N-Channel Enhancement Mode MOSFET TDM3750

DESCRIPTION

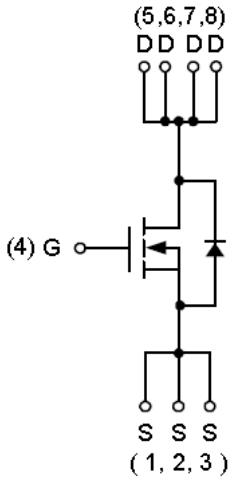
The TDM3750 uses advanced trench technology to provide excellent RDS(ON) and low gate charge. This device is suitable for use as a load switch or in PWM applications.

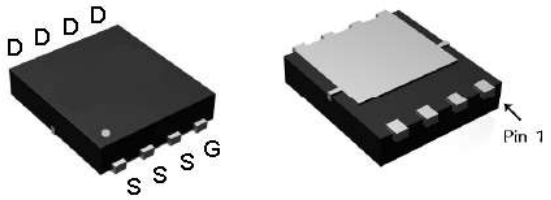
GENERAL FEATURES

- RDS(ON) < 7mΩ @ VGS=10V
  RDS(ON) < 10mΩ @ VGS=4.5V
- High Power and current handling capability
- Lead free product is available
- Surface Mount Package

Application

- Synchronous Rectification in SMPS
- Hard Switching and High Speed Circuit
- DC/DC in Telecoms and Inductrial





DFN5x6-8

ABSOLUTE MAXIMUM RATINGS(T_A=25℃unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	120	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current @ Current-Pulsed	I_{DM}	320	A
Drain Current @ Continuous(Silicon Limited)	I_D（T_C=25℃）	99	A
	I_D（T_C=100℃）	63	A
Drain Current @ Continuous(Package limited)	I_D（T_C=25℃）	60	A
Maximum Power Dissipation	P_D（T_C=25℃）	125	W
Avalanche Energy, Single Pulse	E_{AS}(L=0.5mH)	484	mJ
Maximum Operating Junction Temperature	T_J	150	℃
Storage Temperature Range	T_{STG}	-55 To 150	℃

THERMAL CHARACTERISTICS

Thermal Resistance,Junction-to-Ambient (Note 1)	$R_{\theta JA}$	50	℃/W
Thermal Resistance,Junction-to-Case	$R_{\theta JC}$	1	℃/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	120	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=120V,V_{GS}=0V, T_j=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	1.4	2	2.4	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=20A	-	5.8	7	mΩ
		V_{GS}=4.5V, I_D=20A	-	7.5	10	mΩ
Gate Resistance	RG	V_{GS}=0V,V_{DS} Open, F=1.0MHz	-	2.6	-	Ω
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=60V,V_{GS}=0V, F=1.0MHz	-	3510	-	PF
Output Capacitance	C_{oss}		-	380	-	PF
Reverse Transfer Capacitance	C_{rss}		-	6.5	-	PF
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=60V, I_D=20A, V_{GS}=10V,R_G=10Ω	-	15	-	nS
Turn-on Rise Time	t_r		-	8	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	30	-	nS
Turn-Off Fall Time	t_f		-	9	-	nS
Total Gate Charge	Q_g(10V)	V_{DD}=60V,I_D=20A,V_{GS}=10V()	-	45	-	nC
Total Gate Charge	Q_g(4.5V)		-	20	-	nC
Gate-Source Charge	Q_{gs}		-	8	-	nC
Gate-Drain Charge	Q_{gd}		-	6	-	nC
Reverse Diode Characteristics						
Diode Forward Voltage	V_{SD}	V_{GS}=0V,I_S=20A	-	0.9	1.2	V
Reverse Recovery Time	T_{rr}	I_F=20A, dI/dt=500A/μs	-	45	-	nS
Body Diode Reverse Recovery Charge	Q_{rr}		-	270	-	nC

