

DUAL 20V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$	Package	I_D $T_A = +25^\circ C$ (Notes 5 & 6)
20V	130mΩ @ $V_{GS} = 4.5V$	MSOP-8	2.5A
	150mΩ @ $V_{GS} = 2.7V$		2.3A

Description

This MOSFET has been designed to minimize the on-state resistance ($R_{DS(on)}$) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

Applications

- DC-DC Converters
- Power Management functions
- Motor Control
- Disconnect Switches

Features

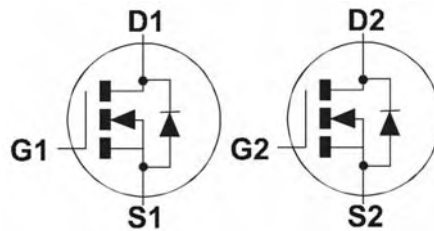
- Low On-Resistance
- Low Threshold
- Fast Switching Speed
- Low Gate Drive
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

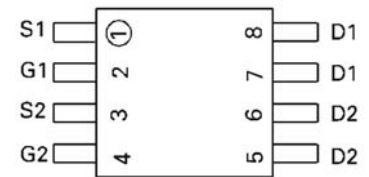
- Case: MSOP-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish e3
- Weight: 0.008 grams (approximate)



Top View



Device Symbol



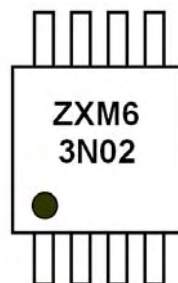
Top View
Pin-Out

Ordering Information (Note 4)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMD63N02XTA	ZXM63N02	7	12	1,000
ZXMD63N02XTC	ZXM63N02	13	12	4,000

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 2. See <http://www.diodes.com> for more information about Diodes Incorporated's definitions of Halogen and Antimony free, "Green" and Lead-Free.
 3. Halogen and Antimony free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 4. For packaging details, go to our website at <http://www.diodes.com>

Marking Information



ZXM63N02 = Product type Marking Code

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

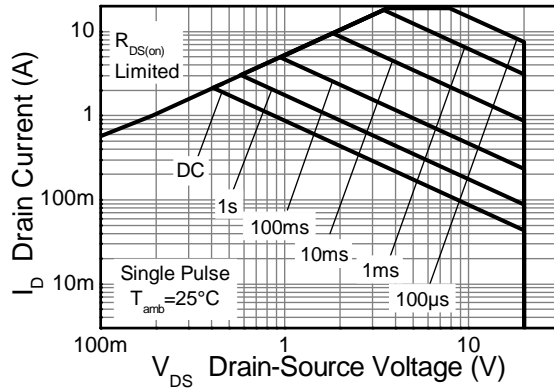
Characteristic			Symbol	Value	Unit	
Drain-Source Voltage			V _{DSS}	20	V	
Gate-Source Voltage			V _{GSS}	±12	V	
Continuous Drain Current	Steady State	@ V _{GS} = 10V; T _A = +25°C (Note 5 & 6)	I _D	2.5	A	
		@ V _{GS} = 10V; T _A = +70°C (Note 5 & 6)		1.9		
		@ V _{GS} = 10V; T _A = +100°C (Note 5 & 6)		0.78		
Pulsed Drain Current			(Notes 6 & 7)	I _{DM}	19	A
Continuous Source Current (Body Diode)			(Notes 5 & 6)	I _S	1.5	A
Pulsed Source Current (Body Diode)			(Notes 6 & 7)	I _{SM}	19	A

