DESCRIPTION

N-Channel Power MOSFET designed by HR-Micro Semiconductor Company, according to the advanced Trench Technology. This devices provide an excellent Gate charge and $R_{DS(ON)}$, which leads to extremely communication and conduction losses. So it is very suitable for AC/DC power conversion, load switch and industrial power applications. The package form is DFN5X6 which accords with the RoHS standard.

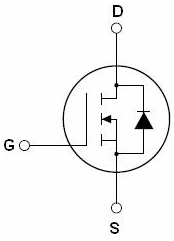
GENERAL FEATURES

- V_{DS}=30V, I_D=100A
  $R_{DS(ON)}$(Typ.)=2.6mΩ @ V_{GS}=4.5V
  $R_{DS(ON)}$(Typ.)=1.8mΩ @ V_{GS}=10V
- Low FOM $R_{DS(ON)}$ × Q_{gd}
- 100% avalanche tested
- Ease to use/drive
- RoHS compliant

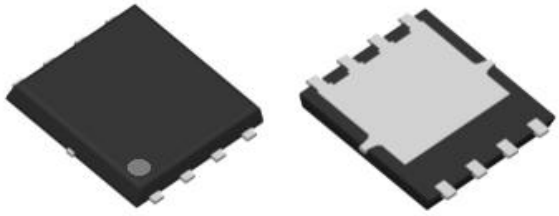
APPLICATION

- DC-DC Converter
- Battery Protection Charge/Discharge
- Load switch
- Synchronous Rectification

PINOUT



Schematic diagram



DFN5*6 top & bottom view

ORDERING INFORMATION

Device	StorageTemperature	Package	Devices Per Reel
MXN30N03G	-55°C to 150°C	DFN5*6	-

KEY PERFORMANCE PARAMETERS(T_C=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	30	V
Drain-Source On-State-Resistance(max@V_{GS}=4.5V)	$R_{DS(ON)}$	3.2	mΩ
Drain-Source On-State-Resistance(max@V_{GS}=10V)	$R_{DS(ON)}$	2.4	mΩ
Total Gate Charge(type)	Q_g	71	nC
Drain Current-Continuous	I_D	100	A
Pulsed Drain Current	I_{DM}	252	A
Maximum Power Dissipation	P_D	41.6	W
Single Pulse Avalanche Energy(Note 1)	E_{AS}	178	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C

Note 1. E_{AS} condition:T_J=25°C,V_{DD}=20V, L=0.1mH

ABSOLUTE MAXIMUM RATINGS(T_A=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage(V_{GS}=0V)	V_{DS}	30	V
Drain Current-Continuous(T_C=25°C)(Note2)	I_D	100	A
Drain Current-Continuous(T_C=100°C)(Note2)	I_D	63	A
Pulsed Drain Current(Note3)	I_{DM}	252	A
Gate-Source Voltage	V_{GSS}	±20	V
Single Pulse Avalanche Energy(Note1)	E_{AS}	178	mJ
Total Power Dissipation	P_D	41.6	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C

THERMAL RESISTANCE

Parameter	Symbol	Limit	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	35	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	3	°C/W

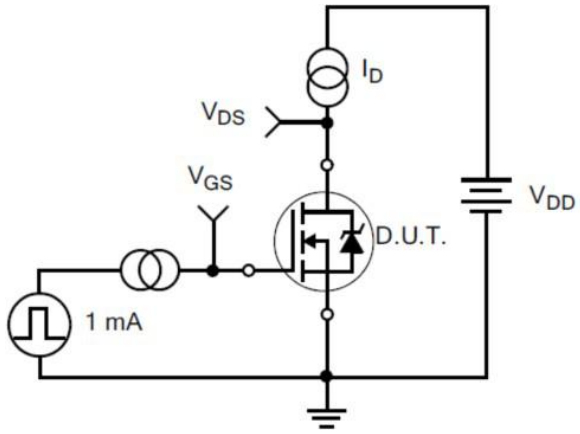
Note 1. E_{AS} condition:L=0.1mH,V_{DD}=20V, Start T_J=25°C
Note 2. Limited by maximum junction temperature.
Note 3. Repetitive Rating: Pulse width limited by maximum junction temperature.

