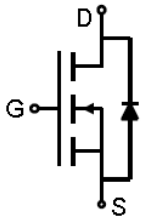
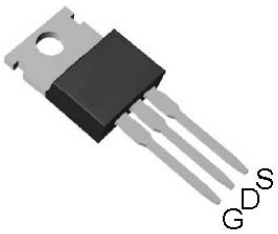
N-Channel Enhancement Mode MOSFET TDM3744

DESCRIPTION

The TDM3744 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.



Schematic diagram



Top View of TO-220

GENERAL FEATURES

- 80V/196A
  RDS(ON) < 3.9mΩ @ VGS=10V
- High Power and current handling capability
- Lead free product is available
- TO220 Package

Application

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

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	80	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current @ Continuous(Silicon Limited)	I_D（T_C=25℃）	196	A
	I_D（T_C=100℃）	139	A
Drain Current @ Continuous(Package Limited)	I_D（T_C=25℃）	180	A
Drain Current @ Current-Pulsed	I_{DM}（T_C=25℃）	500	A
Maximum Power Dissipation	P_D（T_C=25℃）	272	W
Avalanche Energy, Single Pulse	E_{AS}(L=0.5mH,T_C=25℃)	306	mJ
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 175	℃

THERMAL CHARACTERISTICS

Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	60	℃/W
Thermal Resistance,Junction-to-Case	$R_{\theta JC}$	0.55	℃/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	80	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=80V,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-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=20A	-	3.2	3.9	mΩ
Transconductance	g_{fs}	V_{DS}=5V, I_D=20A	-	70	-	S
Gate Resistance	R_G	V_{DS}=0V,V_{GS}=0V, F=1.0MHz	-	1.3	-	Ω
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{iss}	V_{DS}=40V,V_{GS}=0V, F=1.0MHz	-	3635	-	PF
Output Capacitance	C_{oss}		-	1317	-	PF
Reverse Transfer Capacitance	C_{rss}		-	91	-	PF
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=40V, V_{GS}=10V,R_G=10Ω	-	13	-	nS
Turn-on Rise Time	t_r	ID=20A	-	18	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	44	-	nS
Turn-Off Fall Time	t_f		-	25	-	nS
Total Gate Charge	Q_g	V_{DD}=40V,I_D=20A,V_{GS}=10V	-	74	-	nC
Gate-Source Charge	Q_{gs}		-	17	-	nC
Gate-Drain Charge	Q_{gd}		-	31	-	nC
REVERSE DIODE CHARACTERISTICS						
Diode Forward Voltage	V_{SD}	V_{GS}=0V,I_S=20A	-	0.9	1.2	V
Body Diode Reverse Recovery Time	T_{rr}	I_F=20A, dI/dt=400A/μs	-	44	-	nS
Body Diode Reverse Recovery Charge	Q_{rr}		-	155	-	nC