Thermal Characteristics

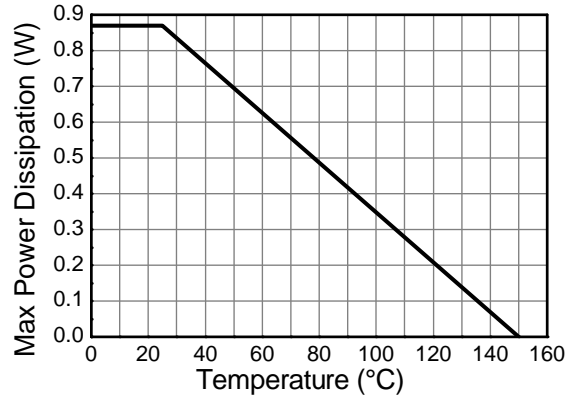
Characteristic		Symbol	Value	Unit	
Power Dissipation	(Notes 6 & 8)	P _D	0.87	W	
	(Notes 5 & 6)		1.25		
	(Notes 8 & 9)		1.04		
Thermal Resistance, Junction to Ambient	(Notes 6 & 8)	R _{θJA}	143	°C/W	
	(Notes 5 & 6)		100		
	(Notes 8 & 9)		120		
Thermal Resistance, Junction to Leads		(Note 10)	R _{θJL}	84.9	°C/W
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +150	°C	

- Notes:
5. For a device surface mounted on FR4 PCB measured at t ≤ 10 sec.
 6. For device with one active die.
 7. Repetitive rating - 25mm x 25mm FR4 PCB, D = 0.02, pulse width 300µs – pulse width limited by maximum junction temperature.
 8. For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.
 9. For device with two active die running at equal power.
 10. Thermal resistance from junction to solder-point (at the end of the drain lead).