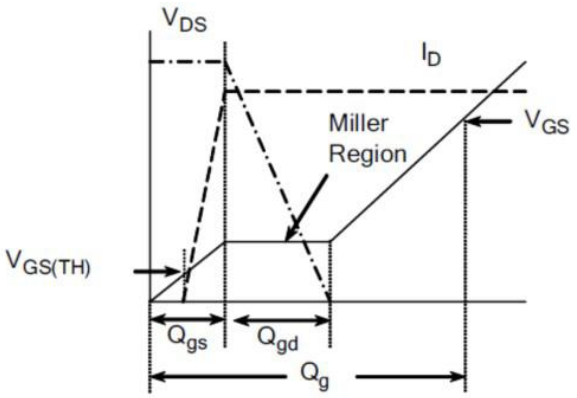
ELECTRICAL CHARACTERISTICS(T_J=25°C unless otherwise noted)

Parameter		Symbol	Condition	Min	Typ	Max	Unit
On/Off Characteristics							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V, I_D=250μA	30	-	-	V
Zero Gate Voltage Drain Current	T_J=25°C	I_{DSS}	V_{DS}=30V, V_{GS}=0V	-	-	1	μA
	T_J=125°C		V_{DS}=24V, V_{GS}=0V	-	-	100	μA
Gate-Source Leakage Current		I_{GSS}	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
Gate-Source Threshold Voltage		$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1.1	1.5	1.7	V
Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=4.5V, I_D=20A	-	2.6	3.2	mΩ
			V_{GS}=10V, I_D=20A	-	1.8	2.4	mΩ
Gate Resistance		R_G	F=1.0MHz open drain	-	1.7	-	Ω
Dynamic Characteristics							
Input Capacitance		C_{iss}	V_{DS}=15V, V_{GS}=0V, F=1.0MHz	-	3662	-	pF
Output Capacitance		C_{oss}		-	520	-	pF
Reverse Transfer Capacitance		C_{rss}		-	418	-	pF
Total Gate Charge		Q_g	V_{DS}=15V, I_D=20A, V_{GS}=10V	-	71	-	nC
Gate-Source Charge		Q_{gs}		-	11.6	-	nC
Gate-Drain Charge		Q_{gd}		-	11.9	-	nC
Gate Plateau Voltage		$V_{plateau}$		-	2.8	-	V
Switching Characteristics							
Turn-on Delay Time		$t_{d(on)}$	V_{DS}=15V, I_D=20A V_{GS}=10V,R_G=3Ω	-	22	-	nS
Turn-on Rise Time		t_r		-	18	-	nS
Turn-Off Delay Time		$t_{d(off)}$		-	44	-	nS
Turn-Off Fall Time		t_f		-	15	-	nS
Source-Drain Diode Characteristics							
Body Diode Forward Voltage		V_{SD}	V_{GS}=0V, I_{SD}=20A	-	-	1.2	V
Continuous Diode Forward Current		I_S		-	-	100	A
Reverse Recovery Time		t_{rr}	I_F=20A, dI/dt=100A/μs	-	22	-	nS
Reverse Recovery Charge		Q_{rr}		-	47	-	nC

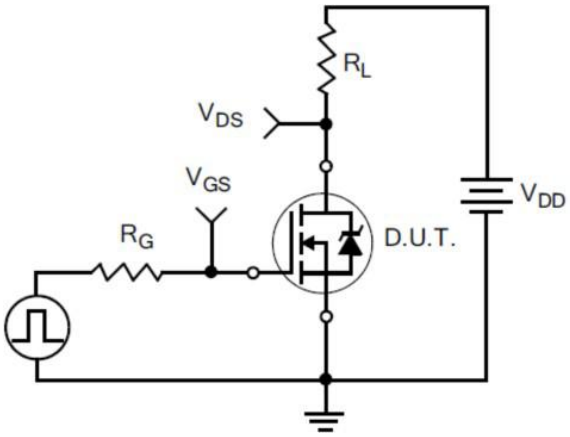
TEST CIRCUIT

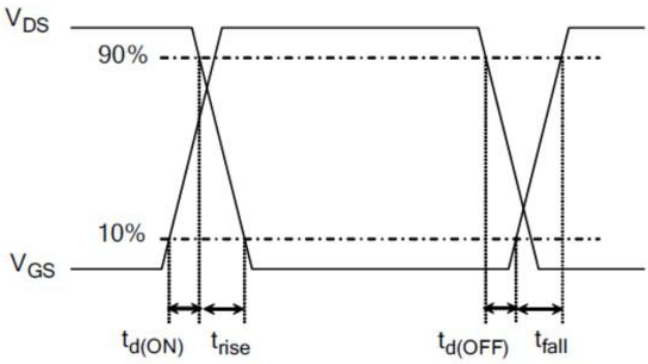
1) Gate Charge Test Circuit and Waveform



