

N-Channel Enhancement Mode MOSFET

TDM3738

DESCRIPTION

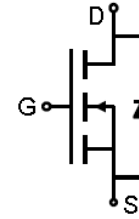
The TDM3738 uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. This device is suitable for use as a load switch or in PWM applications.

GENERAL FEATURES

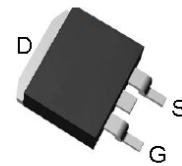
- 100V/161A
 $R_{DS(ON)} < 3.9m\Omega$ @ $V_{GS}=10V$
- High Power and current handling capability
- Lead free product is available
- Surface Mount Package

Application

- Synchronous Rectification in SMPS
- Hard Switching and High Speed Circuit
- Power Tools
- UPS
- Motor Control



Schematic diagram



Top View of TO-263-3

ABSOLUTE MAXIMUM RATINGS($T_A=25^\circ\text{C}$ 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 ($T_C=25^\circ\text{C}$)	161	A
	I_D ($T_C=100^\circ\text{C}$)	114	A
Drain Current @ Current-Pulsed (Note 1)	I_{DM} ($T_C=25^\circ\text{C}$)	450	A
Maximum Power Dissipation	P_D ($T_C=25^\circ\text{C}$)	214	W
Avalanche Energy, Single Pulse	$E_{AS}(L=0.1mH, T_C=25^\circ\text{C})$	180	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	60	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.7	$^\circ\text{C}/\text{W}$

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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 =250μA	100	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =100V,V _{GS} =0V,T _j =25℃	-	-	1	μ A
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V,V _{DS} =0V	-	-	±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} ,I _D =250μA	2	3	4	V
Drain-Source On Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =20A	-	3.4	3.9	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 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/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. 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

