N-Channel Trench Power MOSFET

Lead Free Package and Finish

General Description

The RS30N100G uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 5V. This device is suitable for use as a wide variety of applications.

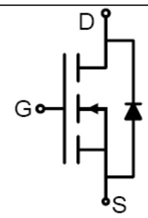
Features

- V_{DS} = 30V,ID =100A
  $R_{DS(ON)}$ < 3.2mΩ @ V_{GS} =10V
  $R_{DS(ON)}$ < 6mΩ @ V_{GS} =5V
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

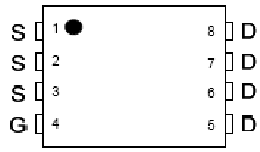
Application

- PWM applications
- DC/DC Converters
- Power management

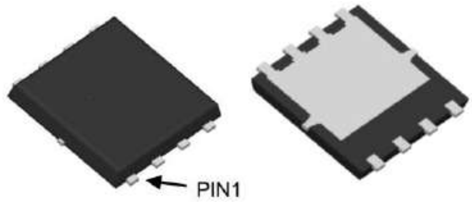
100% UIS TESTED!
100% ΔVds TESTED!



Schematic Diagram



Pin Assignment



DFN5X6-8L top&bottom view

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
RS30N100G	RS30N100G	DFN5X6-8L	-	-	-

Table 1. Absolute Maximum Ratings (T_A=25℃)

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage (V_{GS}=0V）	30	V
V_{GS}	Gate-Source Voltage (V_{DS}=0V)	±20	V
I_D	Drain Current-Continuous(T_c=25℃)	100	A
	Drain Current-Continuous(T_c=100℃)	69	A
$I_{DM\ (pluse)}$	Drain Current-Continuous@ Current-Pulsed (Note 1)	400	A
P_D	Maximum Power Dissipation(T_c=25℃)	58	W
	Maximum Power Dissipation(T_c=100℃)	23	W
E_{AS}	Avalanche energy (Note 2)	870	mJ
T_J,T_{STG}	Operating Junction and Storage Temperature Range	-55 To 150	℃

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature
Notes 2.E_{AS} condition: T_J=25℃,V_{DD}=20V,V_G=10V, R_G=25Ω

Table 2. Thermal Characteristic

Symbol	Parameter	Typ	Max	Unit
$R_{θJC}$	Thermal Resistance, Junction-to-Case	-	2.15	℃/W

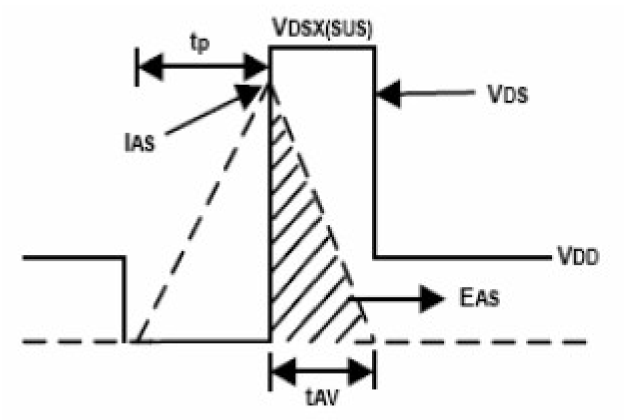
Table 3. Electrical Characteristics (TA=25℃unless otherwise noted)

