N-Channel Enhancement Mode MOSFET TDM3436A

DESCRIPTION

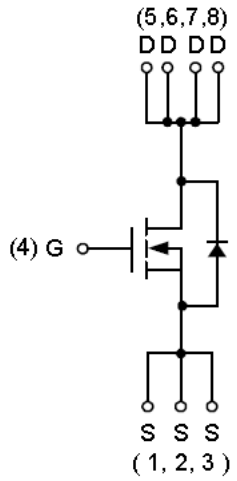
The TDM3436A uses advanced trench technology to provide excellent RDS(ON) and low gate charge. This device is suitable for use as a load switch or in PWM applications.

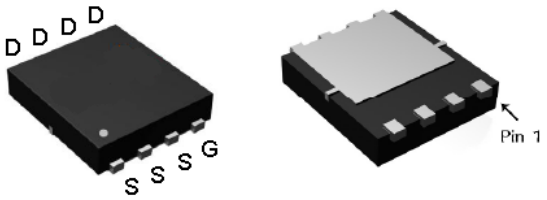
GENERAL FEATURES

- RDS(ON) < 3.2mΩ @ VGS=10V
  RDS(ON) < 5.3mΩ @ VGS=4.5V
- High Power and current handling capability
- Lead free product is available
- Surface Mount Package

Application

- PWM applications
- Load switch
- Power management





DFN5x6-8

ABSOLUTE MAXIMUM RATINGS(T_J=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 (Note 1)	I_D（T_C=25℃）	89	A
	I_D（T_C=100℃）	71	A
Drain Current @ Current-Pulsed (Note 2)	I_{DM}（T_C=25℃）	240	A
Avalanche Current	I_{AS}	54	A
Single Pulse Avalanche Energy (Note 3)	EAS	145	mJ
Maximum Power Dissipation (T_A=25℃) (Note 4)	P_D	22	W
Maximum Operating Junction Temperature	T_J	150	℃
Storage Temperature Range	T_{STG}	-55 To 150	℃

THERMAL CHARACTERISTICS

Thermal Resistance Junction-to-Ambient (Note 1)	$R_{\theta JA}$	55	℃/W
Thermal Resistance Junction-Case (Note 1)	$R_{\theta JC}$	1.7	℃/W

ELECTRICAL CHARACTERISTICS (T_J=25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	40	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D =250μA	1.2	1.7	2.2	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
Drain-Source On-State Resistance (Note2)	$R_{DS(ON)}$	V_{GS}=10V, I_D=20A	-	2.5	3.2	mΩ
		V_{GS}=4.5V, I_D=15A	-	3.8	5.3	mΩ
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{iss}	V_{DS}=20V,V_{GS}=0V, F=1.0MHz	-	2648	-	PF
Output Capacitance	C_{oss}		-	899	-	PF
Reverse Transfer Capacitance	C_{rss}		-	S71	-	PF
SWITCHING CHARACTERISTICS (Note 3)						
Turn-on Delay Time	$t_{d(on)}$	V_{DS}=20V, V_{GS}=10V, R_G=3Ω, I_D=20A	-	10	-	nS
Turn-on Rise Time	t_r		-	5	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	33	-	nS
Turn-Off Fall Time	t_f		-	6.5	-	nS
Total Gate Charge	Q_g	V_{DS}=20V, I_D=20A, V_{GS}=4.5V	-	22.7	-	nC
Gate-Source Charge	Q_{gs}		-	7.5	-	nC
Gate-Drain Charge	Q_{gd}		-	5.5	-	nC
DRAIN-SOURCE DIODE CHARACTERISTICS						
Continuous Source Current (Note 1,5)	I_S	V_G=V_D=0V, Force Current	-	-	30	A
Diode Forward Voltage (Note 2)	V_{SD}	V_{GS}=0V,I_S=20A	-	0.8	1.1	V

NOTES:

1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.

2. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%

3. The EAS data shows Max. rating. The test condition is V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=54A

4. The power dissipation is limited by junction temperature

5. The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.

Typical Operating Characteristics

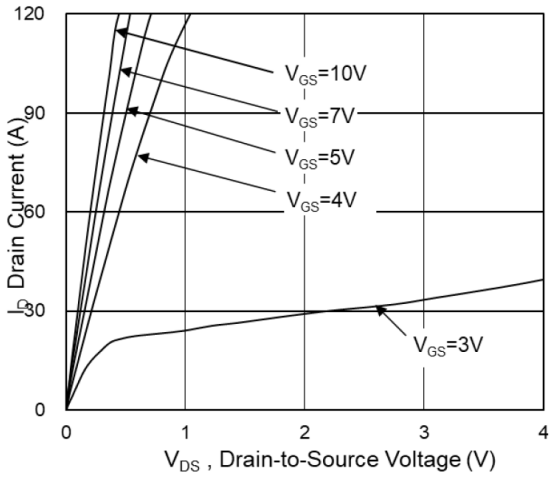


Fig.1 Typical Output Characteristics

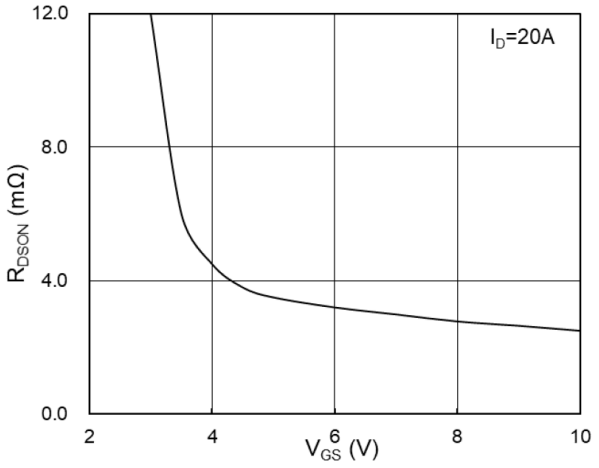


Fig.2 On-Resistance vs G-S Voltage

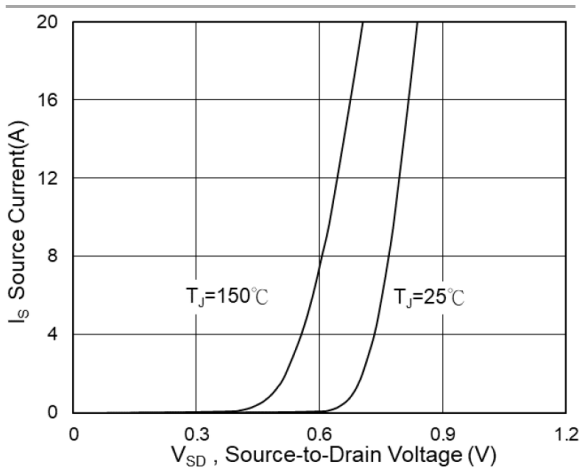


Fig.3 Source Drain Forward Characteristics

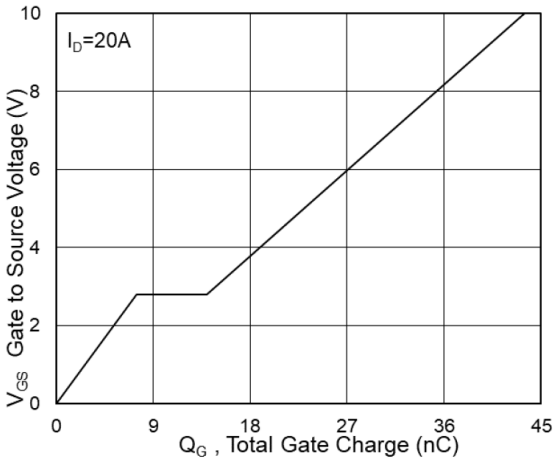


Fig.4 Gate-Charge Characteristics

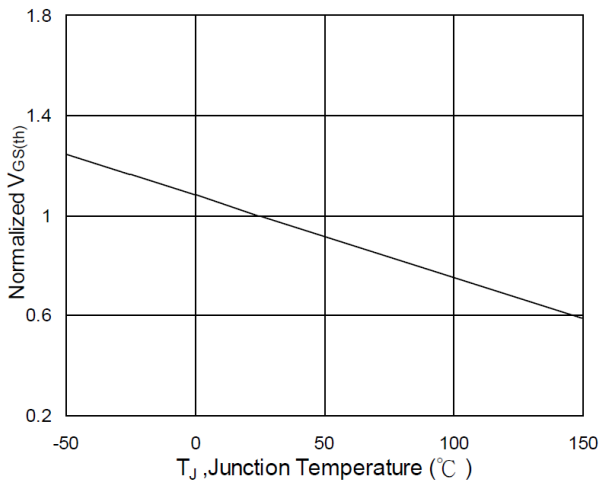


Fig.5 Normalized $V_{GS(th)}$ vs T_J

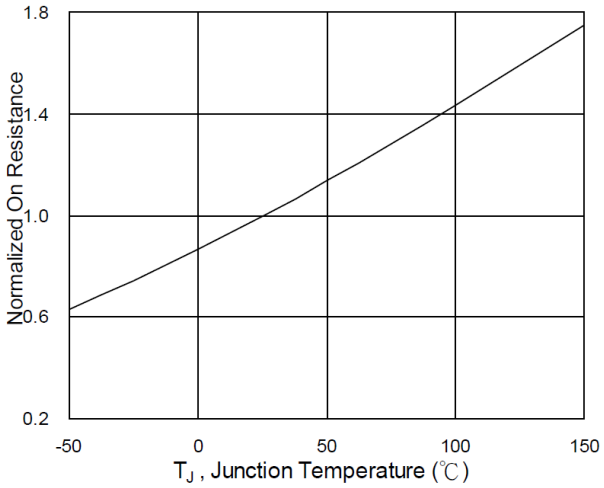


Fig.6 Normalized R_{DSON} vs T_J

Typical Operating Characteristics (Cont.)

