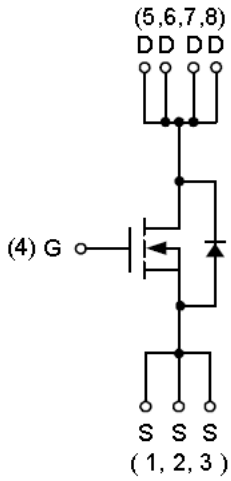
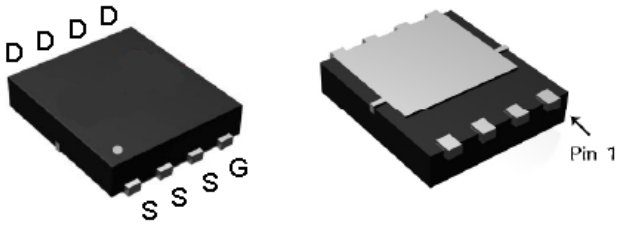
N-Channel Enhancement Mode MOSFET TDM3736

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.





PQFN5X6-8

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(T_A=25℃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℃）	112	A
	I_D（T_C=100℃）	71	A
Drain Current @ Current-Pulsed (Note 1)	I_{DM}（T_C=25℃）	400	A
Maximum Power Dissipation	P_D（T_C=25℃）	104	W
Avalanche Energy, Single Pulse	E_{AS}(L=0.1mH,T_C=25℃)	180	mJ
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

THERMAL CHARACTERISTICS

Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	50	℃/W
Thermal Resistance,Junction-to-Case	$R_{\theta JC}$	1.2	℃/W

ELECTRICAL CHARACTERISTICS (T_A=25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
STATIC CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	100	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=90V,V_{GS}=0V,Tj=25℃	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=VGS,I_D=250μA	2	3	4	V
Drain-Source On Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=20A	-	3.7	4.2	mΩ
Gate Resistance	R_G	V_{DS}=0V,V_{GS}=0V, F=1.0MHz	-	2.1	-	Ω
DYNAMIC CHARACTERISTICS (Note4)						
Input Capacitance	C_{iss}	V_{DS}=50V,V_{GS}=0V, F=1.0MHz	-	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=10Ω	-	14	-	nS
Turn-on Rise Time	t_r	ID=20A	-	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/μs	-	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. IDmax. current limited by package.
2. Surface Mounted on 1in2 FR4 Board, t ≤ 999 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production testing.