Fig 1. Typical Output Characteristics

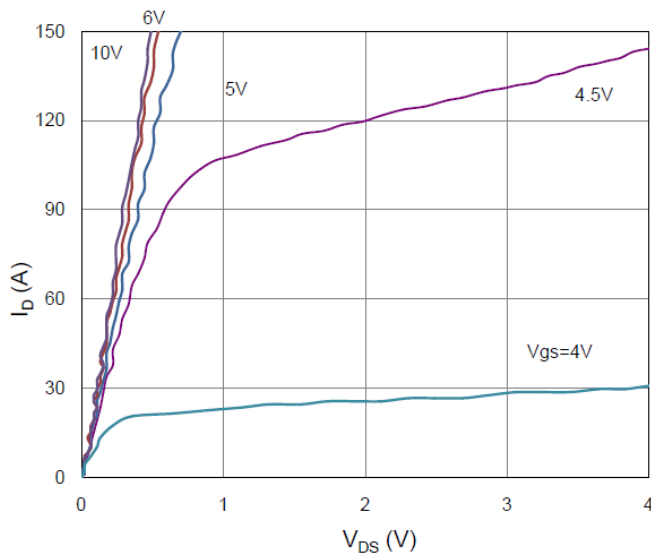


Figure 2. On-Resistance vs. Gate-Source Voltage

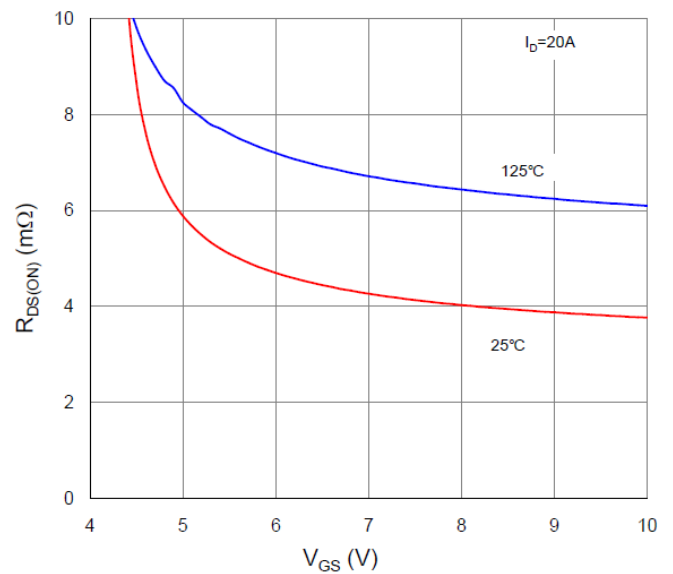


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

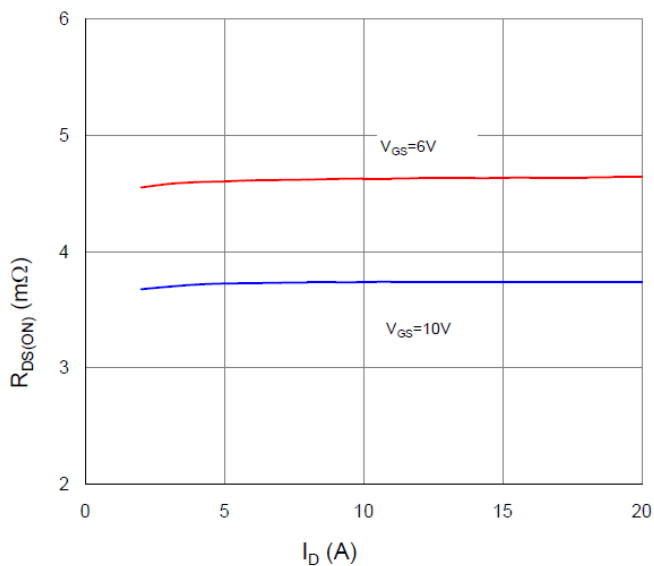
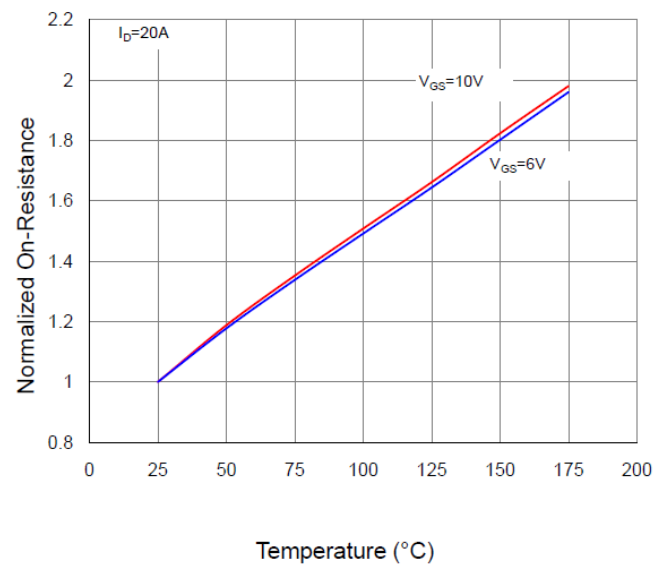


Figure 4. Normalized On-Resistance vs. Junction Temperature



Typical Operating Characteristics(Cont.)

