

NCE P-Channel Enhancement Mode Power MOSFET

Description

The NCE30P50G 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.

Application

- Battery and loading switching
- Ideal for high-frequency switching and synchronous rectification

100% UIS TESTED!
100% ΔV_{ds} TESTED!

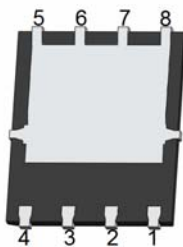
General Features

- $V_{DS} = -30V, I_D = -50A$
 $R_{DS(ON)} < 7m\Omega @ V_{GS} = -10V$
 $R_{DS(ON)} < 11m\Omega @ V_{GS} = -4.5V$
- High density cell design for ultra low R_{dson}
- Very low on-resistance $R_{DS(on)}$
- Good stability and uniformity with high E_{AS}
- 150 °C operating temperature
- Pb-free lead plating

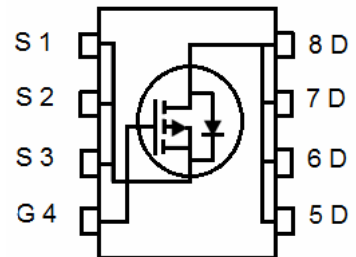
DFN 5X6



Top View



Bottom View



Schematic Diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
NCE30P50G	NCE30P50G	DFN 5x6-8L	-	-	-

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	-50	A
Pulsed Drain Current	I_{DM}	-200	A
Maximum Power Dissipation	P_D	65	W
Derating factor		0.52	W/°C
Single pulse avalanche energy ^(Note 5)	E_{AS}	900	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	°C

Thermal Characteristic

Thermal Resistance, Junction-to-Case ^(Note 2)	$R_{\theta JC}$	1.92	°C/W
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Electrical Characteristics (TC=25°C unless otherwise noted)

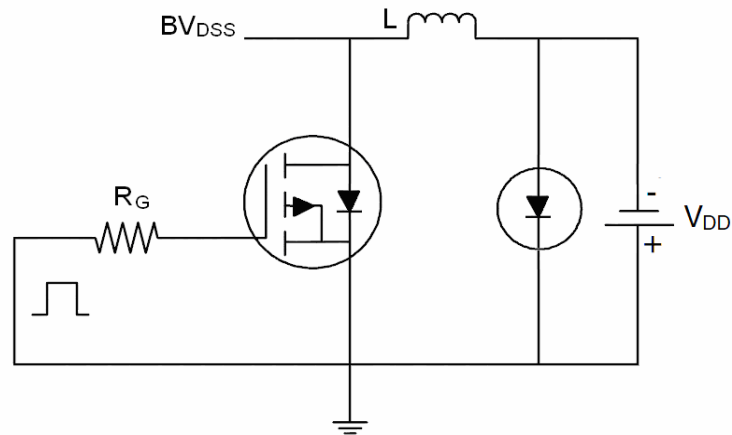
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=-250\mu A$	-30	-33	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-30V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1	-1.5	-2.2	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-20A$	-	5.5	7	m Ω
		$V_{GS}=-4.5V, I_D=-20A$	-	7	11	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=-5V, I_D=-20A$	-	50	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{iss}	$V_{DS}=-15V, V_{GS}=0V,$ $F=1.0MHz$	-	7016	-	PF
Output Capacitance	C_{oss}		-	838	-	PF
Reverse Transfer Capacitance	C_{rss}		-	616	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-15V, I_D=-20A$ $V_{GS}=-10V, R_{GEN}=6\Omega$	-	13	-	nS
Turn-on Rise Time	t_r		-	16	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	80	-	nS
Turn-Off Fall Time	t_f		-	45	-	nS
Total Gate Charge	Q_g	$V_{DS}=-15V, I_D=-20A,$ $V_{GS}=-10V$	-	92.5	-	nC
Gate-Source Charge	Q_{gs}		-	11.5	-	nC
Gate-Drain Charge	Q_{gd}		-	17	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	$V_{GS}=0V, I_S=-20A$	-	-0.85	-1.2	V
Diode Forward Current (Note 2)	I_S		-	-	-50	A
Reverse Recovery Time	t_{rr}	$T_J = 25^\circ C, I_F = -20A$ $di/dt = 100A/\mu s$ (Note3)	-	35	-	nS
Reverse Recovery Charge	Q_{rr}		-	50	-	nC

