N-Channel Enhancement Mode MOSFET TDM3726

DESCRIPTION

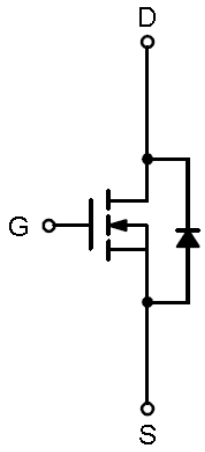
The TDM3726 uses advanced trench technology to provide excellent RDS(ON) and low gate charge. This device is suitable for use as a load switch or in PWM applications.

GENERAL FEATURES

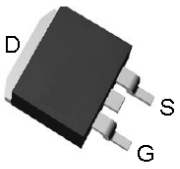
- RDS(ON) < 3.3mΩ @ VGS=4.5V
  RDS(ON) < 2.6mΩ @ VGS=10V
- High Power and current handling capability
- Lead free product is available
- Surface Mount Package

Application

- PWM applications
- Load switch
- Power management



N-Channel MOSFET



Top View of TO-263-3

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current @ Continuous(Silicon Limited)	I_D（T_C=25℃）	200	A
	I_D（T_C=100℃）	142	A
Drain Current @ Continuous(Package Limited)	I_D（T_C=25℃）	69	A
Drain Current @ Current-Pulsed (Note 1)	I_{DM}（T_C=25℃）	540	A
Maximum Power Dissipation	P_D (T_C=25℃)	250	W
Avalanche Energy, Single Pulse	EAS(L=0.4mH)	320	mJ
Maximum Operating Junction Temperature	T_J	150	℃
Storage Temperature Range	T_{STG}	-55 To 150	℃

THERMAL CHARACTERISTICS

Thermal Resistance,Junction-to-Case	$R_{\theta JC}$	0.6	℃/W
Thermal Resistance,Junction-to-Ambient (Note 1)	$R_{\theta JA}$	60	℃/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	40	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=40V,V_{GS}=0V	-	-	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	1.8	2.2	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=20A	-	2.6	3.3	mΩ
		V_{GS}=10V, I_D=20A	-	2.2	2.6	mΩ
DYNAMIC CHARACTERISTICS (Note3)						
Input Capacitance	C_{iss}	V_{DS}=20V,V_{GS}=0V, F=1.0MHz	-	7356	-	PF
Output Capacitance	C_{oss}		-	814	-	PF
Reverse Transfer Capacitance	C_{rss}		-	547	-	PF
Turn-on Delay Time	$t_{d(on)}$	V_{DS}=20V, R_L=10Ω, V_{GEN}=10V,	-	26	-	nS
Turn-on Rise Time	t_r	R_G=10Ω I_D=20A	-	21	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	75	-	nS
Turn-Off Fall Time	t_f		-	25	-	nS
Total Gate Charge	Q_g	V_{DS}=20V,I_D=20A,V_{GS}=10V	-	70	-	nC
Gate-Source Charge	Q_{gs}		-	20	-	nC
Gate-Drain Charge	Q_{gd}		-	35	-	nC
Body Diode Reverse Recovery Time	T_{rr}	I_F=20A, dI/dt=200A/μs	-	40	-	nS
Body Diode Reverse Recovery Charge	Q_{rr}		-	50	-	nC
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode Forward Voltage (Note 2)	V_{SD}	V_{GS}=0V,I_S=20A	-	0.9	1.2	V

NOTES:

1. Pulse width limited by max. junction temperature.
2. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
3. Guaranteed by design, not subject to production testing