Typical Operating Characteristics

Fig 1. Typical Output Characteristics

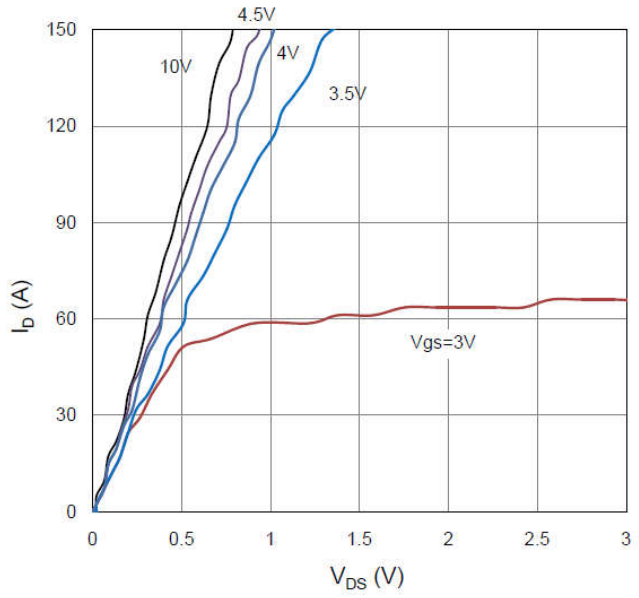


Figure 2. On-Resistance vs. Gate-Source Voltage

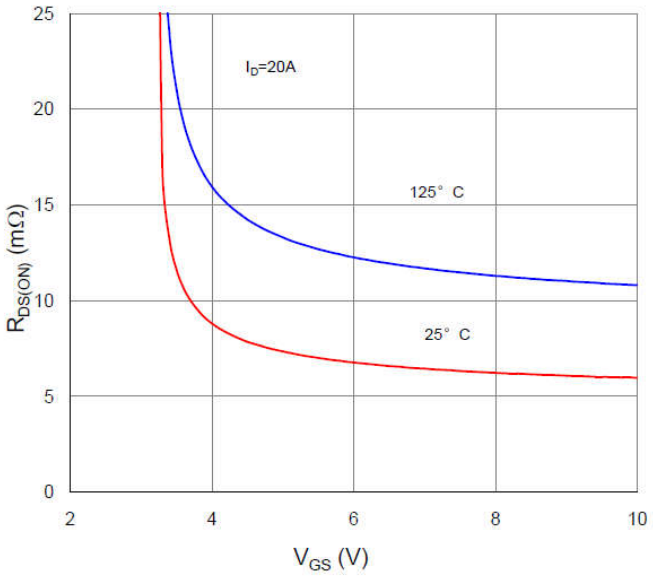


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

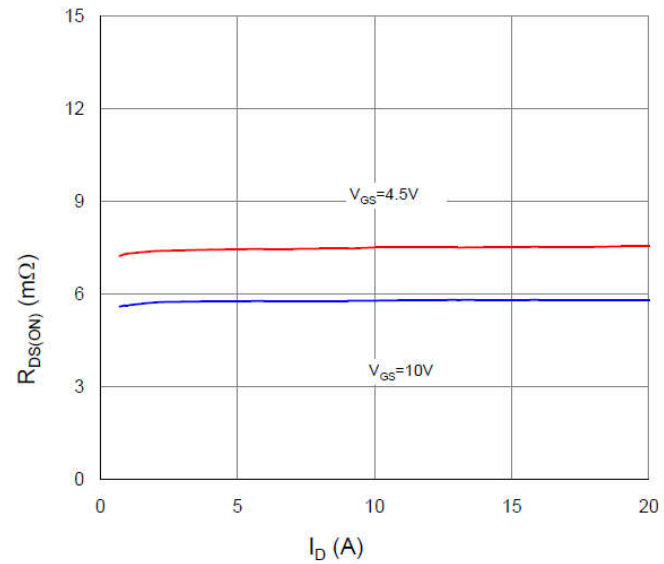
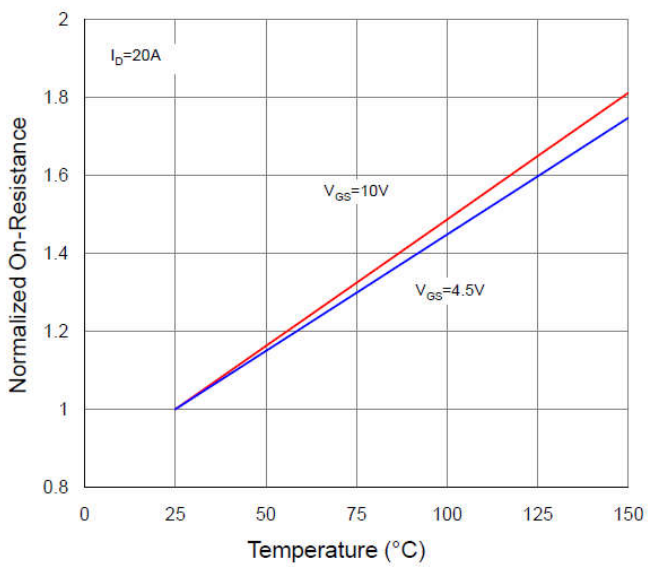


Figure 4. Normalized On-Resistance vs. Junction Temperature



Typical Operating Characteristics(Cont.)

