

N-Channel Enhancement Mode MOSFET

TDM3510

**DESCRIPTION**

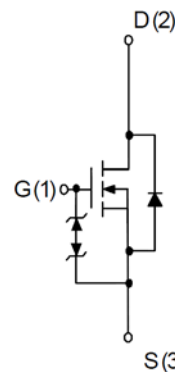
The TDM3510 uses advanced trench technology to provide excellent RDS(ON) and low gate charge. This device is suitable for use as a load switch or in PWM applications.

**GENERAL FEATURES**

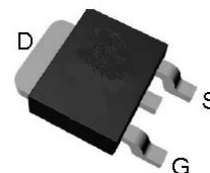
- RDS(ON) < 15.6mΩ @ VGS=4.5V  
RDS(ON) < 10.2mΩ @ VGS=10V
- High Power and current handling capability
- Lead free product is available
- Surface Mount Package

**Application**

- PWM applications
- Load switch
- Power management



N-Channel MOSFET



Top View of TO-252-2

**ABSOLUTE MAXIMUM RATINGS**( $T_A=25^{\circ}C$  unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	40	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current @ Continuous	$I_D (T_C=25^{\circ}C)$	43	A
	$I_D (T_C=100^{\circ}C)$	28	A
Drain Current @ Current-Pulsed (Note 1)	$I_{DM} (T_C=25^{\circ}C)$	60	A
Maximum Power Dissipation	$P_D(T_C=25^{\circ}C)$	27	W
	$P_D(T_C=100^{\circ}C)$	11	W
Drain Current @ Continuous	$I_D (T_A=25^{\circ}C)$	12	A
	$I_D (T_A=70^{\circ}C)$	9	A
Maximum Power Dissipation	$P_D(T_A=25^{\circ}C)$	2	W
	$P_D(T_A=70^{\circ}C)$	1.2	W
Maximum Operating Junction Temperature	$T_J$	150	$^{\circ}C$
Storage Temperature Range	$T_{STG}$	-55 To 150	$^{\circ}C$

**N-Channel Enhancement Mode MOSFET**
**TDM3510**
**ELECTRICAL CHARACTERISTICS** ( $T_A=25^{\circ}\text{C}$  unless otherwise noted)

