DESCRIPTION

The MXD60P02 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as -2.5V. This device is suitable for use as a Battery protection or in other Switching application.

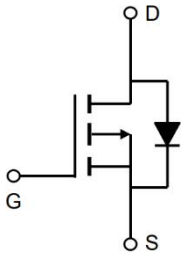
GENERAL FEATURES

- V_{DS}=-20V, I_D=-60A
  $R_{DS(ON)}$(Typ.)=11mΩ @ V_{GS}=-2.5V
  $R_{DS(ON)}$(Typ.)=8mΩ @ V_{GS}=-4.5V

APPLICATION

- Battery protection
- Load switch
- Uninterruptible power supply

PINOUT



Schematic diagram

Marking and pin Assignment


TO-252-3L top view

ORDERING INFORMATION

Part Number	StorageTemperature	Package	Devices Per Reel
MXD60P02	-55°C to 150°C	TO-252-3L	2500

ABSOLUTE MAXIMUM RATINGS(T_C=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	±12	V
Drain Current-Continuous(V_{GS}=-4.5V, T_C=25°C)(Note1)	I_D	-60	A
Drain Current-Continuous(V_{GS}=-4.5V, T_C=70°C)(Note1)	I_D	-48	A
Pulsed Drain Current(Note2)	I_{DM}	-200	A
Total Power Dissipation(T_C=25°C)(Note3)	P_D	60	W
Total Power Dissipation(T_C=70°C)(Note3)	P_D	48	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C
Thermal Resistance, Junction-to-Ambient(Note1)	$R_{\theta JA}$	75	°C/W
Thermal Resistance, Junction-to-Ambient(t≤10s)(Note1)	$R_{\theta JA}$	40	°C/W
Thermal Resistance, Junction-to-Case(Note1)	$R_{\theta JC}$	3.6	°C/W

Note1. The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
Note2. The data tested by pulsed , Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
Note3. The power dissipation is limited by 175°C junction temperature

ELECTRICAL CHARACTERISTICS(T_J=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=-250μA	-20	-22	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-20V, V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±12V, V_{DS}=0V	-	-	±100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250μA	-0.4	-0.65	-1.0	V
Drain-Source On-State Resistance(Note2)	$R_{DS(ON)}$	V_{GS}=-2.5V, I_D=-5.0A	-	11	16	mΩ
		V_{GS}=-4.5V, I_D=-10A	-	8	12	mΩ
Forward Transconductance	g_{FS}	V_{DS}=-10V, I_D=-10A	12	-	-	S
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=-15V, V_{GS}=0V, F=1.0MHz	-	1600	-	pF
Output Capacitance	C_{oss}		-	350	-	pF
Reverse Transfer Capacitance	C_{rss}		-	300	-	pF
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-10V, I_D=-1A, V_{GS}=-4.5V,R_G=6.0Ω	-	10	-	nS
Turn-on Rise Time	t_r		-	15	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	110	-	nS
Turn-Off Fall Time	t_f		-	70	-	nS
Total Gate Charge	Q_g	V_{DS}=-10V, I_D=-10A, V_{GS}=-4.5V	-	63	-	nC
Gate-Source Charge	Q_{gs}		-	9.1	-	nC
Gate-Drain Charge	Q_{gd}		-	13	-	nC
Drain-Source Diode Characteristics						
Continuous Source Current(Note1、3)	I_S	V_G=V_D=0V, Force Current	-	-	-50	A
Diode Forward Voltage(Note2)	V_{SD}	V_{GS}=0V, I_S=-15A	-	-	-1.2	V

Note1. The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
Note2. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
Note3. The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 1. Power Dissipation