Typical Operating Characteristics

Fig 1. Typical Output Characteristics

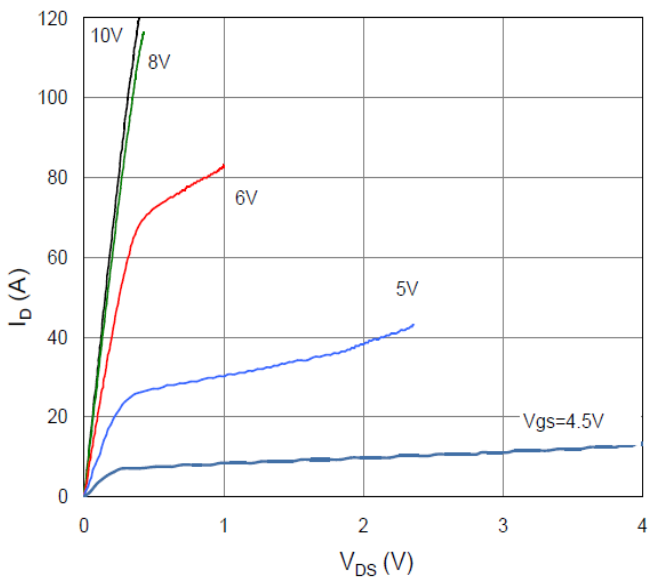


Figure 2. On-Resistance vs. Gate-Source Voltage

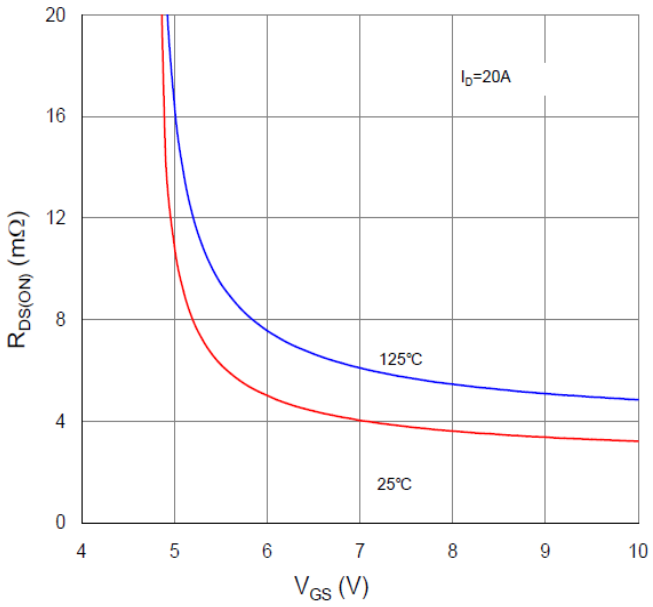


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

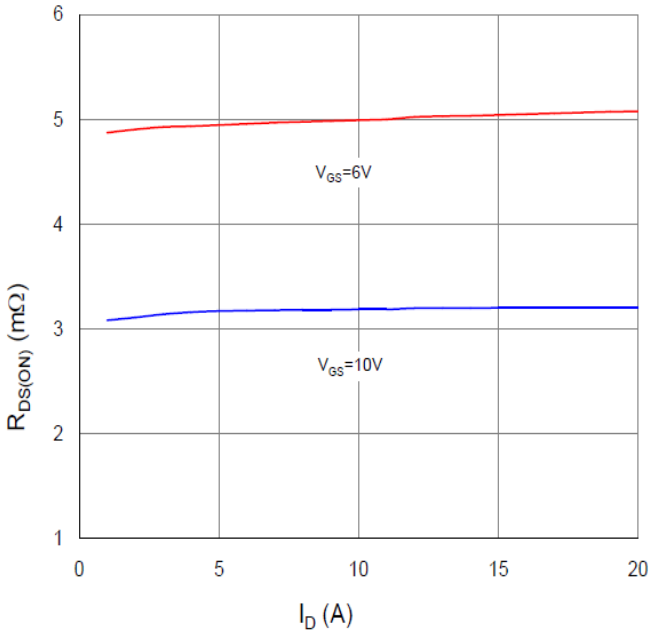
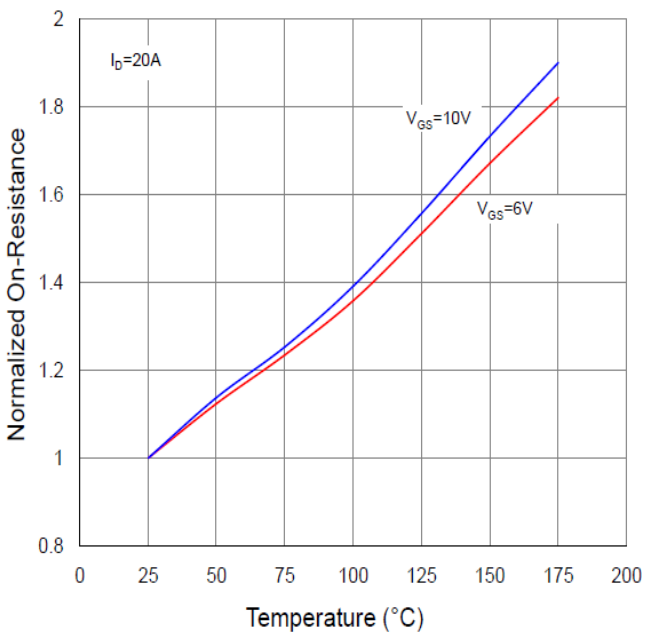


