

NCE P-Channel Enhancement Mode Power MOSFET

Description

The NCE60P70G uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. This device is well suited for high current load applications.

Application

- High side switch for full bridge converter
- DC/DC converter for LCD display

100% UIS TESTED!
100% ΔV_{ds} TESTED!

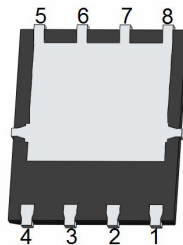
General Features

- $V_{DS} = -60V, I_D = -70A$
 $R_{DS(ON)} = 11m\Omega$ (typical) @ $V_{GS} = -10V$
 $R_{DS(ON)} = 13m\Omega$ (typical) @ $V_{GS} = -4.5V$
- High density cell design for ultra low $R_{ds(on)}$
- Very low on-resistance $R_{DS(on)}$
- Good stability and uniformity with high E_{AS}
- 150 °C operating temperature
- Pb-free lead plating

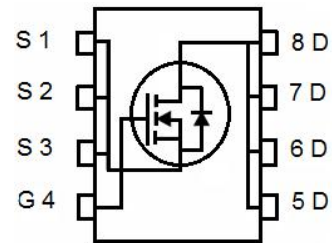
DFN 5X6



Top View



Bottom View



Schematic Diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
NCE60P70G	NCE60P70G	DFN5X6-8L	-	-	-

Absolute Maximum Ratings ($T_C = 25^\circ C$ 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	-70	A
Drain Current-Continuous($T_C = 100^\circ C$)	$I_D(100^\circ C)$	-49	A
Pulsed Drain Current ^(Note 1)	I_{DM}	-280	A
Maximum Power Dissipation	P_D	110	W
Derating factor		0.88	W/ $^\circ C$
Single pulse avalanche energy ^(Note 5)	E_{AS}	560	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ C$

Thermal Characteristic

Thermal Resistance, Junction-to-Case ^(Note 2)	$R_{\theta JC}$	1.14	$^\circ C/W$
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Electrical Characteristics (T_c=25°C unless otherwise noted)

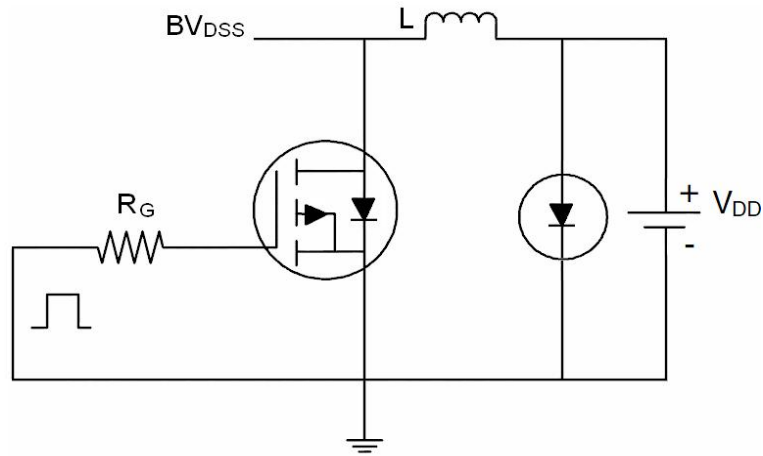
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =-250μA	-60	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-60V, V _{GS} =0V	-	-	-1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =-250μA	-1.2	-1.8	-2.4	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =-10V, I _D =-20A	-	11	13	mΩ
		V _{GS} =-4.5V, I _D =-20A	-	13	16	mΩ
Forward Transconductance	g _{FS}	V _{DS} =-5V, I _D =-20A	-	25	-	S
Dynamic Characteristics (Note 4)						
Input Capacitance	C _{iss}	V _{DS} =-30V, V _{GS} =0V, F=1.0MHz	-	5604	-	PF
Output Capacitance	C _{oss}		-	356	-	PF
Reverse Transfer Capacitance	C _{rss}		-	265	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =-30V, R _L =1.5Ω, V _{GS} =-10V, R _G =3Ω	-	18	-	nS
Turn-on Rise Time	t _r		-	20	-	nS
Turn-Off Delay Time	t _{d(off)}		-	55	-	nS
Turn-Off Fall Time	t _f		-	35	-	nS
Total Gate Charge	Q _g	V _{DS} =-30, I _D =-20A, V _{GS} =-10V	-	62.1	-	nC
Gate-Source Charge	Q _{gs}		-	9.3	-	nC
Gate-Drain Charge	Q _{gd}		-	16.8	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V _{SD}	V _{GS} =0V, I _S =-20A	-	-	-1.2	V
Diode Forward Current (Note 2)	I _S		-	-	-70	A
Reverse Recovery Time	t _{rr}	T _J = 25°C, I _F = - 20A	-	49	-	nS
Reverse Recovery Charge	Q _{rr}	di/dt = -100A/μs (Note 3)	-	71	-	nC