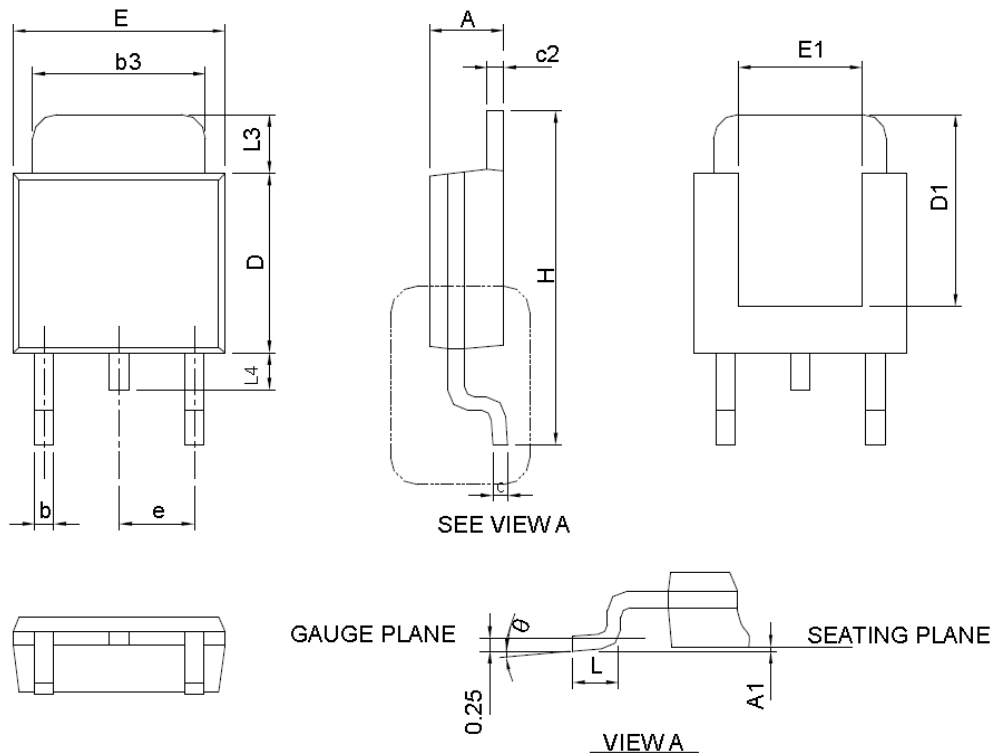
Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	40	-	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=24V, V_{GS}=0V$	-	-	1	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 10$	$\mu A$
<b>ON CHARACTERISTICS</b> (Note 2)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.4	1.8	2.5	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=8A$	-	13	15.6	m $\Omega$
		$V_{GS}=10V, I_D=15A$	-	9.7	10.2	m $\Omega$
		$T_J=100^{\circ}C$	-	12.8	-	m $\Omega$
<b>DYNAMIC CHARACTERISTICS</b> (Note 4)						
Gate Resistance	$R_G$	$V_{DS}=0V, V_{GS}=0V, F=1.0MHz$	-	1.7	-	$\Omega$
Input Capacitance	$C_{iss}$	$V_{DS}=20V, V_{GS}=0V, F=1.0MHz$	-	700	-	PF
Output Capacitance	$C_{oss}$		-	190	-	PF
Reverse Transfer Capacitance	$C_{rss}$		-	32	-	PF
<b>SWITCHING CHARACTERISTICS</b> (Note 3)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DS}=20V, R_L=20\Omega, V_{GEN}=10V, R_G=6\Omega, I_D=1A$	-	10	-	nS
Turn-on Rise Time	$t_r$		-	6.6	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	18	-	nS
Turn-Off Fall Time	$t_f$		-	12	-	nS
Total Gate Charge	$Q_g$	$V_{DS}=20V, I_D=15A, V_{GS}=10V$	-	5.1	-	nC
Gate-Source Charge	$Q_{gs}$		-	2.9	-	nC
Gate-Drain Charge	$Q_{gd}$		-	1.1	-	nC
Body Diode Reverse Recovery Time	$T_{rr}$	$I_F=5A, di/dt=100A/\mu s$	-	18.8	-	nS
Body Diode Reverse Recovery Charge	$Q_{rr}$		-	4.5	-	nC
<b>DRAIN-SOURCE DIODE CHARACTERISTICS</b>						
Diode Forward Voltage (Note 2)	$V_{SD}$	$V_{GS}=0V, I_S=10A$	-	0.8	1.1	V

**NOTES:**

1. Pulse width limited by max. junction temperature.
2. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
3. Guaranteed by design, not subject to production testing

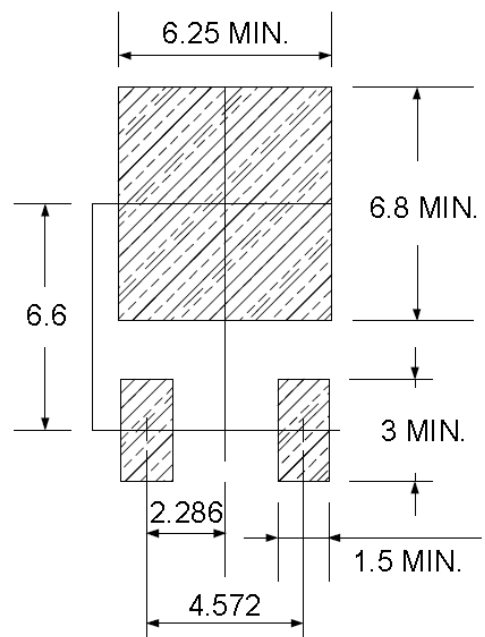
Package Information

TO252-2 Package



DIMENSIONS	TO-252-2			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	2.18	2.39	0.086	0.094
A1	-	0.13	-	0.005
b	0.50	0.89	0.020	0.035
b3	4.95	5.46	0.195	0.215
c	0.46	0.61	0.018	0.024
c2	0.46	0.89	0.018	0.035
D	5.33	6.22	0.210	0.245
D1	4.57	6.00	0.180	0.236
E	6.35	6.73	0.250	0.265
E1	3.81	6.00	0.150	0.236
e	2.29 BSC		0.090 BSC	
H	9.40	10.41	0.370	0.410
L	0.90	1.78	0.035	0.070
L3	0.89	2.03	0.035	0.080
L4	-	1.02	-	0.040
θ	0°	8°	0°	8°

RECOMMENDED LAND PATTERN



UNIT: mm

Design Notes