P-Channel Enhancement Mode Power MOSFET MXD10P03K

DESCRIPTION

The MXD10P03K uses advanced trench technology to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

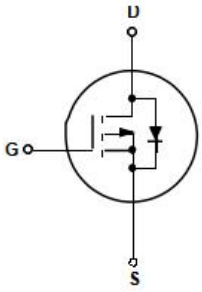
GENERAL FEATURES

- V_{DS}=-30V, I_D=-60A
  $R_{DS(ON)}$(Typ.)=11mΩ @ V_{GS}=-4.5V
  $R_{DS(ON)}$(Typ.)=7.5mΩ @ V_{GS}=-10V
- Low Thermal Resistance
- Advanced trench cell design

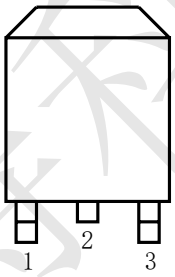
APPLICATION

- Motor drivers
- DC-DC Converter

PINOUT



Schematic diagram



TO-252 top view

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

ORDERING INFORMATION

Part Number	StorageTemperature	Package	Devices Per Reel
MXD10P03K	-55°C to 150°C	TO252	2500

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current(V_{GS}=-10V)(Note1)	I_D	-60	A
Pulsed Source Current(V_{GS}=-10V)(Note1)(Note2)(Note3)	I_{DM}	-144	A
Diode Forward Current	I_S	-60	A
Total Power Dissipation(Note1)	P_{tot}	20	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C
Thermal Resistance, Junction-to-Case(Note1)	$R_{\theta JC}$	6	°C/W

Note 1. Surface Mounted on 1 in^2 pad area, t ≤ 10 sec
Note 2. Pulse width ≤ 10μs, duty cycle ≤ 1%
Note 3. limited by bonding wire

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ELECTRICAL CHARACTERISTICS(T_C=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	-30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-24V, V_{GS}=0V	-	-	-1	μA
		V_{DS}=-24V,V_{GS}=0V,T_J=85°C	-	-	-30	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250μA	-1.0	-1.5	-2.4	V
Drain-Source On-State Resistance(Note1)	$R_{DS(ON)}$	V_{GS}=-4.5V, I_D=-10A	-	11	14	mΩ
		V_{GS}=-10V, I_D=-20A	-	7.5	9	mΩ
Dynamic Characteristics(Note2)						
Input Capacitance	C_{iss}	V_{DS}=-15V, V_{GS}=0V, F=1.0MHz	-	2000	-	pF
Output Capacitance	C_{oss}		-	290	-	pF
Reverse Transfer Capacitance	C_{rss}		-	270	-	pF
Switching Characteristics(Note2)						
Turn-on Delay Time	$t_{d(on)}$	V_{DS}=-15V, I_D=-20A, V_{GEN}=-10V, R_G=4.5Ω, R_L=0.75Ω,	-	10	-	nS
Turn-on Rise Time	t_r		-	8	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	43	-	nS
Turn-Off Fall Time	t_f		-	18	-	nS
Total Gate Charge	Q_g	V_{DS}=-15V, I_{DS}=-20A, V_{GS}=-10V	-	36	-	nC
Gate-Source Charge	Q_{gs}		-	5.3	-	nC
Gate-Drain Charge	Q_{gd}		-	8.8	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage(Note1)	V_{SD}	V_{GS}=0V, I_{SD}=-20A	-	-	-1.3	V
Reverse Recovery Time	t_{rr}	I_{SD}=-20A, dI_{SD}/dt=100A/μs	-	21	-	nS
Reverse Recovery Charge	Q_{rr}		-	14	-	nC

Note 1. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%
Note 2. Guaranteed by design, not subject to prduction testing