Typical Operating Characteristics

Fig 1. Typical Output Characteristics

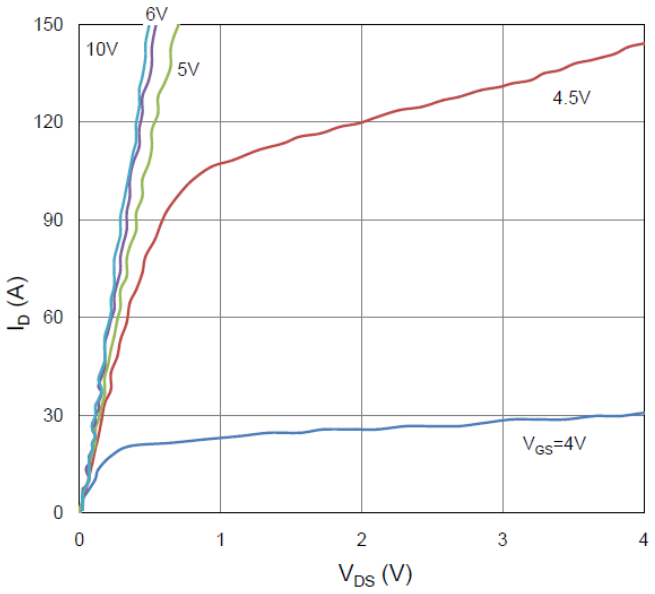


Figure 2. On-Resistance vs. Gate-Source Voltage

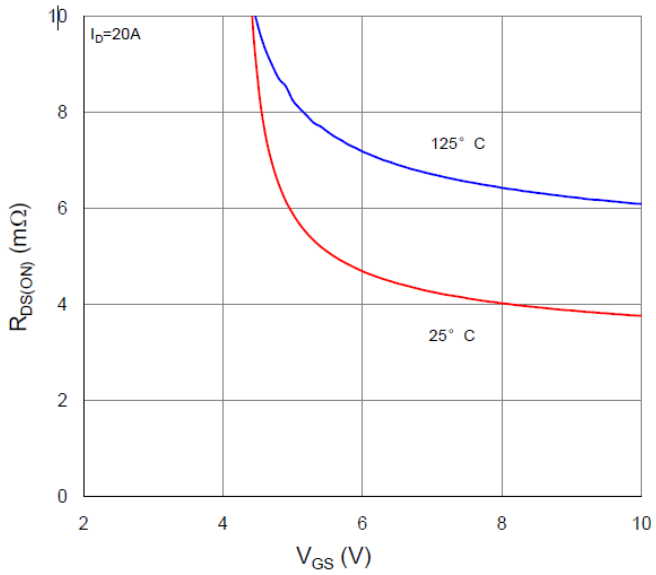


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

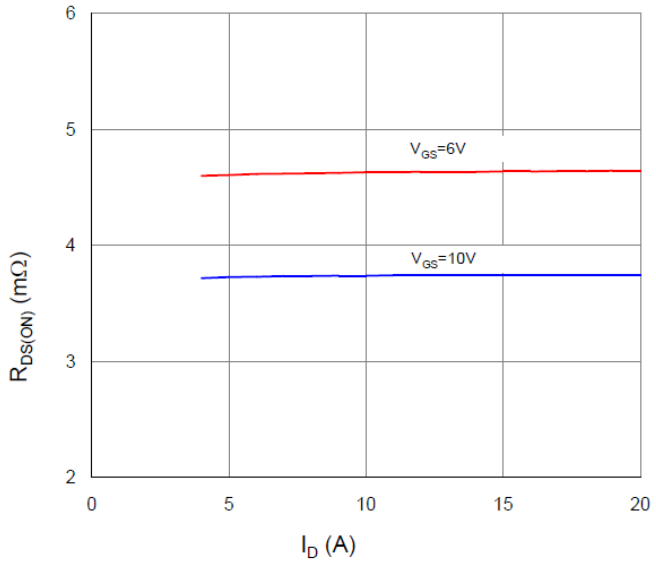
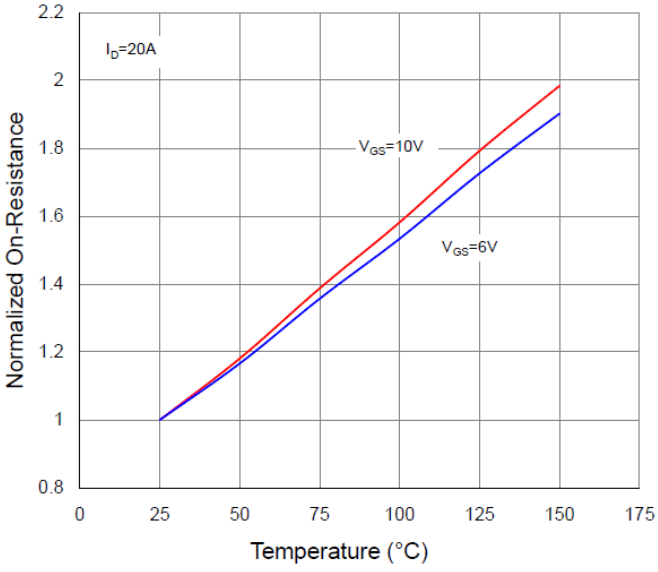


Figure 4. Normalized On-Resistance vs. Junction Temperature



Typical Operating Characteristics(Cont.)

