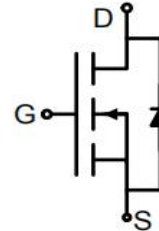
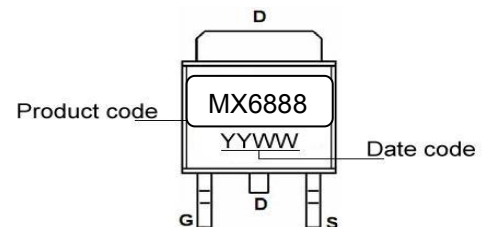


**N-Channel Enhancement Mode Power MOSFET**
**Description**

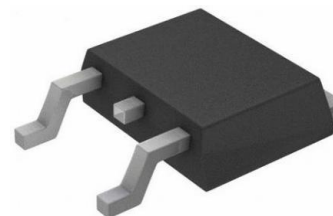
The MXD6888 is N-channel MOS Field Effect Transistor designed for high current switching applications. rugged EAs capability and ultra low  $R_{DS(ON)}$  is suitable for PWM, load switching especially for E-Bike controller applications.


**General Features**

- ◆  $V_{DS} = 60V$ ,  $I_D = 80A$
- ◆  $R_{DS(ON)}$ (Typ.)  $6.8m\Omega$  @  $V_{GS}=10V$
- ◆  $R_{DS(ON)}$ (Typ.)  $8.0m\Omega$  @  $V_{GS}=4.5V$
- ◆ Special Designed for E-Bike Controller Application
- ◆ Ultra Low On-Resistance
- ◆ High UIS and UIS 100% Test

**Schematic diagram**

**Application**

- ◆ Power switching application
- ◆ Hard switched and high frequency circuits
- ◆ Uninterruptible power supply

**Marking and pin assignment**

**TO-252-2L top view**
**Absolute Maximum Ratings (TA=25°C unless otherwise noted)**

Parameter	Symbol	Limit	Unit
Drain-Source Voltage ( $V_{GS}=0V$ )	$V_{DS}$	60	V
Gate-Source Voltage ( $V_{DS}=0V$ )	$V_{GS}$	$\pm 20$	V
Drain Current (DC) at $T_c=25^\circ C$	$I_D (DC)$	80	A
Drain Current (DC) at $T_c=100^\circ C$	$I_D (DC)$	65	A
Drain Current-Continuous@ Current-Pulsed (Note 1)	$I_{DM} (pulse)$	260	A
Peak Diode Recovery Voltage	$dv/dt$	8	V/ns
Maximum Power Dissipation( $T_c=25^\circ C$ )	$P_D$	75	W
Derating Factor		0.5	W/°C
Single Pulse Avalanche Energy (Note 2)	$E_{AS}$	300	mJ
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to 175	°C

