

N-Channel Enhancement Mode Power MOSFET

Description

The PES025N08R uses deep trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. It can be used in a wide variety of applications.

General Features

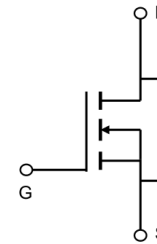
- $V_{DS} = 90V$, $I_D = 300A$

$$R_{DS(ON)} < 2.2m\Omega @ V_{GS}=10V$$

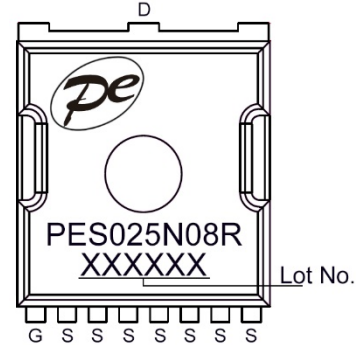
- High Power and current handling capability
- Lead free product is acquired
- Surface Mount Package

Application

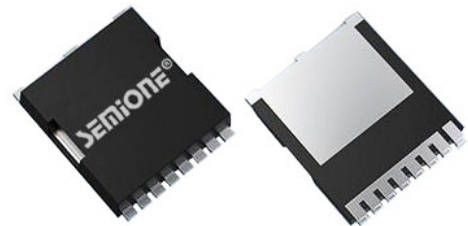
- Synchronous rectification
- Battery management
- UPS (Uninterruptible Power Supply)



Schematic diagram



Marking and pin assignment



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

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	90	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	300	A
Drain Current-Continuous ($T_C=100^\circ C$)	$I_D(T_C=100^\circ C)$	210	A
Pulsed Drain Current (Note 1)	I_{DM}	1200	A
Maximum Power Dissipation	P_D	326	W
Single Pulsed Avalanche Energy ($L=0.1mH$)	E_{AS}	845	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 175	$^\circ C$

Thermal Characteristic

Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.46	$^\circ C/W$
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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 =250μA	90	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =80V, 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	2.5	3.0	4	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =50A	-	1.9	2.2	mΩ
Forward Transconductance	g _{FS}	V _{DS} =5V, I _D =50A	-	90	-	S
Dynamic Characteristics (Note 4)						
Input Capacitance	C _{iss}	V _{DS} =40V, V _{GS} =0V, F=1.0MHz	-	7500	-	pF
Output Capacitance	C _{oss}		-	1300	-	pF
Reverse Transfer Capacitance (Note 4)	C _{rss}		-	40	-	pF
Gate Resistance	R _g	V _{DS} =0V, V _{GS} =0V, F=1.0MHz	-	1.5	-	Ω
Switching Characteristics						
Turn-on Delay Time	t _{d(on)}	V _{DS} =40V, I _D =10A, R _L =1Ω, V _{GS} =10V, R _G =3Ω	-	19	-	nS
Turn-on Rise Time	t _r		-	7	-	nS
Turn-Off Delay Time	t _{d(off)}		-	45	-	nS
Turn-Off Fall Time	t _f		-	12	-	nS
Total Gate Charge	Q _g	V _{DS} =40V, I _D =50A, V _{GS} =10V	-	130	-	nC
Gate-Source Charge	Q _{gs}		-	44	-	nC
Gate-Drain Charge	Q _{gd}		-	30	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V _{SD}	V _{GS} =0V, I _S =10A	-	-	1.2	V
Diode Forward Current (Note 2)	I _S		-	-	240	A
Reverse Recovery Time	t _{rr}	IF=80A, di/dt=100A/μs	-	86	-	nS
Reverse Recovery Charge	Q _{rr}		-	224	-	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.