Notes:

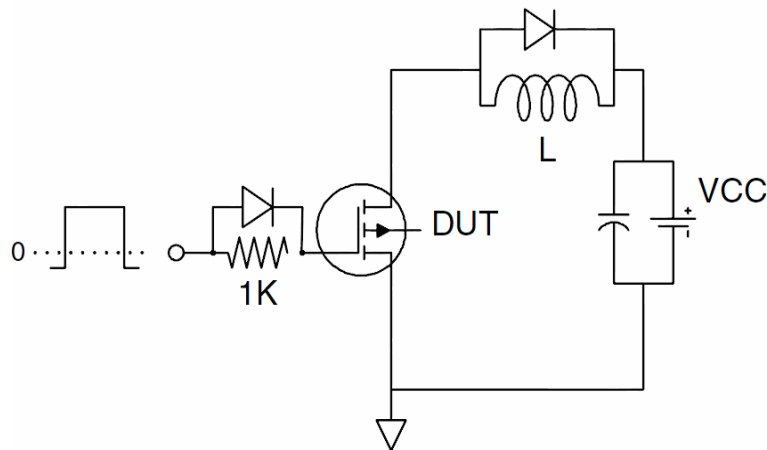
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production
5. EAS condition: $T_J=25^\circ C, V_{DD}=-15V, V_G=-10V, L=0.5mH, R_g=25\Omega$

Test Circuit

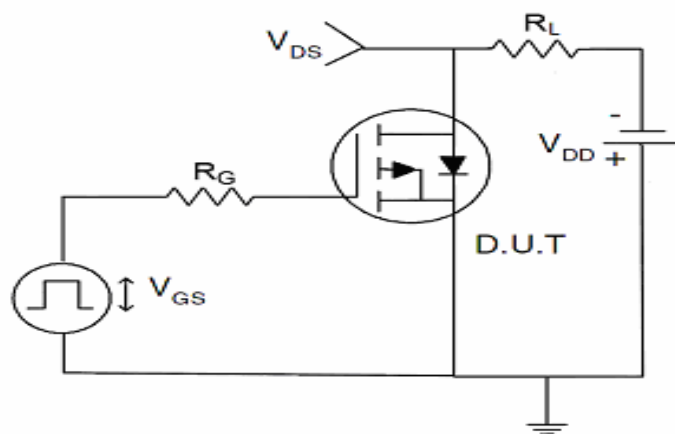
1) E_{AS} Test Circuit



2) Gate Charge Test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics (Curves)

