

N-Channel Enhancement Mode MOSFET

TDM3736

DESCRIPTION

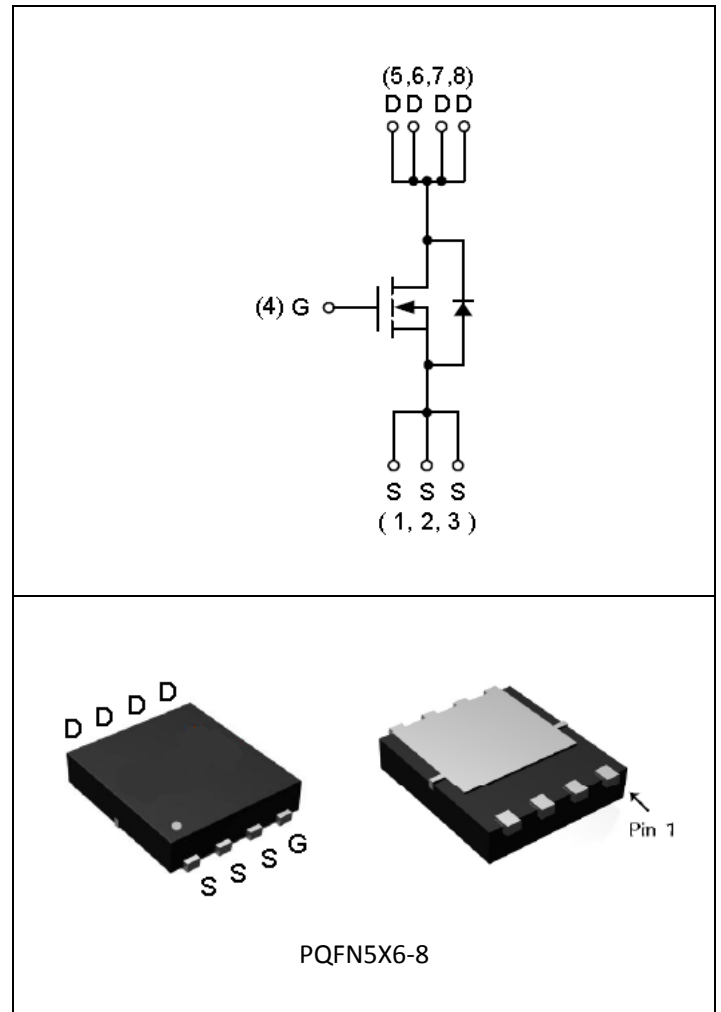
The TDM3736 uses advanced trench technology to provide excellent RDS(ON) and low gate charge. This device is suitable for use as a load switch or in PWM applications.

GENERAL FEATURES

- 100V/112A
RDS(ON) < 4.2mΩ @ VGS=10V
- High Power and current handling capability
- Lead free product is available
- Surface Mount Package

Application

- DC-DC Conversion
- Hard Switching and High Speed Circuit
- Power Tools
- UPS
- SSR



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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V _{DS}	100	V
Gate-Source Voltage	V _{GS}	±20	V
Drain Current @ Continuous(Note 1)	I _D (T _C =25°C)	112	A
	I _D (T _C =100°C)	71	A
Drain Current @ Current-Pulsed (Note 1)	I _{DM} (T _C =25°C)	400	A
Maximum Power Dissipation	P _D (T _C =25°C)	104	W
Avalanche Energy, Single Pulse	E _{AS} (L=0.1mH,T _C =25°C)	180	mJ
Operating Junction and Storage Temperature Range	T _J ,T _{STG}	-55 To 150	°C

THERMAL CHARACTERISTICS

Thermal Resistance,Junction-to-Ambient (Note 2)	R _{θJA}	50	°C/W
Thermal Resistance,Junction-to-Case	R _{θJC}	1.2	°C/W