Figure 4. Normalized On-Resistance vs. Junction Temperature



Typical Operating Characteristics(Cont.)

Figure 5. Typical Transfer Characteristics

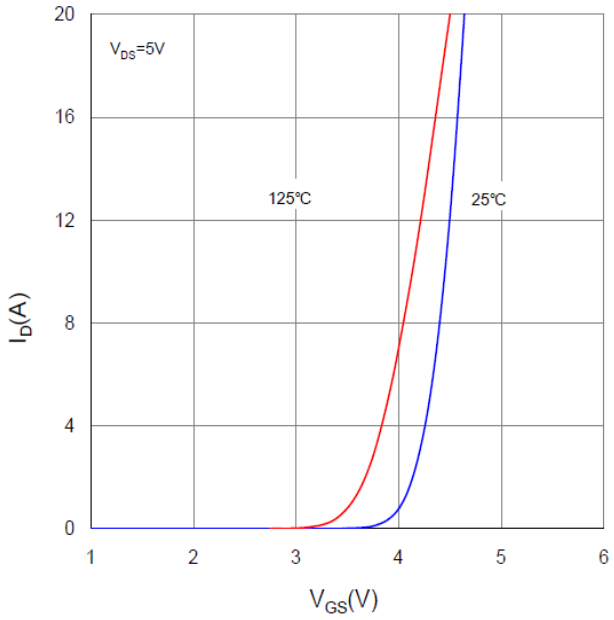


Figure 6. Typical Source-Drain Diode Forward Voltage