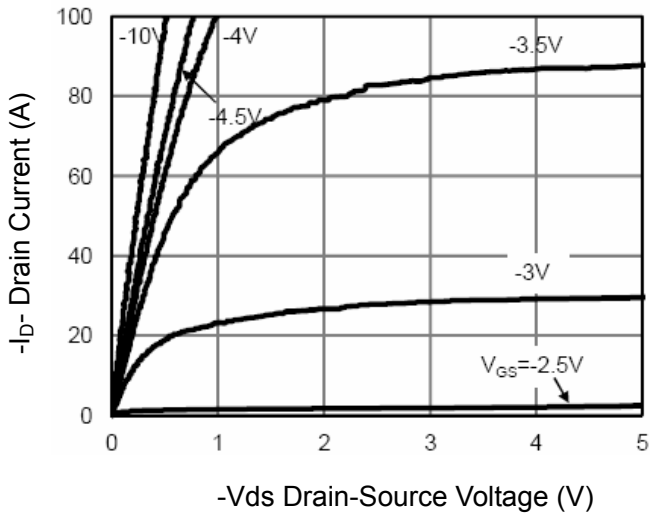


Figure 1 Output Characteristics

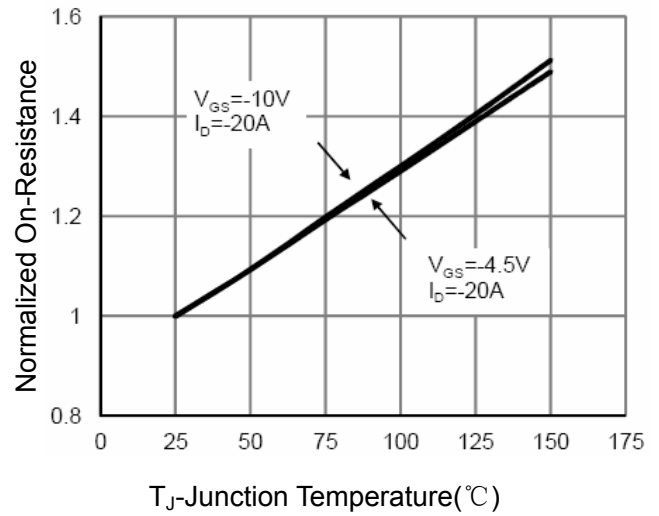


Figure 4 $R_{DS(on)}$ -Junction Temperature

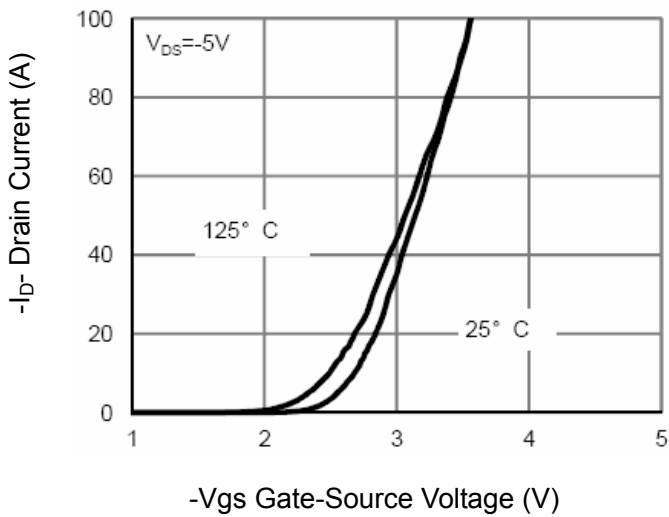


Figure 2 Transfer Characteristics

