

## DESCRIPTION

The MXD15P15K uses advanced trench technology to provide excellent  $R_{DS(ON)}$  with low gate charge. It can be used in a wide variety of applications.

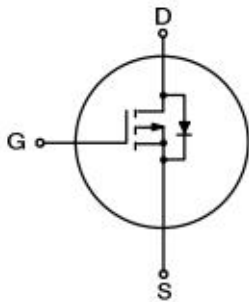
## GENERAL FEATURES

- $V_{DS} = -140V$ ,  $I_D = -15A$   
 $R_{DS(ON)} \cong 180m\Omega$  @  $V_{GS} = -10V$
- Low Thermal Resistance
- Advanced trench cell design

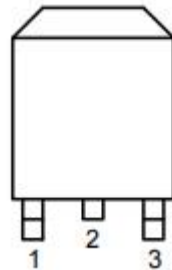
## APPLICATION

- Motor drivers
- DC-DC Converter

## PINOUT



Schematic diagram



TO-252 Top View

Pin	Description
1	Gate(G)
2	Drain(D)
3	Source(S)

## ORDERING INFORMATION

Part Number	Storage Temperature	Package	Devices Per Reel
MXD15P15K	-55°C to 150°C	TO-252	2500

## ABSOLUTE MAXIMUM RATINGS ( $T_C = 25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	-140	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current ( $V_{GS} = -10V$ ) <sup>(Note1)(Note3)</sup>	$I_D$	-15	A
Pulsed Source Current ( $V_{GS} = -10V$ ) <sup>(Note1)(Note2)(Note3)</sup>	$I_{DM}$	-60	A
Diode Forward Current	$I_S$	-15	A
Total Power Dissipation <sup>(Note1)</sup>	$P_{tot}$	89	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to 150	°C
Thermal Resistance, Junction-to-Case <sup>(Note1)</sup>	$R_{\theta JC}$	62.5	°C/W

Note 1. Surface Mounted on 1 in<sup>2</sup> pad area,  $t \leq 10$  sec

Note 2. Pulse width  $\leq 10\mu s$ , duty cycle  $\leq 1\%$

Note 3. limited by bonding wire



**ELECTRICAL CHARACTERISTICS** ( $T_C=25^\circ\text{C}$  unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-140	-	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-120V, V_{GS}=0V$	-	-	-25	$\mu A$
		$V_{DS}=-120V, V_{GS}=0V, T_J=85^\circ C$	-	-	-30	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
<b>On Characteristics</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1	-	-3	V
Drain-Source On-State Resistance <sup>(Note1)</sup>	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-12A$	-	-	180	m $\Omega$
<b>Dynamic Characteristics</b> <sup>(Note2)</sup>						
Input Capacitance	$C_{iss}$	$V_{DS}=-25V, V_{GS}=0V, F=1.0MHz$	-	2850	4560	pF
Output Capacitance	$C_{oss}$		-	150	-	pF
Reverse Transfer Capacitance	$C_{rss}$		-	100	-	pF
<b>Switching Characteristics</b> <sup>(Note2)</sup>						
Turn-on Delay Time	$t_{d(on)}$	$V_{DS}=-50V, I_D=-10A, V_{GEN}=-10V, R_G=3.3\Omega$	-	11	-	nS
Turn-on Rise Time	$t_r$		-	26	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	67	-	nS
Turn-Off Fall Time	$t_f$		-	60	-	nS
Total Gate Charge	$Q_g$	$V_{DS}=-80V, I_{DS}=-12A, V_{GS}=-10V$	-	55	90	nC
Gate-Source Charge	$Q_{gs}$		-	8.2	-	nC
Gate-Drain Charge	$Q_{gd}$		-	16.6	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage <sup>(Note1)</sup>	$V_{SD}$	$V_{GS}=0V, I_{SD}=-12A$	-	-	-1.3	V
Reverse Recovery Time	$t_{rr}$	$I_{SD}=-12A, di_{SD}/dt=100A/\mu s$	-	75	-	nS
Reverse Recovery Charge	$Q_{rr}$		-	250	-	nC