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 1. Power Capability

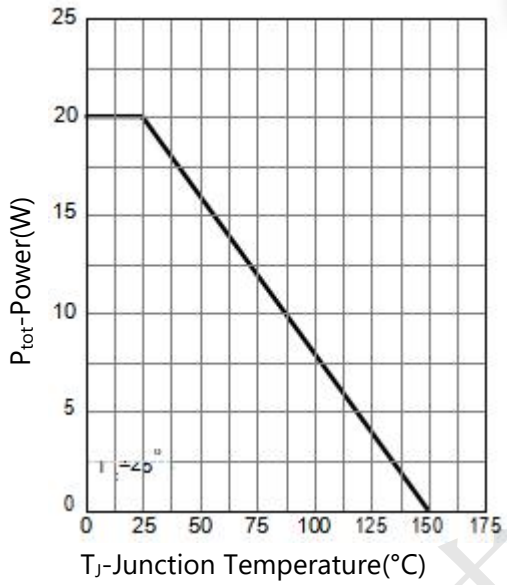


Figure 2. Current Capability

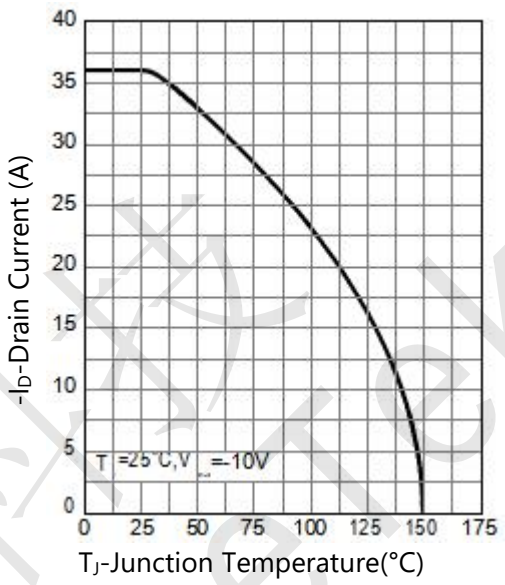


Figure 3. Safe Operation Area

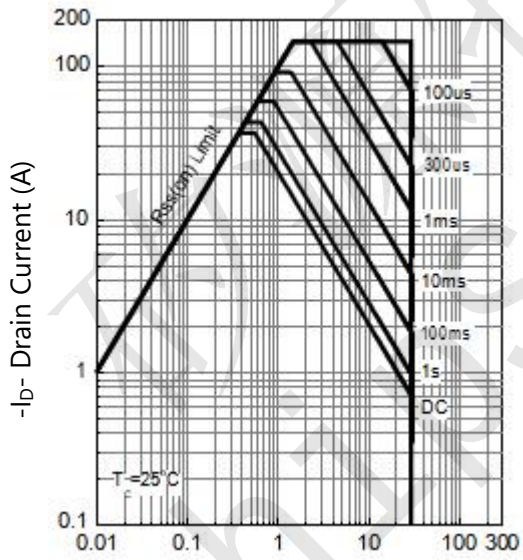
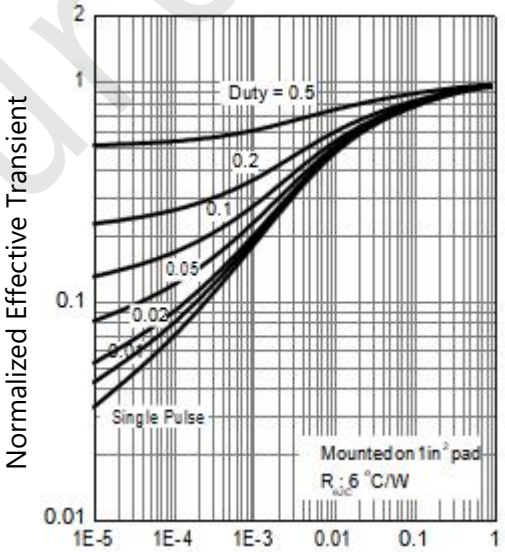


Figure 4. Transient Thermal Impedance



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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 5. Output Characteristics