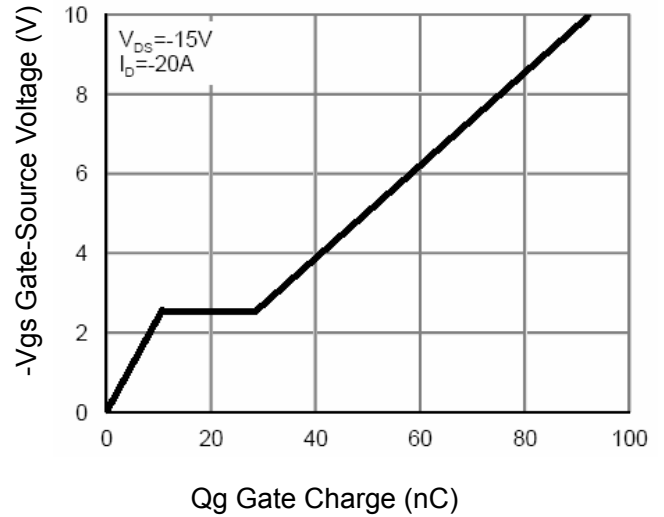


Figure 5 Gate Charge

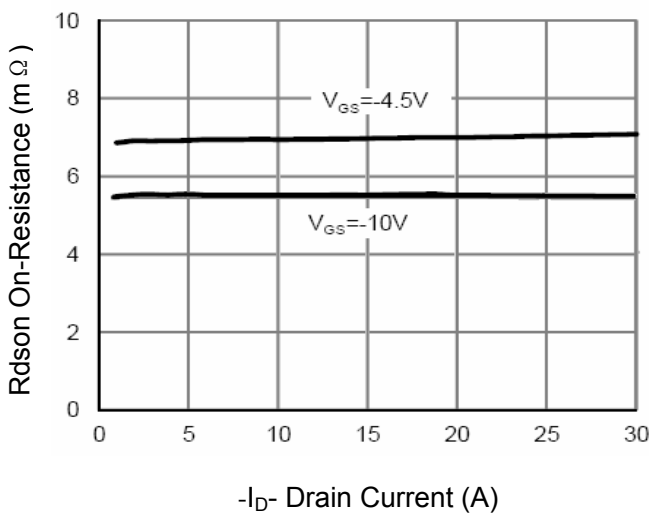


Figure 3 $R_{DS(on)}$ - Drain Current

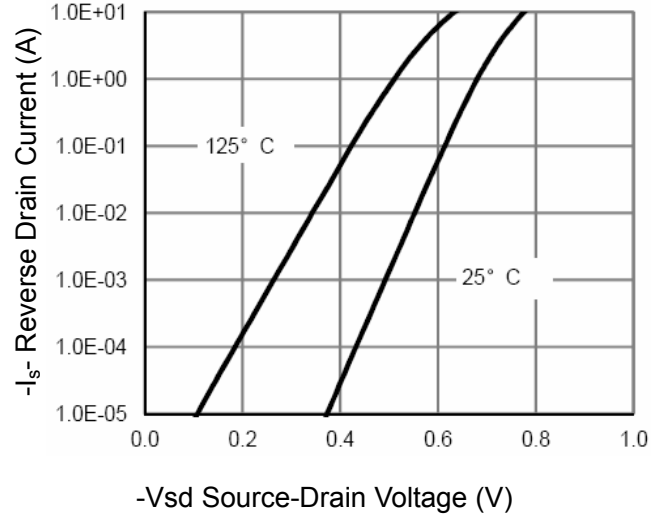
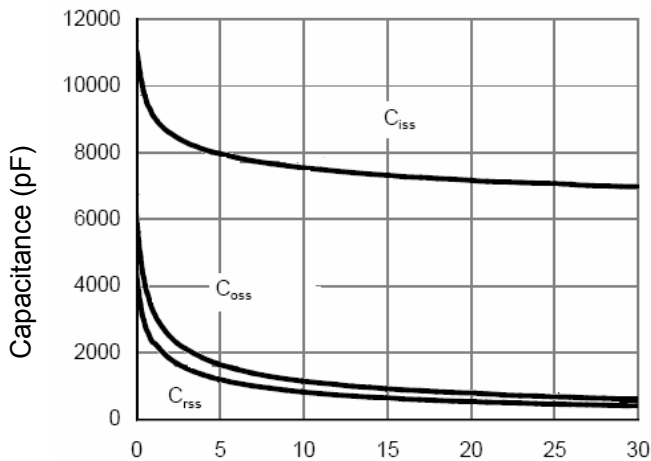
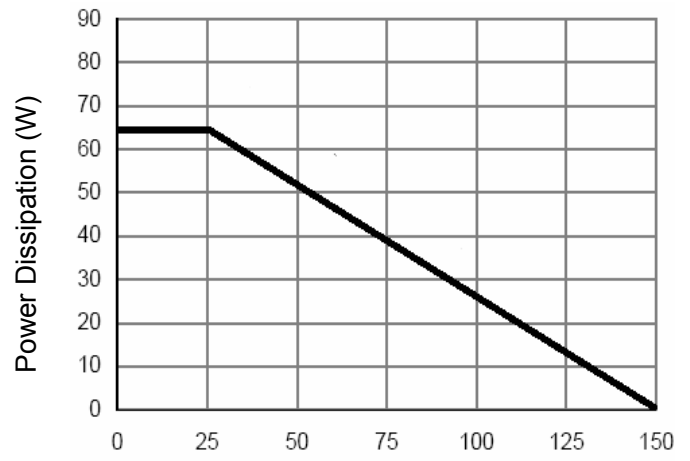