Notes:

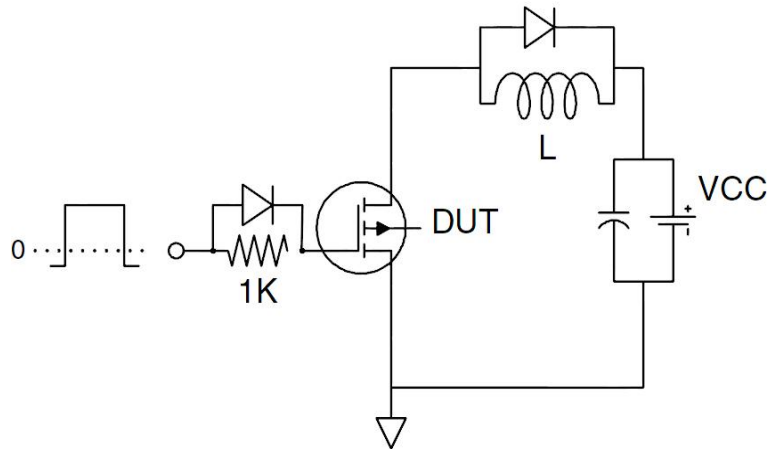
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. E_{AS} condition: T_J=25°C, V_{DD}=-30V, V_G=-10V, L=0.5mH, R_G=25Ω

Test Circuit

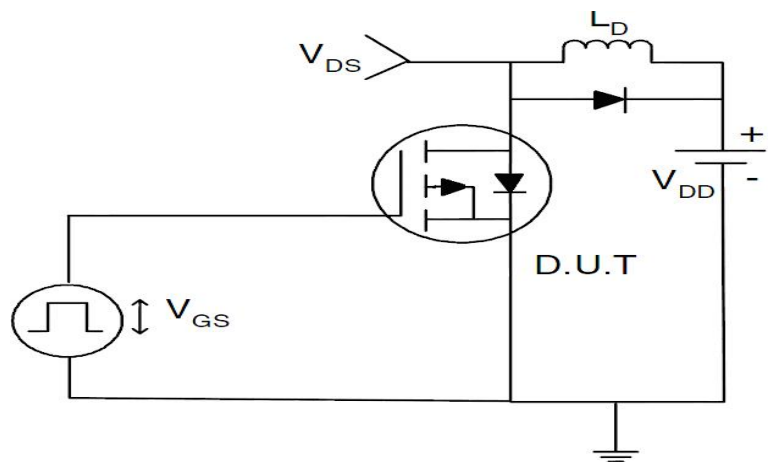
1) E_{AS} Test Circuit



2) Gate Charge Test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics (Curves)