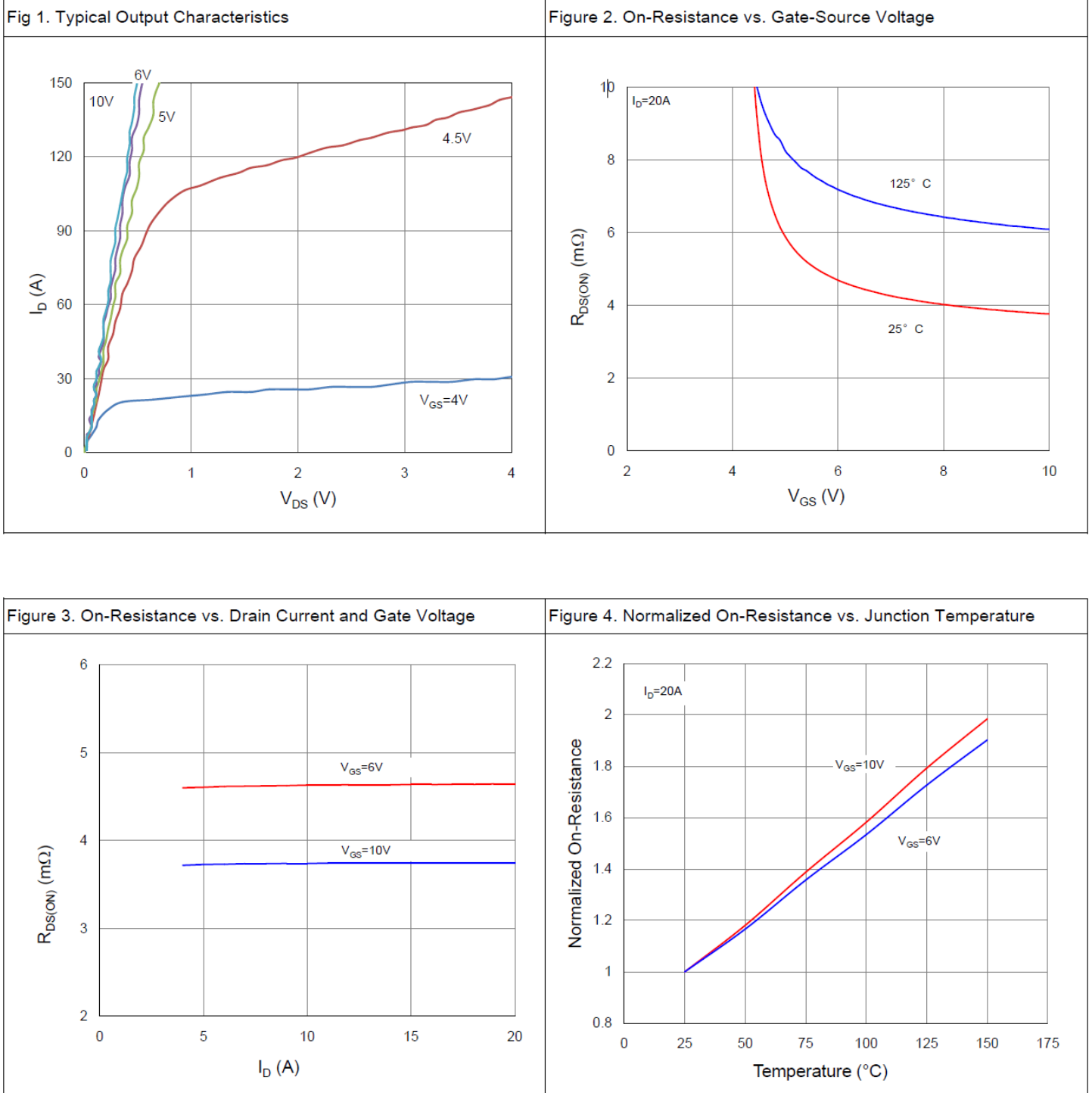
ELECTRICAL CHARACTERISTICS ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
STATIC CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	100	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=90V, V_{GS}=0V, T_j=25^{\circ}\text{C}$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2	3	4	V
Drain-Source On Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=20A$	-	3.7	4.2	$m\Omega$
Gate Resistance	R_G	$V_{DS}=0V, V_{GS}=0V, F=1.0\text{MHz}$	-	2.1	-	Ω
DYNAMIC CHARACTERISTICS (Note4)						
Input Capacitance	C_{iss}	$V_{DS}=50V, V_{GS}=0V, F=1.0\text{MHz}$	-	4110	-	PF
Output Capacitance	C_{oss}		-	1066	-	PF
Reverse Transfer Capacitance	C_{rss}		-	13	-	PF
Turn-on Delay Time	$t_{d(on)}$	$V_{DS}=50V, V_{GS}=10V, R_G=10\Omega$ $I_D=20A$	-	14	-	nS
Turn-on Rise Time	t_r		-	10	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	50	-	nS
Turn-Off Fall Time	t_f		-	15	-	nS
Total Gate Charge	Q_g	$V_{DS}=50V, I_D=20A, V_{GS}=10V$	-	52	-	nC
Gate-Source Charge	Q_{gs}		-	16	-	nC
Gate-Drain Charge	Q_{gd}		-	11	-	nC
Body Diode Reverse Recovery Time	T_{rr}	$I_F=20A, di/dt=500A/\mu s$	-	70	-	nS
Body Diode Reverse Recovery Charge	Q_{rr}		-	315	-	nC
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode Forward Voltage (Note 3)	V_{SD}	$V_{GS}=0V, I_S=20A$	-	0.9	1.2	V