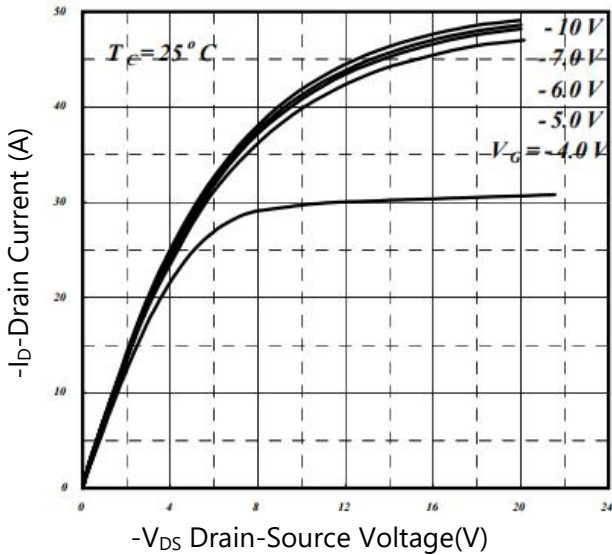
Note 1. The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$

Note 2. Guaranteed by design, not subject to production testing

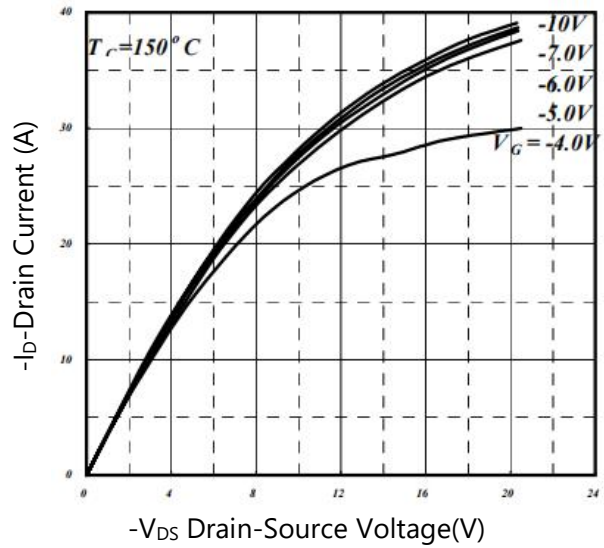


**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**

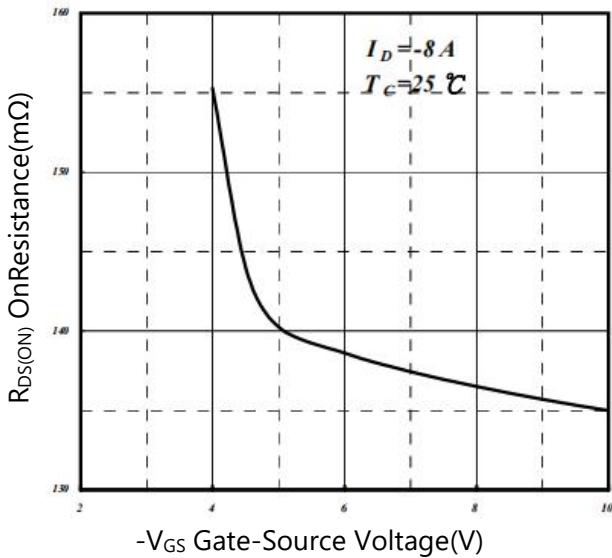
**Figure 1. Output Characteristics( $T_c=25^\circ C$ )**



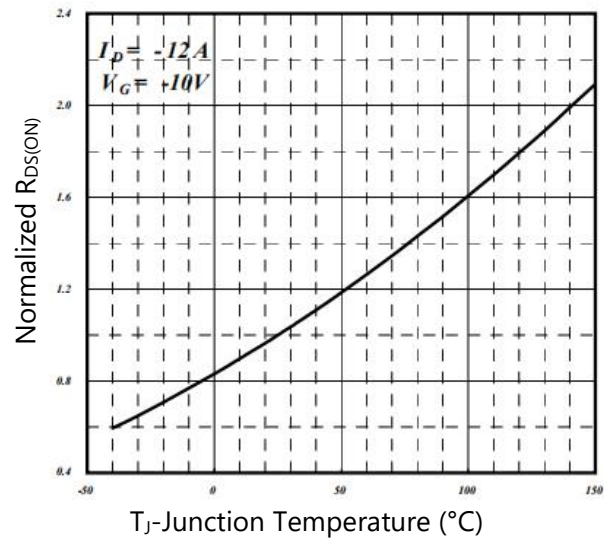
**Figure 2. Output Characteristics( $T_c=150^\circ C$ )**