**Electrical Characteristics** (TA=25°C unless otherwise noted)

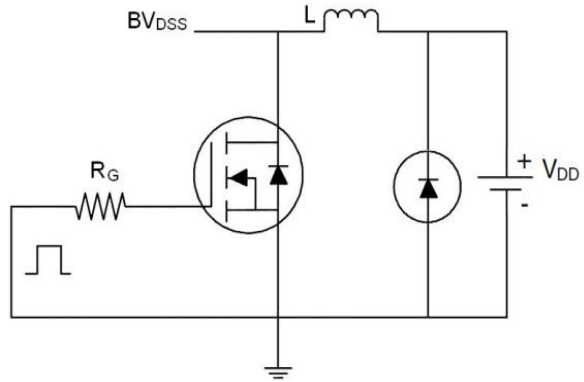
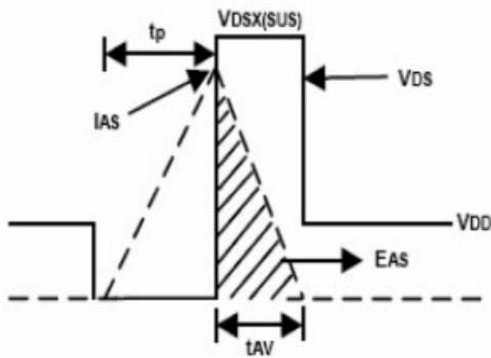
Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	60		-	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V	-	-	1	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA
<b>On Characteristics (Note 3)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	2		4	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =40A	-	6.8	8.2	mΩ
		V <sub>GS</sub> =5V, I <sub>D</sub> =40A	-	8.0	8.5	
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =15A	15	-	-	S
<b>Dynamic Characteristics (Note4)</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, F=1.0MHz	-	2873	-	PF
Output Capacitance	C <sub>oss</sub>		-	252	-	PF
Reverse Transfer Capacitance	C <sub>rss</sub>		-	205	-	PF
<b>Switching Characteristics (Note 4)</b>						
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =30V, I <sub>D</sub> =2A, R <sub>L</sub> =15Ω V <sub>GS</sub> =10V, R <sub>GEN</sub> =2.5Ω	-	14.5	-	nS
Turn-on Rise Time	t <sub>r</sub>		-	24	-	nS
Turn-Off Delay Time	t <sub>d(off)</sub>		-	45	-	nS
Turn-Off Fall Time	t <sub>f</sub>		-	22	-	nS
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =60V, I <sub>D</sub> =40A, V <sub>GS</sub> =10V	-	56	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	10	-	nC
Gate-Drain Charge	Q <sub>gd</sub>		-	16	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage	V <sub>SD</sub>	T <sub>J</sub> =25°C, V <sub>GS</sub> =0V, I <sub>S</sub> =40A	-	0.89	0.99	V
Diode Forward Current	I <sub>DS</sub>		-	-	60	A
Reverse Recovery Time	t <sub>rr</sub>	T <sub>J</sub> = 25°C, I <sub>F</sub> = 75A di/dt = 100A/μs(Note3)	-	22	-	nS
Reverse Recovery Charge	Q <sub>rr</sub>		-	27	-	nC
Forward Turn-On Time	t <sub>on</sub>	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

**Notes:**

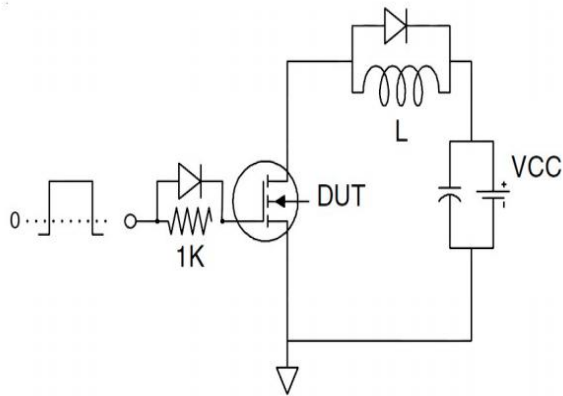
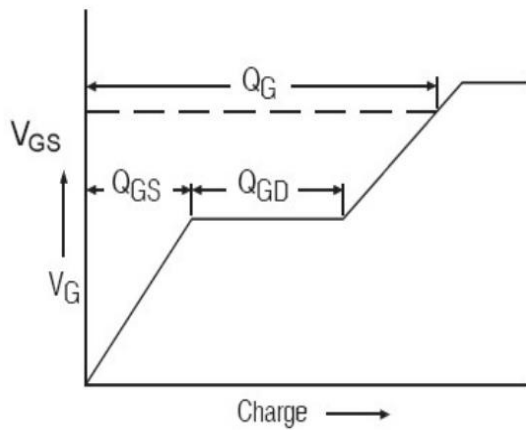
- 1.Repetitive Rating: Pulse width limited by maximum junction temperature
- 2.EAS condition:T<sub>J</sub>=25°C,V<sub>DD</sub>=33V,V<sub>G</sub>=10V
- 3.Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 1.5%, R<sub>G</sub>=25Ω, Starting T<sub>J</sub>=25°C