Typical Electrical and Thermal Characteristics

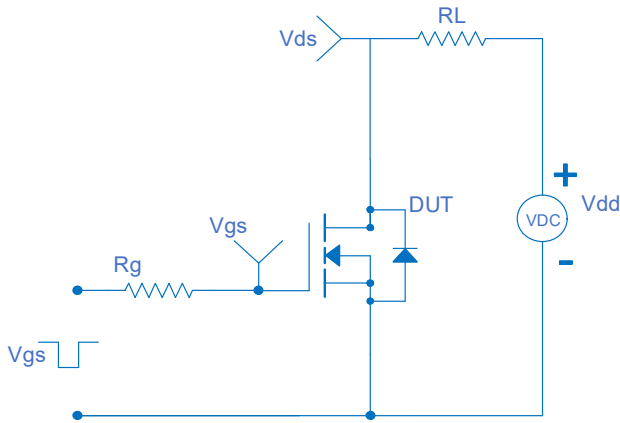


Figure 1 Switching Test Circuit

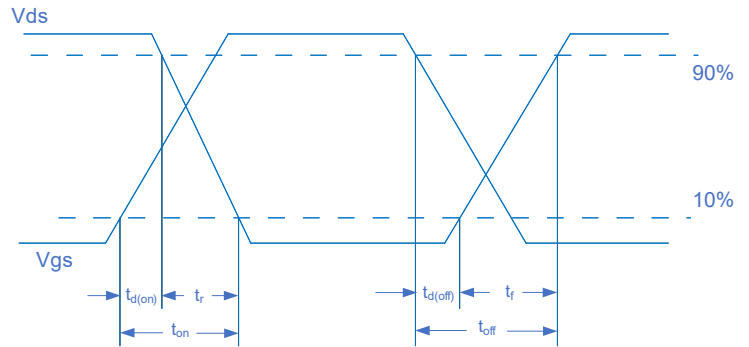


Figure 2 Switching Waveform

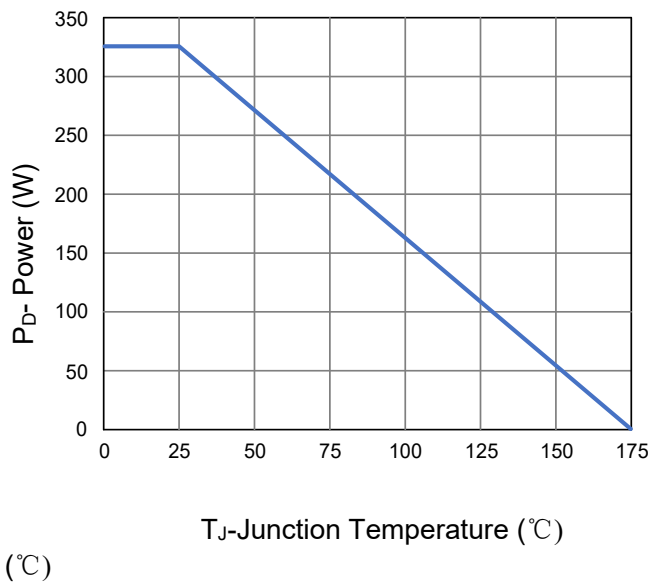


Figure 3 Power De-rating

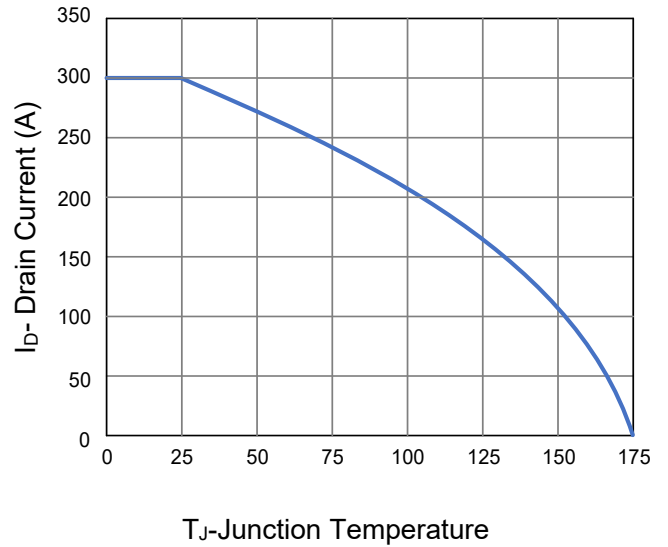


Figure 4 Drain Current

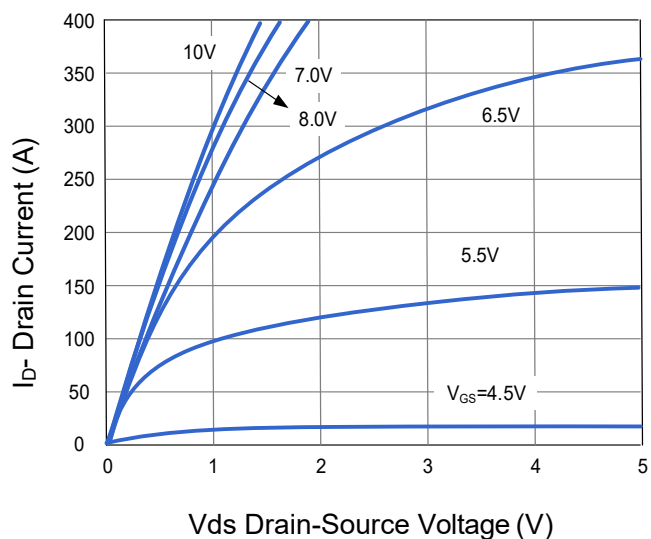