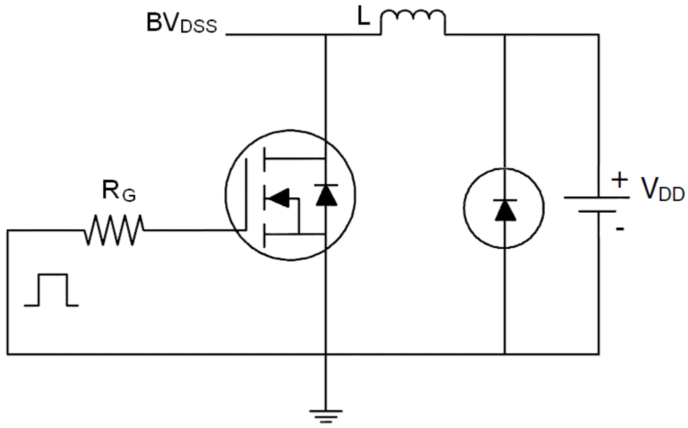
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V I_D=250μA	30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=24V,V_{GS}=0V			1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±20V,V_{DS}=0V			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	1	1.6	3	V
g_{FS}	Forward Transconductance	V_{DS}=5V,I_D=20A	18	45		S
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=20A		2.3	3.2	mΩ
		V_{GS}=5V, I_D=20A		4	6	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=15V,V_{GS}=0V, f=1.0MHz		5400		pF
C_{oss}	Output Capacitance			920		pF
C_{rss}	Reverse Transfer Capacitance			260		pF
Rg	Gate resistance	V_{GS}=0V, V_{DS}=0V,f=1.0MHz		0.9		Ω
Switching Times						
$t_{d(on)}$	Turn-on Delay Time	V_{GS}=10V, V_{DS}=15V, R_L=0.75Ω,R_{GEN}=3Ω		24		nS
t_r	Turn-on Rise Time			49		nS
$t_{d(off)}$	Turn-Off Delay Time			85		nS
t_f	Turn-Off Fall Time			21		nS
Q_g	Total Gate Charge	V_{GS}=10V, V_{DS}=25V, I_D=14A		126		nC
Q_{gs}	Gate-Source Charge			14		nC
Q_{gd}	Gate-Drain Charge			38		nC
Source-Drain Diode Characteristics						
I_{SD}	Source-Drain Current(Body Diode)				100	A
V_{SD}	Forward on Voltage(Note 1)	V_{GS}=0V,I_S=20A			1.2	V
t_{rr}	Body Diode Reverse Recovery Time	I_F=20A, dI/dt=100A/µs		29		ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=20A, dI/dt=100A/µs		20		nC

Notes 1. Repetitive Rating: Pulse width limited by maximum junction temperature.