Figure 5. Typical Transfer Characteristics

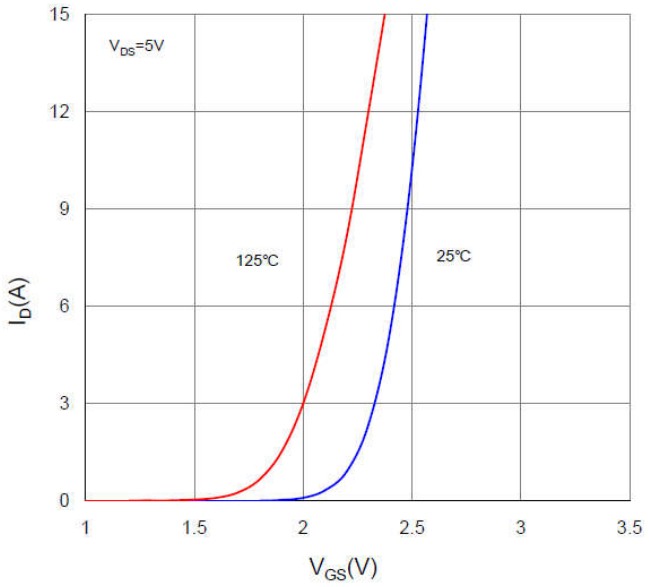


Figure 6. Typical Source-Drain Diode Forward Voltage

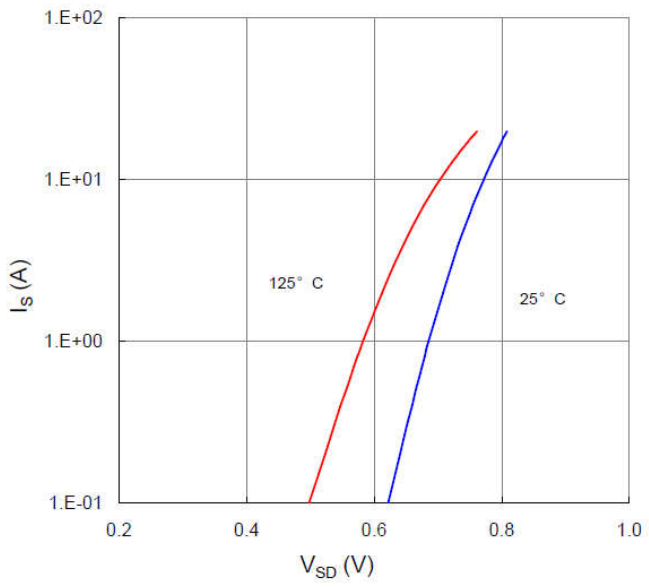


Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage

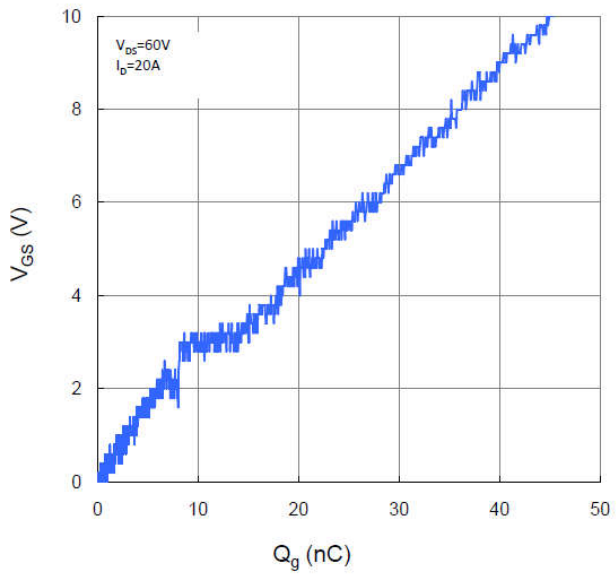
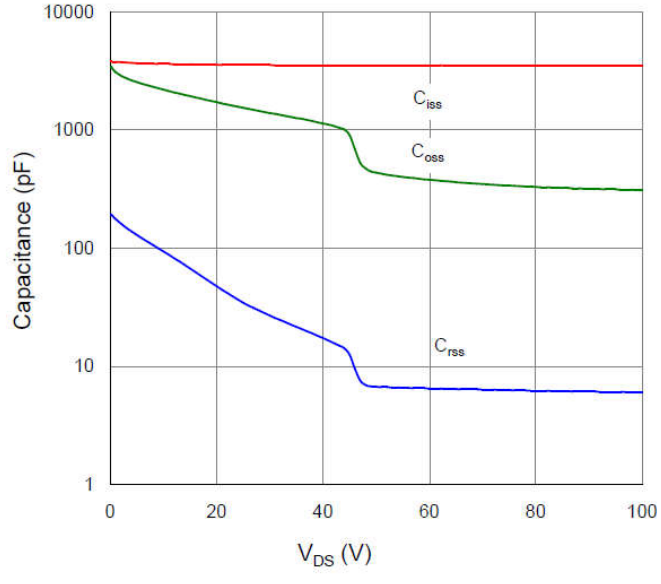