Typical Operating Characteristics

Fig 1. Typical Output Characteristics

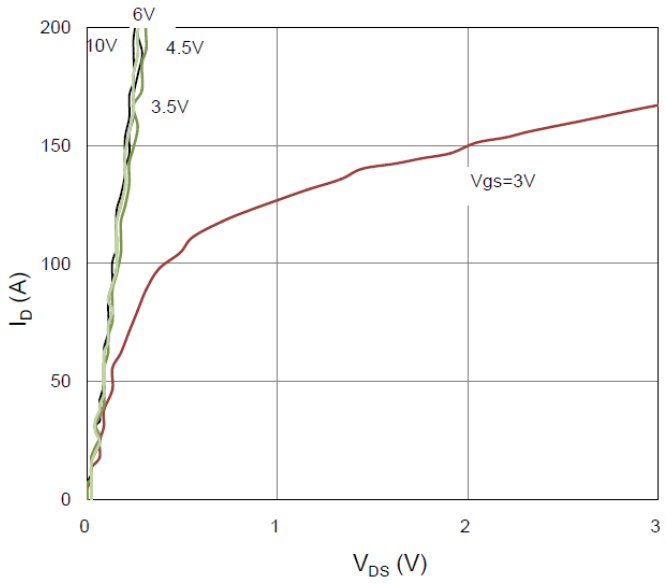


Figure 2. On-Resistance vs. Gate-Source Voltage

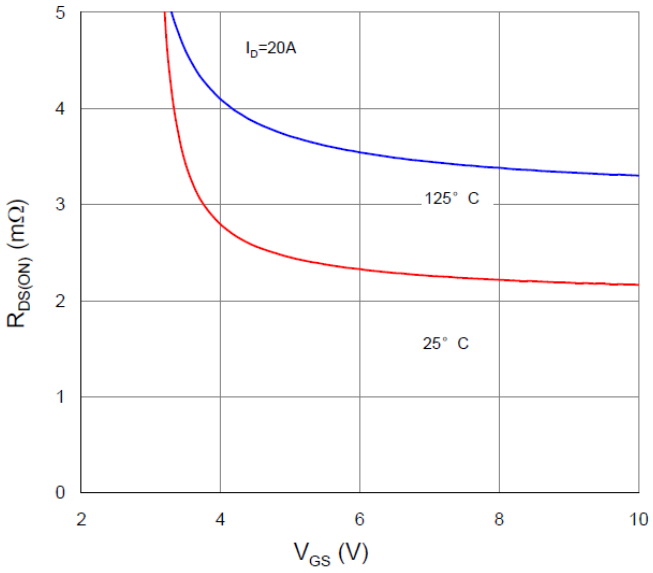


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

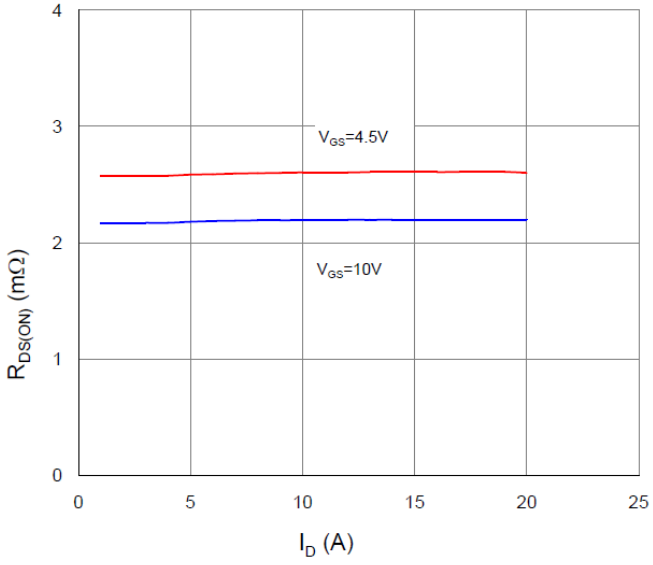
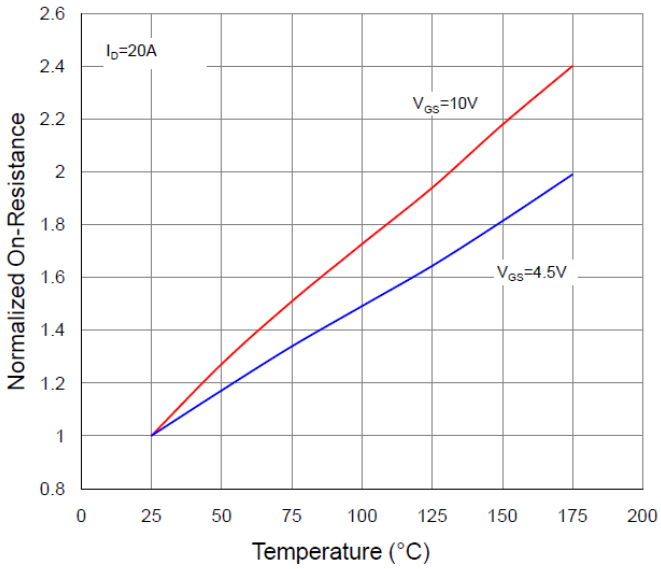


Figure 4. Normalized On-Resistance vs. Junction Temperature



Typical Operating Characteristics(Cont.)

