



N-Channel Enhancement Mode Power MOSFET **MXD3080K**

DESCRIPTION

These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.

These devices are well suited for high efficiency fast switching applications.

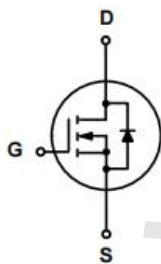
GENERAL FEATURES

- $V_{DS}=30V$, $I_D=80A$
 $R_{DS(ON)}(Typ.)=3.7m\Omega$ @ $V_{GS}=10V$
 $R_{DS(ON)}(Typ.)=6m\Omega$ @ $V_{GS}=4.5V$
- Improved dv/dt capability
- 100% EAS Guaranteed
- Fast switching

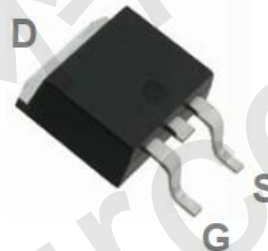
APPLICATION

- NB / VGA / V_{CORE}
- POL Applications
- SMPS 2nd SR

PINOUT



Schematic diagram



TO-252 Top View

ORDERING INFORMATION

Part Number	Storage Temperature	Package	Devices Per Reel
MXD3080K	-55°C to 150°C	TO-252	-

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_C=25^\circ C$)	I_D	80	A
Continuous Drain Current ($T_C=100^\circ C$)	I_D	51	A
Pulsed Drain Current ^(Note1)	I_{DM}	320	A
Single Pulsed Avalanche Energy ^(Note2)	E_{AS}	88	mJ
Single Pulsed Avalanche Current ^(Note2)	I_{AS}	42	A
Power Dissipation ($T_C=25^\circ C$)	P_D	54	W
Power Dissipation (Derate above 25°C)	P_D	0.43	W/°C
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 175	°C
Thermal Resistance, Junction-to-Case ^(Note1)	$R_{\theta JC}$	2.3	°C/W
Thermal Resistance, Junction-to-Ambient ^(Note1)	$R_{\theta JA}$	62	°C/W

Note 1. Repetitive Rating : Pulsed width limited by maximum junction temperature.

Note 2. $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=42A, R_G=25\Omega, Starting T_J=25^\circ C$.



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

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=30V, V_{GS}=0V$	-	-	1	μA
		$V_{DS}=24V, V_{GS}=0V, T_J=125^\circ C$	-	-	10	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.6	2.5	V
Drain-Source On-State Resistance ^(Note1)	$R_{DS(ON)}$	$V_{GS}=10V, I_D=30A$	-	3.7	5	m Ω
		$V_{GS}=4.5V, I_D=25A$	-	6	9	m Ω
Forward Transconductance	g_{fs}	$V_{GS}=10V, I_D=10A$	-	18	-	S
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V, F=1.0MHz$	-	1160	-	pF
Output Capacitance	C_{oss}		-	200	-	pF
Reverse Transfer Capacitance	C_{rss}		-	180	-	pF
Switching Characteristics^{(Note1)(Note2)}						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=15V, I_D=15A, V_{GS}=10V, R_G=3.3\Omega$	-	7.5	-	nS
Turn-on Rise Time	t_r		-	14.5	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	35.2	-	nS
Turn-Off Fall Time	t_f		-	9.6	-	nS
Total Gate Charge	Q_g	$V_{DS}=15V, I_{DS}=20A, V_{GS}=4.5V$	-	11.1	-	nC
Gate-Source Charge	Q_{gs}		-	1.85	-	nC
Gate-Drain Charge	Q_{gd}		-	6.8	-	nC
Gate Resistance	R_g	$V_{DS}=0V, V_{GS}=0V, F=1MHz$	-	2.5	-	Ω
Drain-Source Diode Characteristics						
Coninuous Current	I_S	$V_G=V_D=0V, \text{Force Current}$	-	-	80	A
Pulsed Source Current ^(Note1)	I_{SM}		-	-	320	A
Forward Voltage ^(Note1)	V_{SD}	$I_S=1A, V_{GS}=0V,$	-	-	1	V

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

Note 2. Essentially independent of operating temperature.