Figure 5 Output Characteristics

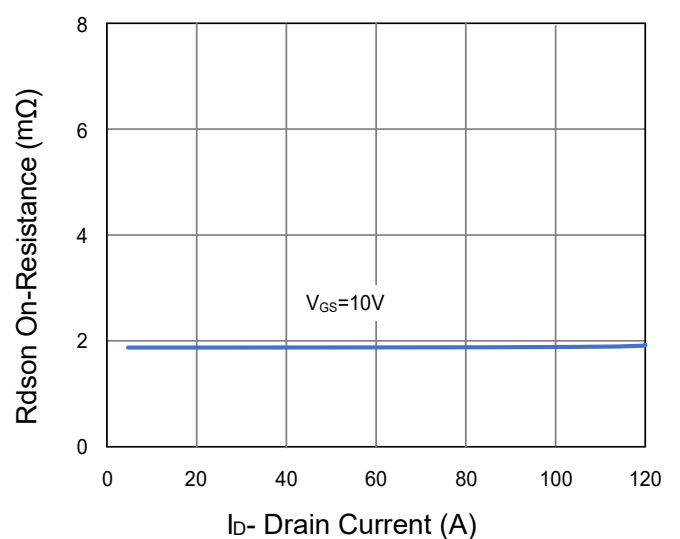


Figure 6 Rdson vs Drain Current

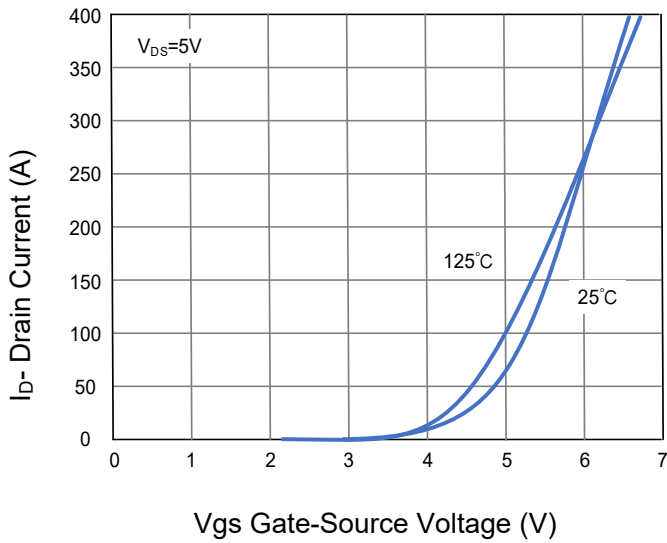


Figure 7 Transfer Characteristics

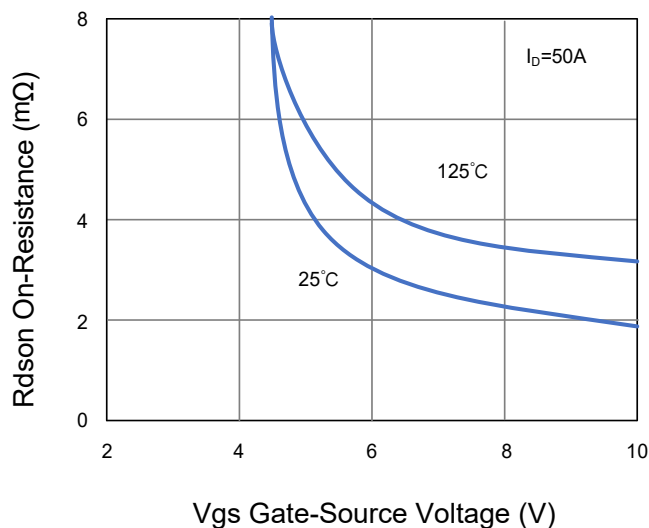


Figure 9 $R_{DS(on)}$ vs V_{GS}

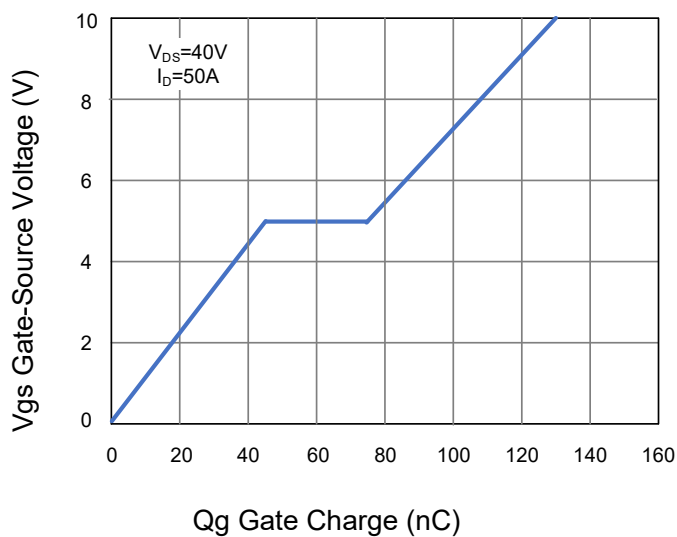


Figure 11 Gate Charge