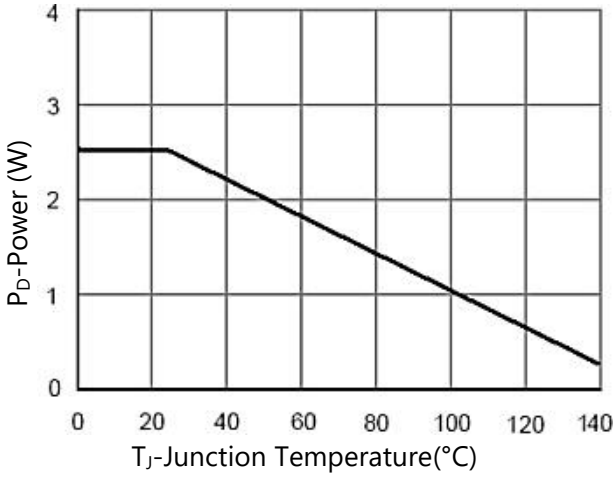


Figure 2. Drain Current

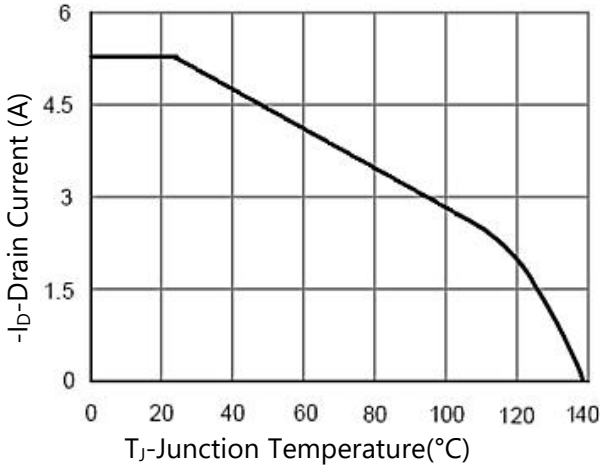


Figure 3. Output Characteristics

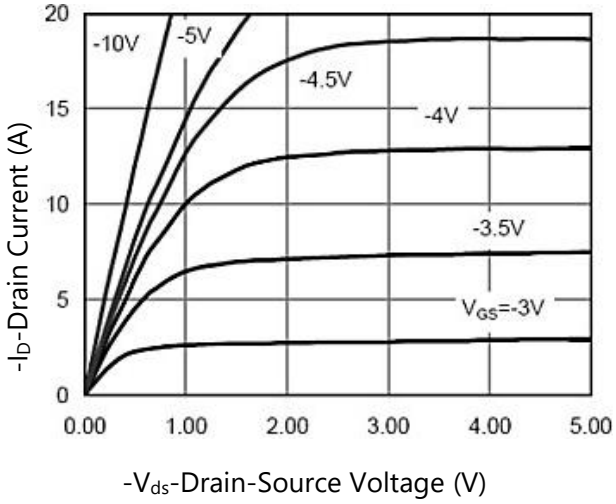


Figure 4. Drain-Source On-Resistance

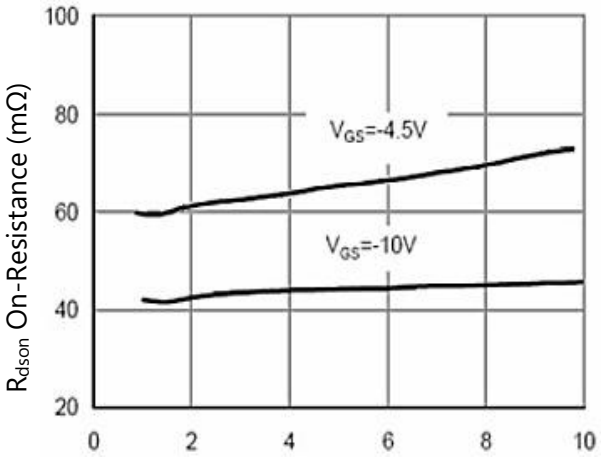


Figure 5. Transfer Characteristics

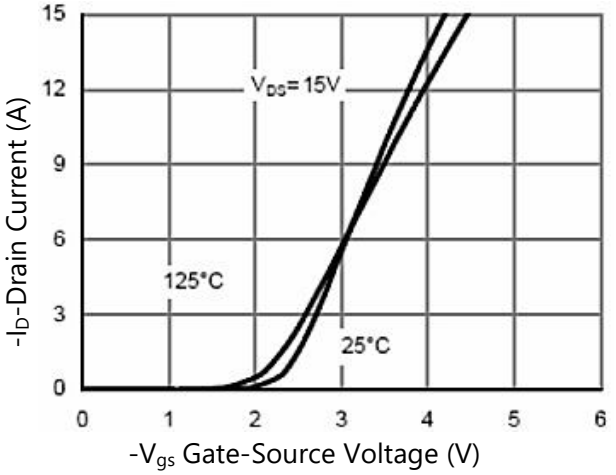
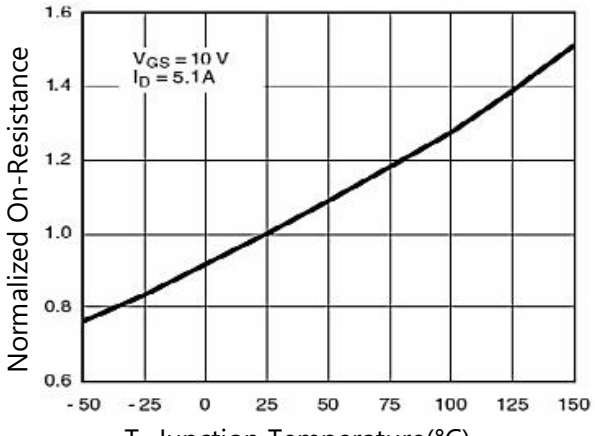


