



PE039N03G N-Channel Enhancement Mode Power MOSFET

PE039N03G Description

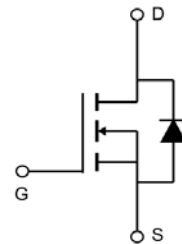
The PE039N03G uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. It can be used in a wide variety of applications.

PE039N03G General Features

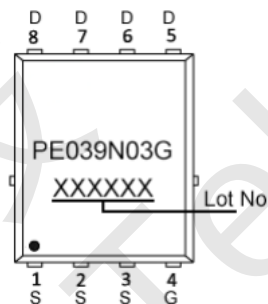
- $V_{DS} = 30V$, $I_D = 90A$
- $R_{DS(ON)} < 4m\Omega$ @ $V_{GS}=10V$
- $R_{DS(ON)} < 6.5m\Omega$ @ $V_{GS}=4.5V$
- High Power and current handling capability
- Lead free product is acquired
- Surface Mount Package

PE039N03G Application

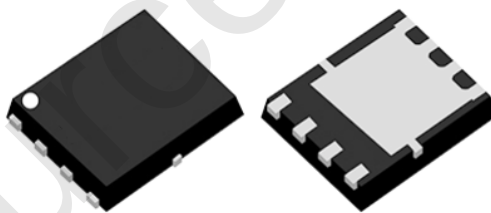
- PWM applications
- Load switch



Schematic diagram



Marking and pin assignment



DFN5x6-8L

PE039N03G Absolute Maximum Ratings (TC=25°C unless otherwise noted)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	90	A
Drain Current-Continuous ($T_C=100^\circ C$)	$I_D(T_C=100^\circ C)$	63	A
Pulsed Drain Current (Note 1)	I_{DM}	270	A
Maximum Power Dissipation	P_D	50	W
Single Pulsed Avalanche Energy ($L=0.1mH$)	E_{AS}	162	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ C$

PE039N03G Thermal Characteristic

Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	2.5	$^\circ C/W$
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PE039N03G 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 =250μA	30	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =30V, 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	1.0	1.7	2.2	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =10A	-	3.2	4	mΩ
		V _{GS} =4.5V, I _D =5A	-	5	6.5	mΩ
Forward Transconductance	g _{FS}	V _{DS} =5V, I _D =20A	-	50	-	S
Dynamic Characteristics (Note 4)						
Input Capacitance	C _{iss}	V _{DS} =15V, V _{GS} =0V, F=1.0MHz	-	1900	-	pF
Output Capacitance	C _{oss}		-	260	-	pF
Reverse Transfer Capacitance (Note 4)	C _{rss}		-	216	-	pF
Gate Resistance	R _g	V _{DS} =0V, V _{GS} =0V, F=1.0MHz	-	1.2	-	Ω
Switching Characteristics						
Turn-on Delay Time	t _{d(on)}	V _{DD} =15V, I _D =2A, R _L =1Ω, V _{GS} =10V, R _G =3Ω	-	20	-	nS
Turn-on Rise Time	t _r		-	16	-	nS
Turn-Off Delay Time	t _{d(off)}		-	45	-	nS
Turn-Off Fall Time	t _f		-	9	-	nS
Total Gate Charge	Q _g	V _{DS} =15V, I _D =10A, V _{GS} =10V	-	44	-	nC
Gate-Source Charge	Q _{gs}		-	5.4	-	nC
Gate-Drain Charge	Q _{gd}		-	8	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V _{SD}	V _{GS} =0V, I _S =1A	-	-	1.2	V
Diode Forward Current (Note 2)	I _S		-	-	90	A
Reverse Recovery Time	t _{rr}	I _F =10A, di/dt=100A/μs	-	40	-	nS
Reverse Recovery Charge	Q _{rr}		-	31	-	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 product.



