

DESCRIPTION

The MXD2060K 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 wide variety of applications.

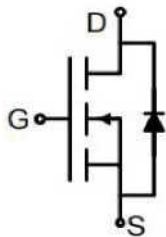
GENERAL FEATURES

- $V_{DS}=20V$, $I_D=60A$
 $R_{DS(ON)}(Typ.)=6.2m\Omega @ V_{GS}=2.5V$
 $R_{DS(ON)}(Typ.)=4.8m\Omega @ V_{GS}=4.5V$
- High Power and current handling capability
- Lead free product is acquired
- Surface Mount Package

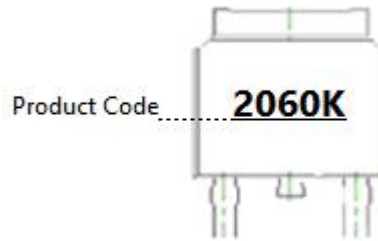
APPLICATION

- Battery Protection
- Load switch
- Power management

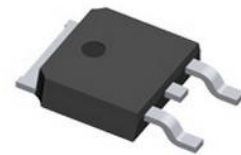
PINOUT



Schematic diagram



Marking and pin Assignment



TO-252 top view

ORDERING INFORMATION

Device	Marking	Storage Temperature	Package	Devices Per Reel
MXD2060K	2060K	-55°C to 150°C	TO-252	2500

KEY PERFORMANCE PARAMETERS ($T_A=25^\circ C$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage ($V_{GS}=0V$)	V_{DS}	20	V
Gate-Source Voltage ($V_{DS}=0V$)	V_{GS}	± 10	V
Drain Current-Continuous ($T_C=25^\circ C$) ^(Note 1)	I_D	60	A
Drain Current-Continuous ($T_C=100^\circ C$)	I_D	42.5	A
Drain Current-Continuous@Current-Pulsed ^(Note 2)	$I_{DM(pluse)}$	240	A
Maximum Power Dissipation ($T_C=25^\circ C$)	P_D	50	W
Maximum Power Dissipation ($T_C=100^\circ C$)	P_D	25	W
Avalanche energy ^(Note 3)	E_{AS}	156	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 175	$^\circ C$

THERMAL CHARACTERISTIC

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	3	$^\circ C/W$

Notes 1. The maximum current rating is package limited.

Notes 2. Repetitive Rating: Pulse width limited by maximum junction temperature

Notes 3. EAS condition: $T_J=25^\circ C$, $V_{DD}=30V$, $V_G=4.5V$, $R_G=25\Omega$,



N-Channel Enhancement Mode Power MOSFET MXD2060K



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

Parameter	Symbol	Condition	Min	Typ	Max	Unit
-----------	--------	-----------	-----	-----	-----	------

On/Off Characteristics

Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	19.5	22	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=19V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 10V, V_{DS}=0V$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.5	0.7	1.1	V
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=10A$	-	38	-	S
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=2.5V, I_D=10A$	-	6.2	9.4	$m\Omega$
		$V_{GS}=4.5V, I_D=15A$	-	4.8	6.3	$m\Omega$

Dynamic Characteristics

Input Capacitance	C_{iss}	$V_{DS}=10V, V_{GS}=0V,$ $F=1.0MHz$	-	1825	-	pF
Output Capacitance	C_{oss}		-	275	-	pF
Reverse Transfer Capacitance	C_{rss}		-	218	-	pF
Gate resistance	R_g	$V_{DS}=0V, V_{GS}=0V,$ $F=1.0MHz$	-	1.3	-	Ω