Figure 5. Typical Transfer Characteristics

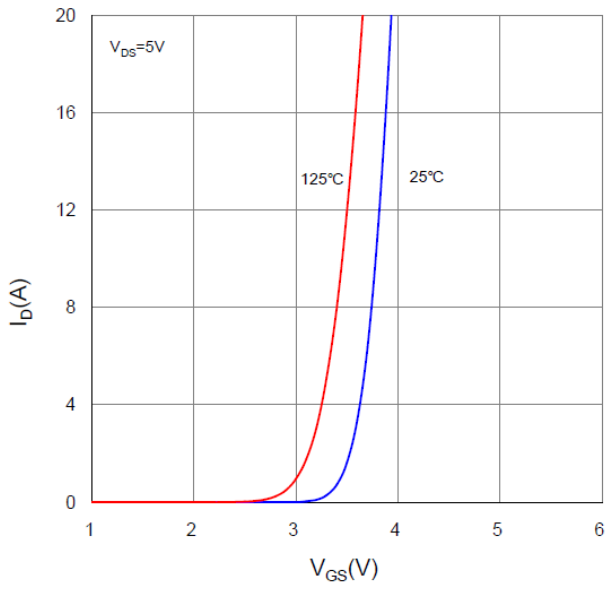


Figure 6. Typical Source-Drain Diode Forward Voltage

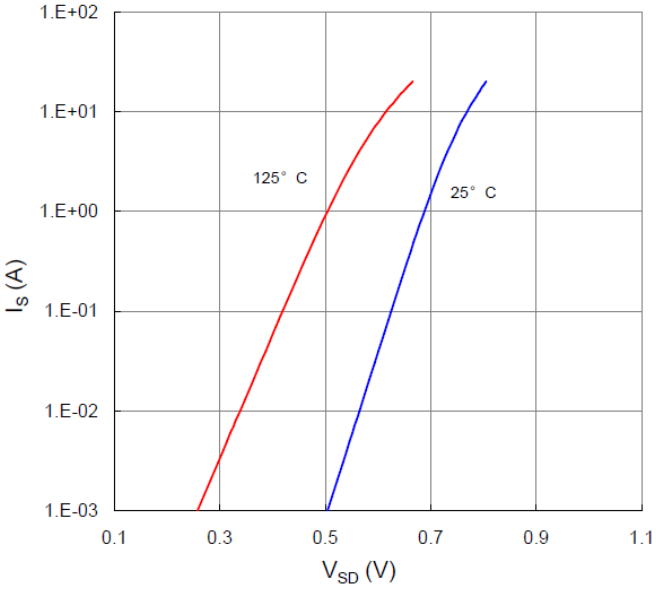


Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage

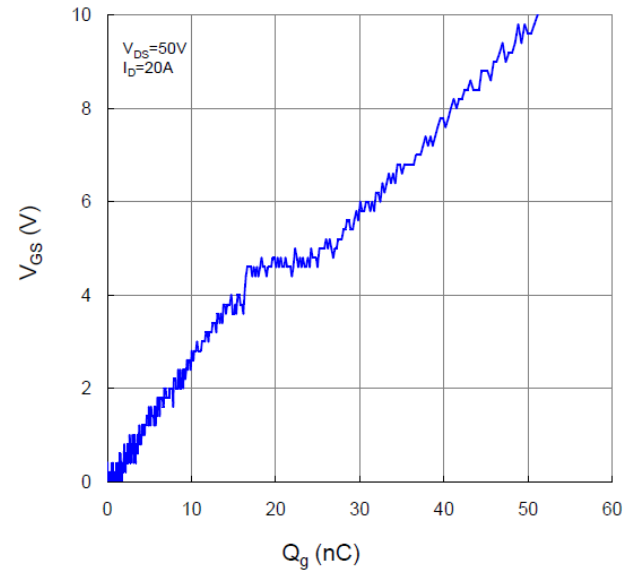
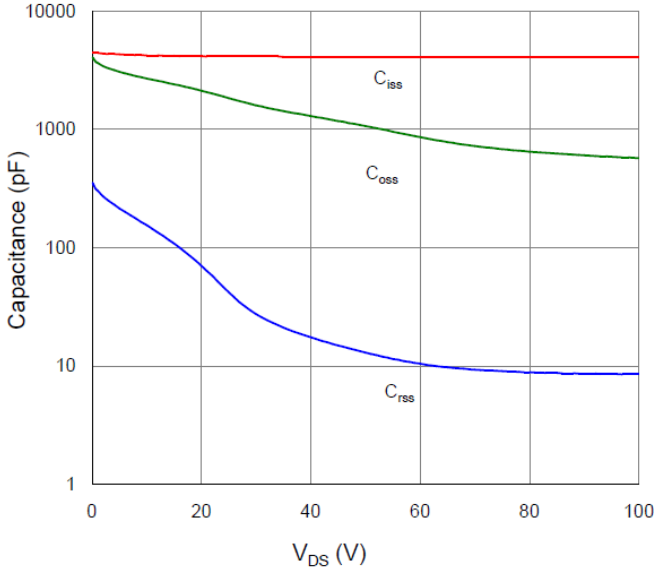