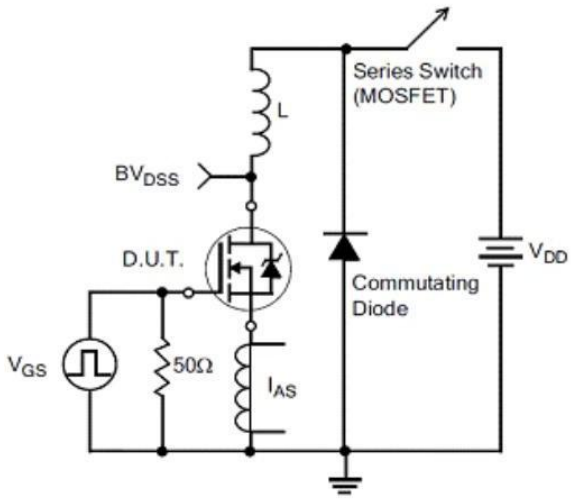


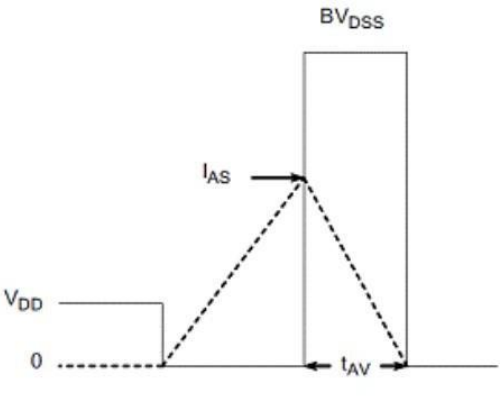
2) Resistive Switching Test Circuit and Waveform





