N-Channel Enhancement Mode Power MOSFET **MXD20N03**

DESCRIPTION

The MXD20N03 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a wide variety of applications.

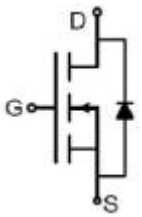
GENERAL FEATURES

- V_{DS}=30V, I_D=20A
  $R_{DS(ON)}$(Typ.)=16mΩ @ VGS=10V
  $R_{DS(ON)}$(Typ.)=28mΩ @ VGS=4.5V
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

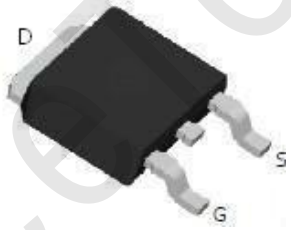
APPLICATION

- PWM applications
- Load switch
- Power management

PINOUT



Schematic diagram



TO-252 top view

ORDERING INFORMATION

Device	StorageTemperature	Package	Devices Per Reel
MXD20N03	-55°C to 150°C	TO-252	2500

KEY PERFORMANCE PARAMETERS(T_A=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage(V_{GS}=0V)	V_{DS}	30	V
Gate-Source Voltage(V_{DS}=0V)	V_{GS}	±20	V
Drain Current-Continuous(T_C=25°C)	I_D	20	A
Drain Current-Continuous@Current-Pulsed(Note1)	$I_{DM(pluse)}$	10	A
Maximum Power Dissipation	P_D	7	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature

THERMAL CHARACTERISTIC

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	85	°C/W

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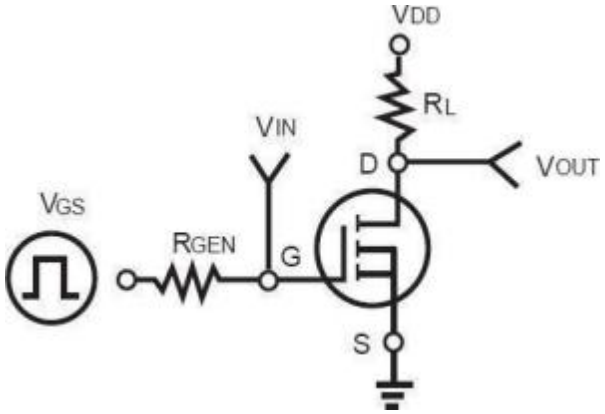
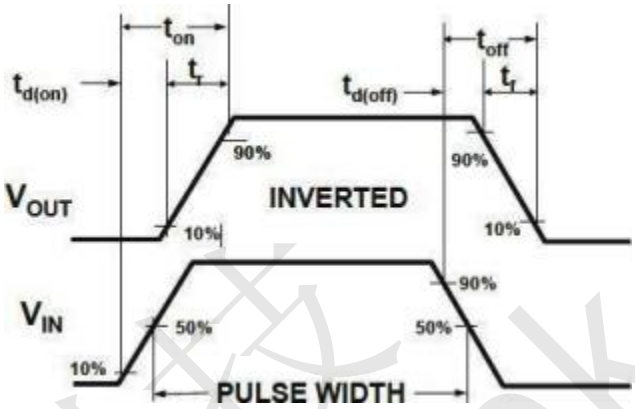
ELECTRICAL CHARACTERISTICS(T_A=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
On/Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=30V, V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1	1.5	2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V,I_D=5A	-	16	22	mΩ
		V_{GS}=4.5V,I_D=4A	-	28	40	mΩ
Forward Transconductance	g_{FS}	V_{DS}=5V, I_D=5A	3	5.8	-	S
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=15V, V_{GS}=0V, F=1.0MHz	-	760	-	pF
Output Capacitance	C_{oss}		-	215	-	pF
Reverse Transfer Capacitance	C_{rss}		-	120	-	pF
Total Gate Charge	Q_g	V_{DS}=10V, I_D=3.6A, V_{GS}=5V	-	7	-	nC
Gate-Source Charge	Q_{gs}		-	1.5	-	nC
Gate-Drain Charge	Q_{gd}		-	3	-	nC
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=15V, I_D=5.5A, R_L=15Ω, V_{GS}=10V,R_G=2.5Ω	-	10	-	nS
Turn-on Rise Time	t_r		-	4	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	27	-	nS
Turn-Off Fall Time	t_f		-	5	-	nS
Source-Drain Diode Characteristics						
Source-Drain Current(Body Diode)	I_{SD}		-	-	30	A
Forward On Voltage	V_{SD}	V_{GS}=0V, I_S=1A	-	0.78	1.2	V