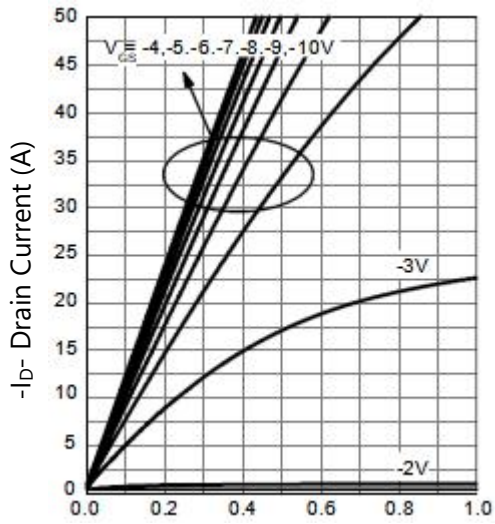


Figure 6. Drain-Source On Resistance

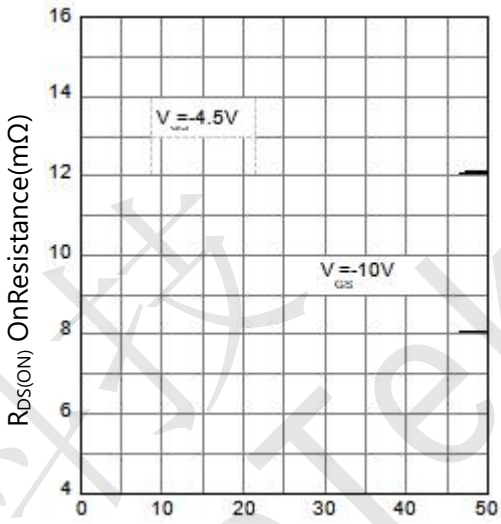


Figure 7. Transfer Characteristics

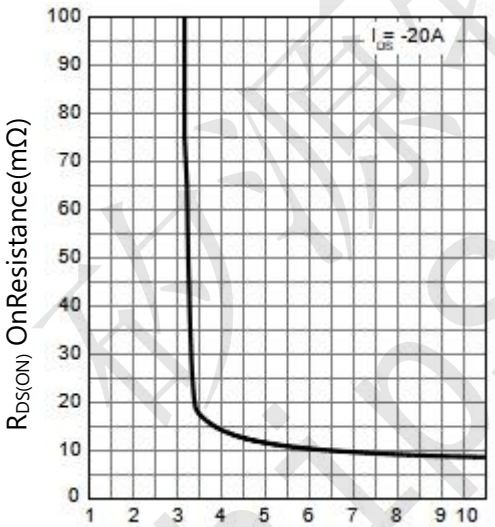
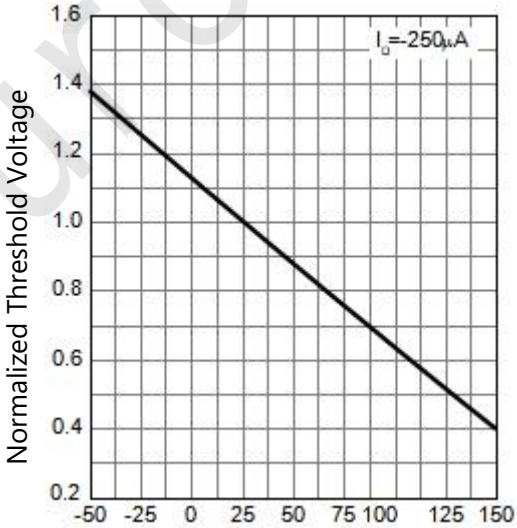


Figure 8. Normalized Threshold Voltage



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 9. Normalized On Resistance