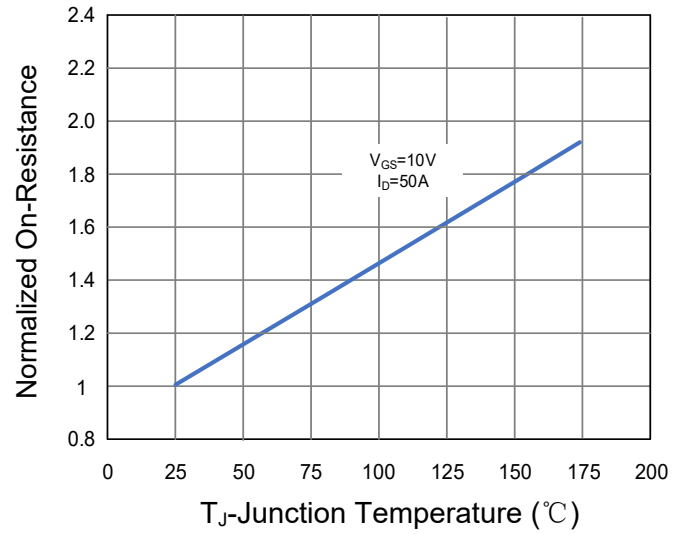


Figure 8 $R_{DS(on)}$ vs Junction Temperature

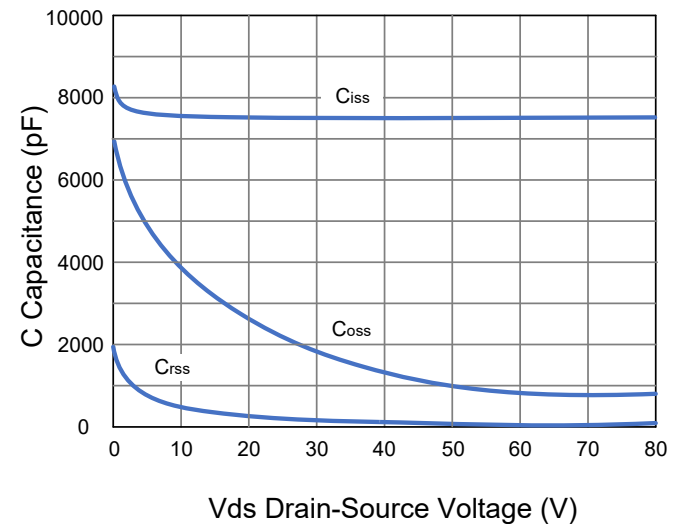


Figure 10 Capacitance vs V_{DS}

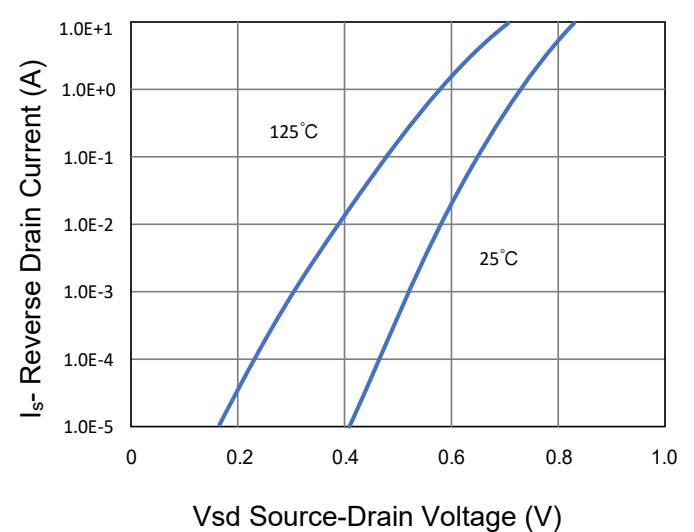


Figure 12 Source- Drain Diode Forward

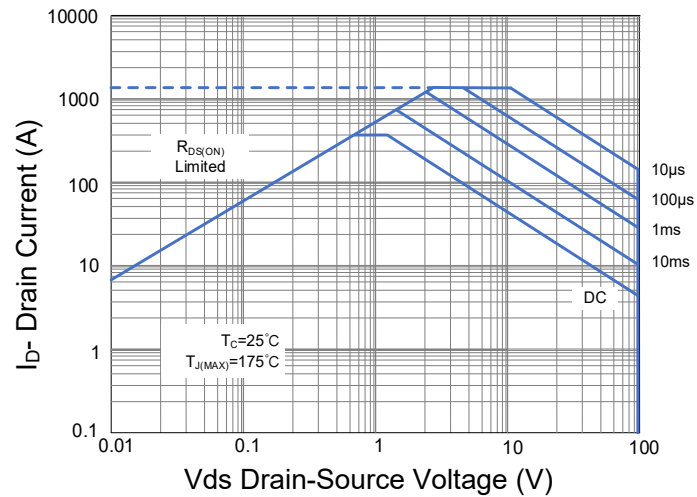


Figure 13 Safe Operation Area

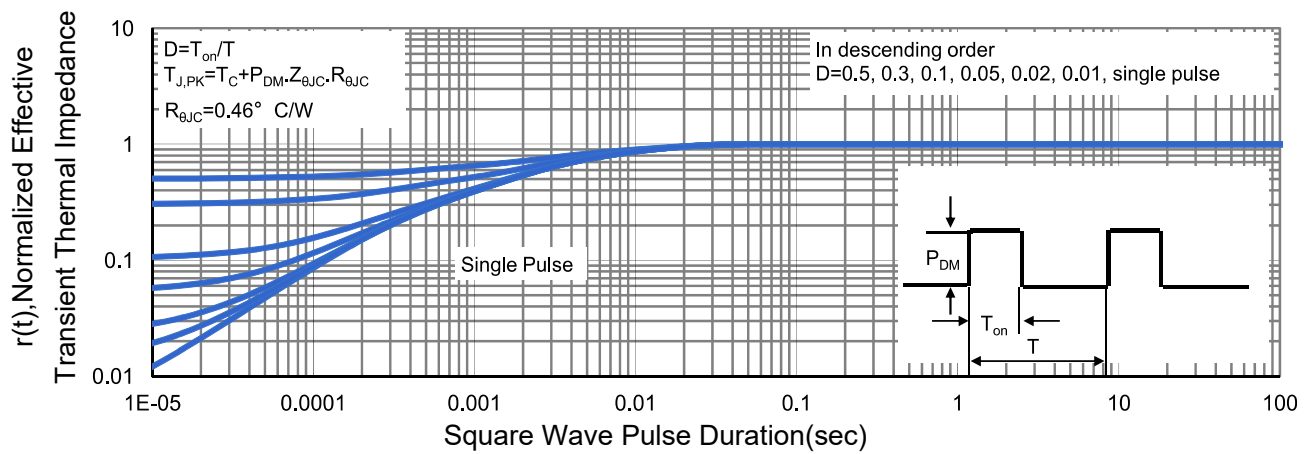