SWITCH TIME TEST CIRCUIT AND SWITCHING WAVEFORMS





TYPICAL PERFORMANCE CHARACTERISTICS

Figure1. Power Dissipation

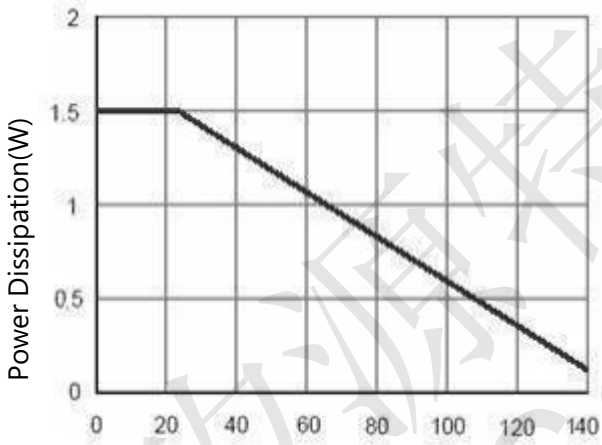


Figure2. Drain Current

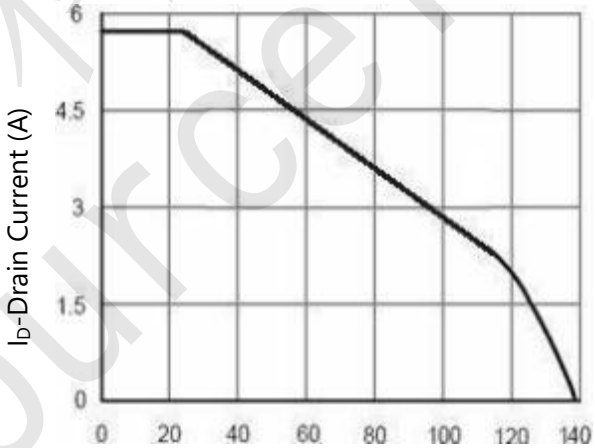


Figure3. Output Characteristics

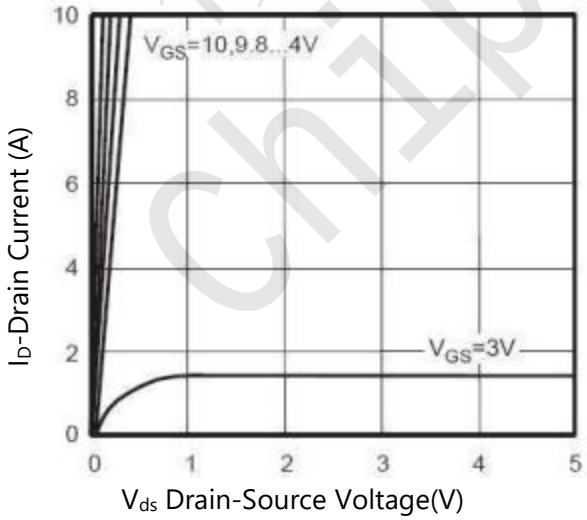
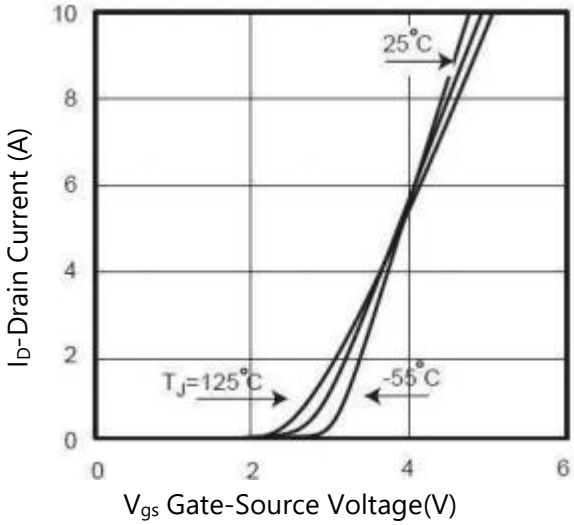