Figure 5. Typical Transfer Characteristics

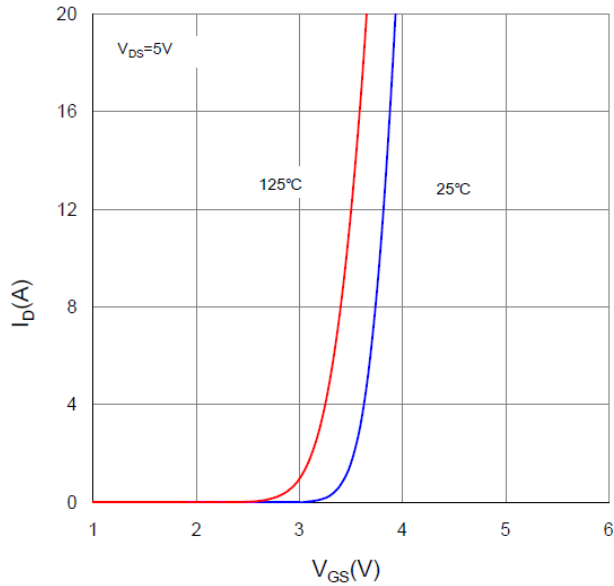


Figure 6. Typical Source-Drain Diode Forward Voltage

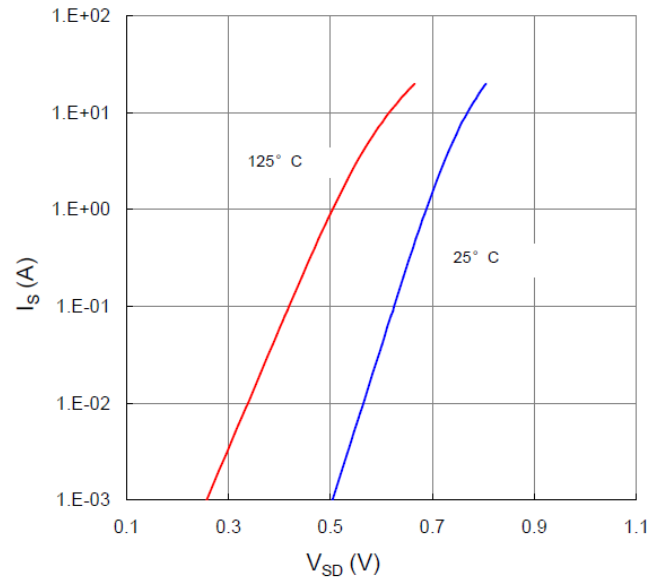


Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage

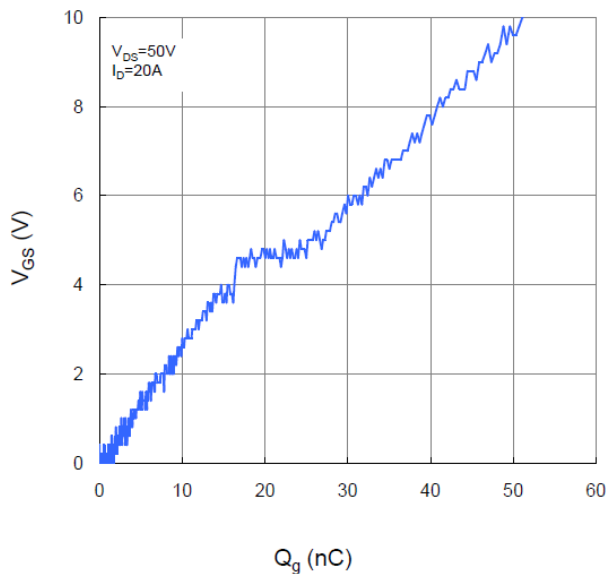
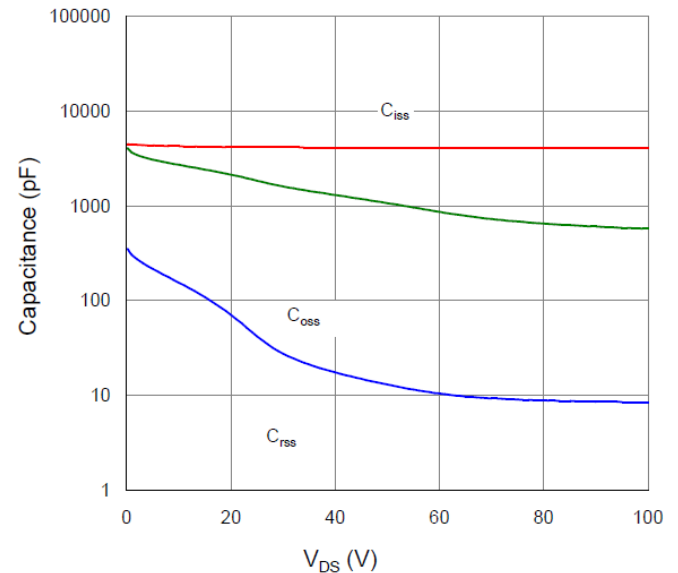


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage



Typical Operating Characteristics (Cont.)

