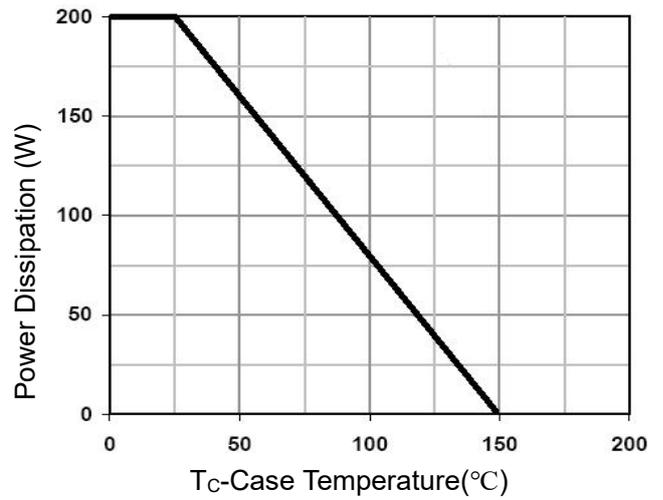


Figure 9 Power De-rating

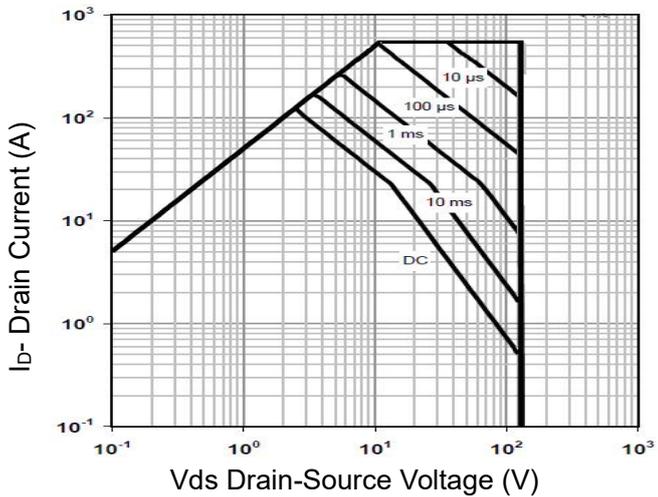


Figure 8 Safe Operation Area

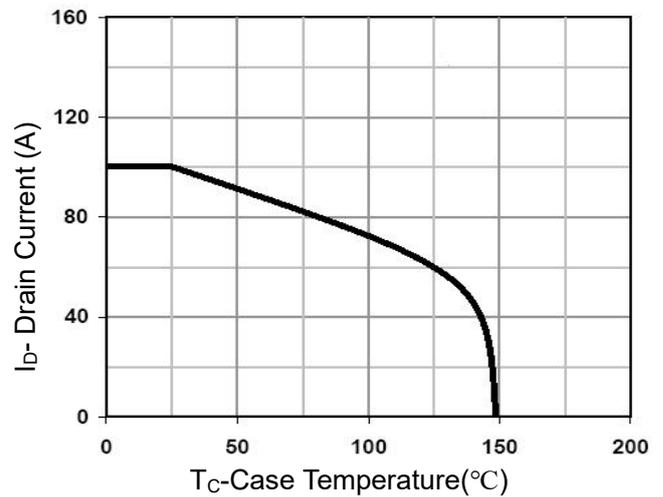


Figure 10 Current De-rating

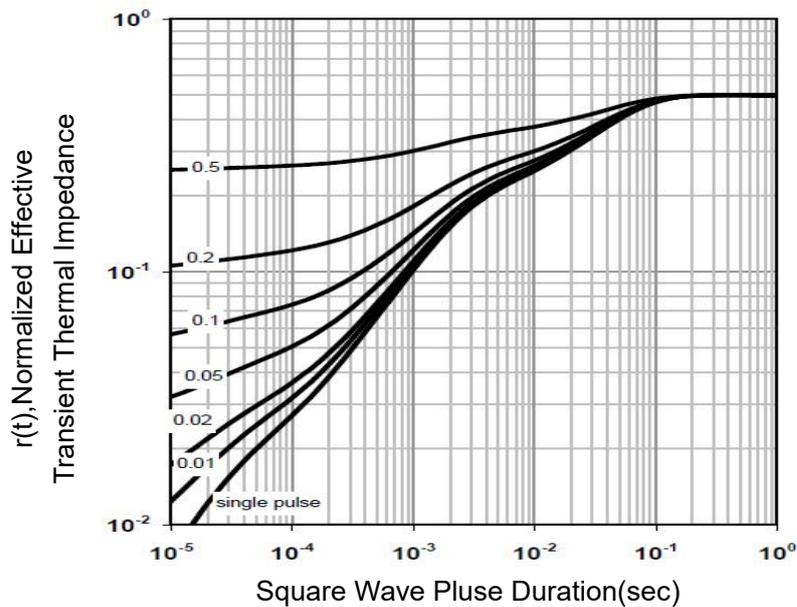
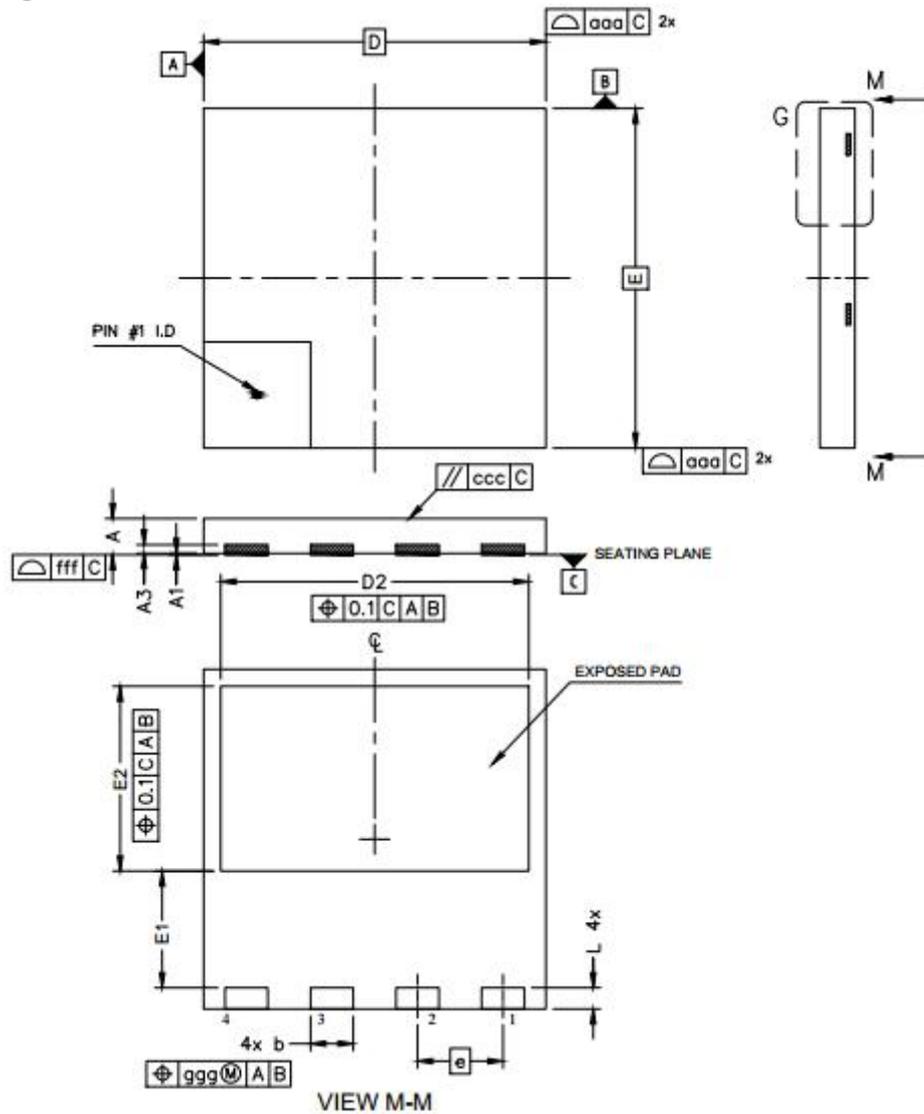


Figure 11 Normalized Maximum Transient Thermal Impedance

DFN8X8 Package Information



DIM	MIN	NOM	MAX	NOTES
A	0.75	0.85	0.95	1.0 DIMENSIONING & TOLERANCEING CONFIRM TO ASME Y14.5M-1994. 2.0 ALL DIMENSIONS ARE IN MILLIMETERS. ANGLES ARE IN DEGREES. 3.0 DIMENSION b APPLIES TO METALLIZED TERMINAL AND IS MEASURED BETWEEN 0.90mm AND 1.10mm FROM TERMINAL TIP. 4.0 DIMENSIONS DO NOT INCLUDE BURRS OR MOLD FLASH. 5.0 COPLANARITY APPLIES TO THE EXPOSED HEAT SLUG AS WELL AS THE TERMINAL. 6.0 RADIUS ON TERMINAL IS OPTIONAL.
A1	0.00		0.05	
A3	0.10	0.20	0.30	
b	0.90	1.00	1.10	
D	7.90	8.00	8.10	
E	7.90	8.00	8.10	
D2	7.10	7.20	7.30	
E1	2.65	2.75	2.85	
E2	4.25	4.35	4.45	
e		2.00 BSC		
L	0.40	0.50	0.60	
aaa		0.10		
ggg		0.05		
ccc		0.05		
fff		0.05		

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