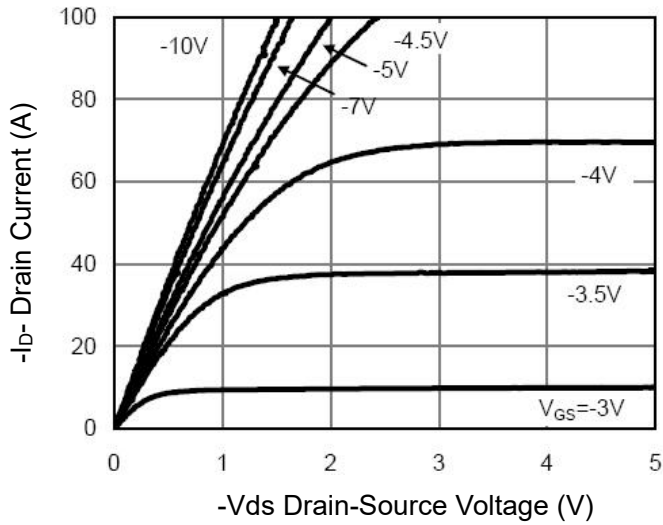


Figure 1 Output Characteristics

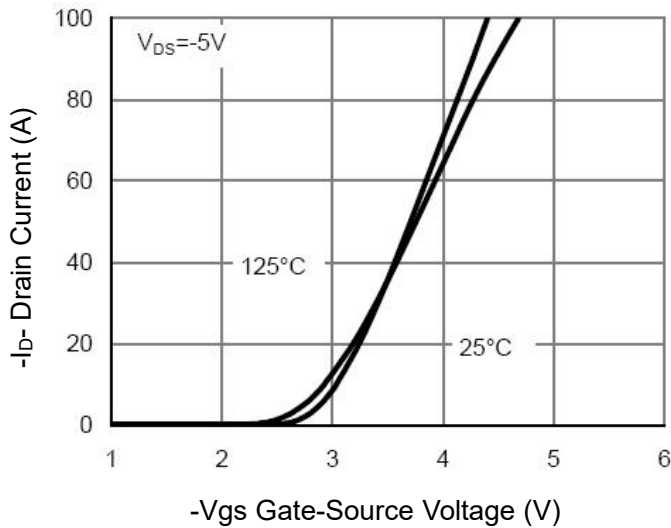


Figure 2 Transfer Characteristics

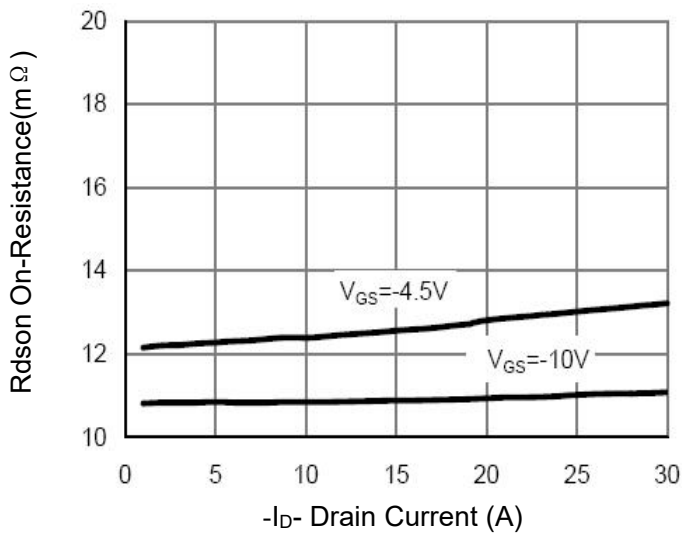


Figure 3 Rdson- Drain Current

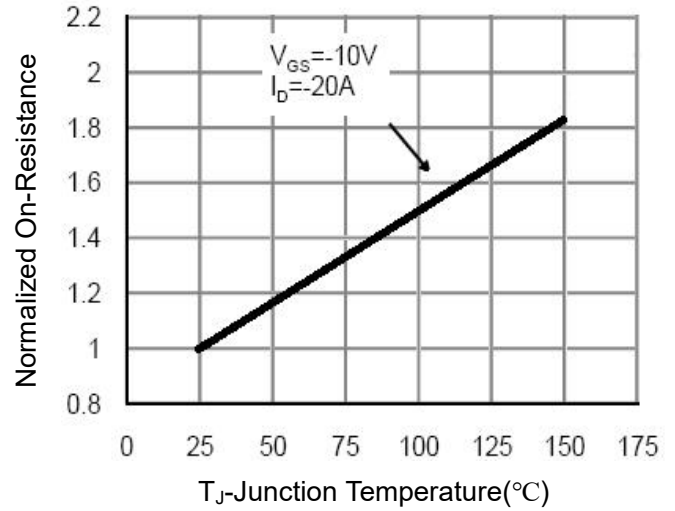


Figure 4 Rdson-Junction Temperature