## Typical Performance Characteristics

### 1) $E_{AS}$ Test Circuits



### 2) Gate Charge Test Circuit:



### 3) Switch Time Test Circuit:

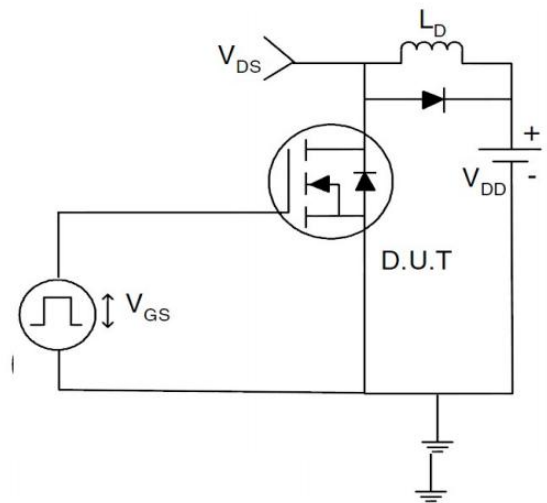
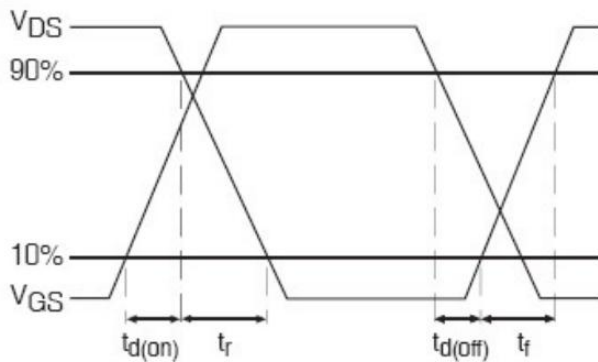