Switching Times

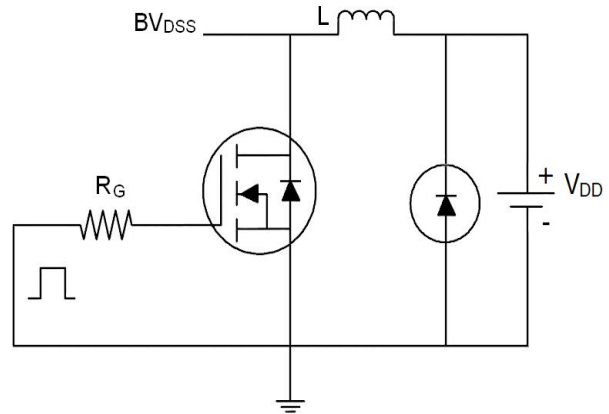
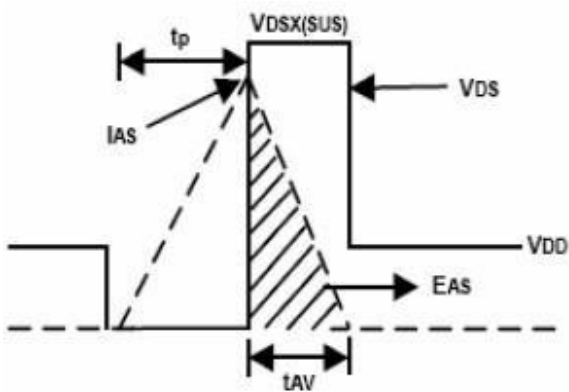
Turn-on Delay Time	$t_{d(on)}$	$V_{GS}=4.5V, V_{DS}=10V,$ $R_L=0.5\Omega, R_{GEN}=3\Omega$	-	5.9	-	nS
Turn-on Rise Time	t_r		-	10.2	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	54	-	nS
Turn-Off Fall Time	t_f		-	16	-	nS
Total Gate Charge	Q_g	$V_{DS}=10V, I_D=20A,$ $V_{GS}=4.5V$	-	25.3	-	nC
Gate-Source Charge	Q_{gs}		-	2.6	-	nC
Gate-Drain Charge	Q_{gd}		-	9.4	-	nC

Source-Drain Diode Characteristics

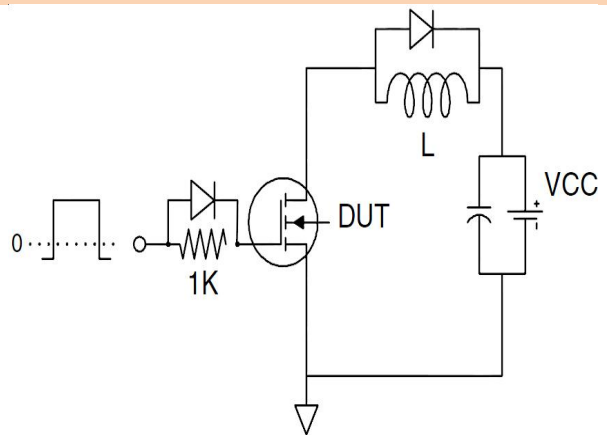
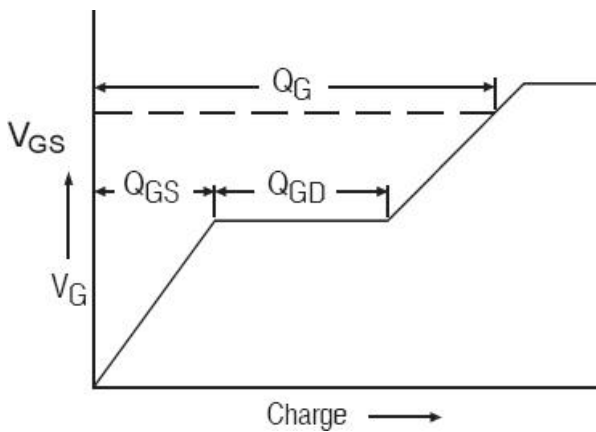
Source-Drain Current(Body Diode)	I_{SD}		-	-	60	A
Forward On Voltage	V_{SD}	$V_{GS}=0V, I_S=1A$	-	0.78	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F=20A, dI/dt=100A/\mu s$	-	26.5	-	nS
Body Diode Reverse Recovery Charge	Q_{rr}	$I_F=20A, dI/dt=100A/\mu s$	-	25	-	nC

TEST CIRCUIT

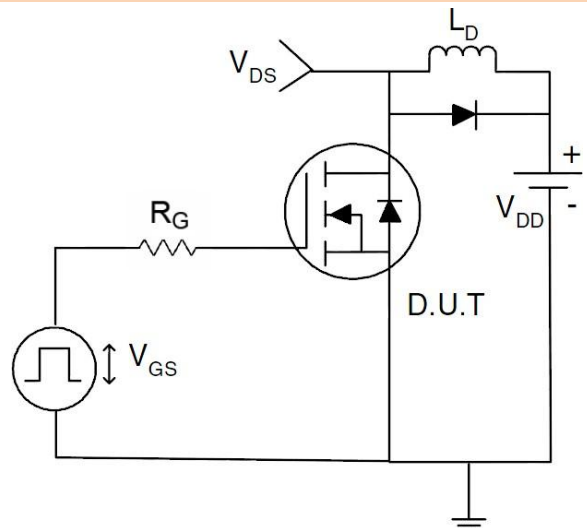
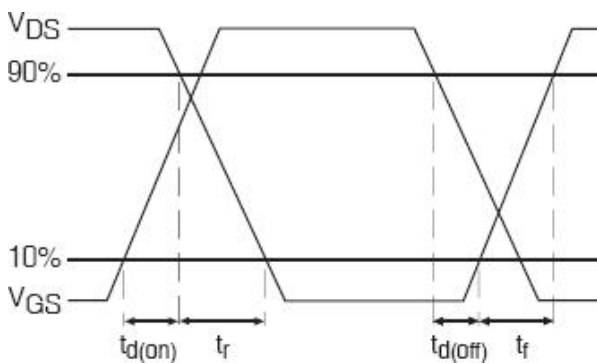
1) EAS Test Circuits