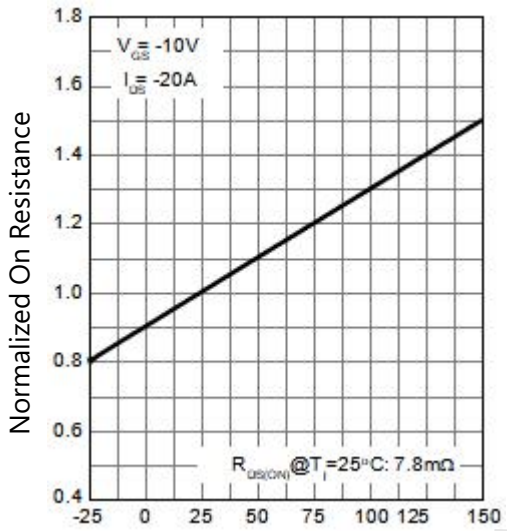


Figure 10. Diode Forward Current

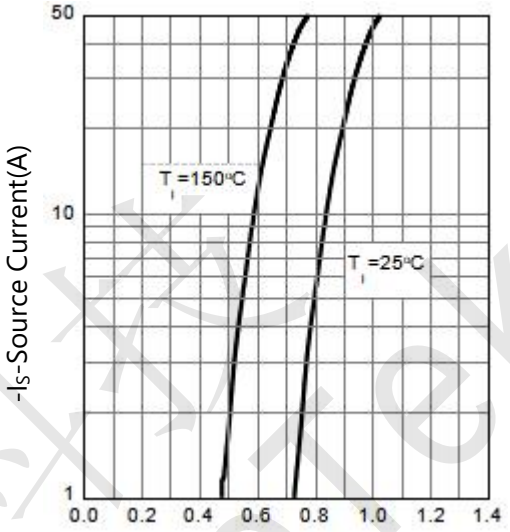


Figure 11. Capacitance

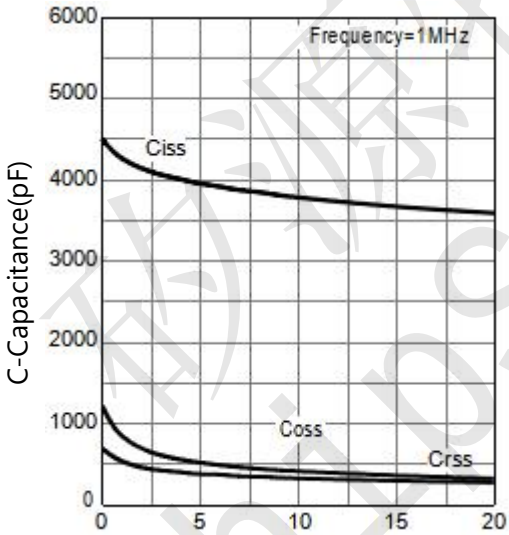
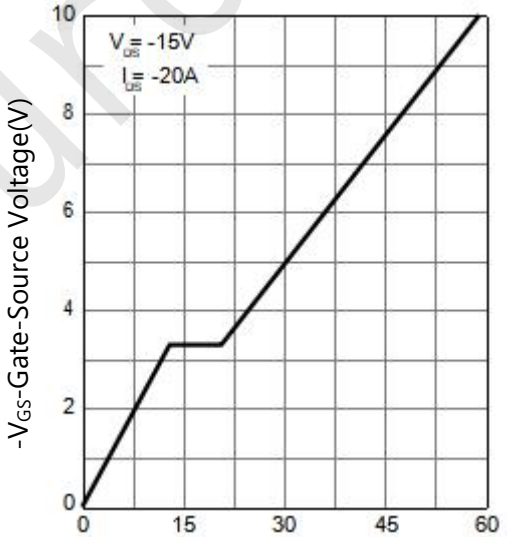


Figure 12. Gate Charge



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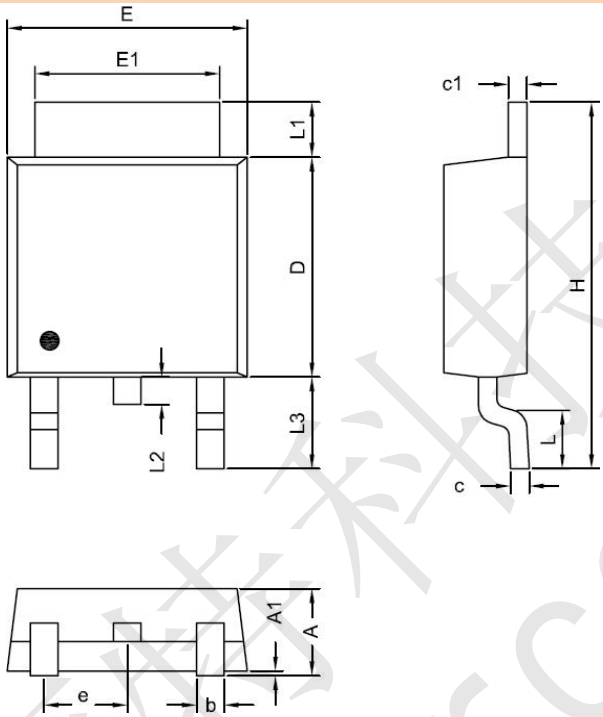
PACKAGE INFORMATION

TO252



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