Figure1. Output Characteristics

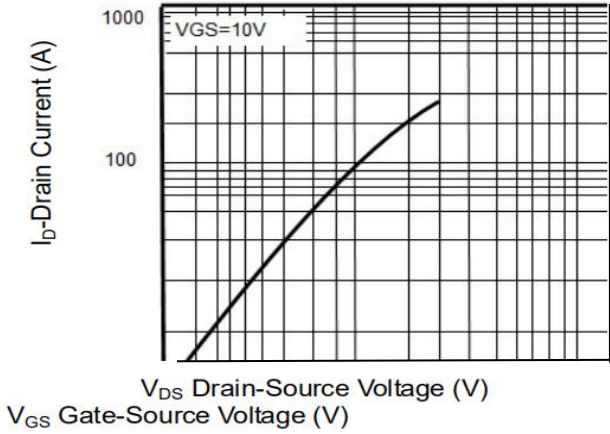


Figure2. Transfer Characteristics

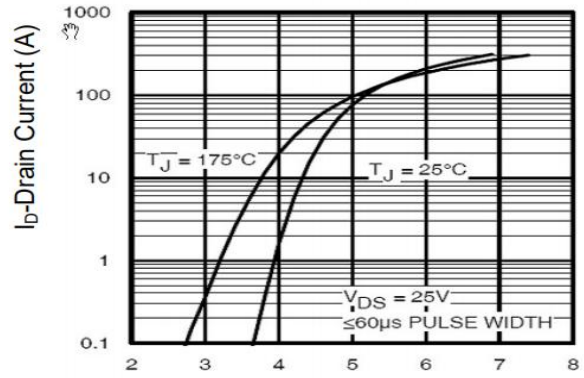


Figure3. BVDSS vs Junction Temperature

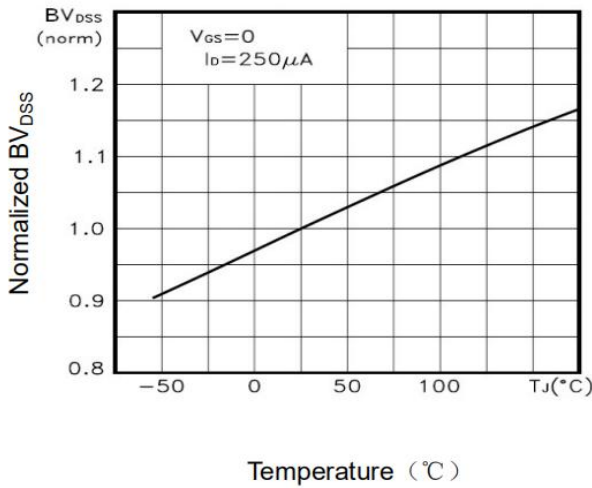


Figure4. ID vs Junction Temperature

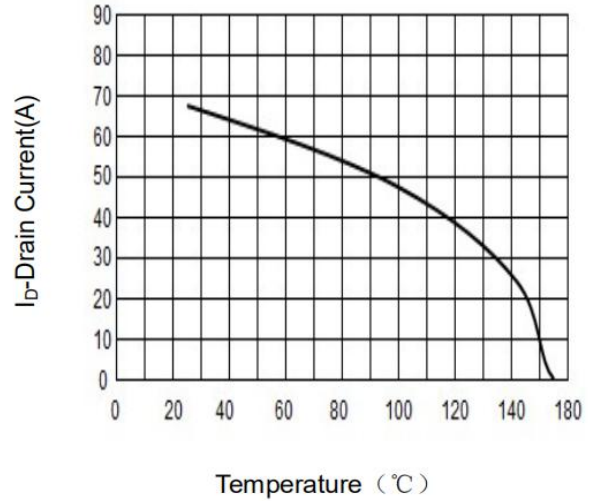


Figure5. VGS(th) vs Junction Temperature

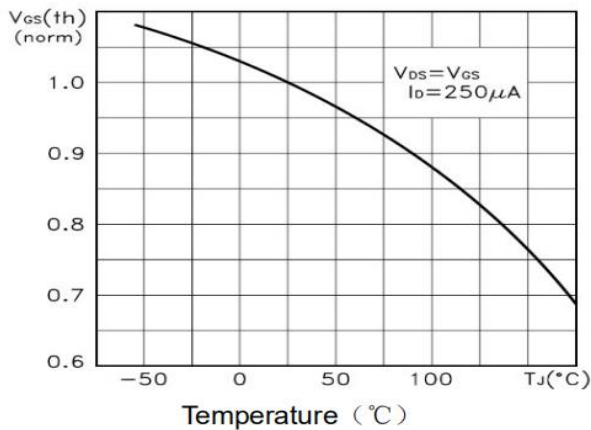