PE039N03G Typical Electrical and Thermal Characteristics

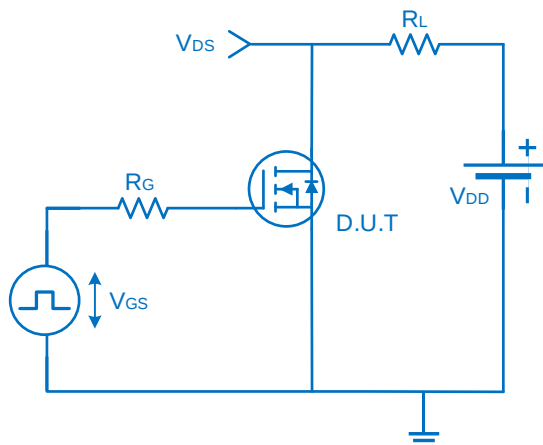


Figure 1 Switching Test Circuit

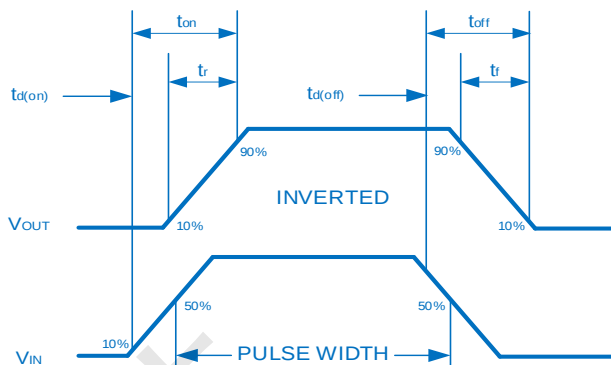


Figure 2 Switching Waveform

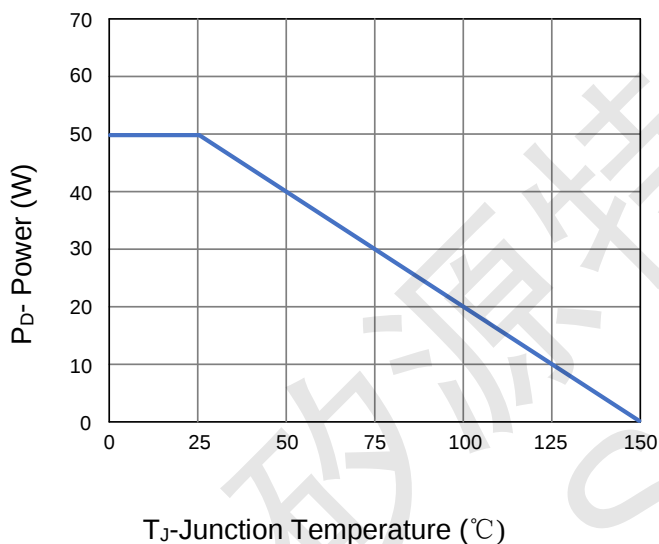


Figure 3 Power De-rating

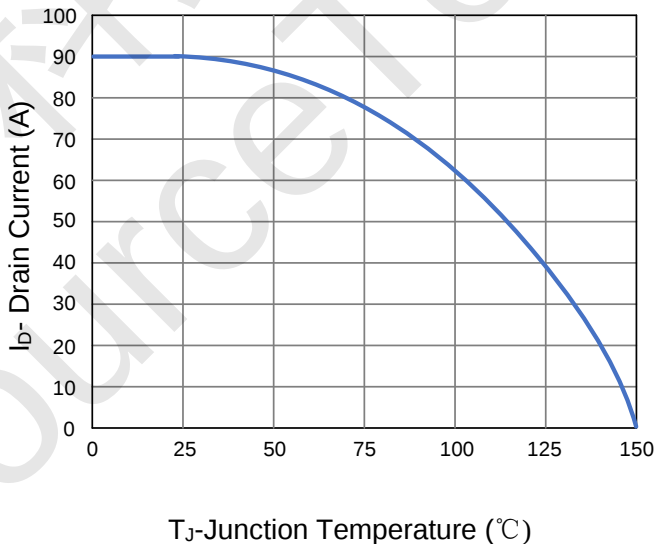