**Figure 3. On-Resistance vs Gate Voltage**



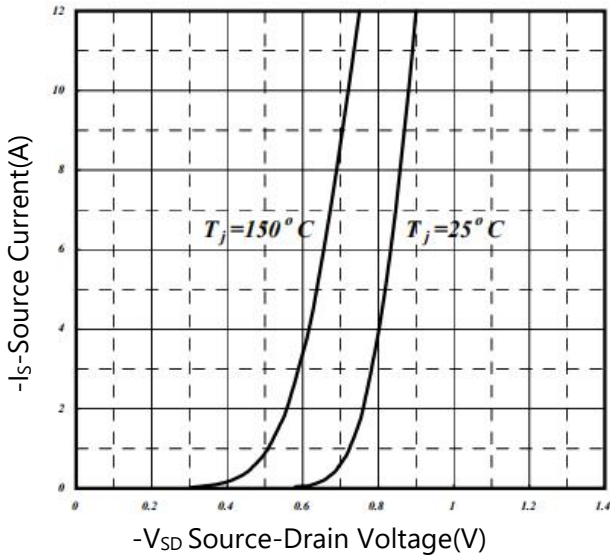
**Figure 4. Normalized On-Resistance vs Junction Temperature**



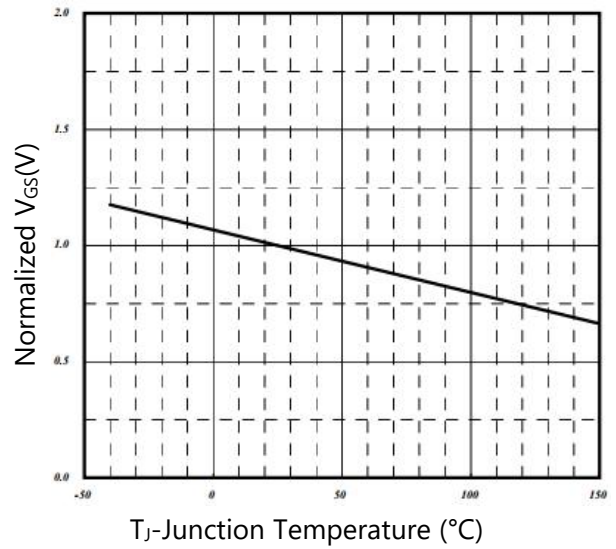


**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**

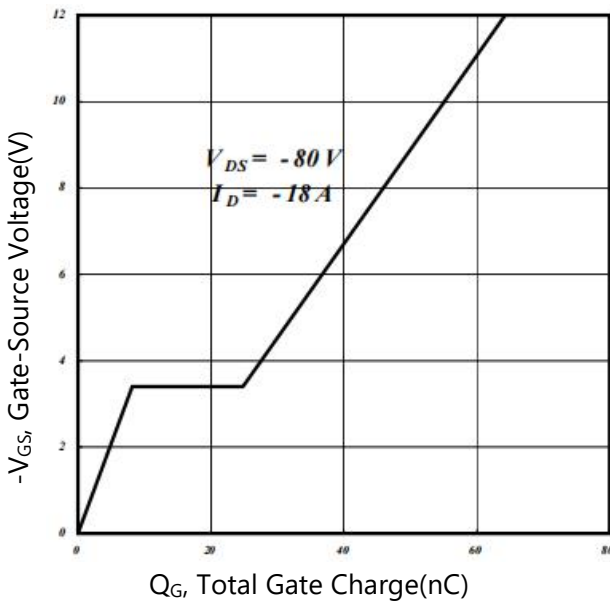
**Figure 5. Forward Characteristics of Reverse Diode**