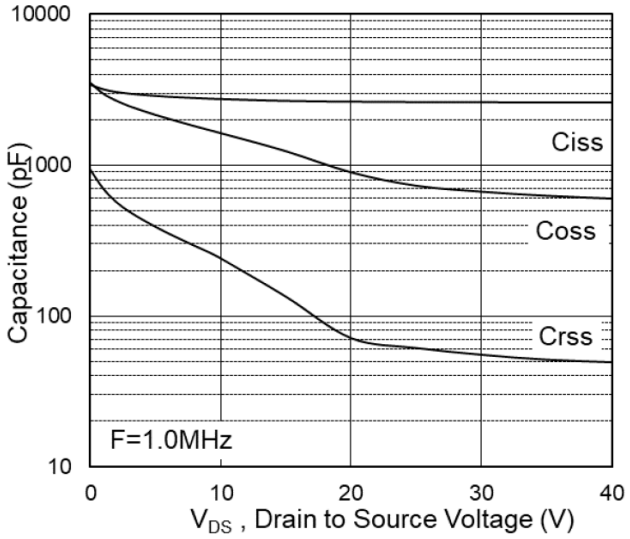


Fig.7 Capacitance

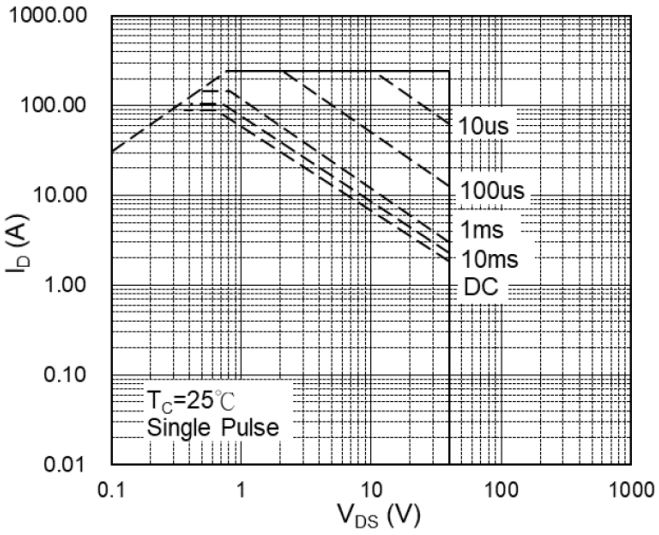


Fig.8 Safe Operating Area

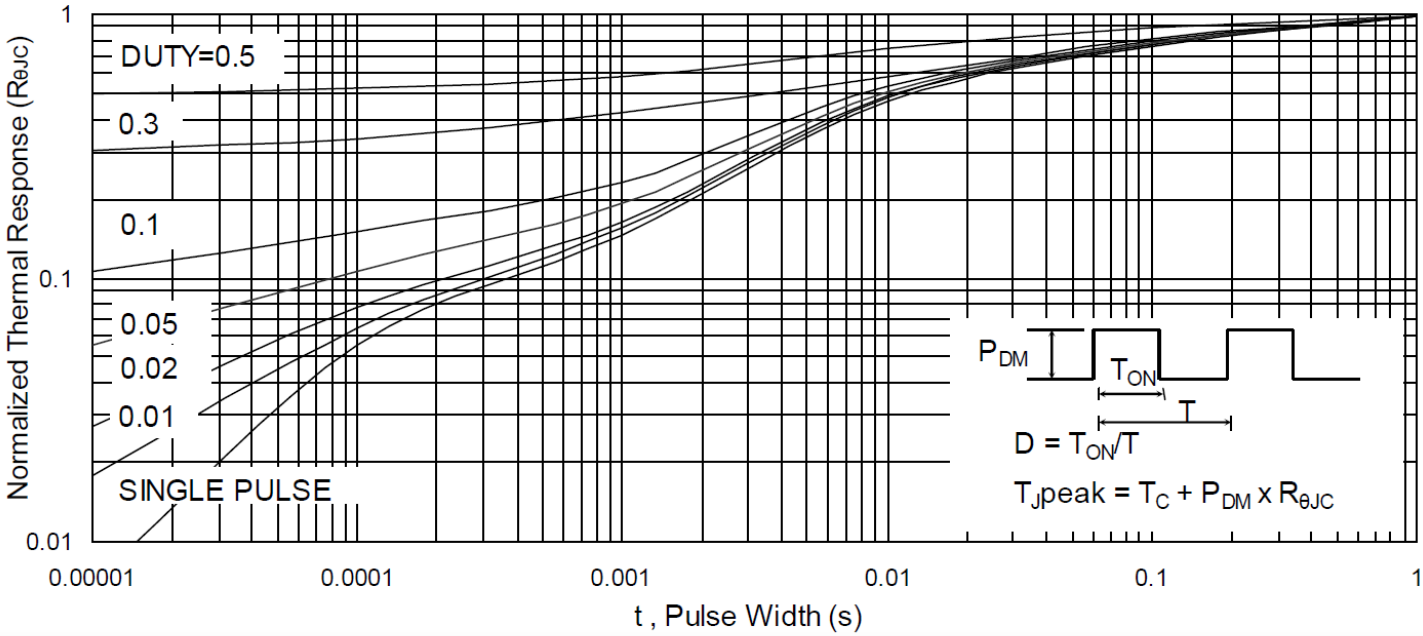
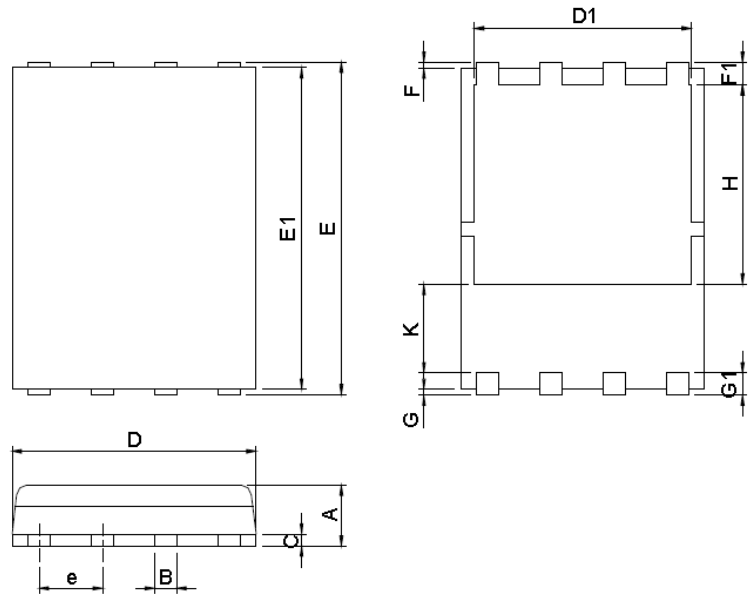


Fig.9 Normalized Maximum Transient Thermal Impedance

Package Information

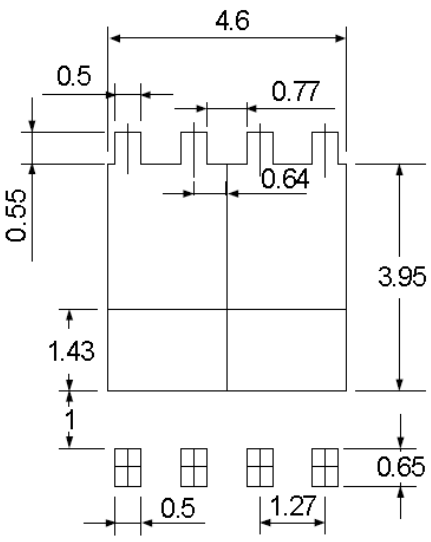
DFN5*6-8 Package



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