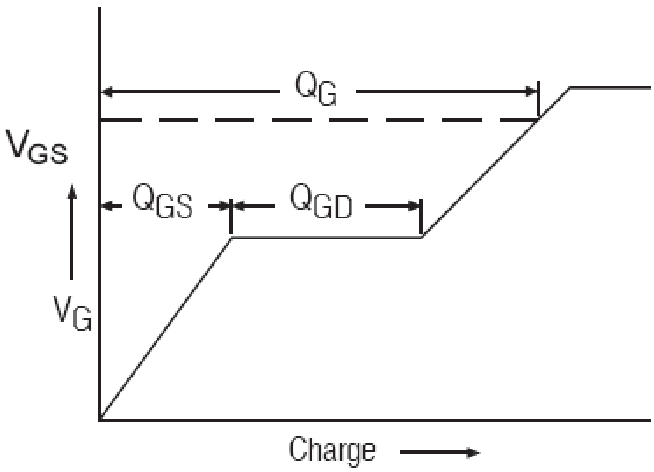
Test Circuit

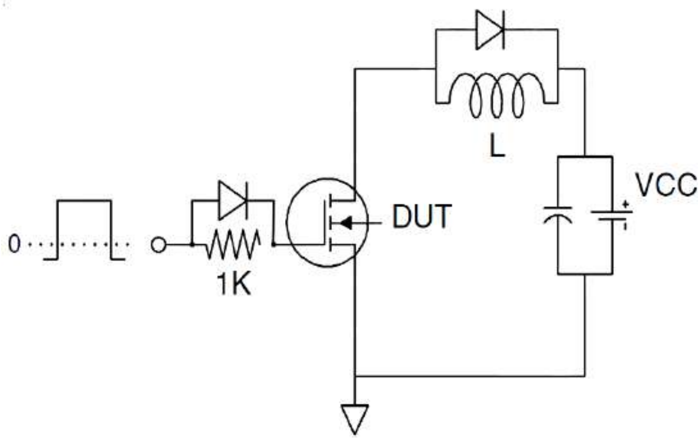
1) E_{AS} Test Circuits



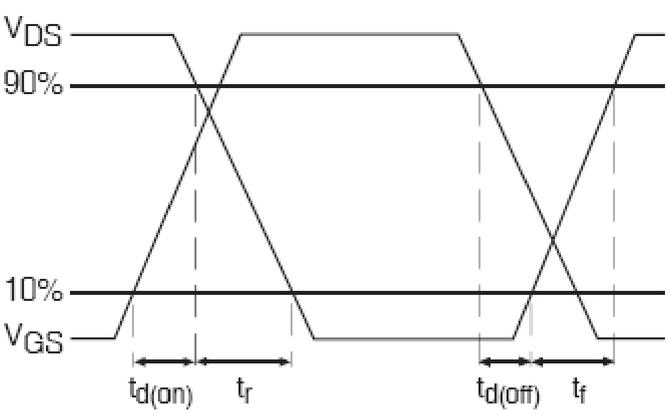


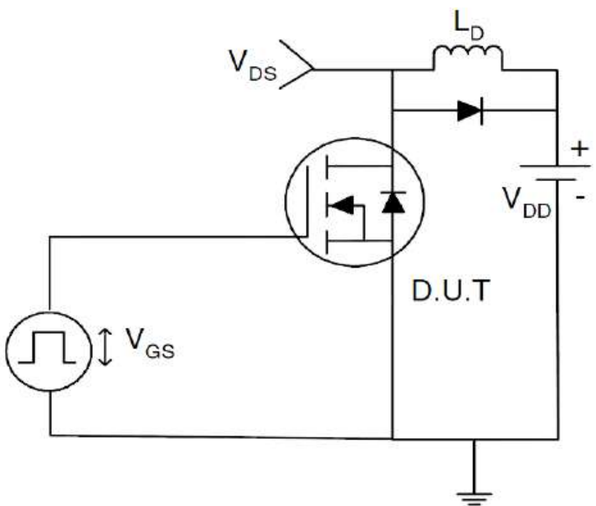
2) **Gate Charge Test Circuit:**





3) **Switch Time Test Circuit:**





TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (Curves)