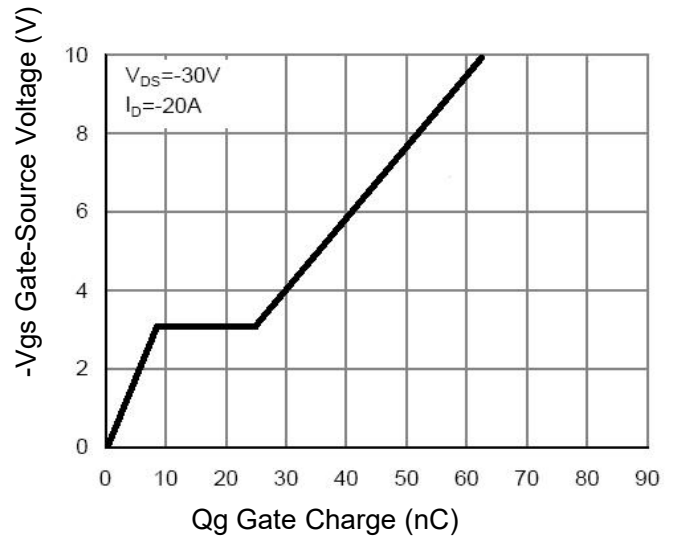


Figure 5 Gate Charge

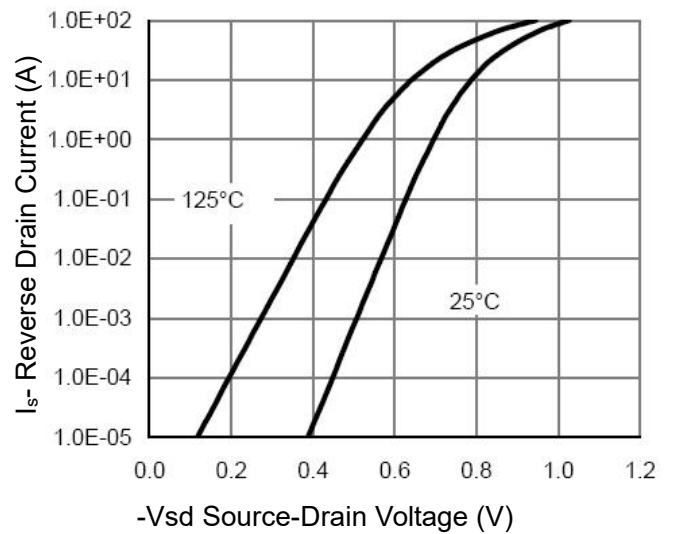


Figure 6 Source- Drain Diode Forward

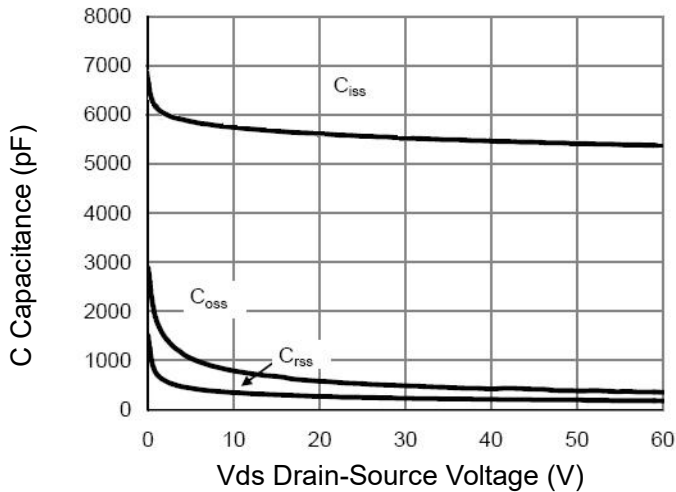


Figure 7 Capacitance vs Vds

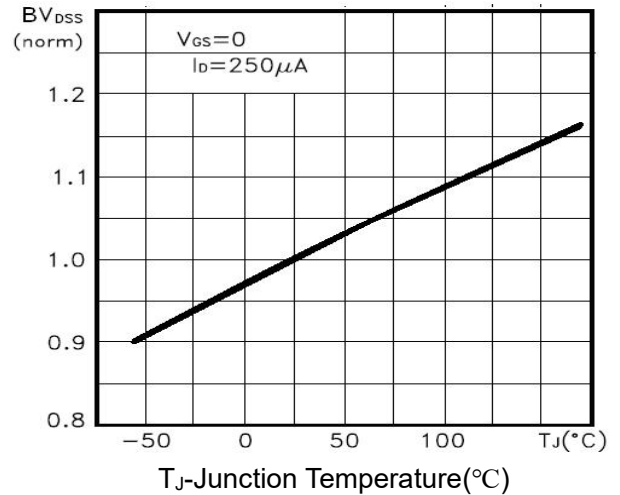


Figure 9 BV_{DSS} vs Junction Temperature