Figure 5. Typical Transfer Characteristics

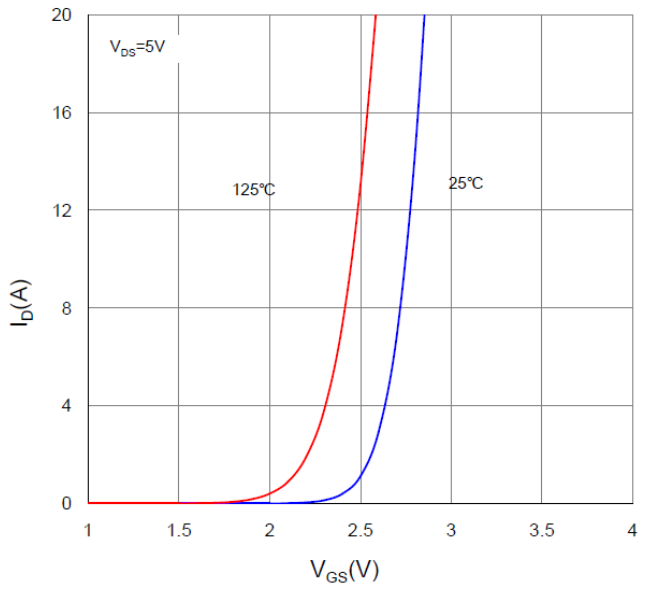


Figure 6. Typical Source-Drain Diode Forward Voltage

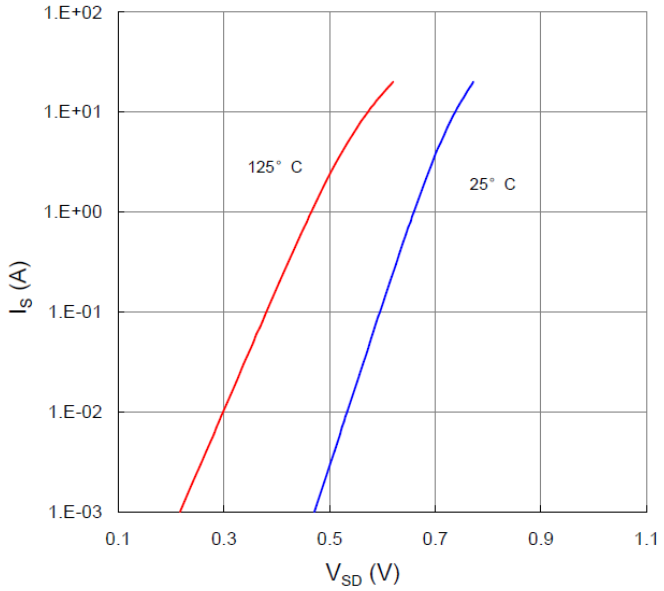


Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage

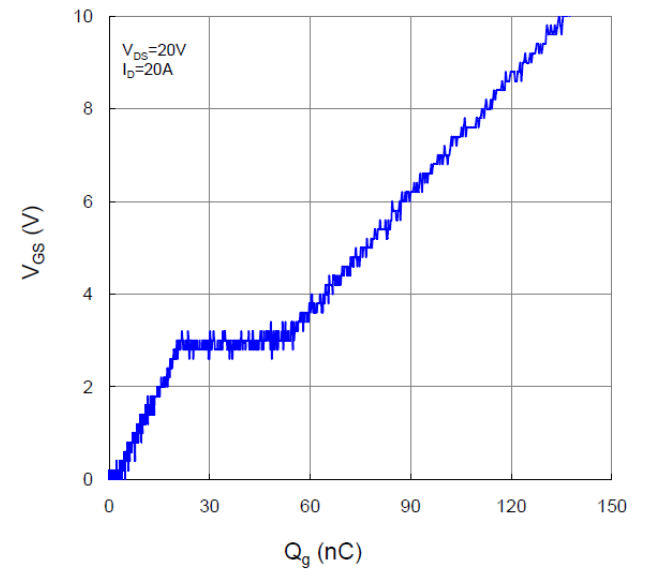
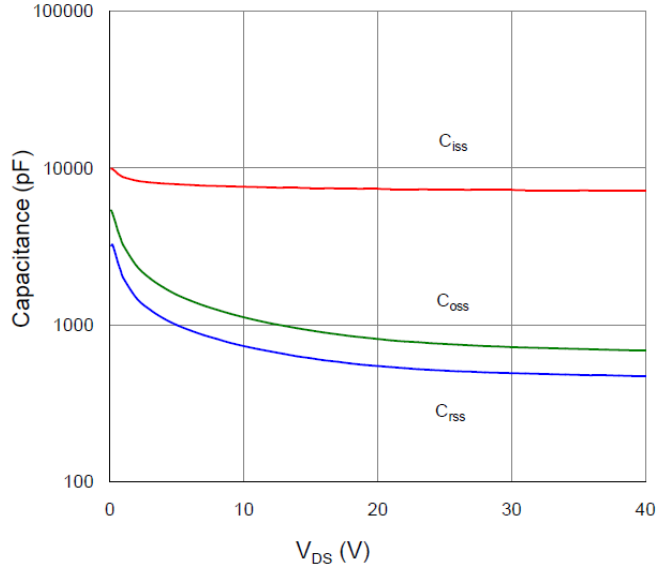


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage



Typical Operating Characteristics (Cont.)