Figure 6. R_{DSON} vs Junction Temperature



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 7. R_{dson} vs V_{gs}

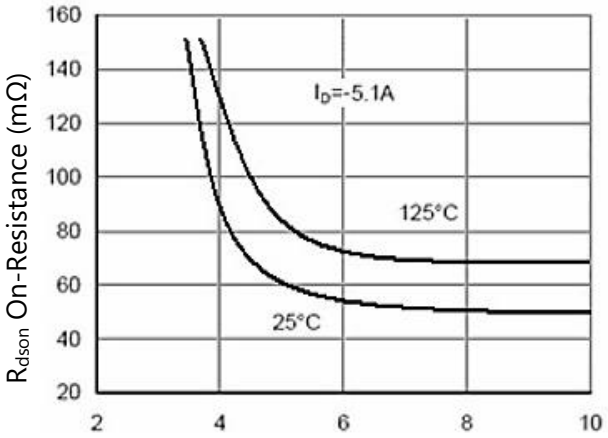


Figure 8. Capacitance vs V_{ds}

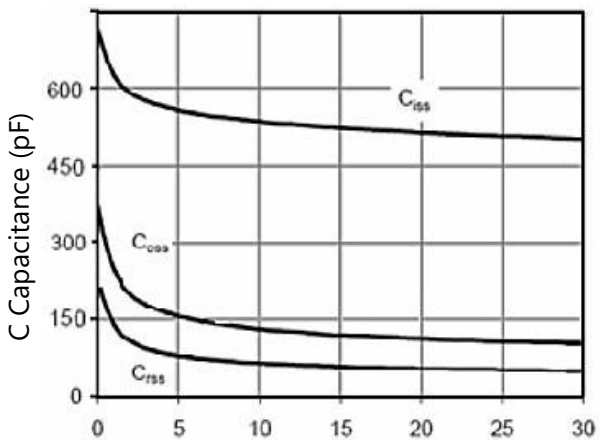


Figure 9. Gate Charge

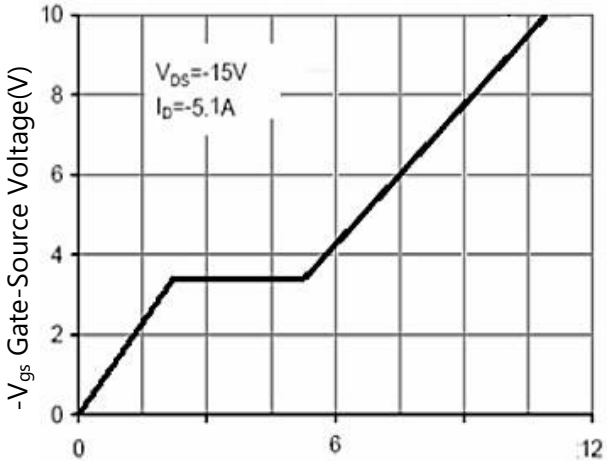


Figure 10. Sourece-Drain Diode Forward

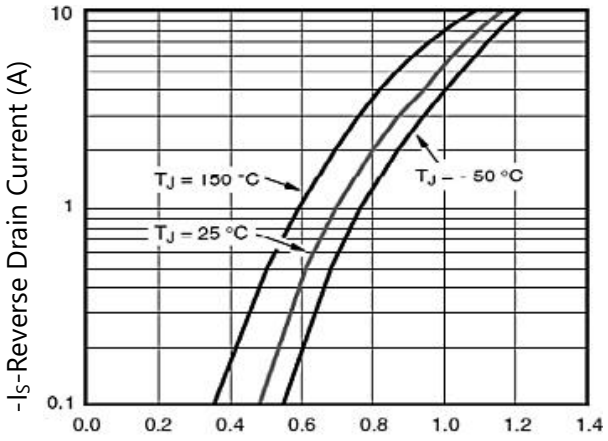
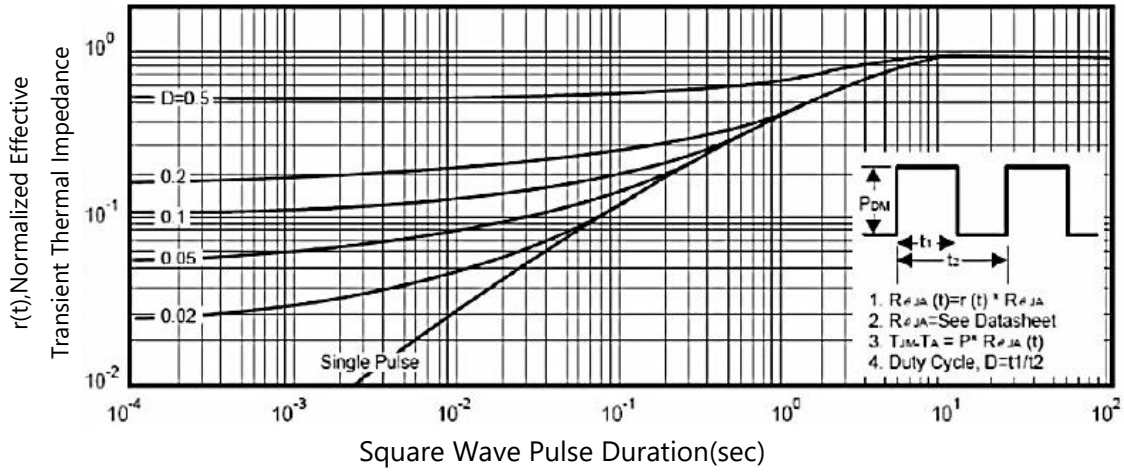
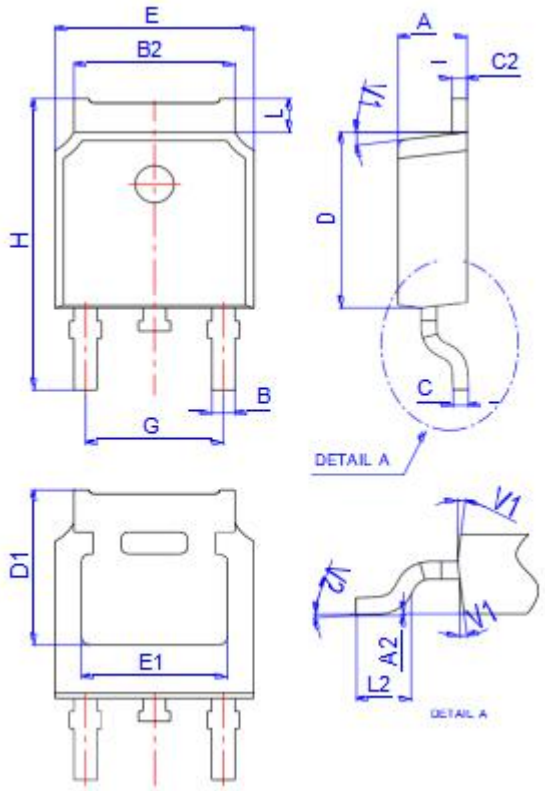


Figure 11. Normalized Maximum Transient Thermal Impedance



PACKAGE INFORMATION

TO-252-3L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.10	2.50	0.083	0.098
A2	0	0.10	0	0.004
B	0.66	0.86	0.026	0.034
B2	5.18	5.48	0.202	0.216
C	0.40	0.60	0.016	0.024
C2	0.44	0.58	0.017	0.023
D	5.90	6.30	0.232	0.248
D1	5.30REF		0.209REF	
E	6.40	6.80	0.252	0.268
E1	4.63	-	0.182	-
G	4.47	4.67	0.176	0.184
H	9.50	10.70	0.374	0.421
L	1.09	1.21	0.043	0.048
L2	1.35	1.65	0.053	0.065
V1	7°TYP		7°TYP	
V2	0°	6°	0°	6°