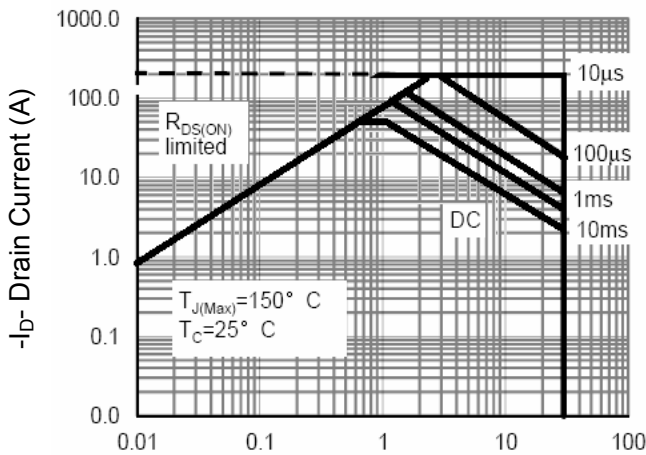
Figure 6 Source- Drain Diode Forward



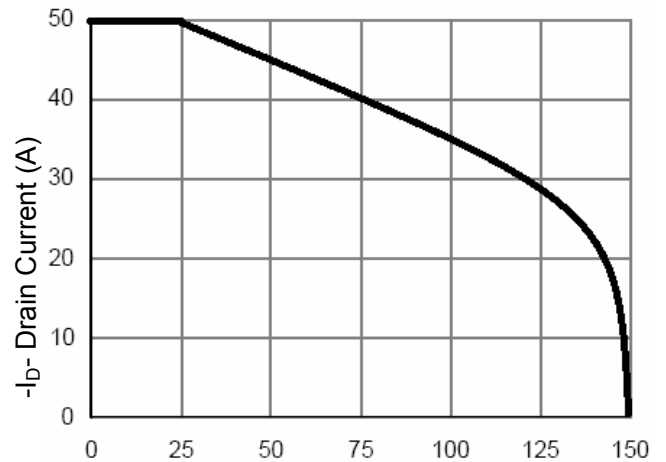
- Vds Drain-Source Voltage (V)
Figure 7 Capacitance vs Vds



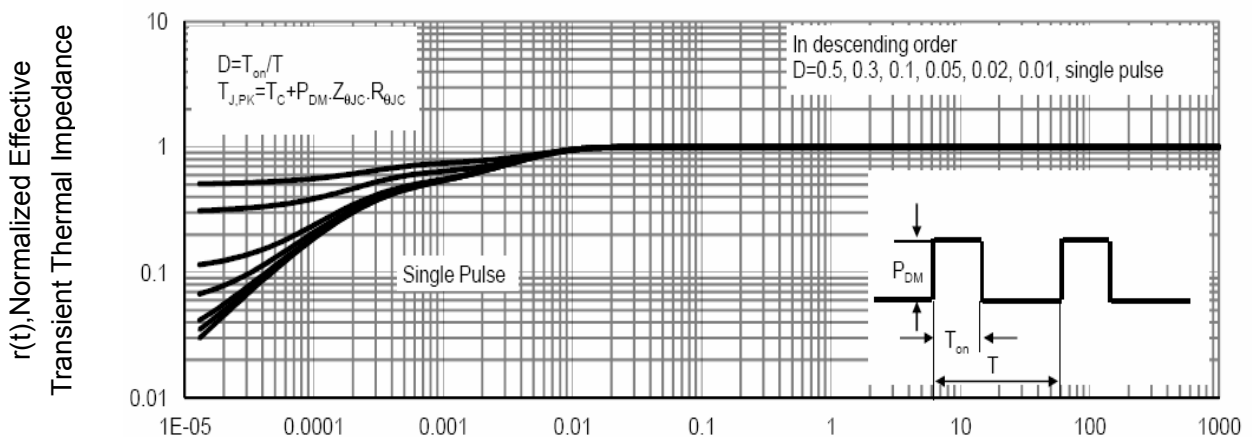
T_J-Junction Temperature(°C)
Figure 9 Power De-rating