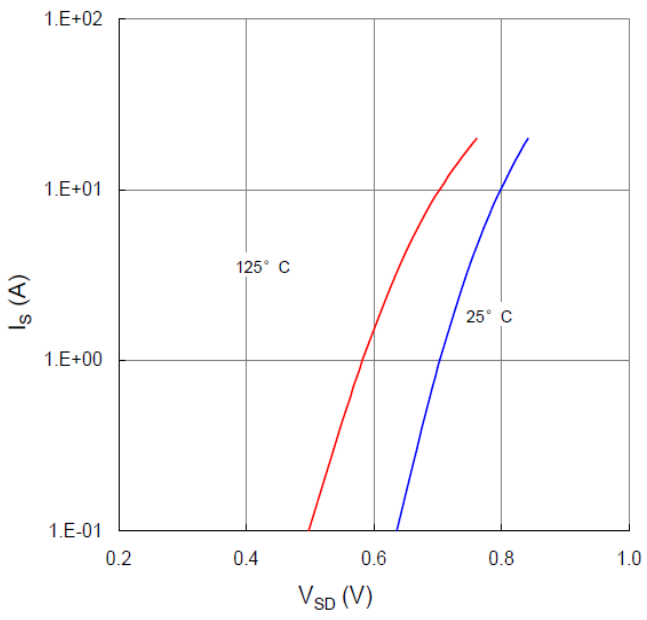


Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage

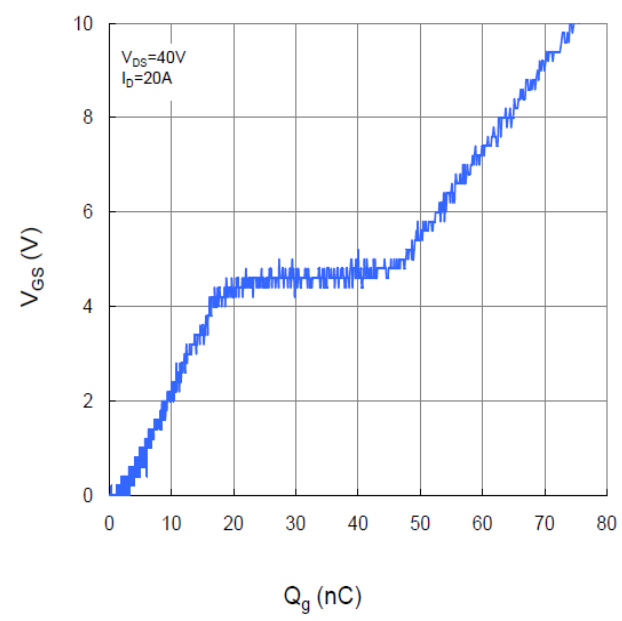
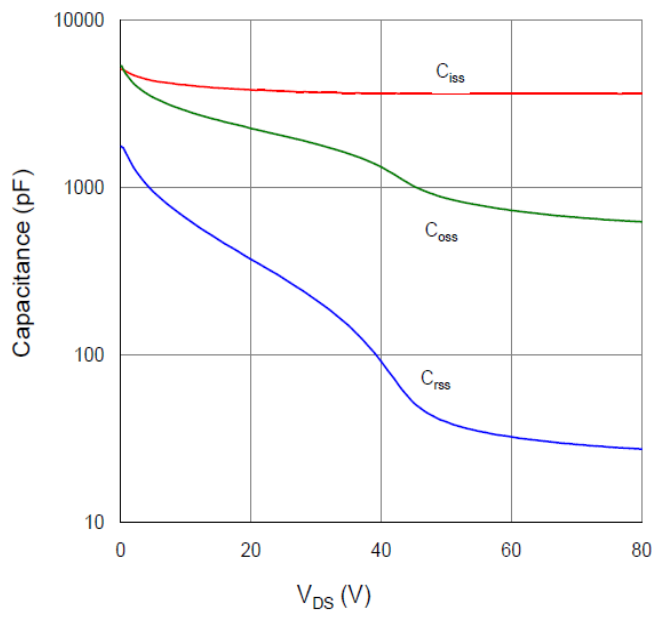


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage



Typical Operating Characteristics (Cont.)