Figure 4 Drain Current

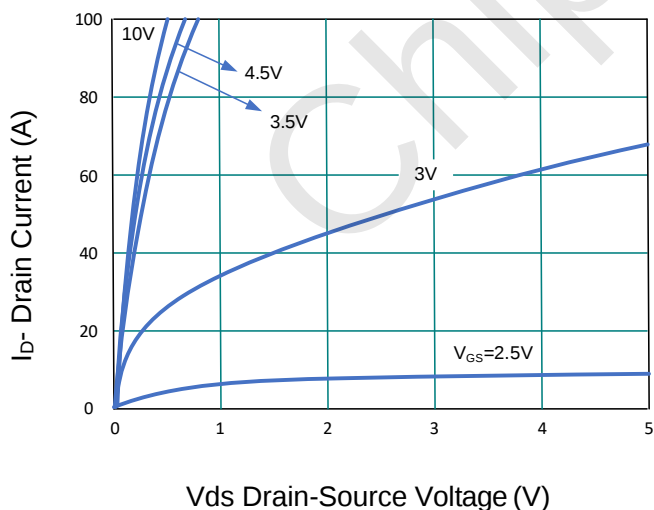


Figure 5 Output Characteristics

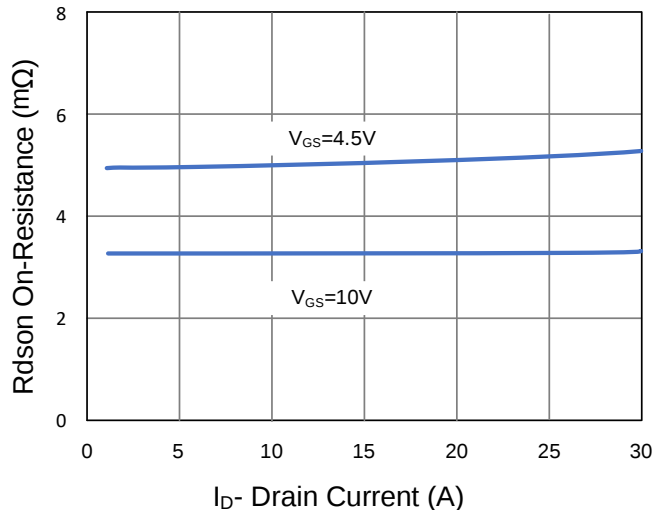


Figure 6 Rdson vs Drain Current

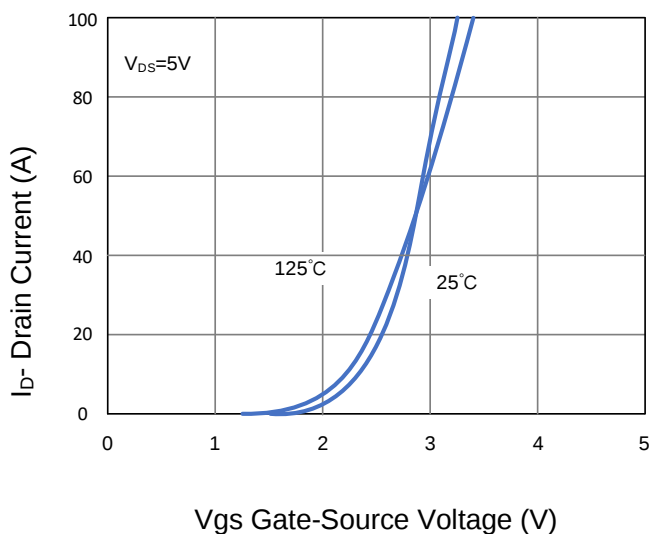


Figure 7 Transfer Characteristics

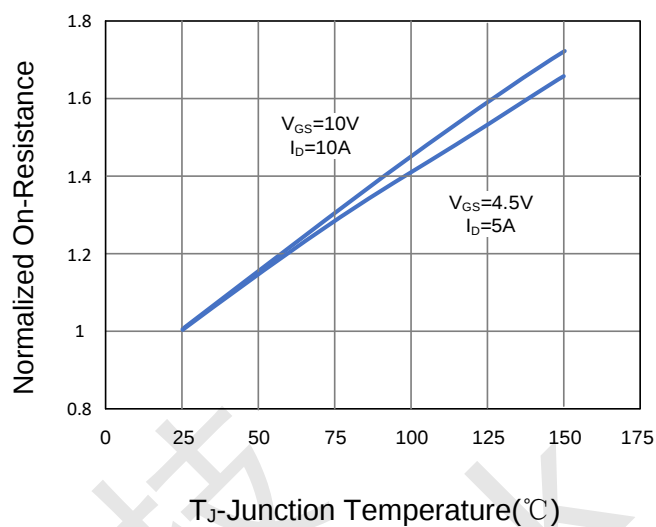