Figure4. Transfer Characteristics



TYPICAL PERFORMANCE CHARACTERISTICS

Figure5. Capacitance

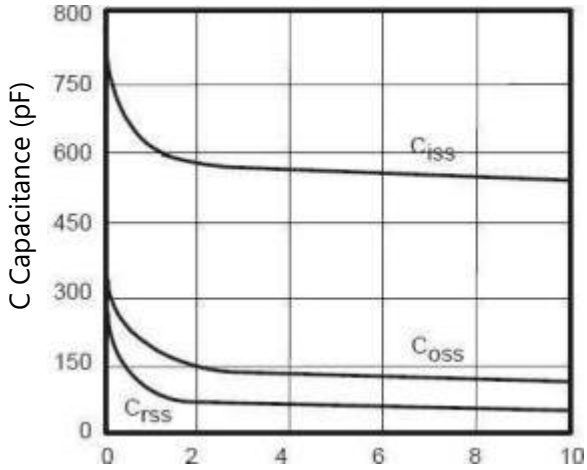


Figure6. $R_{DS(ON)}$ vs JunctionTemperature

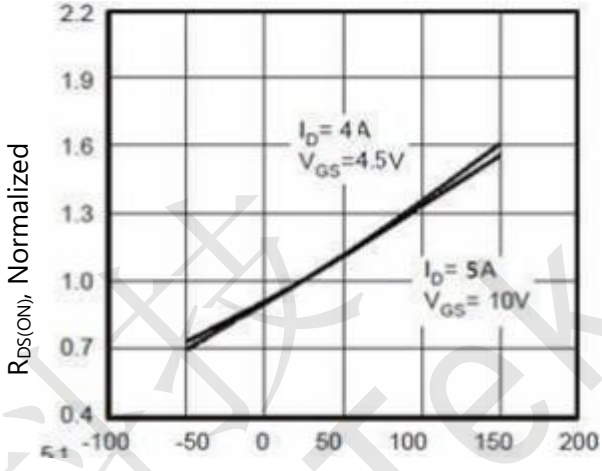


Figure7. Max BV_{DSS} vs Junction Temperature

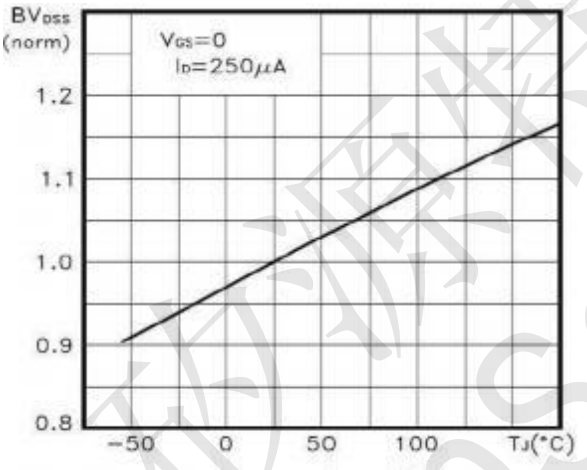


Figure8. $V_{GS(th)}$ vs JunctionTemperature

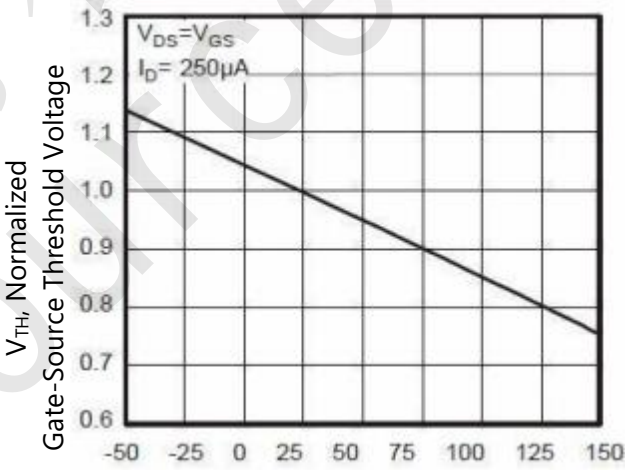


Figure9 Gate Charge Waveforms

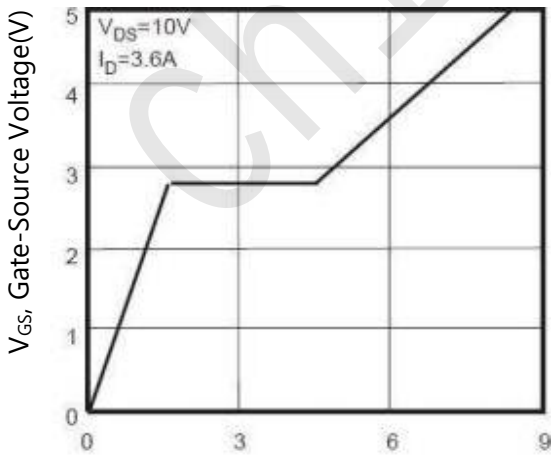
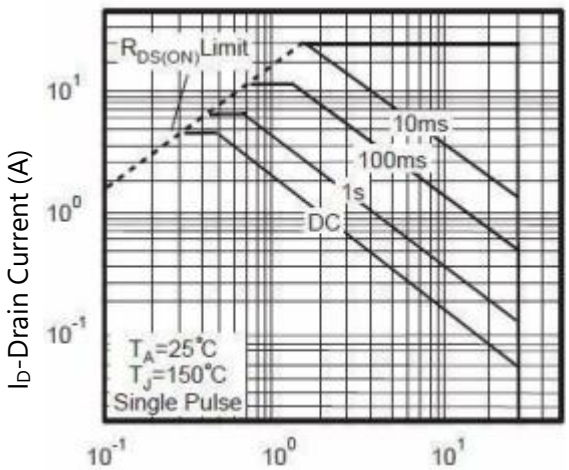
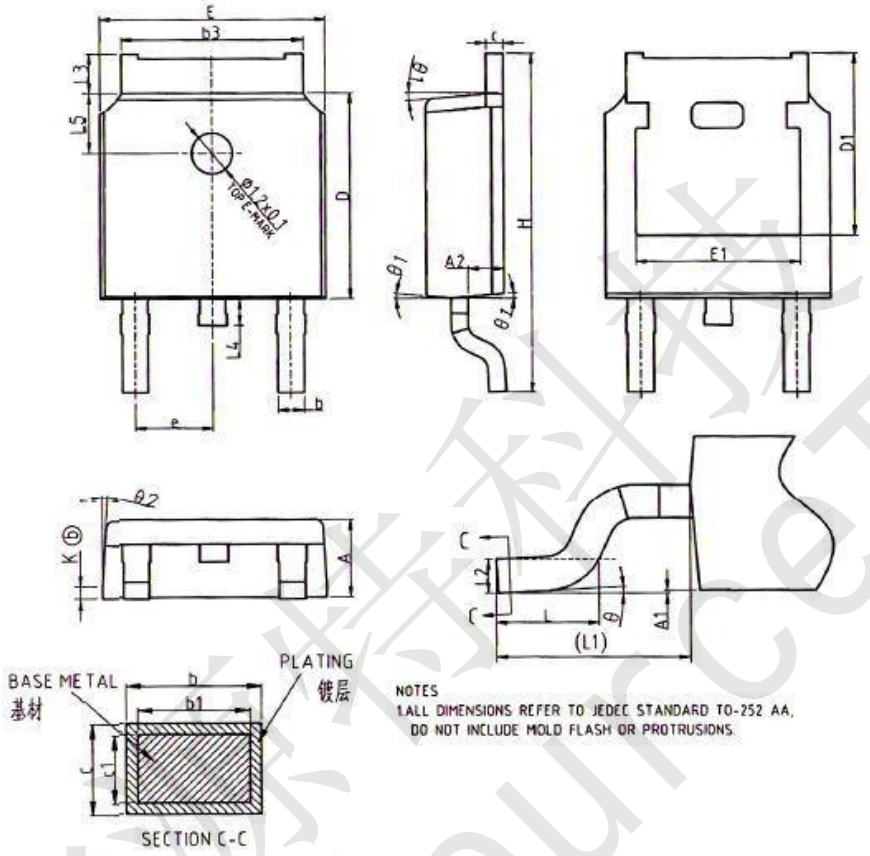


Figure10. Maximum Safe Operating Area



PACKAGE INFORMATION

TO-252



SYMBOL	COMMON DIMENSIONS IN MILLIMETERS			SYMBOL	COMMON DIMENSIONS IN MILLIMETERS		
	MIN	NOM	MAX		MIN	NOM	MAX
A	2.20	2.30	2.38	H	9.90	10.10	10.30
A1	0.00	-	0.10	L	1.40	1.50	1.70
A2	0.97	1.07	1.17	L1	2.90REF		
b	0.72	0.78	0.85	L2	0.51BSC		
b1	0.71	0.76	0.81	L3	0.90	-	1.25
b3	5.23	5.33	5.46	L4	0.60	0.80	1.00
c	0.47	0.53	0.58	L5	1.70	1.80	1.90
c1	0.46	0.51	0.56	θ	0°	-	8°
D	6.00	6.10	6.20	θ1	5°	7°	9°
D1	5.30REF			θ2	5°	7°	9°
E	6.50	6.60	6.70	K	0.40REF		
E1	4.70	4.83	4.92				
e	2.286BSC						