2) Gate Charge Test Circuit



3) Switch Time Test Circuit



TYPICAL PERFORMANCE CHARACTERISTICS

Figure1. Output Characteristics

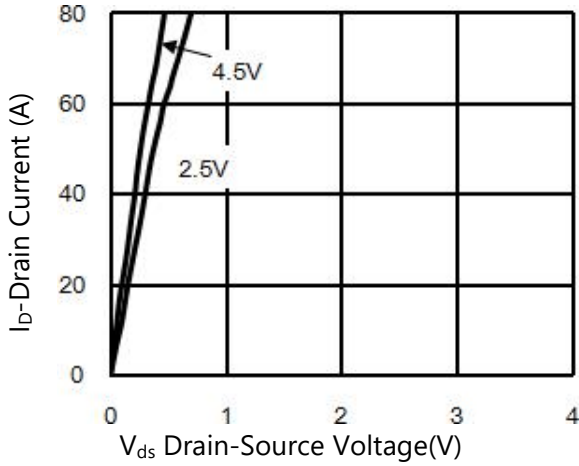


Figure2. Transfer Characteristics

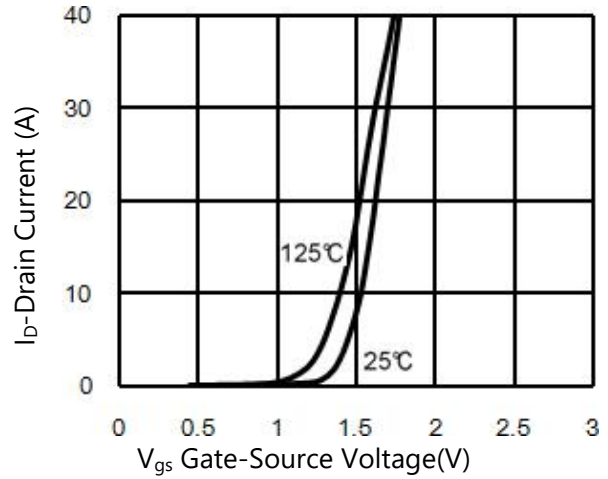


Figure3. Power Dissipation

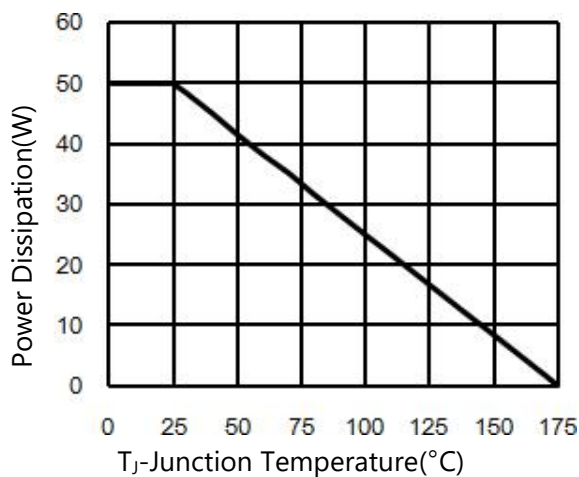


Figure4. Drain Current

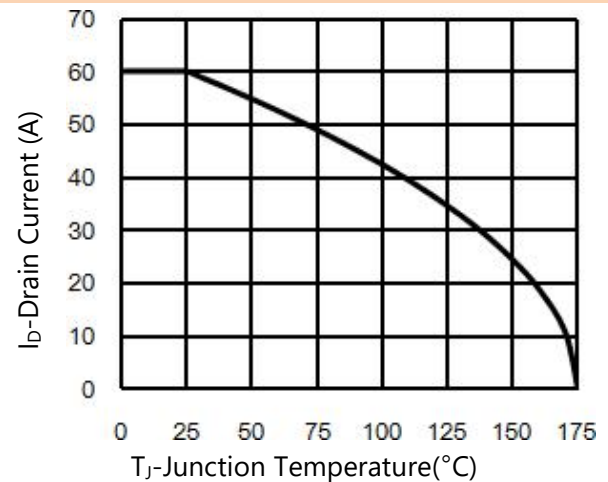


Figure5. $V_{GS(th)}$ vs Junction Temperature

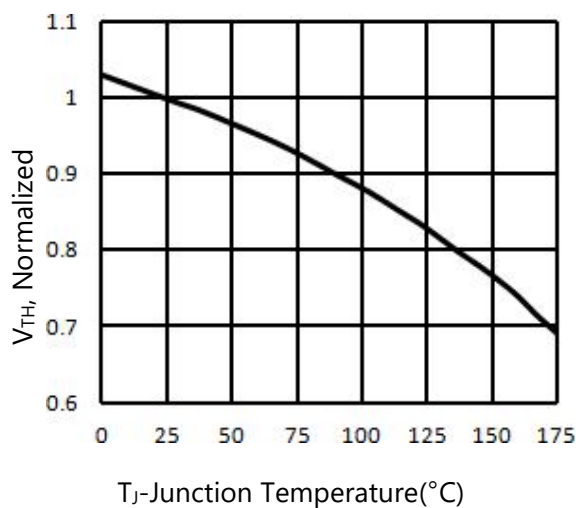
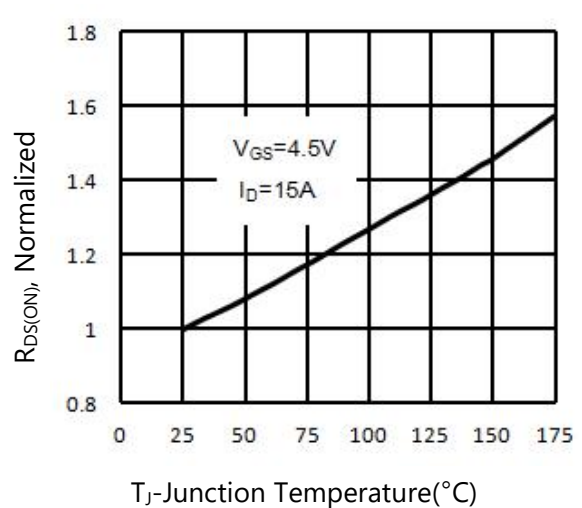