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage



Typical Operating Characteristics (Cont.)

Figure 9. Maximum Safe Operating Area

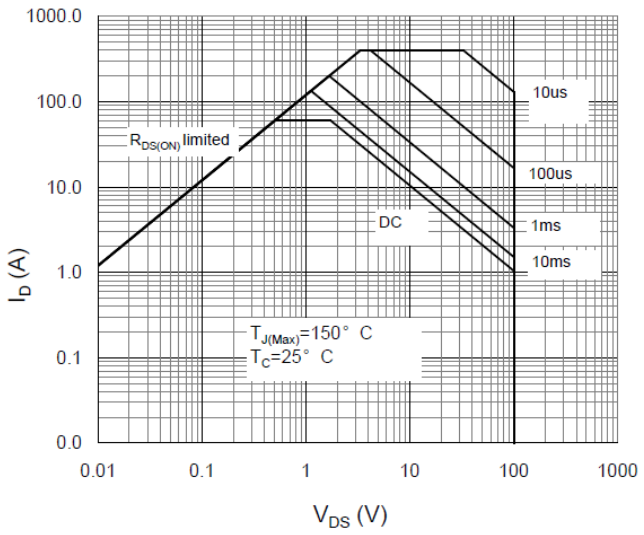


Figure 10. Maximun Drain Current vs. Case Temperature

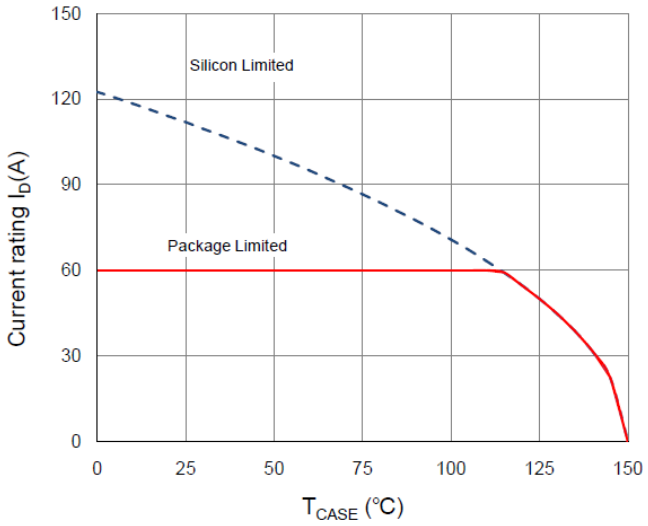