Figure6. Rds(on) Vs Junction Temperature

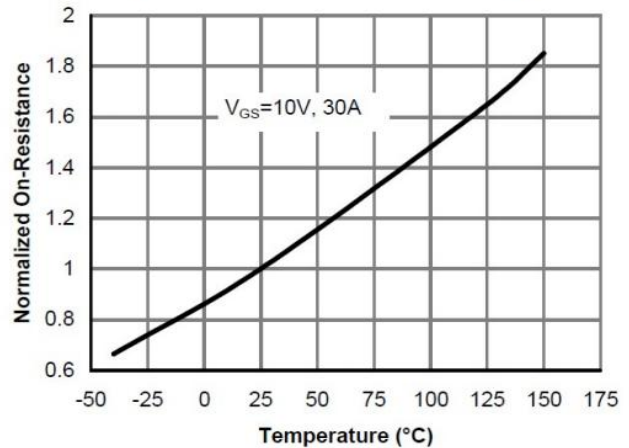


Figure1. Output Characteristics

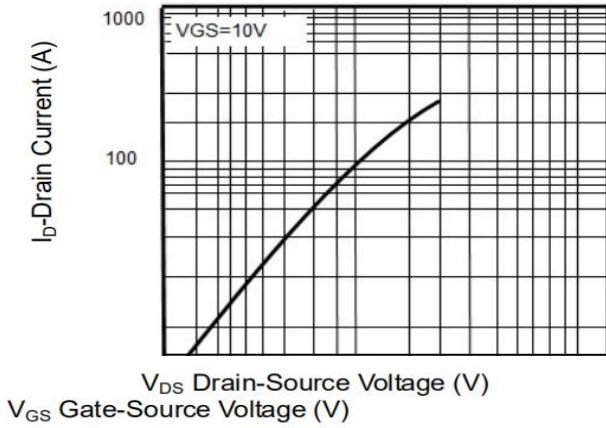


Figure2. Transfer Characteristics

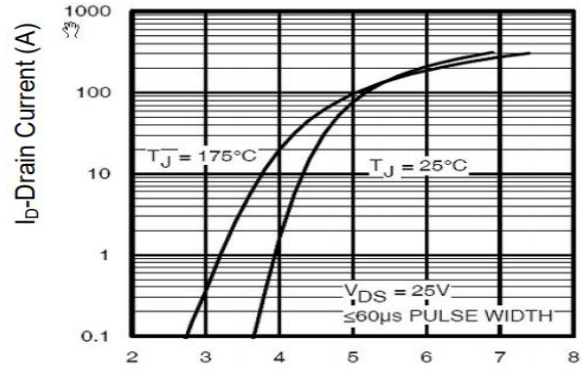


Figure3. BV<sub>DSS</sub> vs Junction Temperature

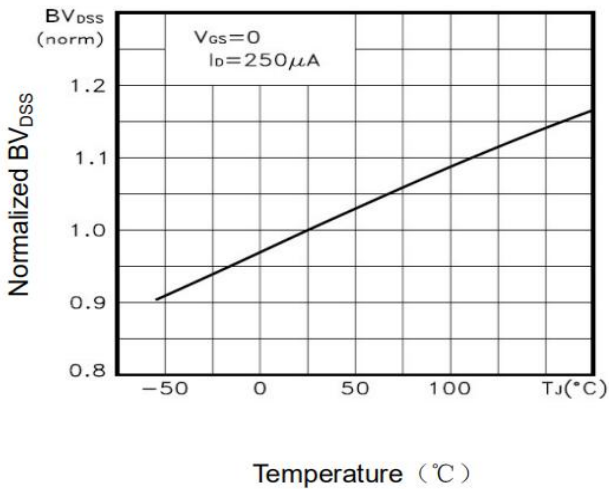


Figure4. ID vs Junction Temperature