Figure 8 Rdson vs Junction Temperature

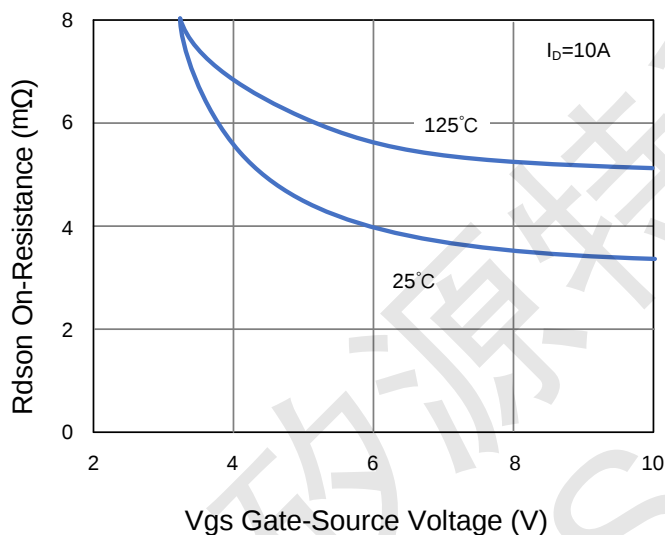


Figure 9 Rdson vs Vgs

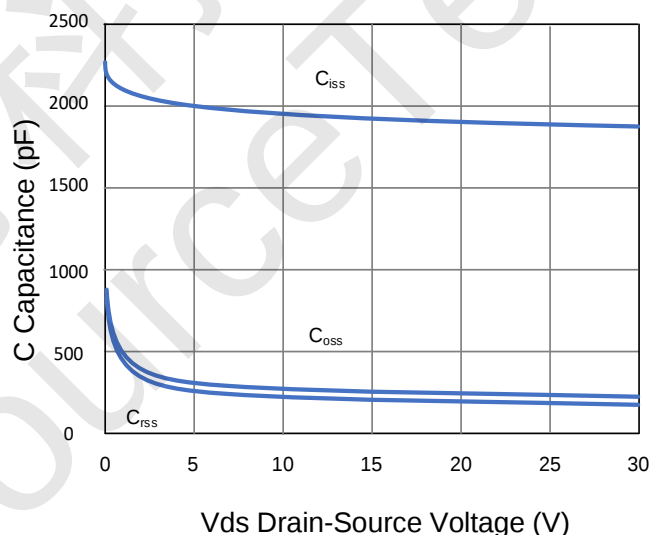


Figure 10 Capacitance vs Vds

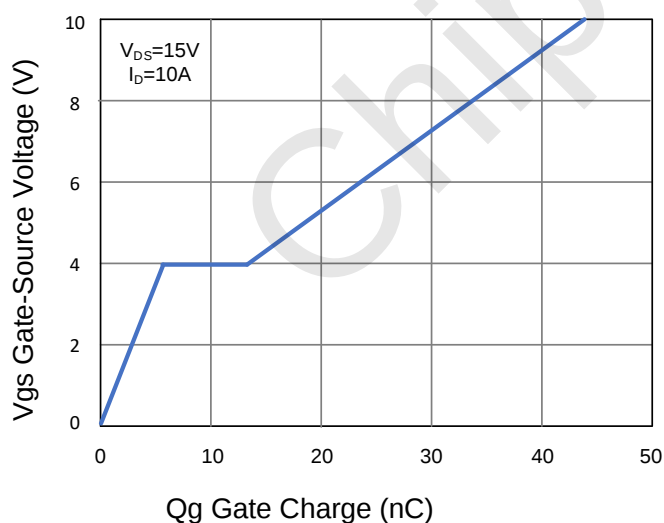


Figure 11 Gate Charge

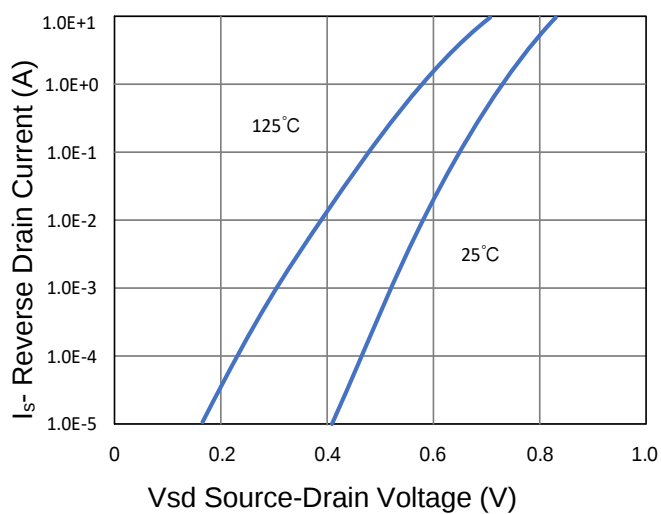