3) Unclamped Inductive Switching Test Circuit and Waveform





$$E_{AS} = \frac{I_{AS}^2 L}{2}$$

TYPICAL PERFORMANCE CHARACTERISTICS

Figure1. Output Characteristics

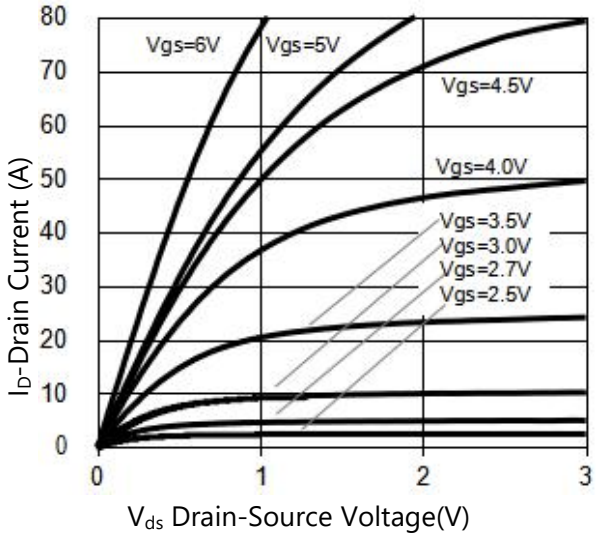


Figure2. Transfer Characteristics

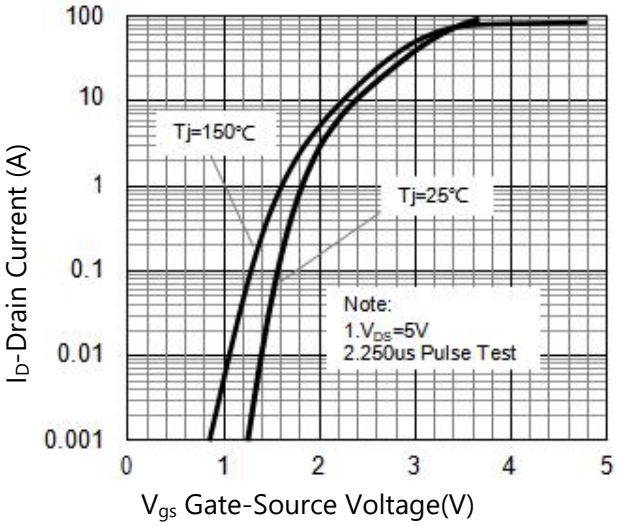


Figure3. BV_{DSS} vs Junction Temperature

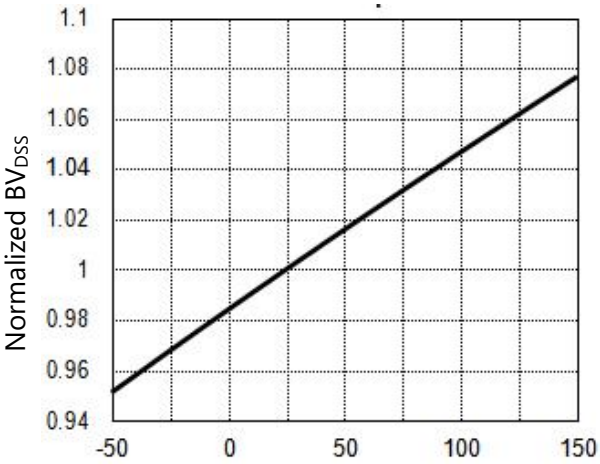


Figure4. Drain Current vs Case Temperature

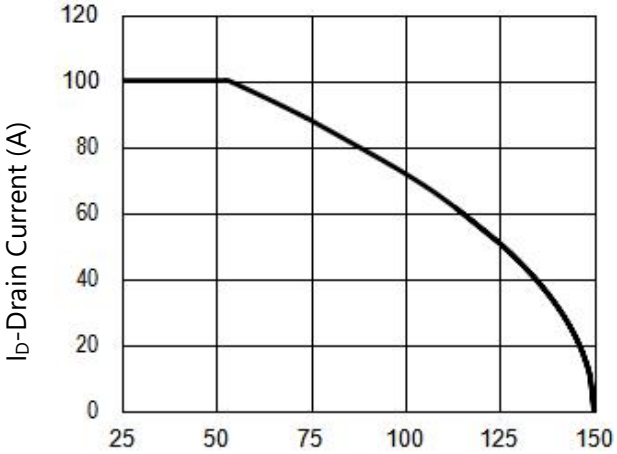


Figure5. $V_{GS(th)}$ vs Junction Temperature

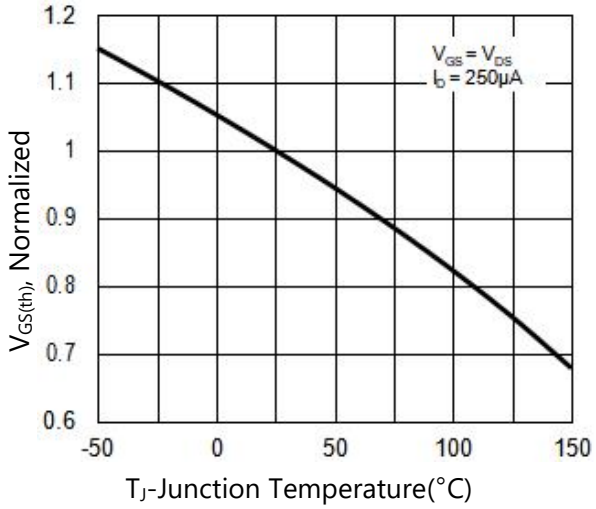
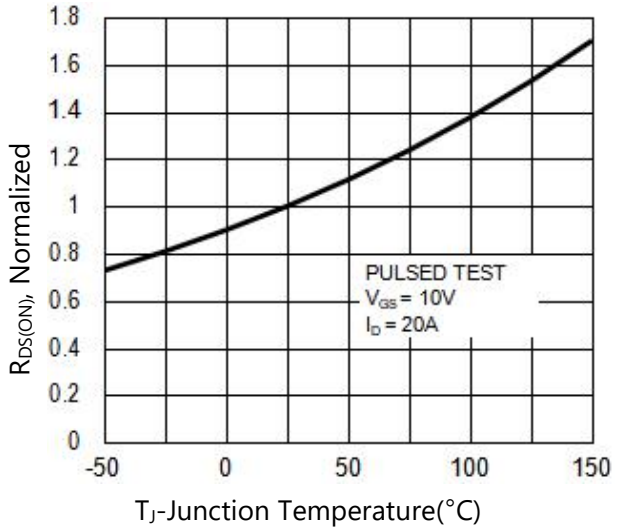