Figure 9. Maximum Safe Operating Area

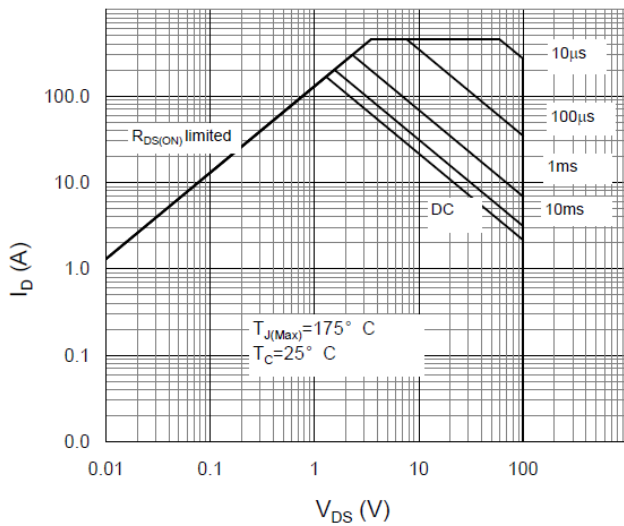


Figure 10. Maximum Drain Current vs. Case Temperature

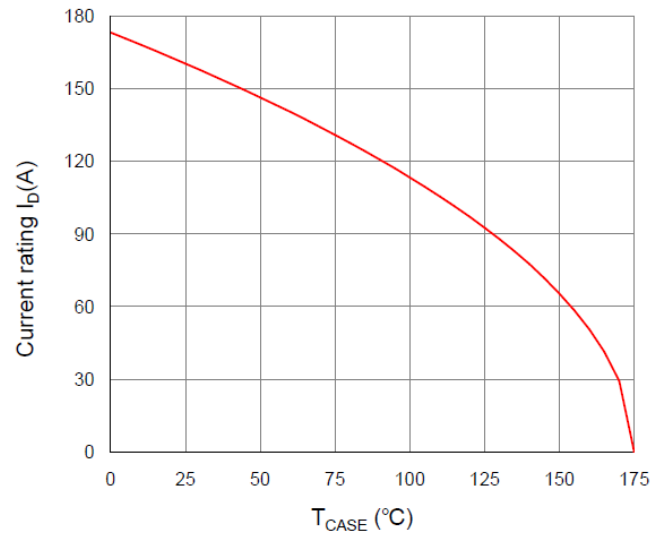
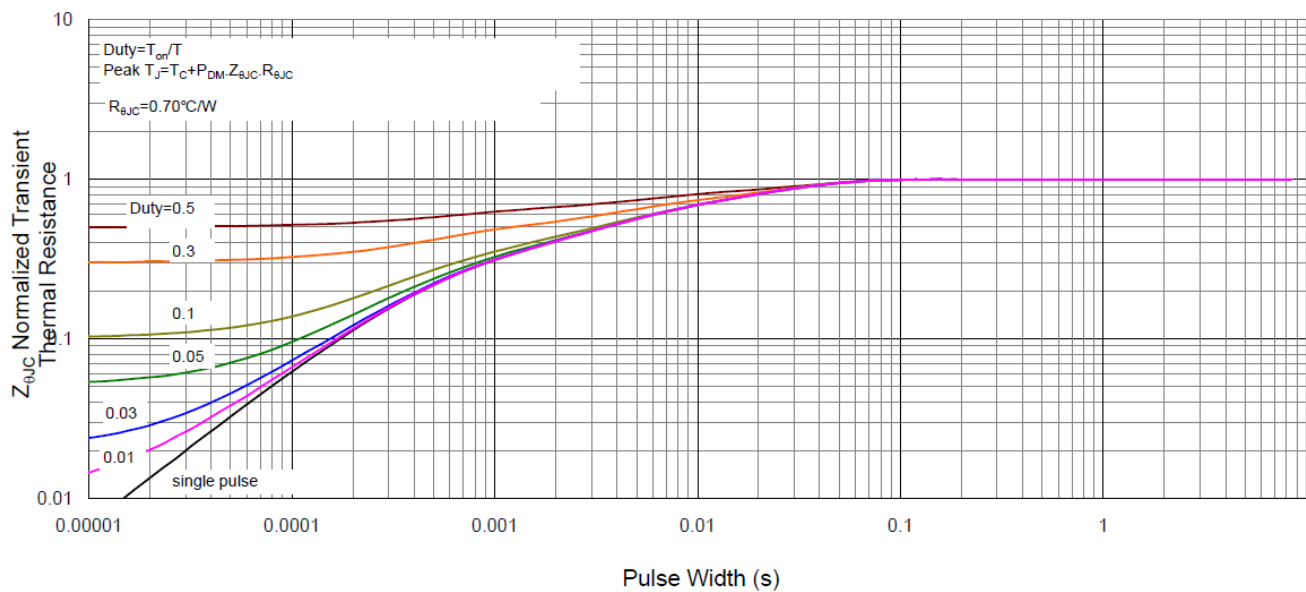


Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Case

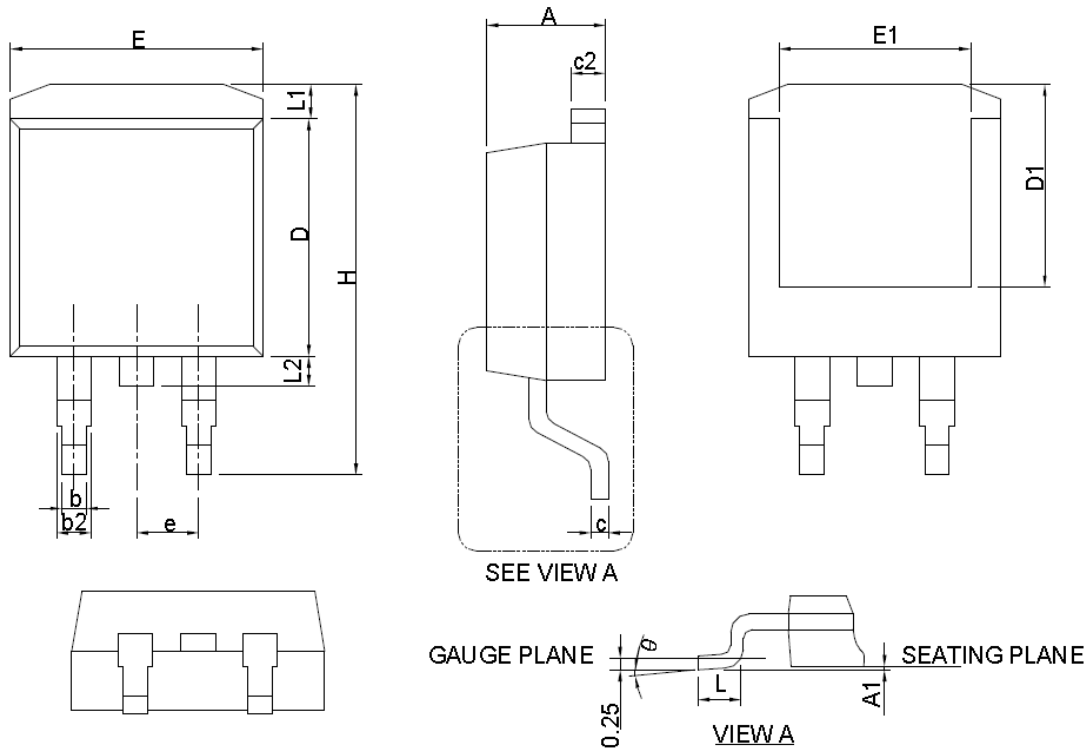


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Package Information

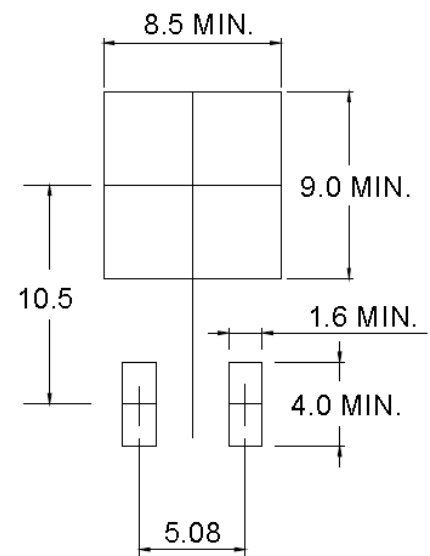
TO263-3 Package



SYMBOL	TO-263-3			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.06	4.83	0.160	0.190
A1	0.00	0.25	0.000	0.010
b	0.51	0.99	0.020	0.039
b2	1.14	1.78	0.045	0.070
c	0.38	0.74	0.015	0.029
c2	1.14	1.65	0.045	0.065
D	8.38	9.65	0.330	0.380
D1	6.00	9.00	0.236	0.354
E	9.65	11.43	0.380	0.450
E1	6.22	9.00	0.245	0.354
e	2.54 BSC		0.100 BSC	
H	14.61	15.88	0.575	0.625
L	1.78	2.79	0.070	0.110
L1	-	1.68	-	0.066
L2	-	1.78	-	0.070
θ	0°	8°	0°	8°

Note : Follow JEDEC TO-263 AB.

RECOMMENDED LAND PATTERN



UNIT: mm

Design Notes