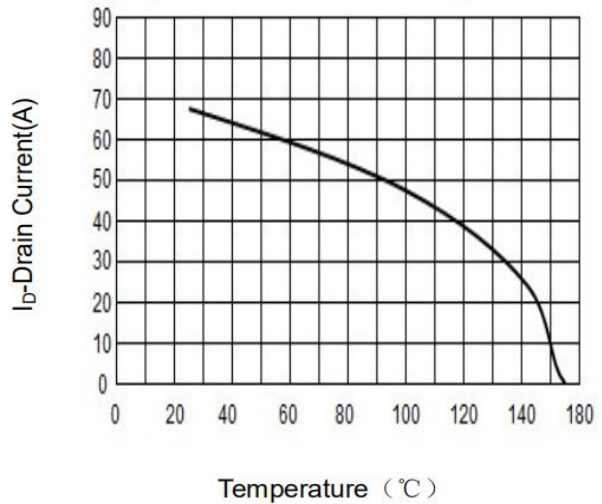


Figure5. VGS(th) vs Junction Temperature

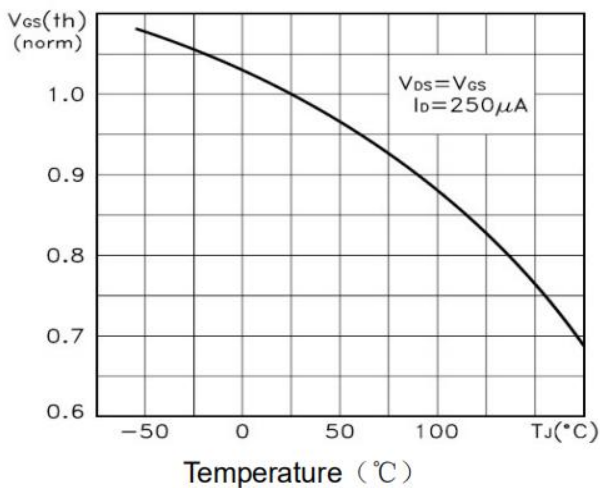


Figure6. R<sub>dson</sub> Vs Junction Temperature

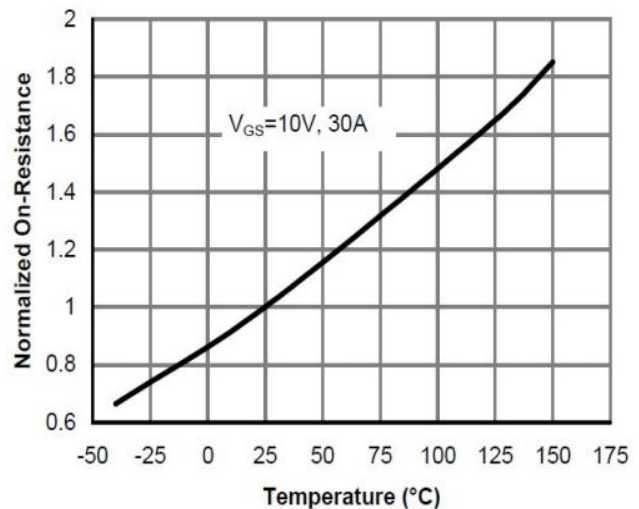




Figure7. Gate Charge

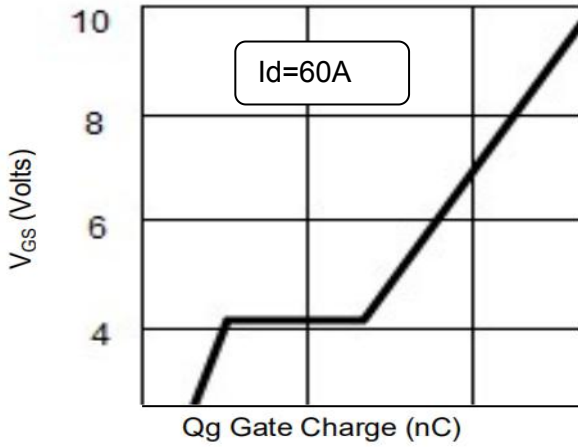


Figure8. Capacitance vs Vds

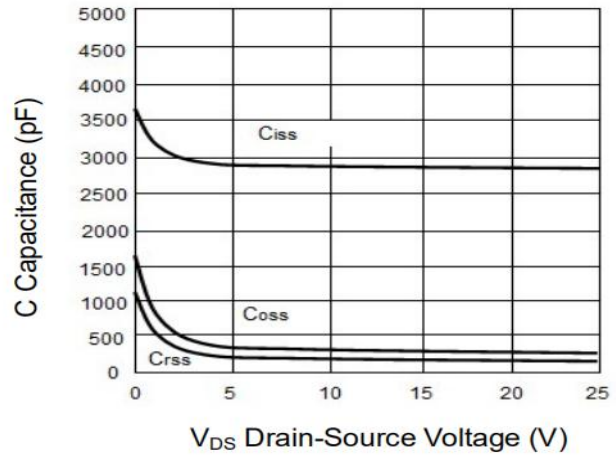


Figure9. Source- Drain Diode Forward