NOTES:

1. I_{Dmax} . current limited by package.
2. Surface Mounted on 1in2 FR4 Board, $t \leq 999$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production testing.

Typical Operating Characteristics



Typical Operating Characteristics(Cont.)

Figure 5. Typical Transfer Characteristics

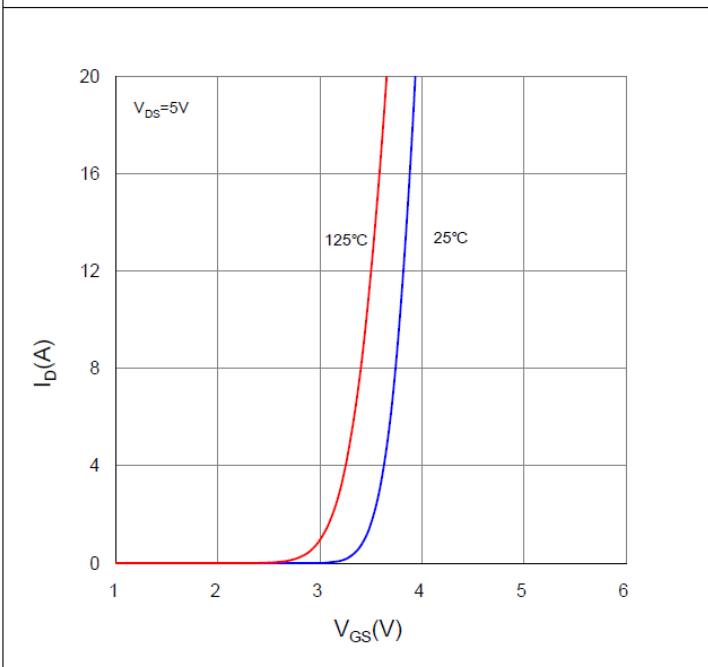