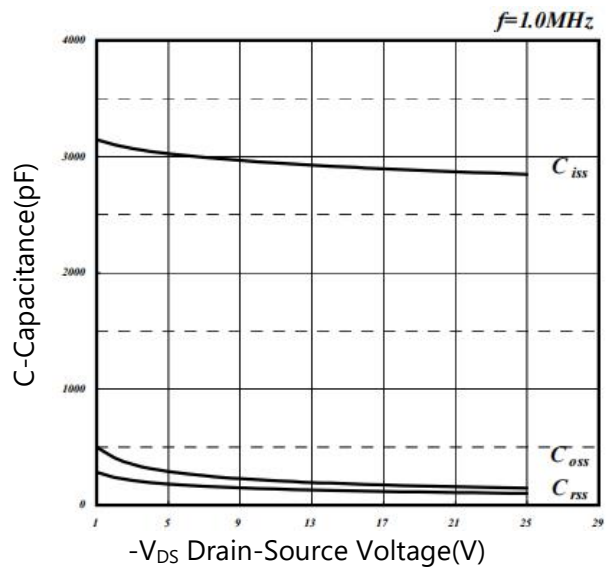
**Figure 6. Gate Threshold Voltage vs Junction Temperature**



**Figure 7. Gate Charge Characteristics**



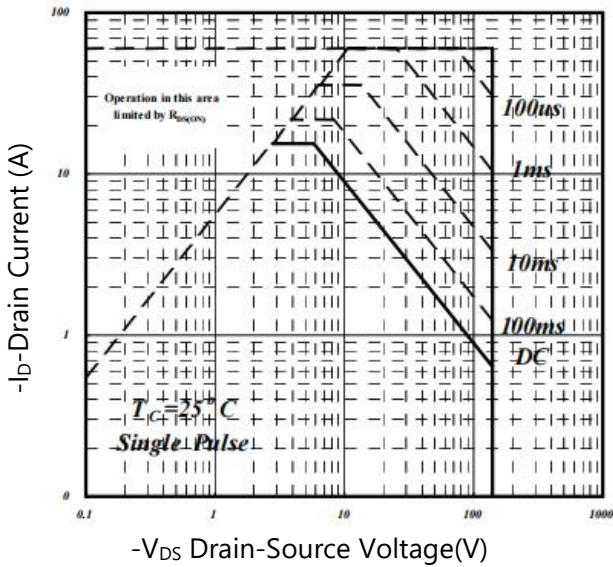
**Figure 8. Typical Capacitance Characteristics**