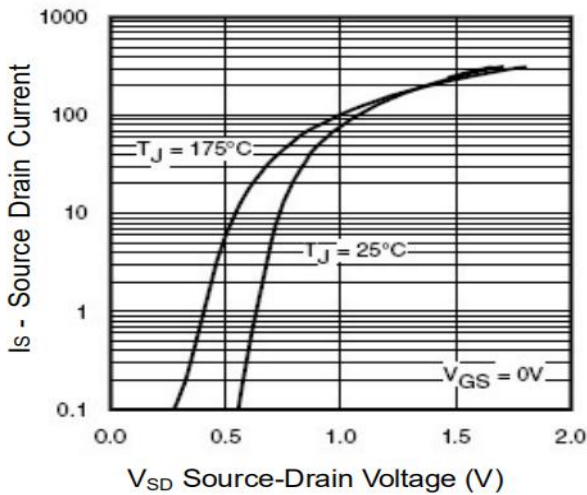


Figure10. Safe Operation Area

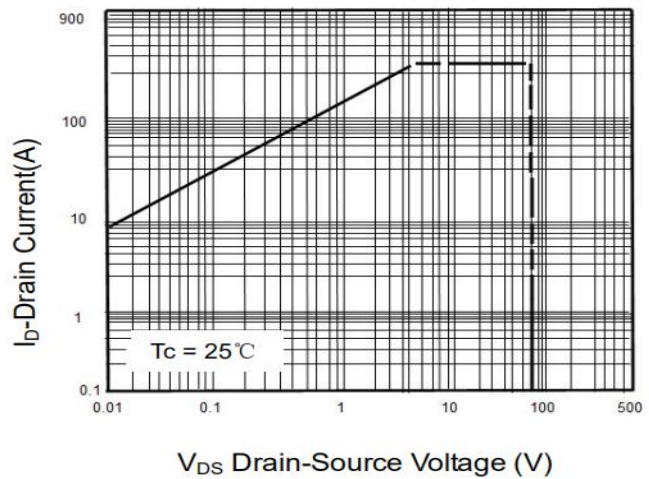
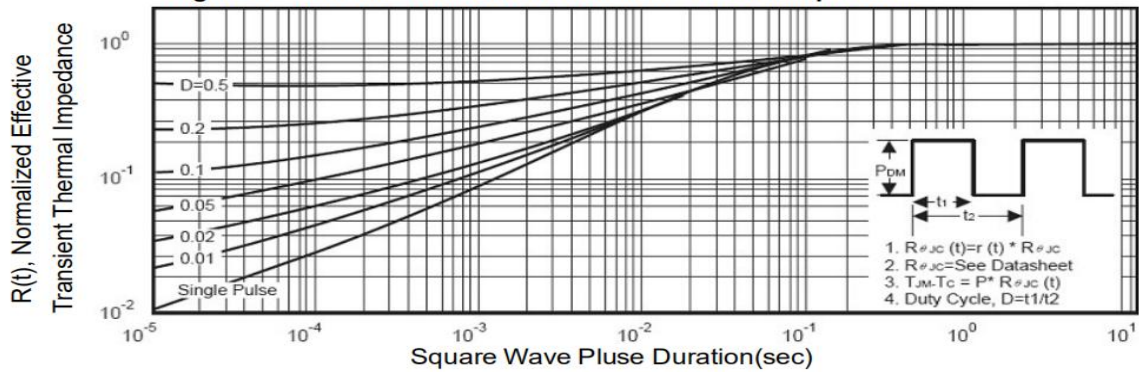
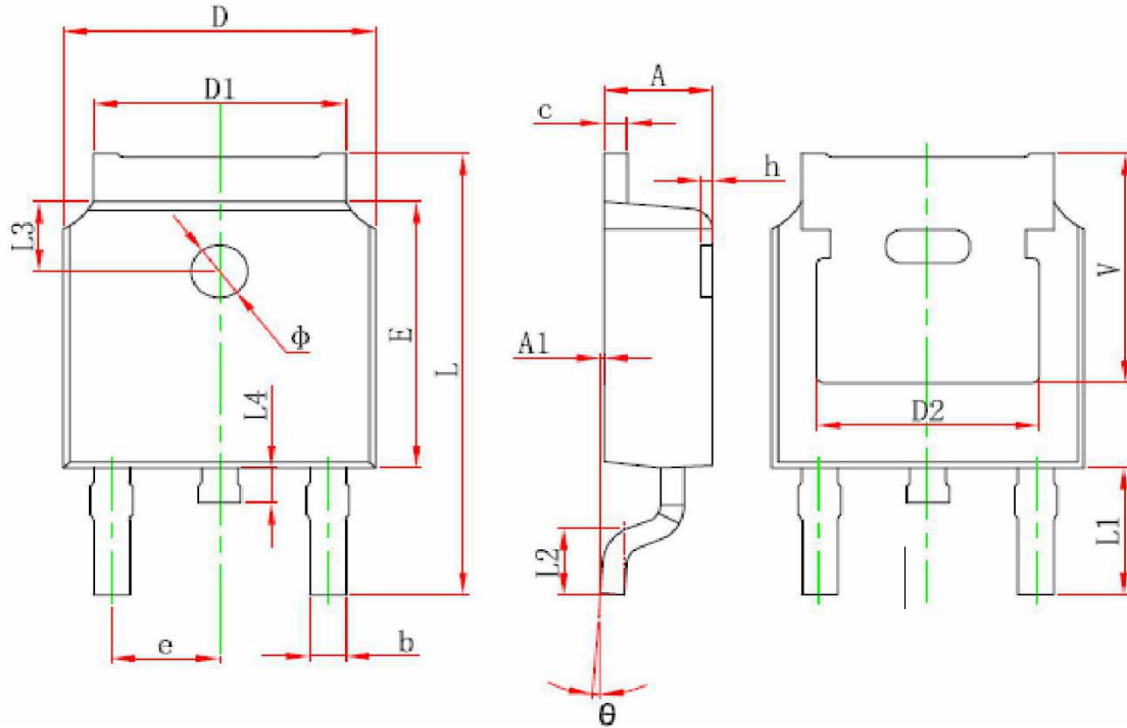


Figure11. Normalized Maximum Transient Thermal Impedance



**TO-252-2L Package Information**


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 REF.		0.211 REF.	