Figure 6. Typical Source-Drain Diode Forward Voltage

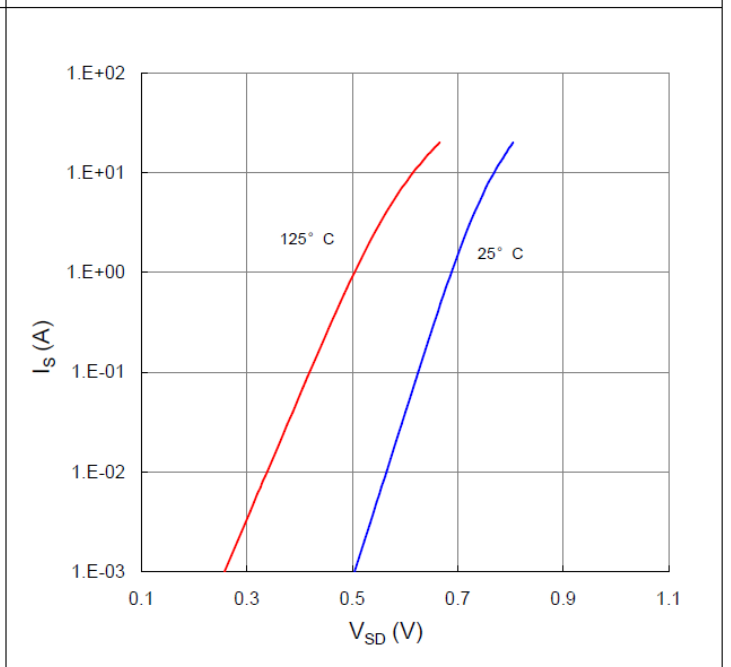


Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage

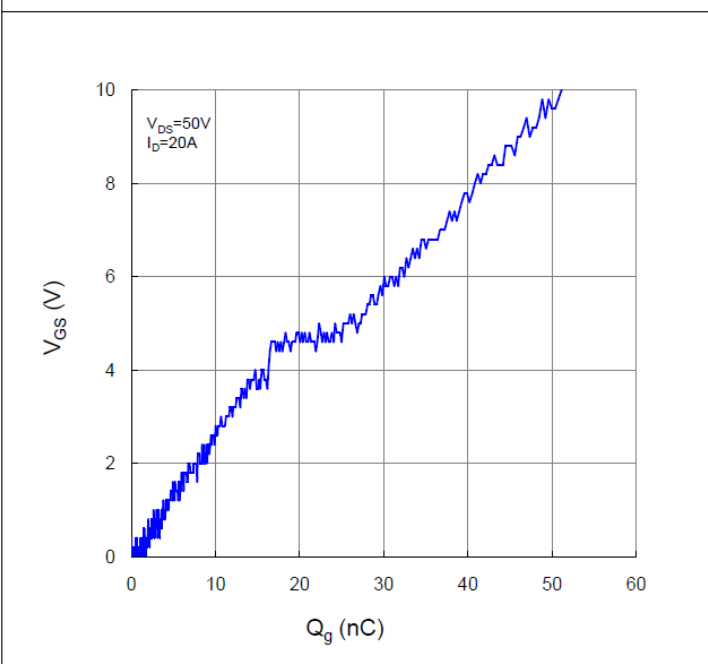
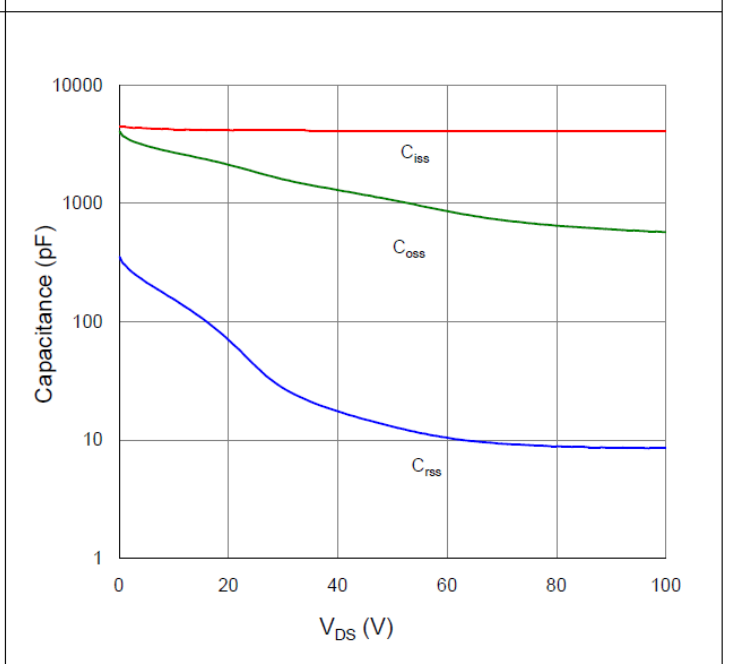


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage



Typical Operating Characteristics (Cont.)