Figure6. $R_{DS(ON)}$ vs Junction Temperature



TYPICAL PERFORMANCE CHARACTERISTICS

Figure7. Gate Charge Waveforms

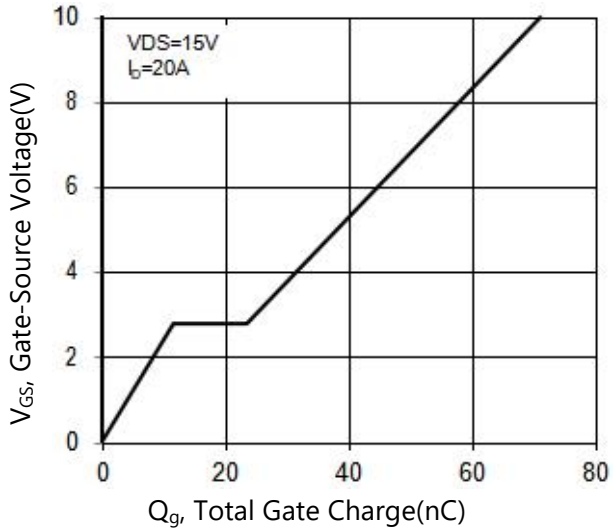


Figure8. Capacitance Characteristics

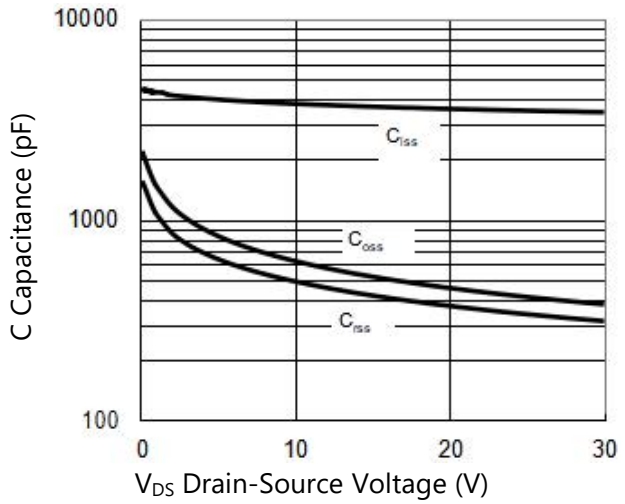


Figure9. Source-Drain Diode Forward

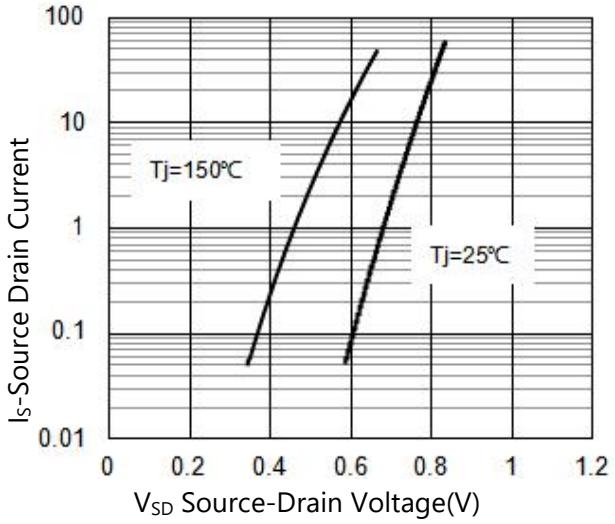


Figure10. Safe Operating Area