Figure 9. Maximum Safe Operating Area

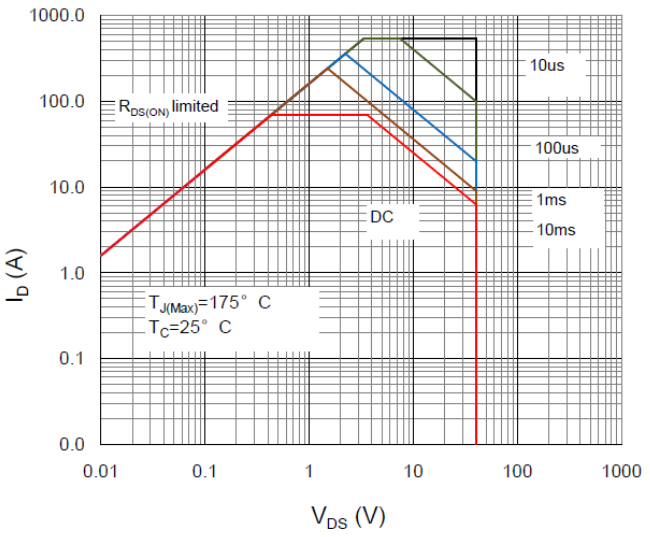


Figure 10. Maximun Drain Current vs. Case Temperature

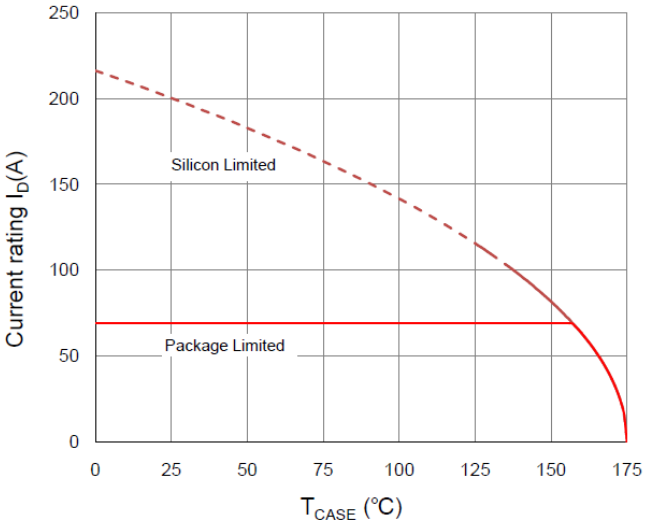
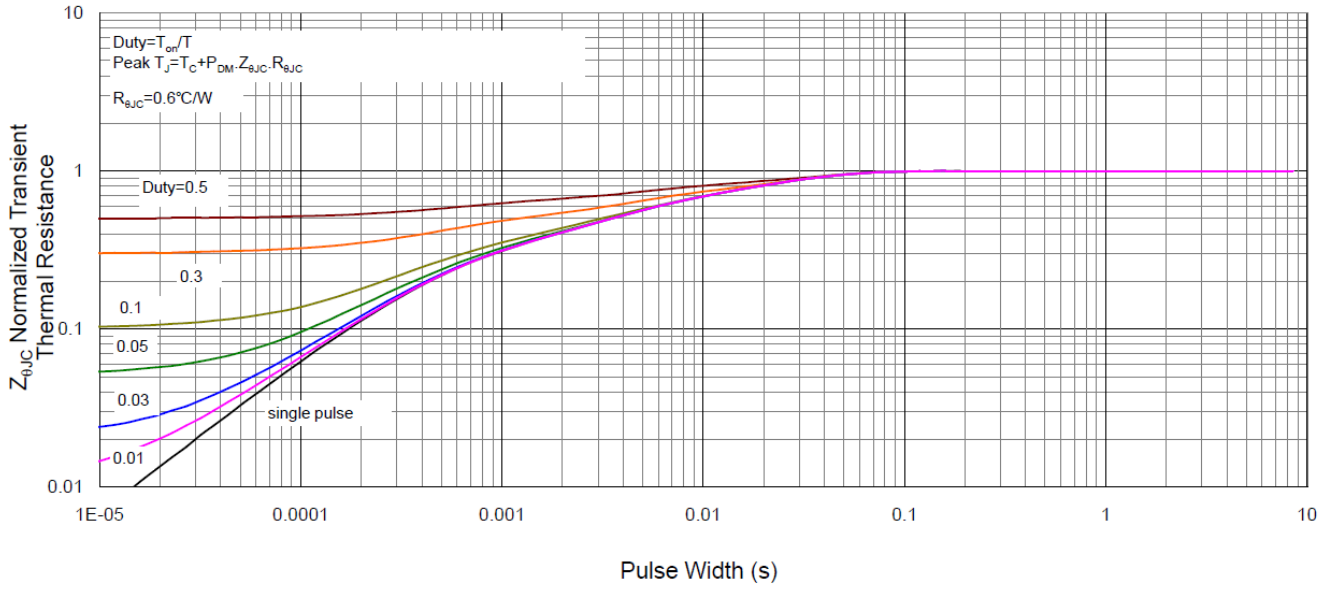