Figure 9. Maximum Safe Operating Area

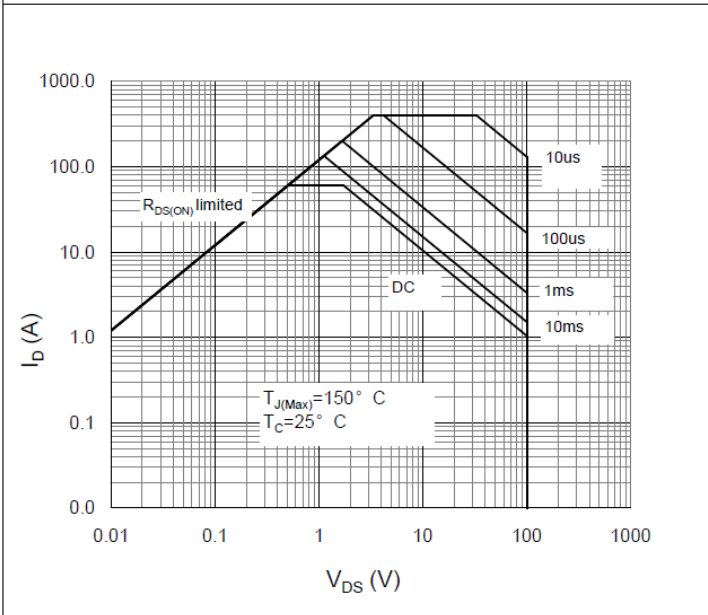


Figure 10. Maximum Drain Current vs. Case Temperature

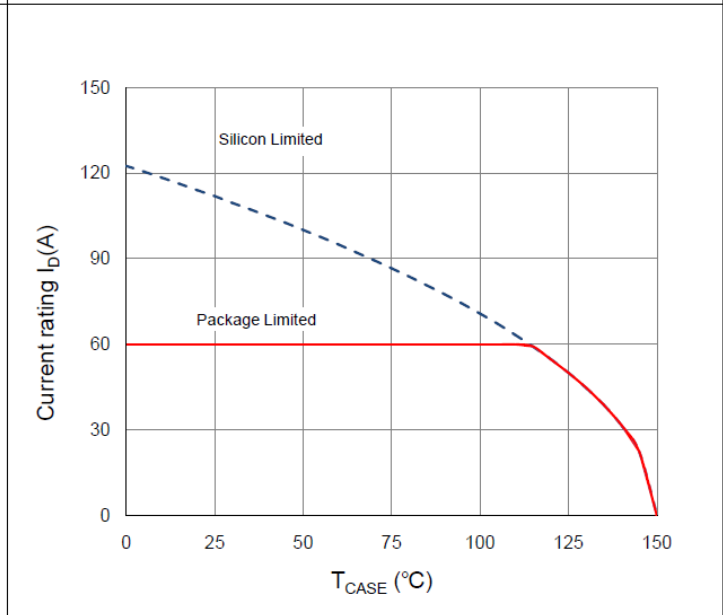
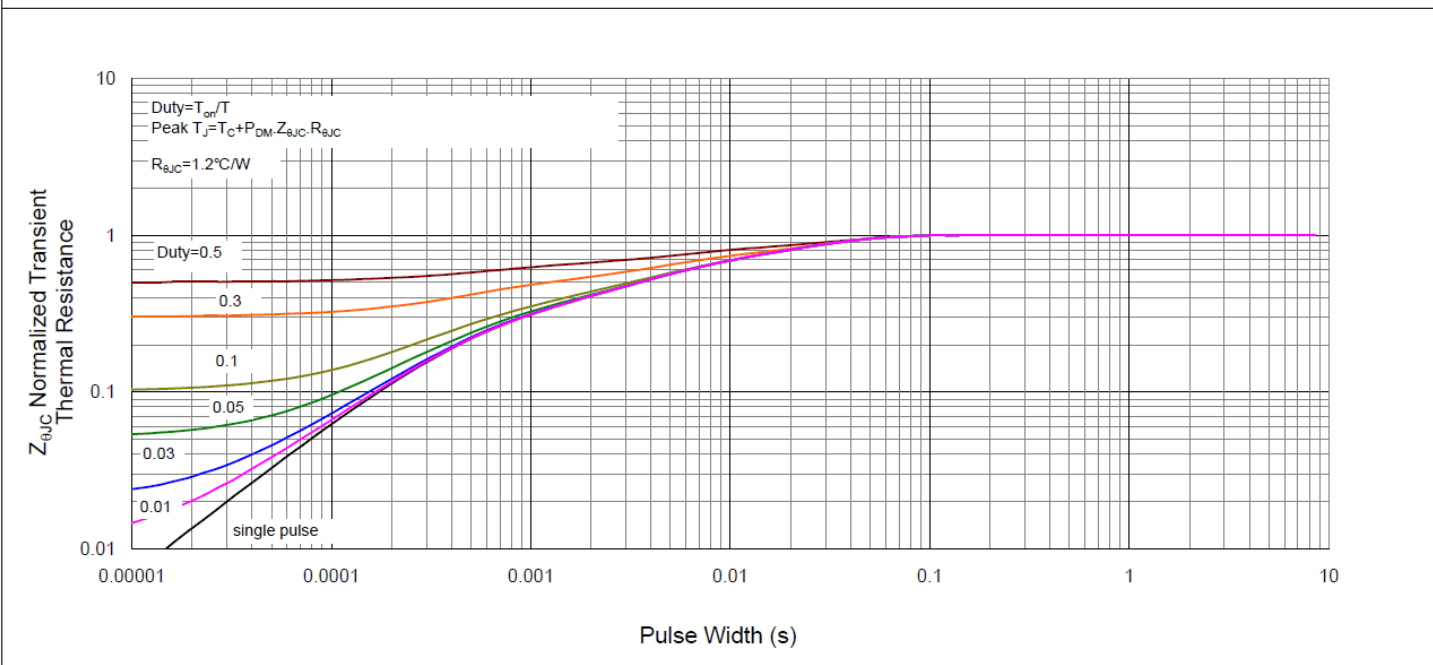
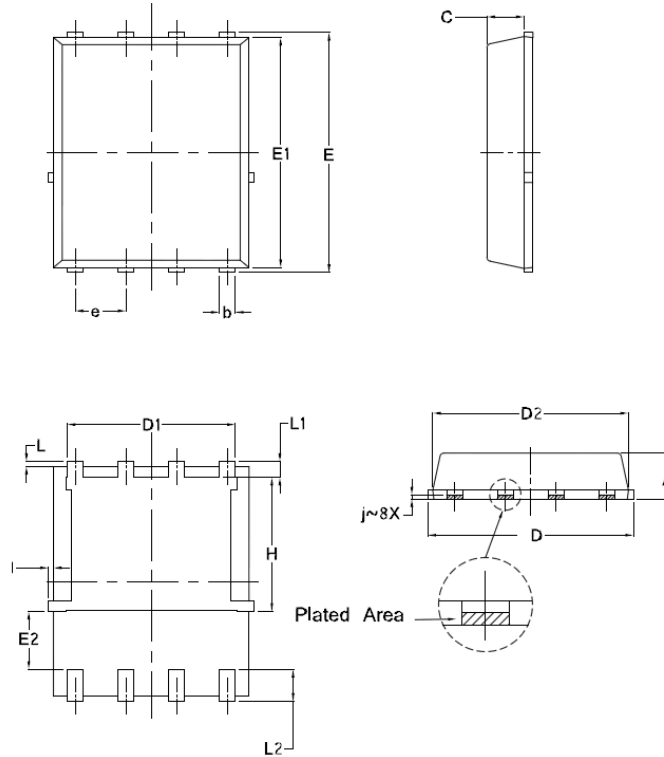


Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Case



Package Information

PQFN5X6-8 Package



SYMBOL	COMMON			
	MM		INCH	
	MIN.	MAX.	MIN.	MAX.
A	0.90	1.20	0.035	0.047
b	0.30	0.51	0.012	0.020
C	0.8	1.0	0.031	0.039
D	4.90	5.20	0.192	0.205
D1	4.0	4.4	0.157	0.173
D2	4.7	5.1	0.185	0.201
E	5.9	6.2	0.232	0.244
E1	5.6	5.9	0.220	0.232
E2	1.4	1.65	0.055	0.065
e	1.27BSC		0.050BSC	
L	0.05	0.30	0.002	0.012
L1	0.35	0.55	0.0137	0.0217
L2	0.65	0.90	0.0255	0.0354
H	3.20	3.50	0.1260	0.1378
I	0	0.18	0	0.0071
j	0.1015BSC		0.0040BSC	

Design Notes