Figure 9. Maximum Safe Operating Area

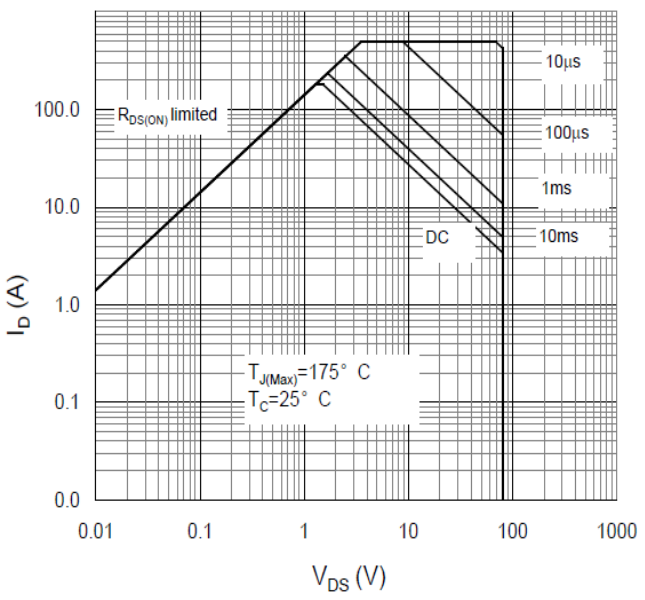


Figure 10. Maximun Drain Current vs. Case Temperature

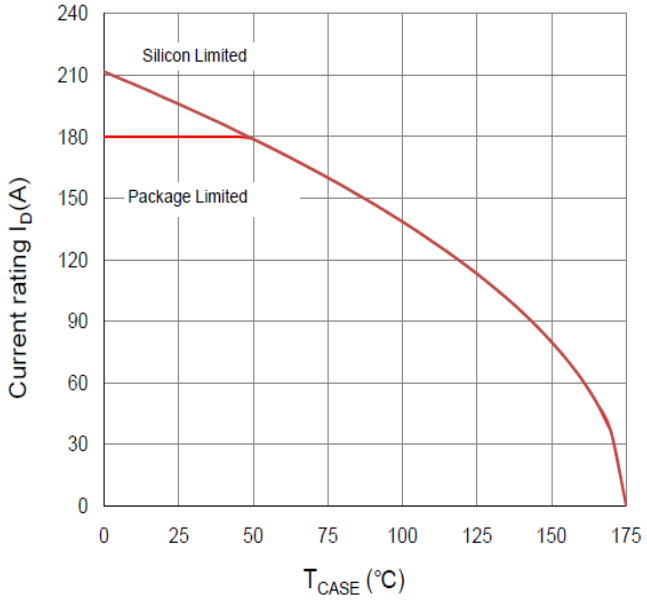
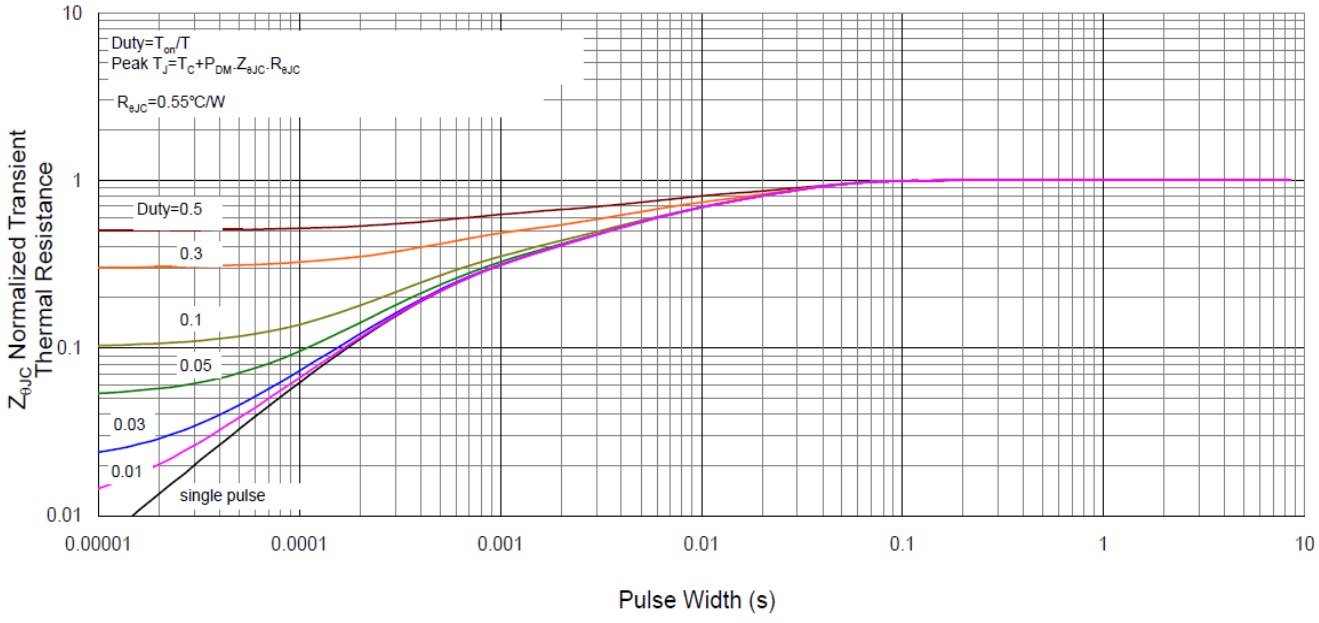
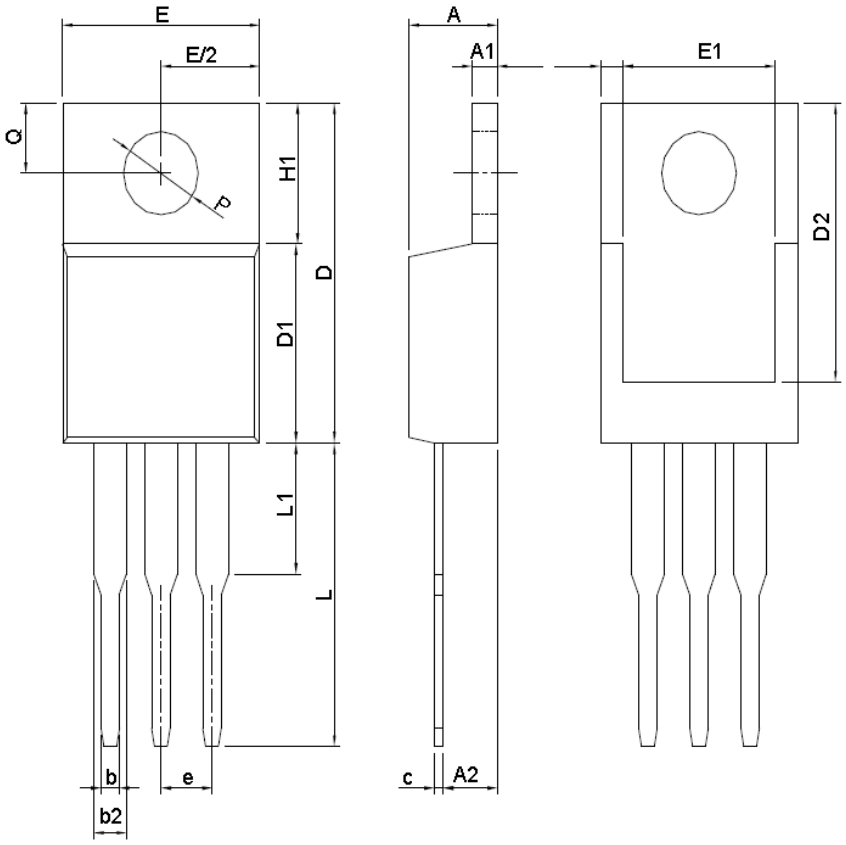


Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Case



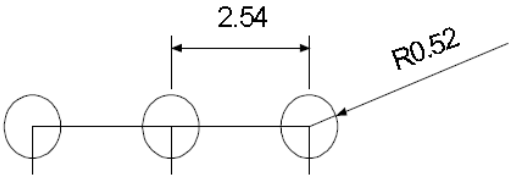
Package Information

TO220 Package



SYMBOL	TO-220			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	3.56	4.83	0.140	0.190
A1	0.51	1.40	0.020	0.055
A2	2.03	2.92	0.080	0.115
b	0.38	1.02	0.015	0.040
b2	1.14	1.78	0.045	0.070
c	0.36	0.61	0.014	0.024
D	14.22	16.51	0.560	0.650
D1	8.38	9.30	0.330	0.366
D2	12.19	13.65	0.480	0.537
E	9.65	10.67	0.380	0.420
E1	6.86	8.89	0.270	0.350
e	2.54 BSC		0.100 BSC	
H1	5.84	6.86	0.230	0.270
L	12.70	14.73	0.500	0.580
L1	-	6.35	-	0.250
P	3.53	4.09	0.139	0.161
Q	2.54	3.43	0.100	0.135

RECOMMENDED LAND PATTERN



UNIT: mm

Design Notes

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