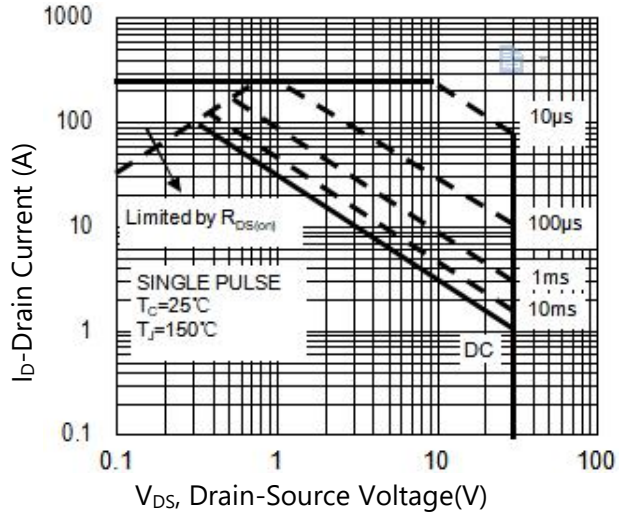
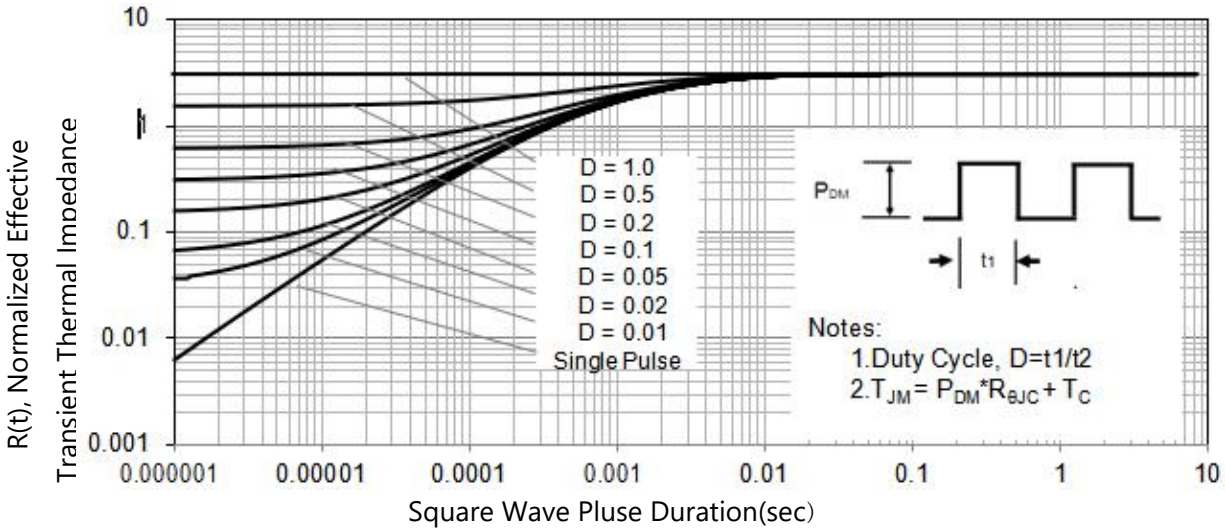
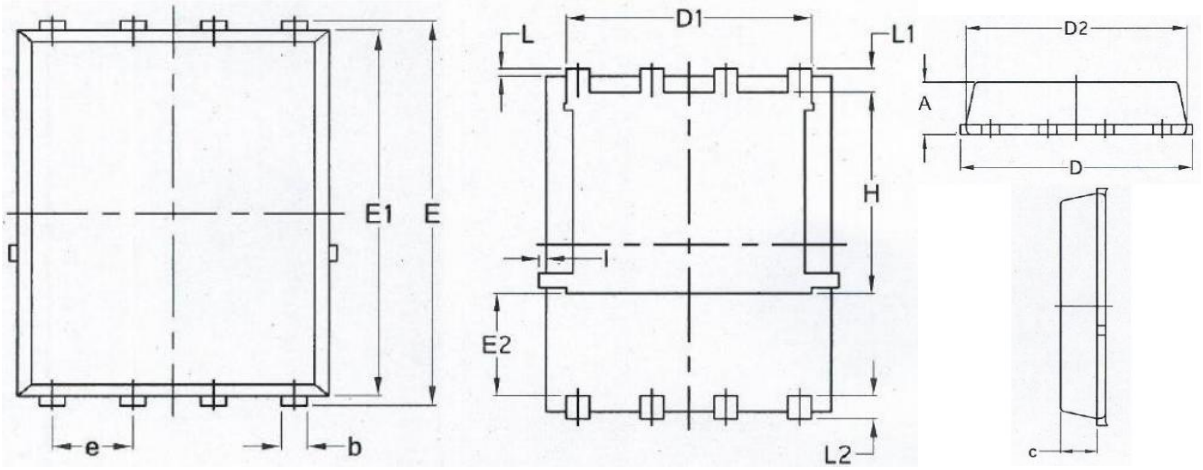


Figure11. Normalized Maximum Transient Thermal Impedance



PACKAGE INFORMATION

DFN5*6



SYMBOL	Dimensions In Millimeters		Dimensions In Inches	
	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