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage



Typical Operating Characteristics (Cont.)

Figure 9. Maximum Safe Operating Area

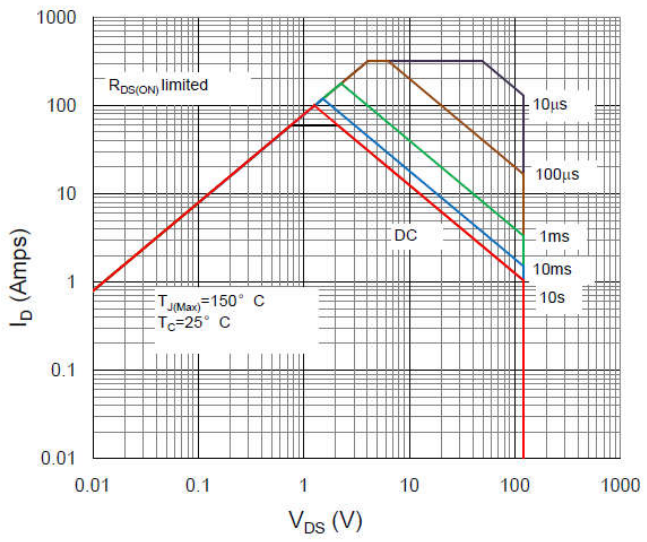


Figure 10. Maximun Drain Current vs. Case Temperature

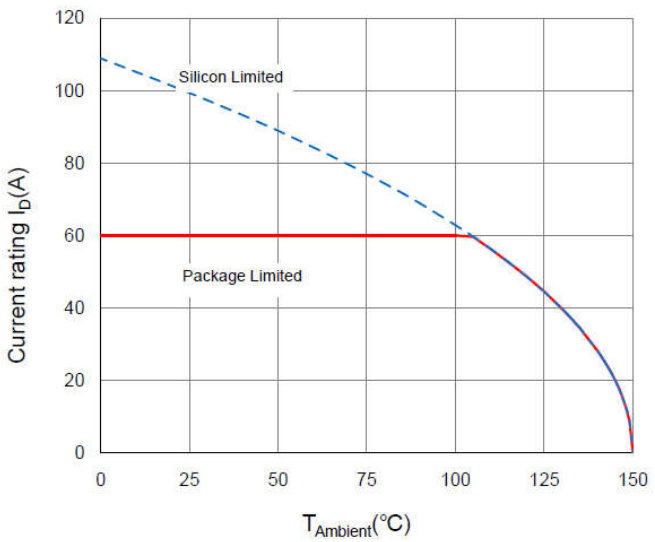
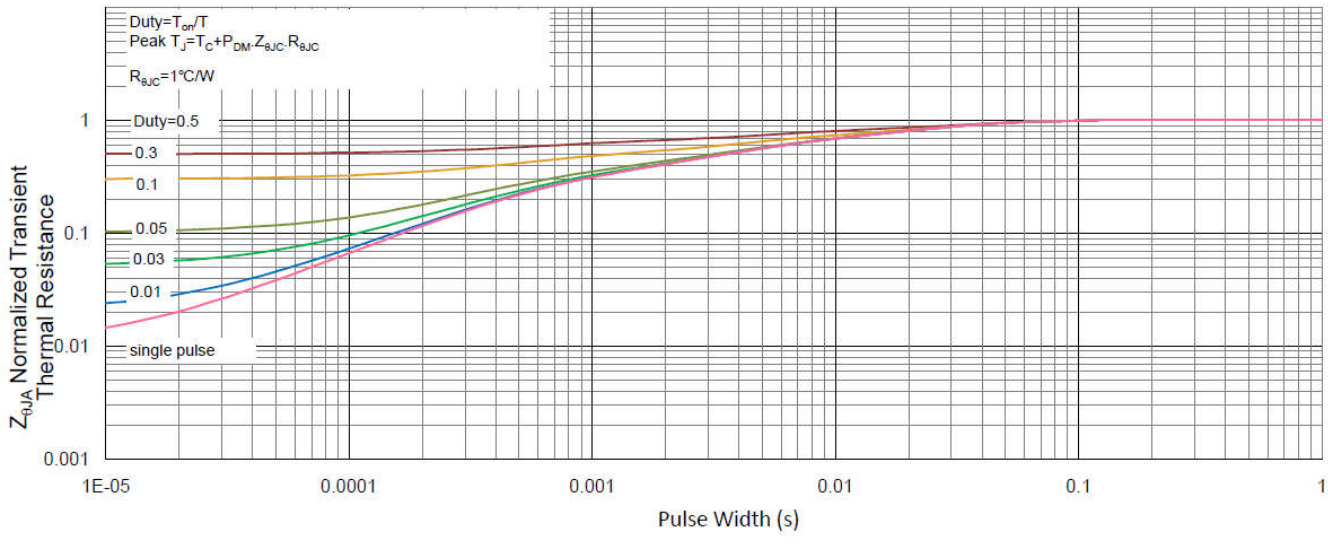
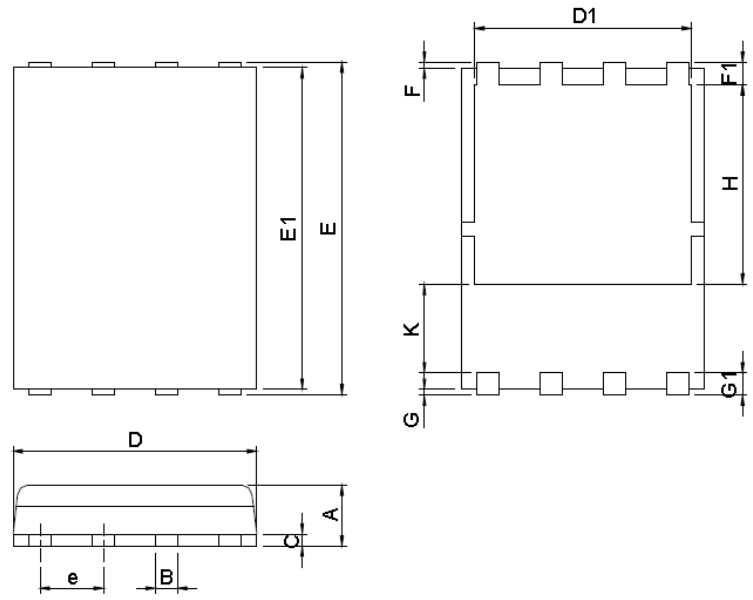


Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Ambient



Package Information

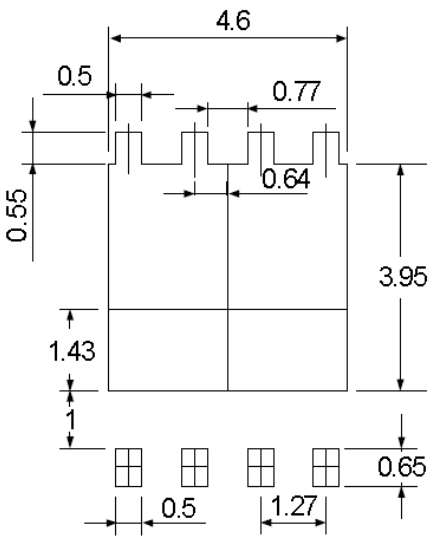
DFN5*6-8 Package



SYMBOL	DFN5x6-8			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	0.90	1.20	0.035	0.047
B	0.3	0.51	0.012	0.020
C	0.19	0.25	0.007	0.010
D	4.80	5.30	0.189	0.209
D1	4.00	4.40	0.157	0.173
E	5.90	6.20	0.232	0.244
E1	5.50	5.80	0.217	0.228
e	1.27 BSC		0.050 BSC	
F	0.05	0.30	0.002	0.012
F1	0.35	0.75	0.014	0.030
G	0.05	0.30	0.002	0.012
G1	0.35	0.75	0.014	0.030
H	3.34	3.9	0.131	0.154
K	0.762	-	0.03	-

Note : 1.Dimension D, D1,D2 and E1 do not include mold flash or protrusions.
Mold flash or protrusions shall not exceed 10 mil.

RECOMMENDED LAND PATTERN



UNIT: mm

Design Notes