Figure 1. Output Characteristics

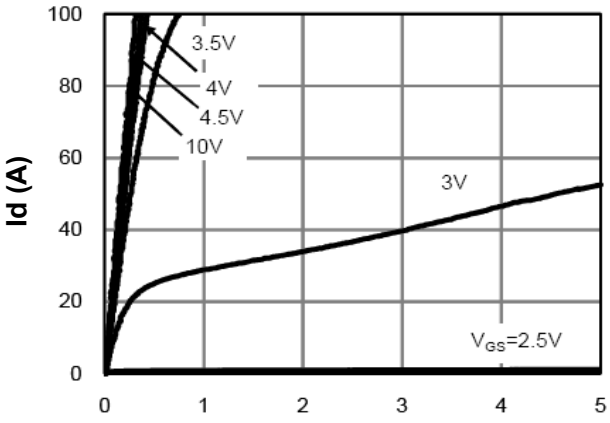


Figure 2. Transfer Characteristics

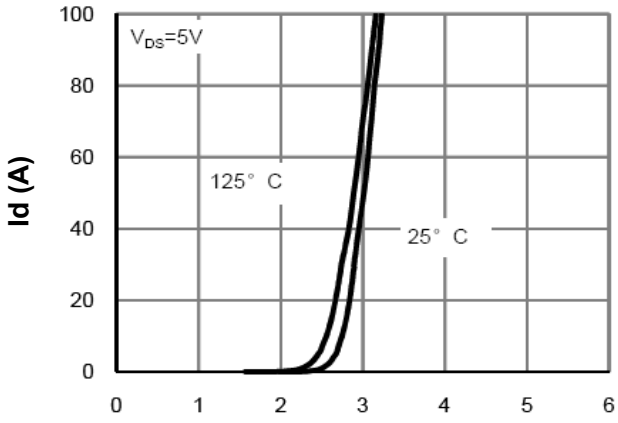


Figure 3. Max BV_{DSS} vs Junction Temperature

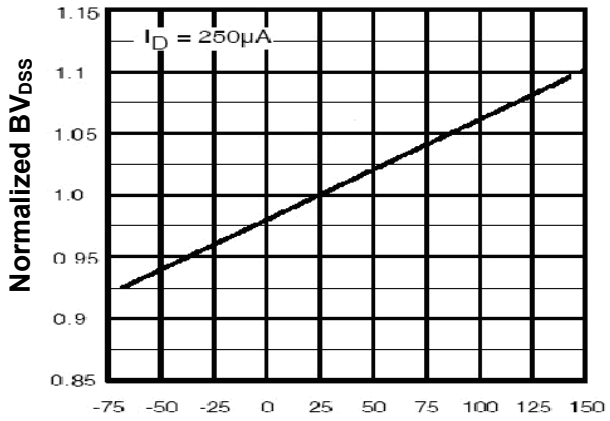


Figure 4. Drain Current

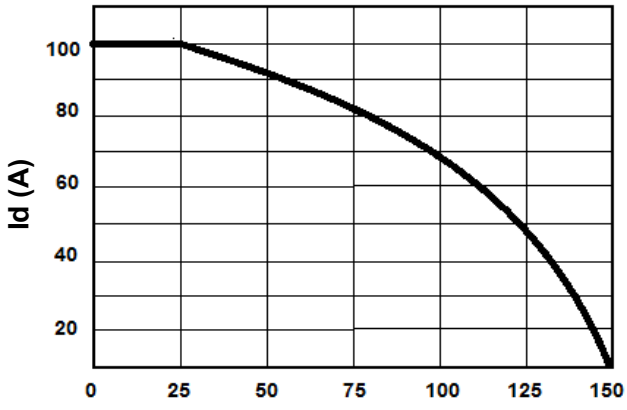


Figure 5. $V_{GS(th)}$ vs Junction Temperature

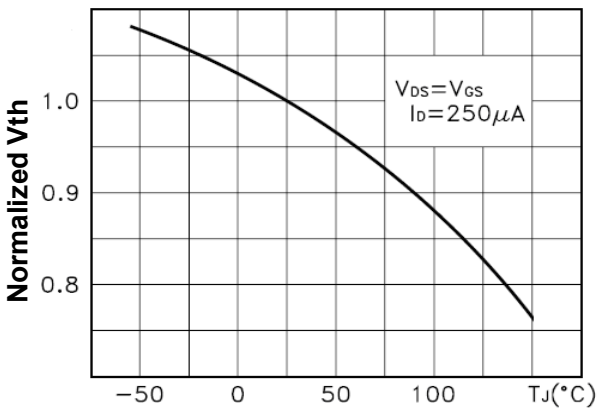


Figure 6. $R_{DS(ON)}$ vs Junction Temperature