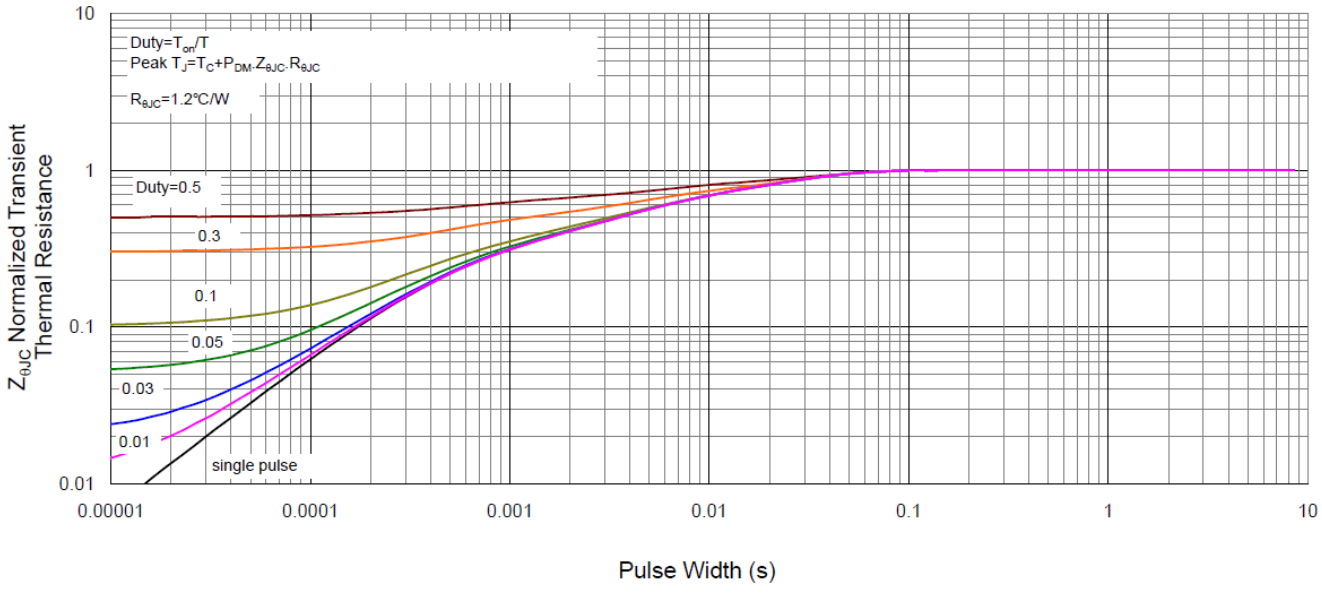
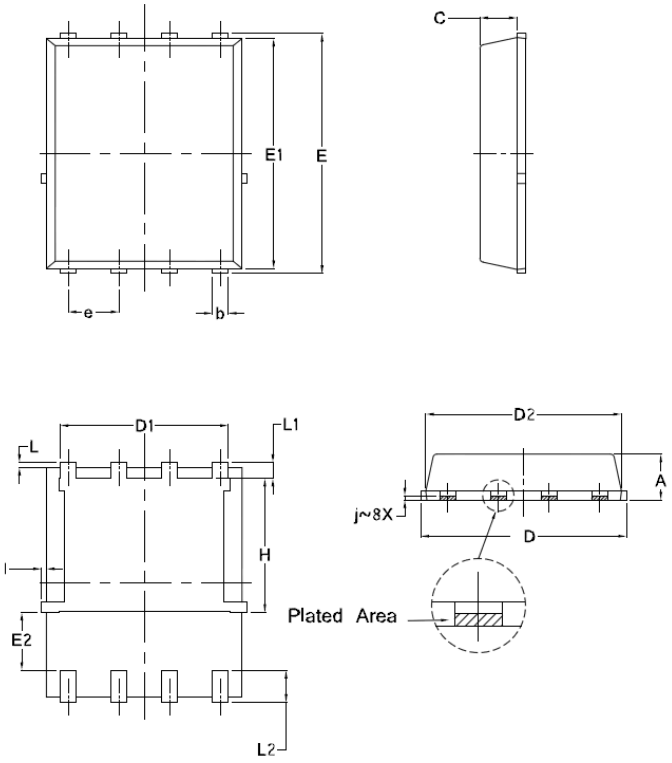


Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Case



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

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