Figure 12 Source- Drain Diode Forward

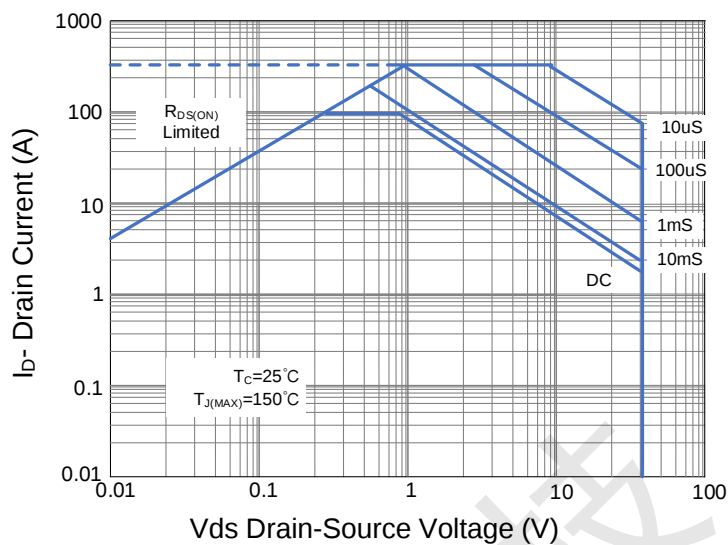


Figure 13 Safe Operation Area

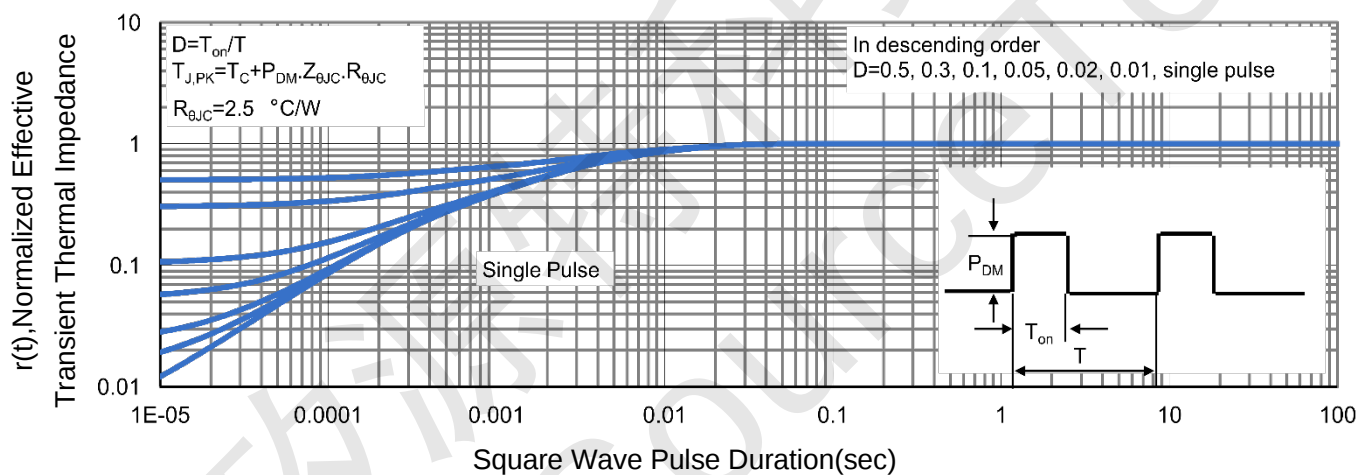
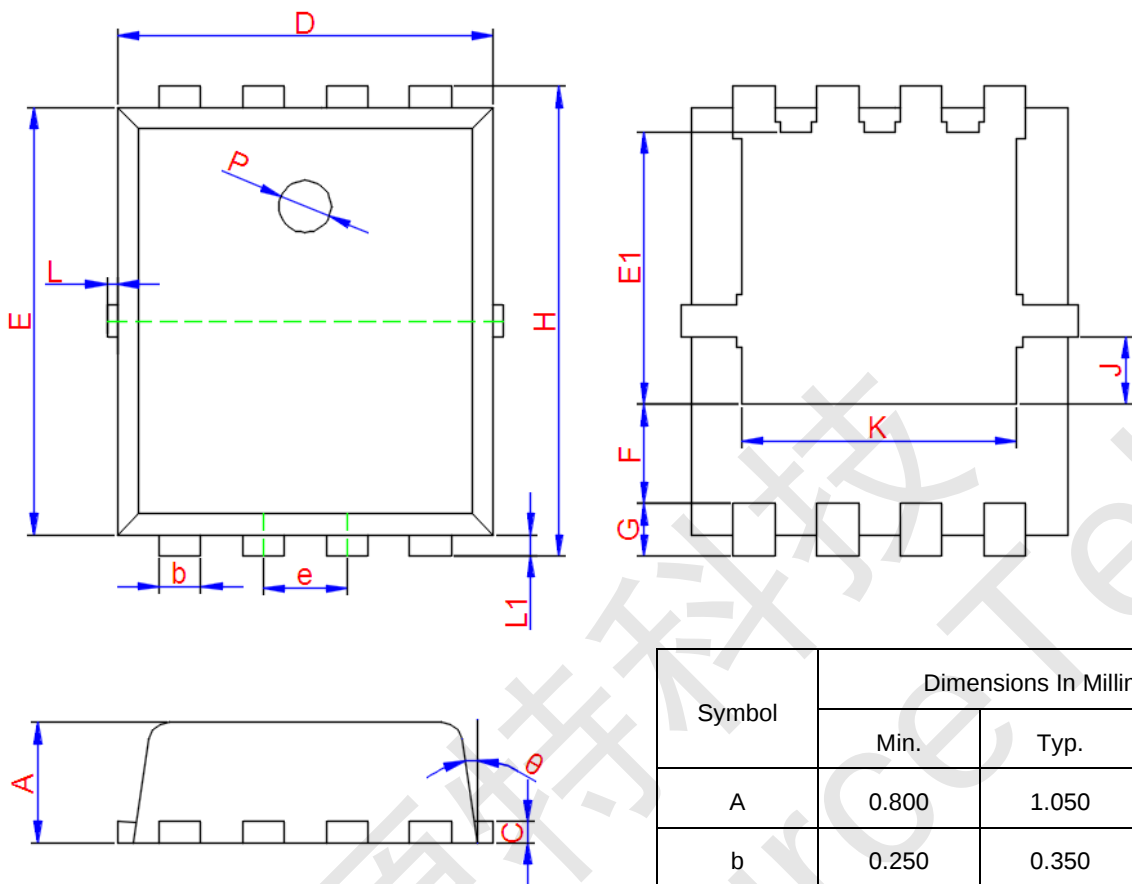


Figure 14 Normalized Maximum Transient Thermal Impedance



PE039N03G DFN5x6-8L Package Information



Symbol	Dimensions In Millimeters		
	Min.	Typ.	Max.
A	0.800	1.050	1.200
b	0.250	0.350	0.490
c	0.254TYP.		
D	4.800	5.000	5.100
e	1.270TYP.		
E	5.650	5.800	5.900
E1	3.400TYP.		
F	1.300TYP.		
G	0.600TYP.		
H	5.950	6.080	6.200
J	0.950TYP.		
K	4.000TYP		
L	-	-	0.150
L1	0.100	0.140	0.180
P	1.180TYP.		
θ	6°	10°	14°