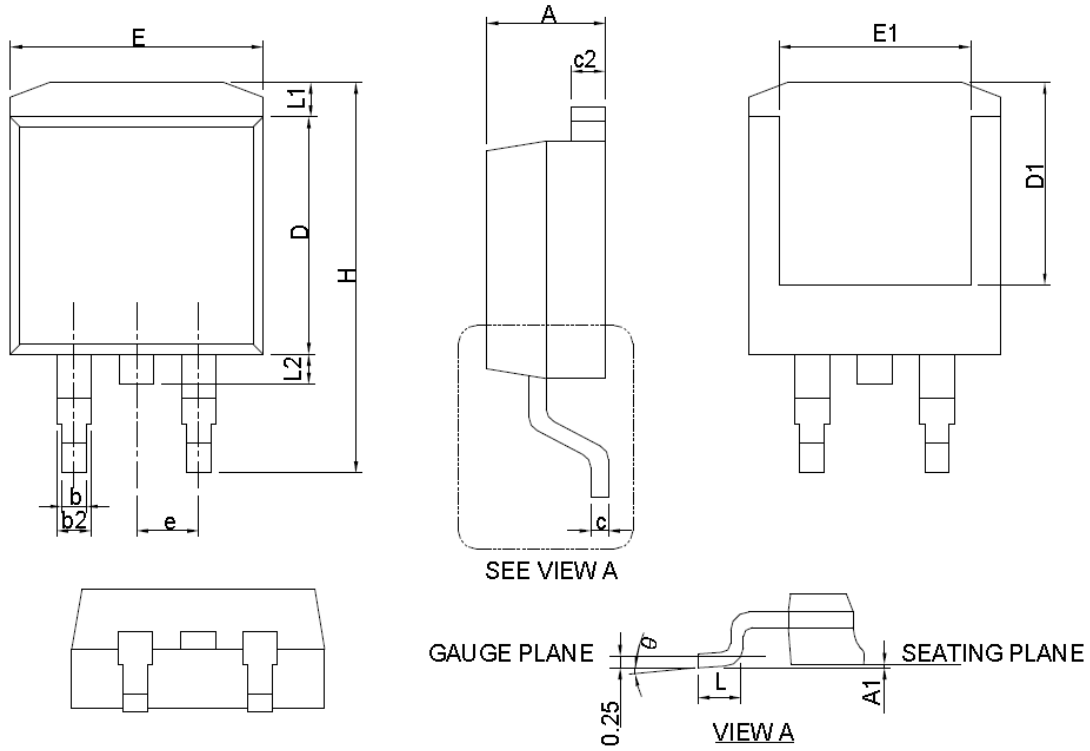


Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Case



Package Information

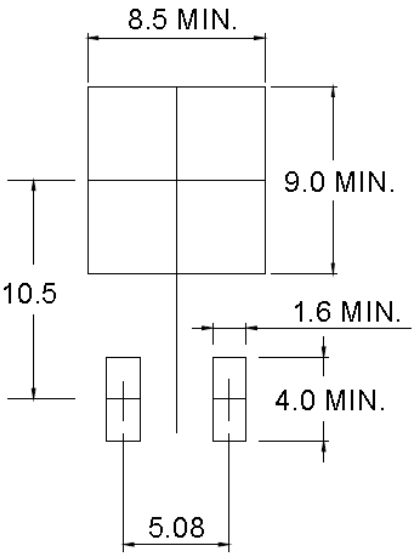
TO263-3 Package



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