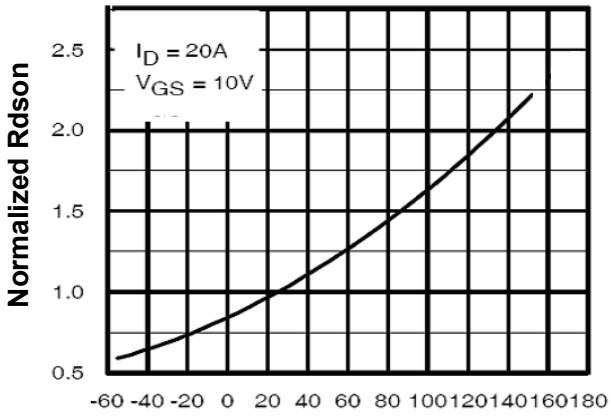


Figure 7. Gate Charge Waveforms

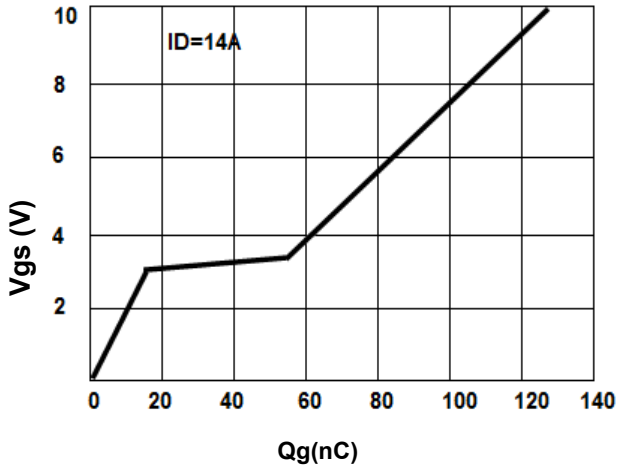


Figure 8. Capacitance

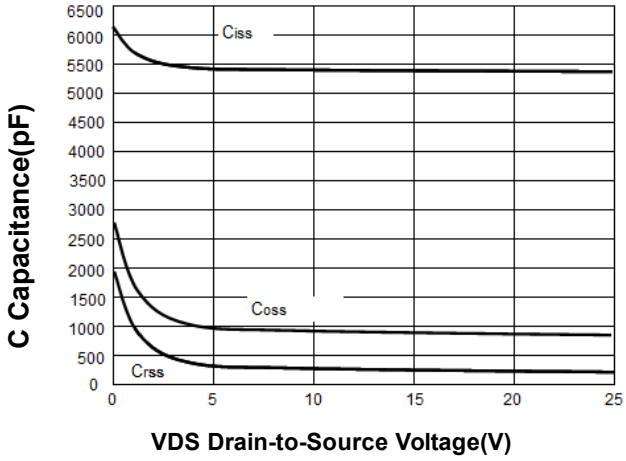


Figure 9. Body-Diode Characteristics

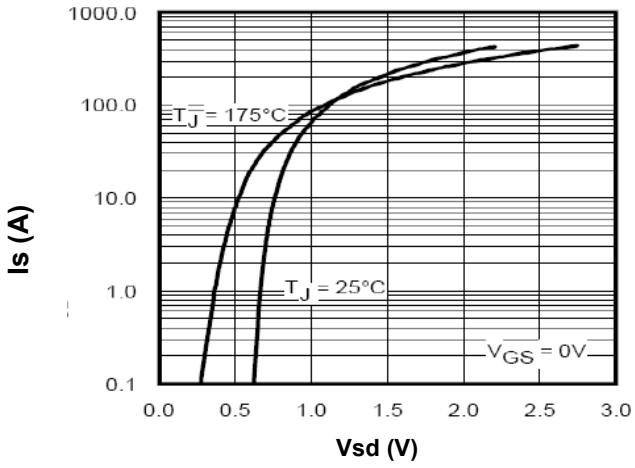


Figure 10. Maximum Safe Operating Area

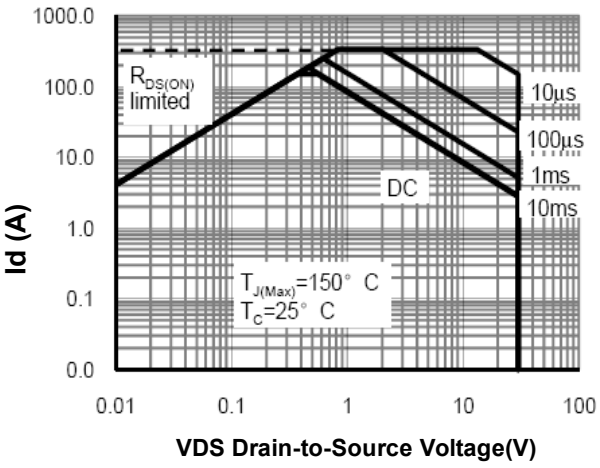
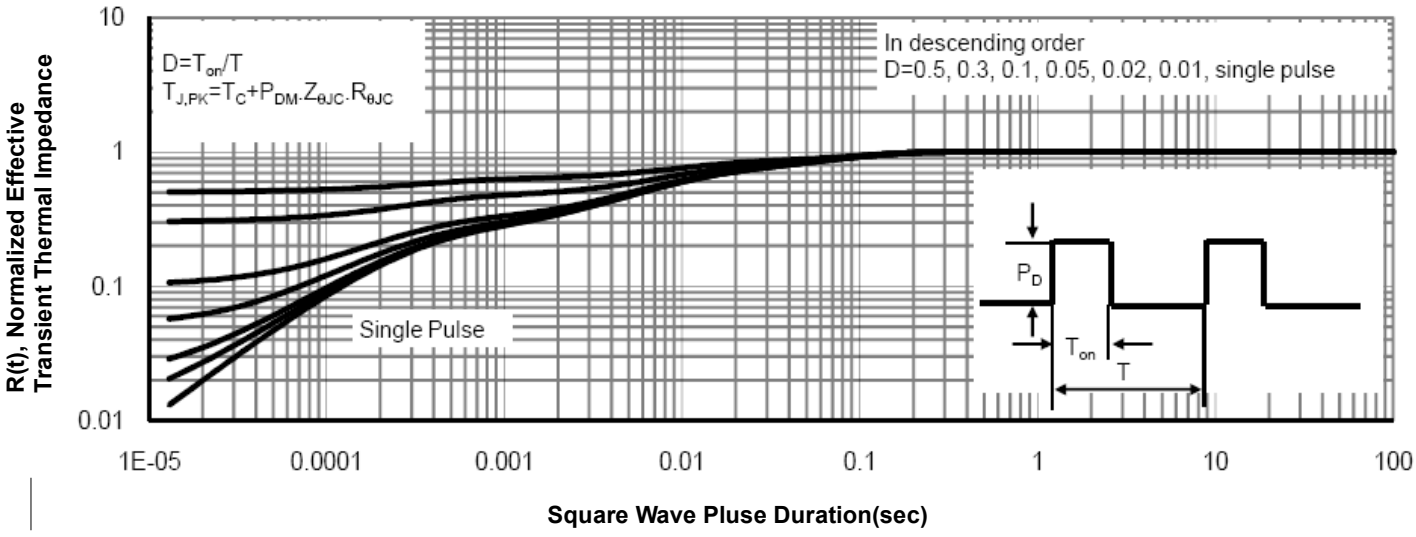
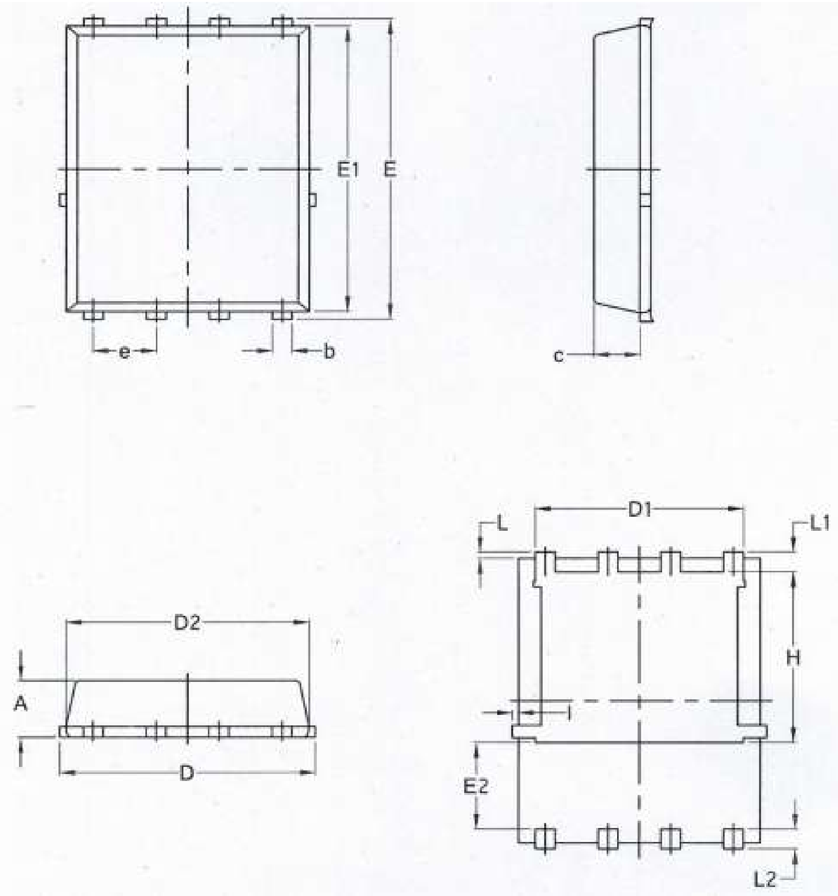


Figure 11. Normalized Maximum Transient Thermal Impedance



DFN5X6-8L Package Information



SYMBOL	COMMON			
	MM		INCH	
	MIN.	MAX.	MIN.	MAX.
A	1.03	1.17	0.0406	0.0461
b	0.34	0.48	0.0134	0.0189
c	0.824	0.970	0.0324	0.0382
D	4.80	5.40	0.1890	0.2126
D1	4.11	4.31	0.1618	0.1697
D2	4.80	5.00	0.1890	0.1969
E	5.95	6.15	0.2343	0.2421
E1	5.65	5.85	0.2224	0.2303
E2	1.60	—	0.0630	—
e	1.27 BSC		0.05 BSC	
L	0.05	0.25	0.0020	0.0098
L1	0.38	0.50	0.0150	0.0197
L2	0.38	0.50	0.0150	0.0197
H	3.30	3.50	0.1299	0.1378
I	—	0.18	—	0.0070