Figure6. $R_{DS(on)}$ vs Junction Temperature



TYPICAL PERFORMANCE CHARACTERISTICS

Figure7. Gate Charge Waveforms

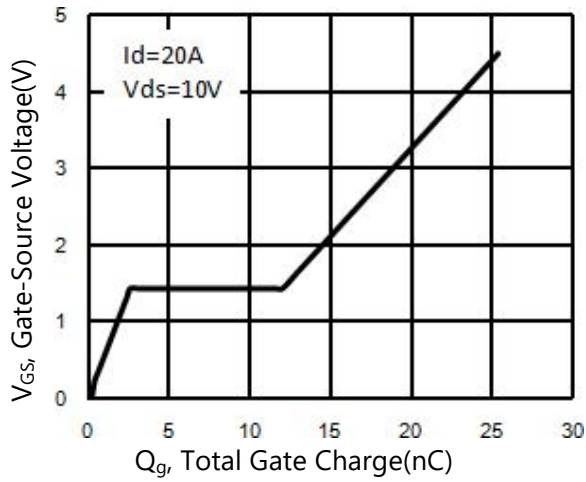


Figure8. Capacitance

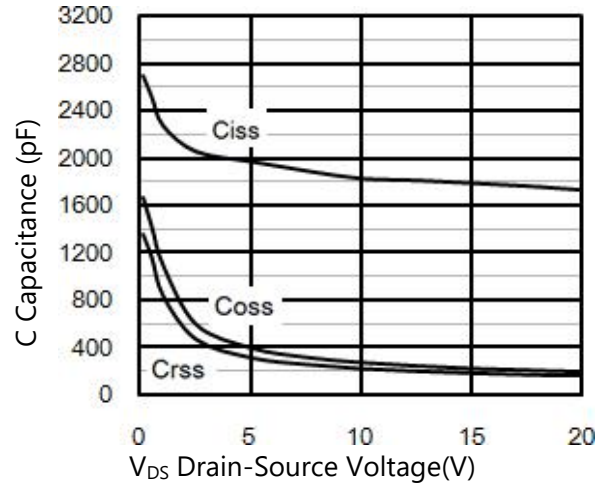


Figure9. Body-Diode Characteristics

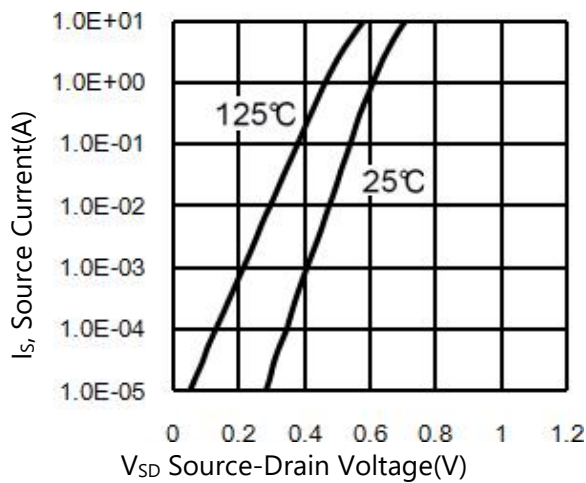
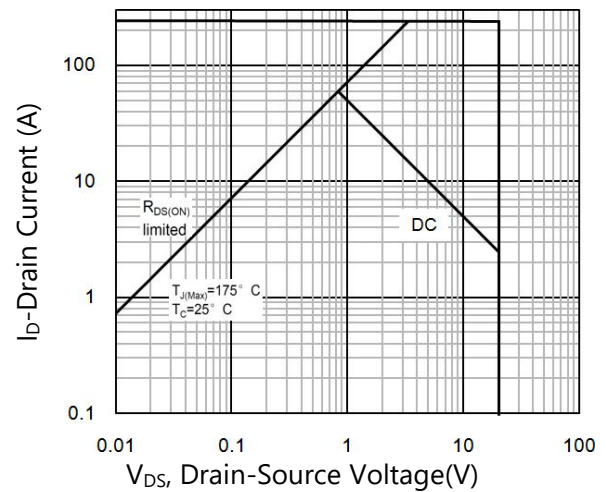
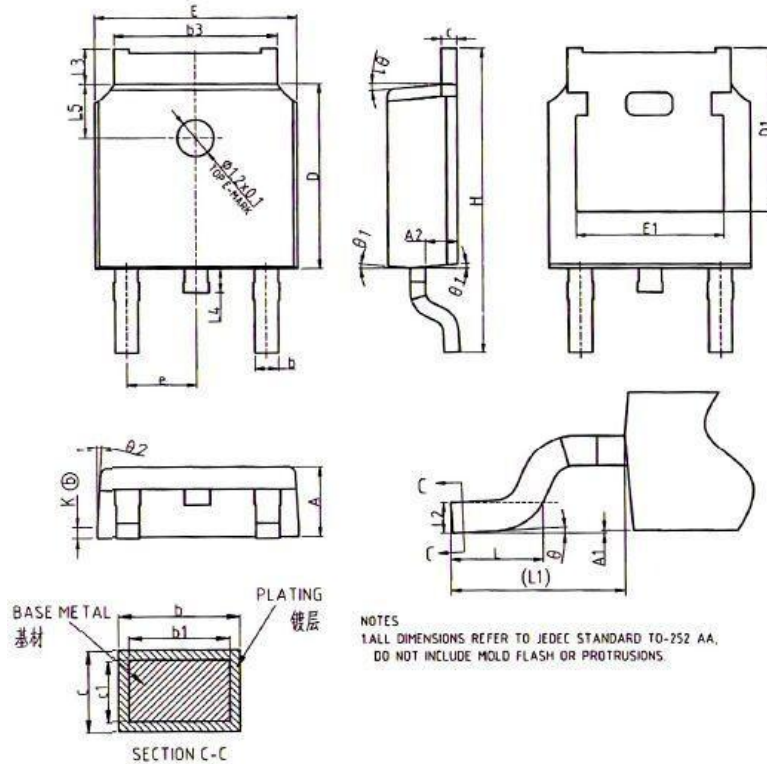


Figure10. Maximum Safe Operating Area



PACKAGE INFORMATION

TO-252



SYMBOL	Dimensions In Millimeters		
	MIN	NOM	MAX
A	2.20	2.30	2.38
A1	0.00	-	0.10
A2	0.97	1.07	1.17
b	0.72	0.78	0.85
b1	0.71	0.76	0.81
b3	5.23	5.33	5.46
c	0.47	0.53	0.58
c1	0.46	0.51	0.56
D	6.00	6.10	6.20
D1	5.30REF		
E	6.50	6.60	6.70
E1	4.70	4.83	4.92
e	2.286BSC		
H	9.90	10.10	10.30
L	1.40	1.50	1.70
L1	2.90REF		
L2	0.51BSC		
L3	0.90	-	1.25
L4	0.60	0.80	1.00
L5	1.70	1.80	1.90
θ	0°	-	8°
θ_1	5°	7°	9°
θ_2	5°	7°	9°
K	0.40REF		