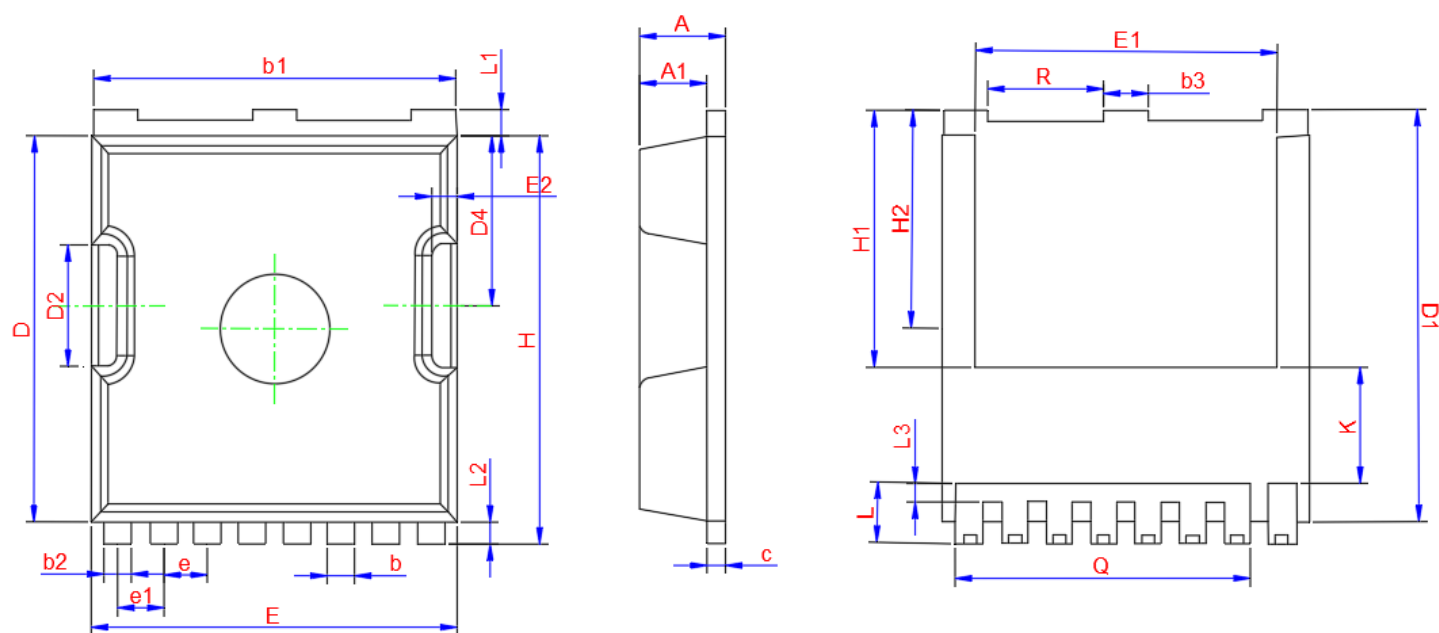


Figure 14 Normalized Maximum Transient Thermal Impedance

TOLL Package Information



Symbol	Dimensions In Millimeters			Symbol	Dimensions In Millimeters		
	Min.	Typ.	Max.		Min.	Typ.	Max.
A	2.200	2.300	2.400	E2	0.500	0.600	0.700
A1	1.700	1.800	1.900	e	1.200 BSC		
b	0.600	0.700	0.800	e1	1.225 BSC		
b1	9.650	9.800	9.950	H	11.550	11.700	11.850
b2	0.650	0.750	0.850	H1	6.950 BSC		
b3	1.100	1.200	1.300	H2	5.900 BSC		
c	0.400	0.500	0.600	K	3.100 REF.		
D	10.250	10.400	10.550	L	1.550	1.650	1.850
D1	11.000	11.100	11.200	L1	0.550	0.700	0.850
D2	2.850	3.200	3.400	L2	0.450	0.600	0.750
D4	4.470	4.570	4.670	L3	0.400	0.500	0.600
E	9.750	9.900	10.050	Q	7.950 REF.		
E1	8.000	8.100	8.200	R	2.950	3.100	3.250