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 1. Continuous Drain Current vs T_C

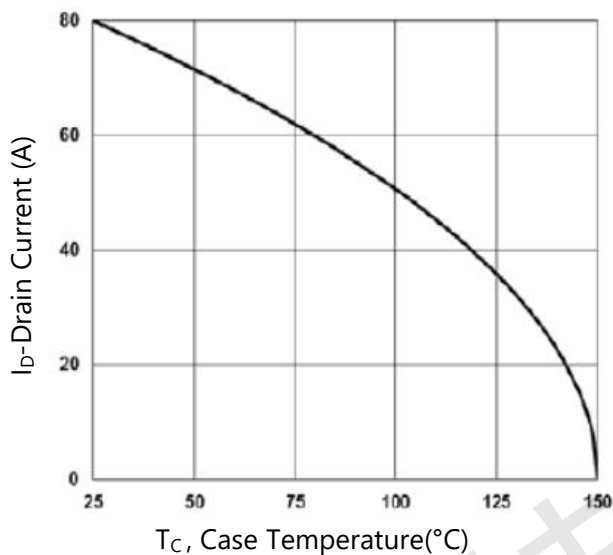


Figure 2. Normalized $R_{DS(on)}$ vs T_J

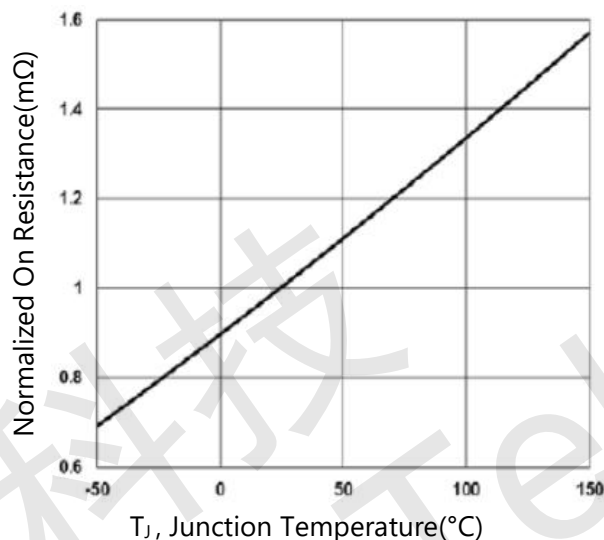


Figure 3. Normalized V_{th} vs T_J

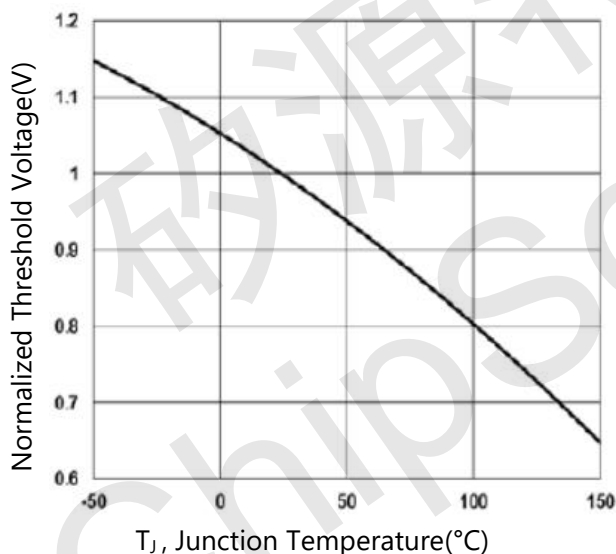
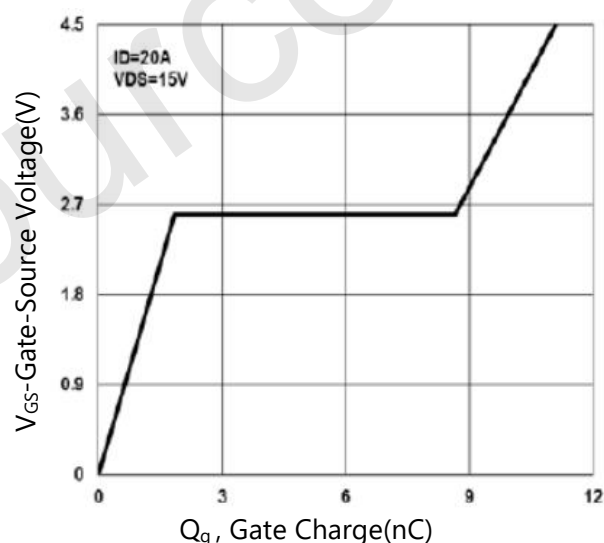