-Vds Drain-Source Voltage (V)
Figure 8 Safe Operation Area



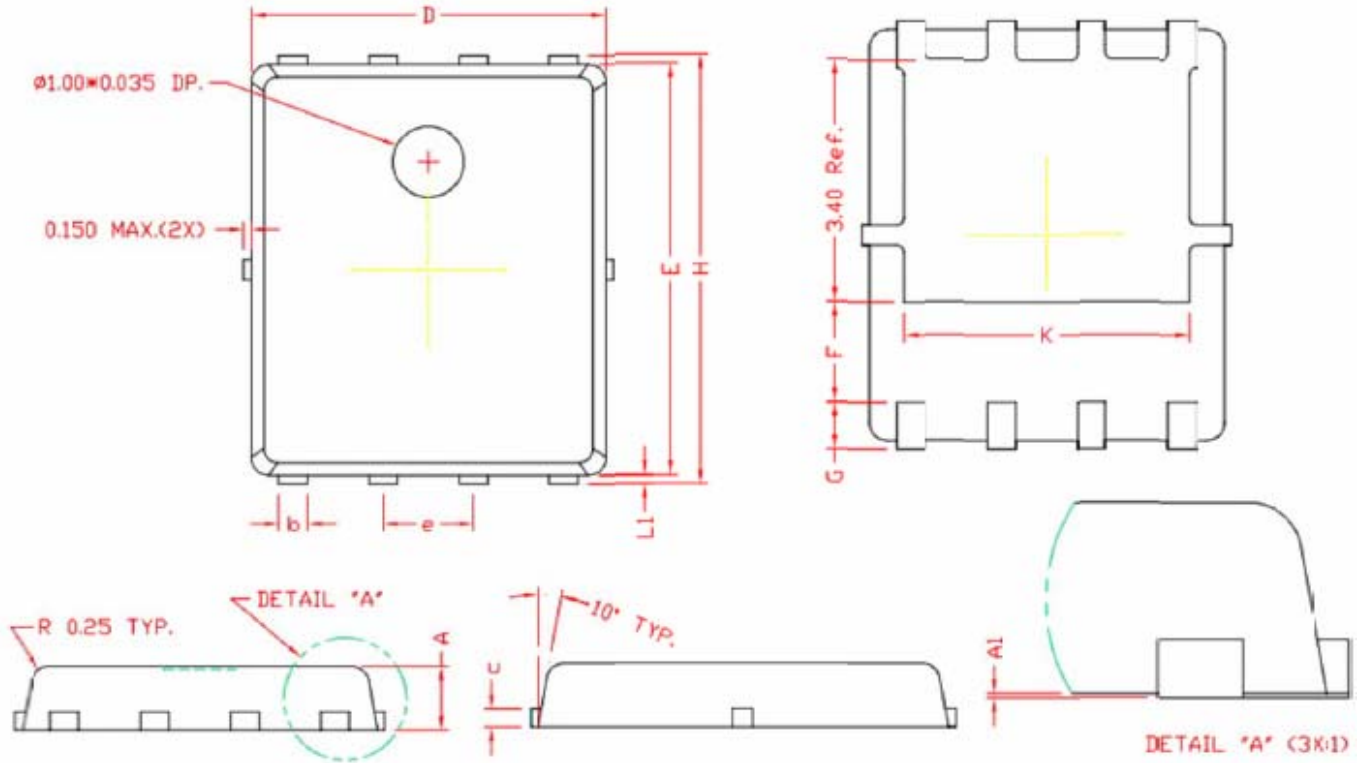
T_J-Junction Temperature(°C)
Figure 10 ID Current Derating vs Junction Temperature



Square Wave Pulse Duration(sec)

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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