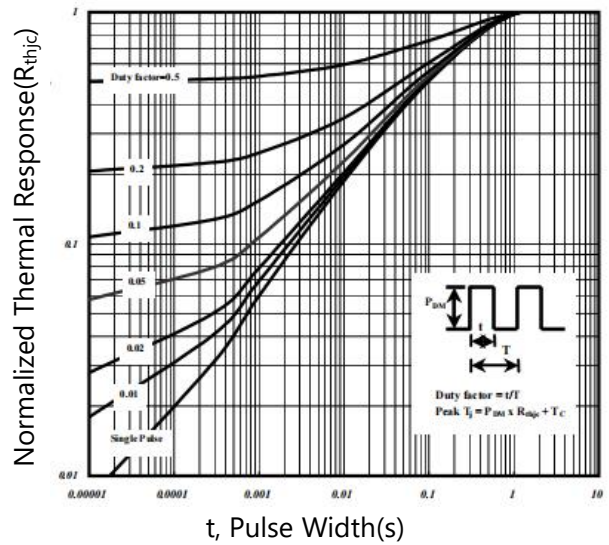


**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**

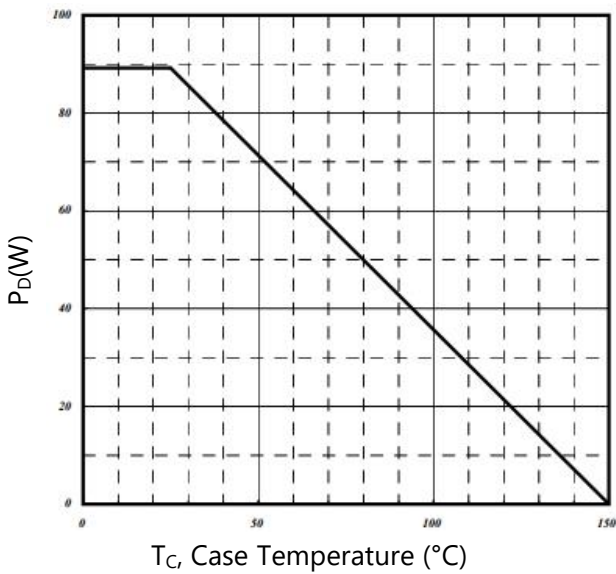
**Figure 9. Maximum Safe Operating Area**



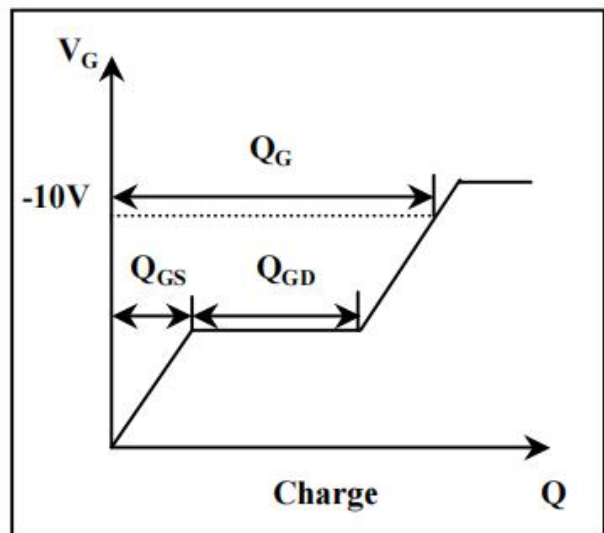
**Figure 10. Effective Transient Thermal Impedance**



**Figure 11. Typical Power Dissipation**

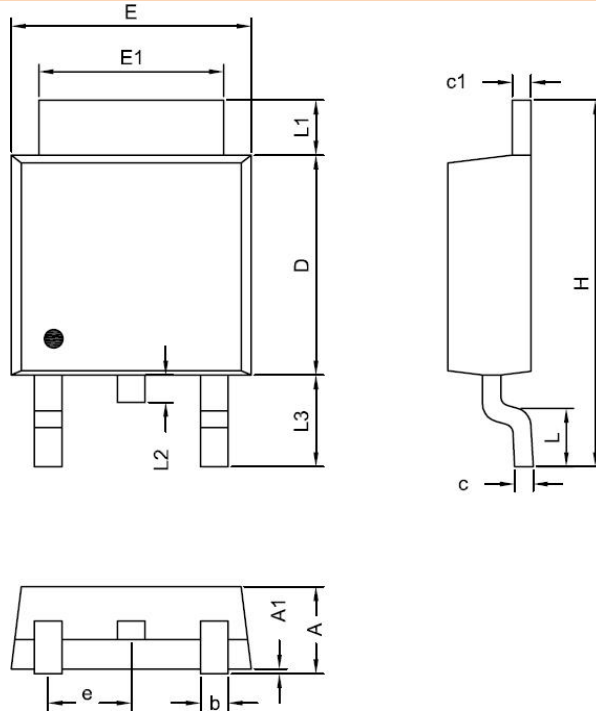


**Figure 12. Gate Charge Waveform**



PACKAGE INFORMATION

TO252-3L



Symbol	Dimensions In Millimeters	
	MIN.	MAX.
A	2.19	2.38
A1	0.02	0.13
D	5.30	6.40
E	6.35	6.80
E1	5.20	5.50
c	0.40	0.60
c1	0.40	0.60
b	0.55	0.85
e	2.30 BCS	
L	1.00	1.80
L1	0.70	1.80
L2	0.70 BCS	
L3	2.40	2.80
H	9.20	10.40