Figure 4. Gate Charge Waveform





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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 5. Normalized Transient Impedance

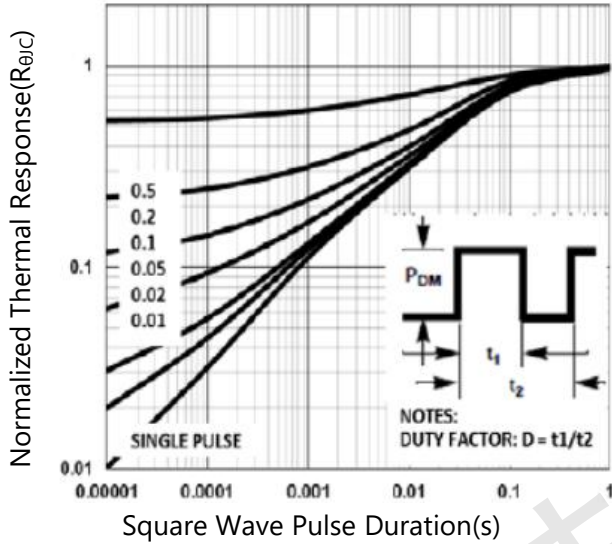


Figure 6. Maximum Safe Operation Area

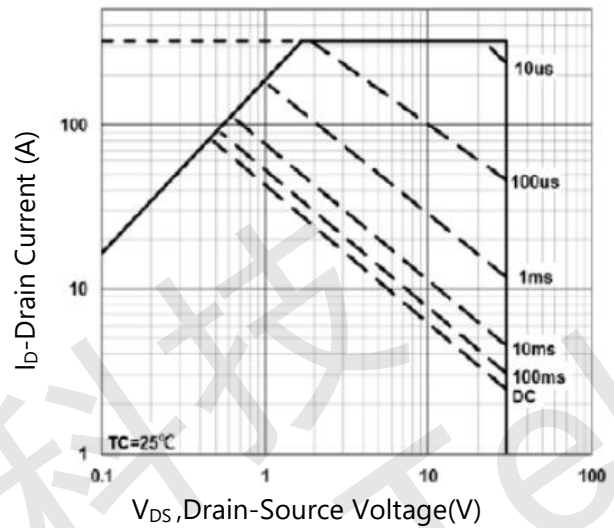


Figure 7. Switch Time Waveform

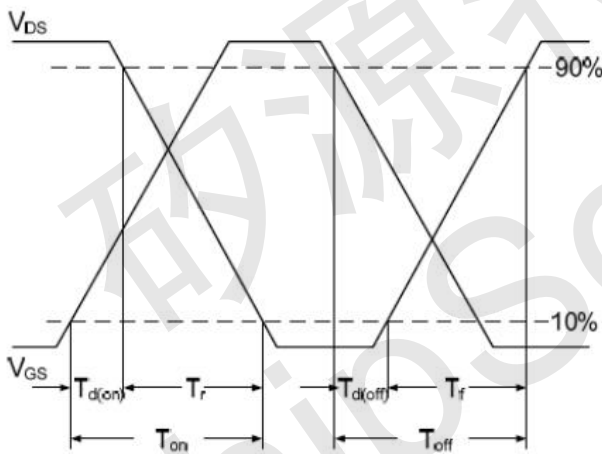
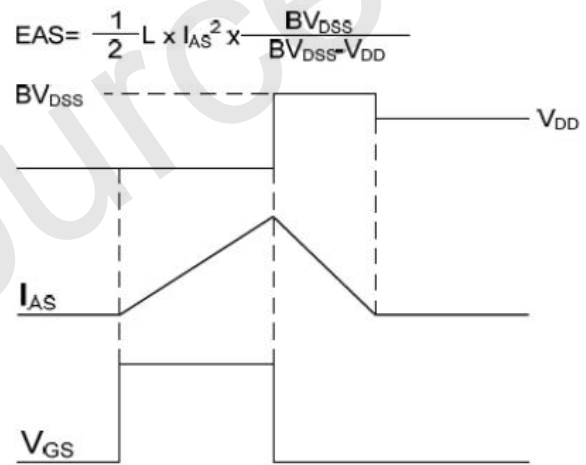


Figure 8. EAS Waveform

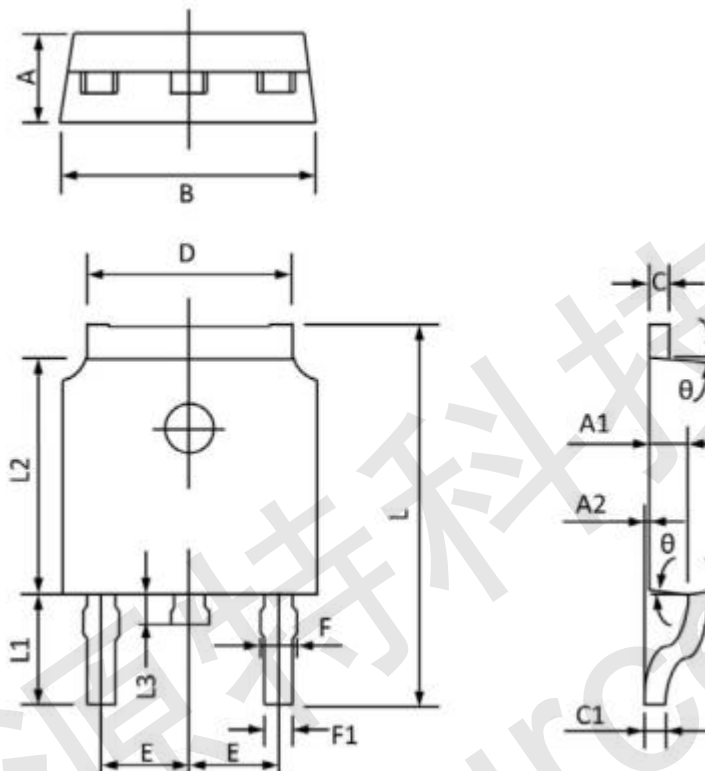




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 **PACKAGE INFORMATION**

TO-252



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	2.200	2.400	0.087	0.094
A1	0.910	1.110	0.036	0.044
A2	0.000	0.150	0.000	0.006
B	6.400	6.800	0.252	0.268
C	0.450	0.580	0.018	0.023
C1	0.450	0.580	0.018	0.023
D	5.100	5.500	0.201	0.217
E	2.186	2.386	0.086	0.094
F	0.600	0.940	0.024	0.037
F1	0.500	0.860	0.020	0.034
L	9.400	10.400	0.370	0.409
L1	2.400	3.000	0.094	0.118
L2	5.400	6.200	0.213	0.244
L3	0.600	1.200	0.024	0.047
θ	3°	9°	3°	9°