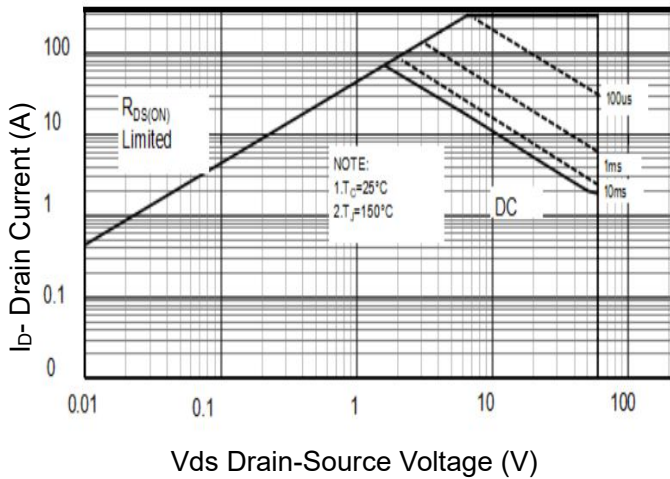


Figure 8 Safe Operation Area

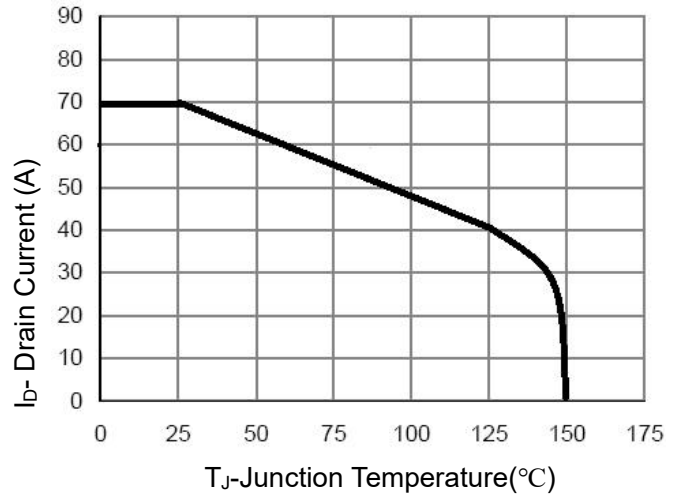


Figure 10 I_D Current De-rating

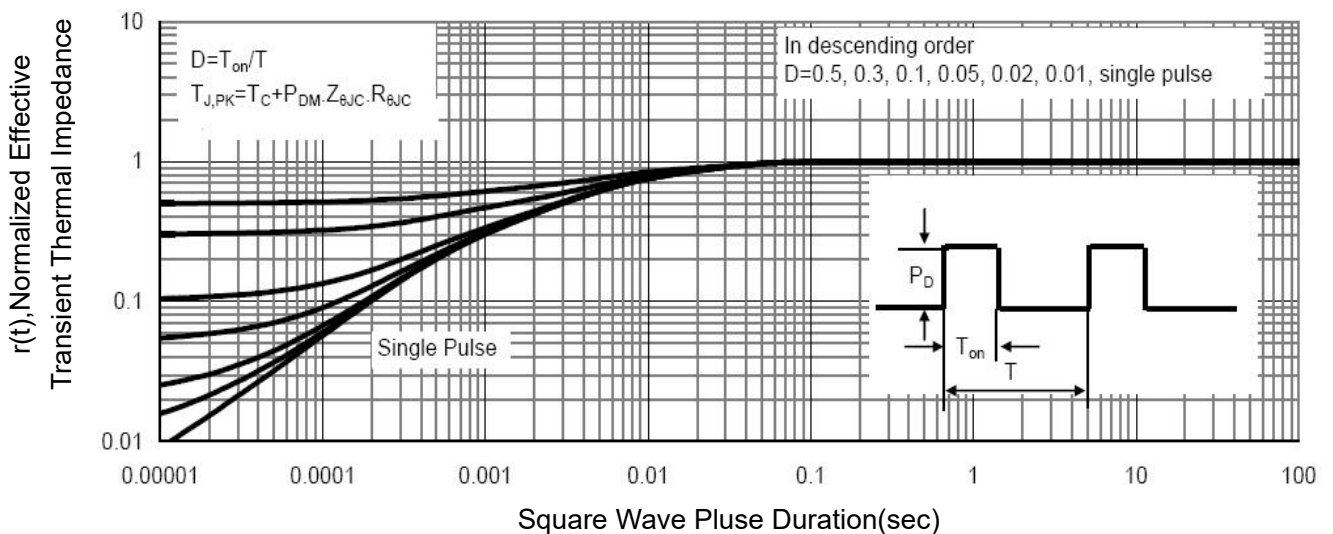
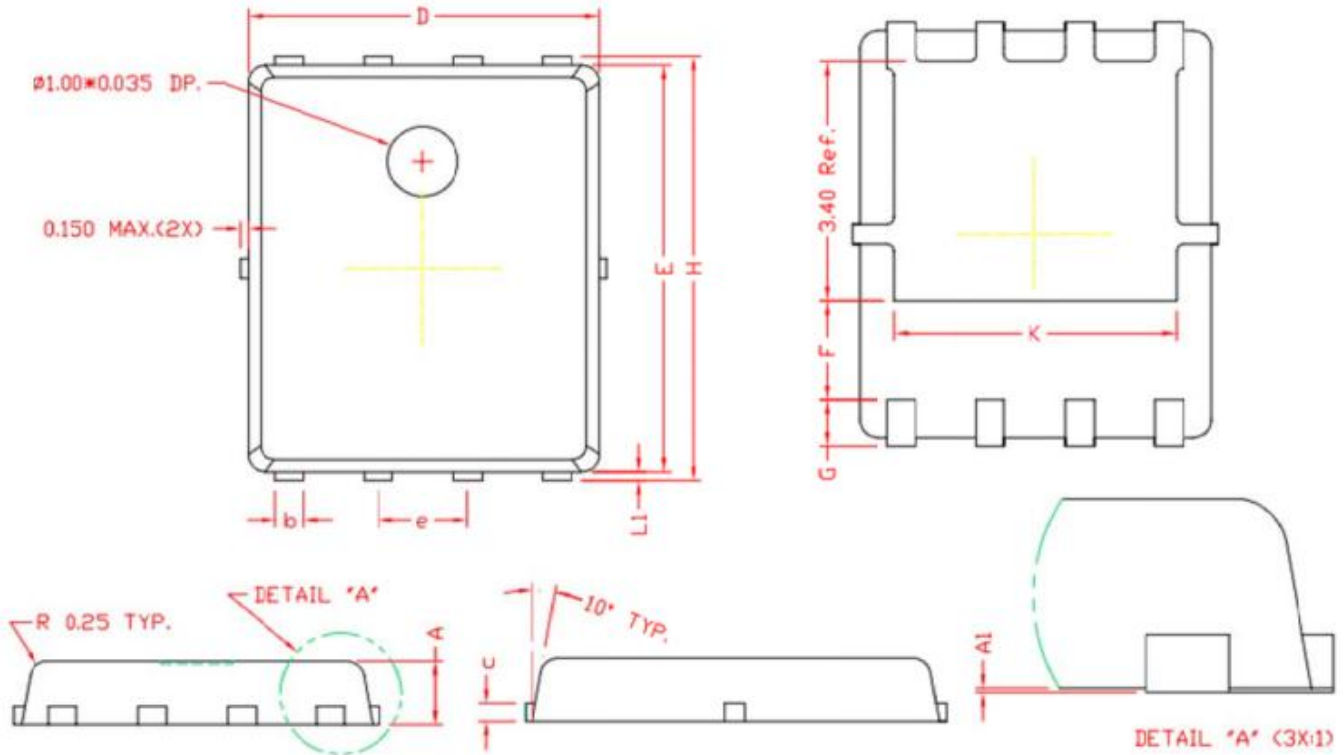


Figure 11 Normalized Maximum Transient Thermal Impedance

DFN5X6-8L Package Information



COMMON DIMENSIONS

(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	0.80	0.90	1.00
A1	0.00	0.03	0.05
b	0.35	0.42	0.49
c	0.254 REF.		
D	4.90	5.00	5.10
F	1.40 REF.		
E	5.70	5.80	5.90
e	1.27 BSC.		
H	5.95	6.08	6.20
L1	0.10	0.14	0.18
G	0.60 REF.		
K	4.00 REF.		

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