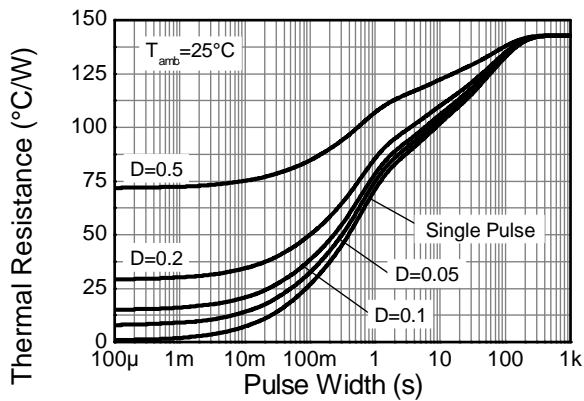
Thermal Characteristics



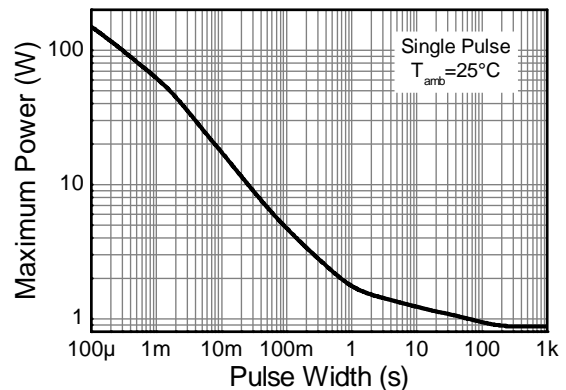
Safe Operating Area



Derating Curve



Transient Thermal Impedance



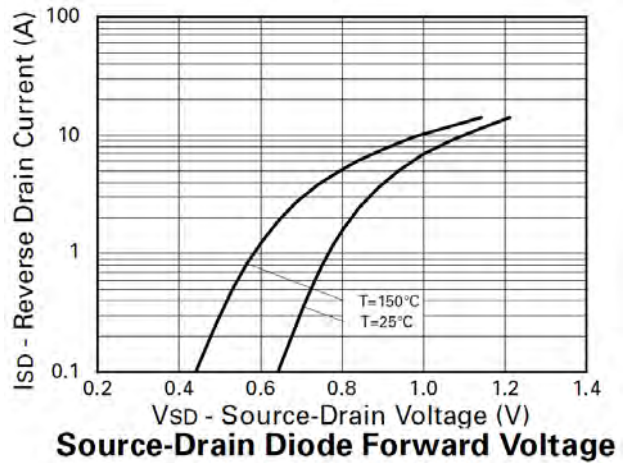
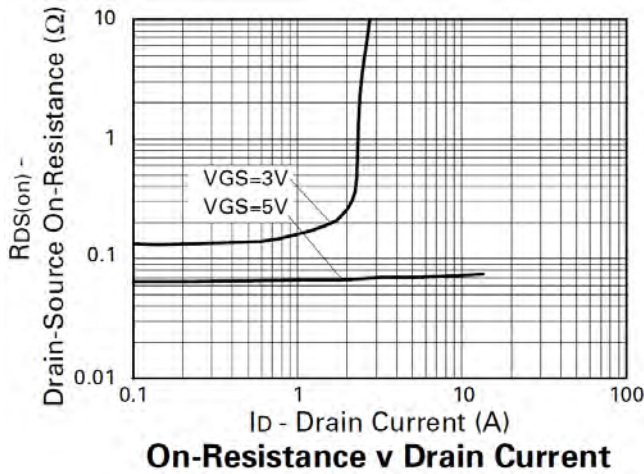
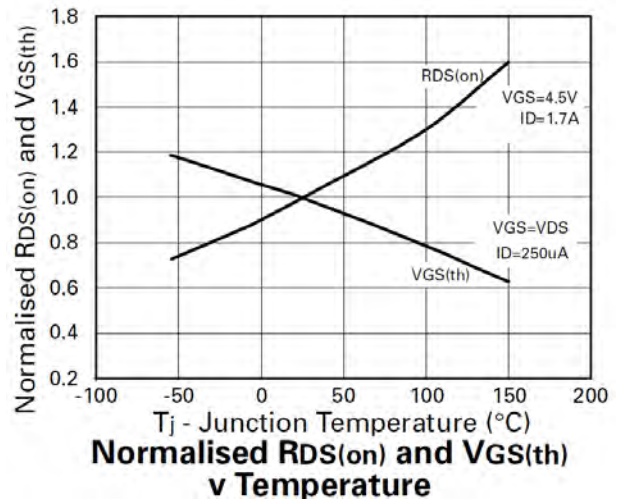
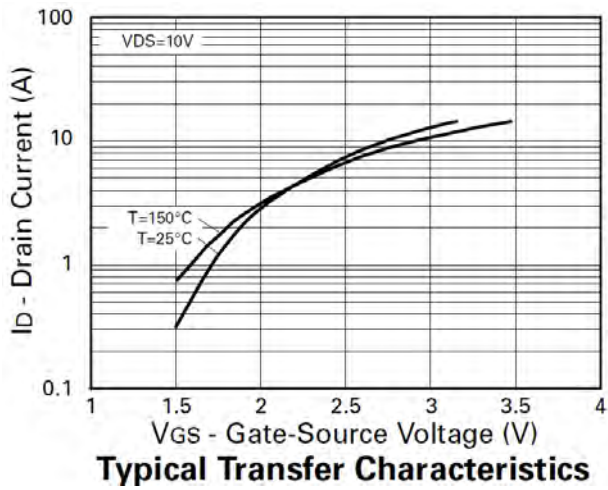
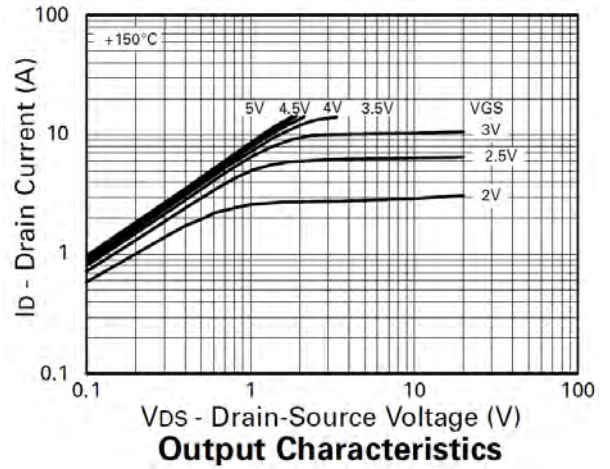
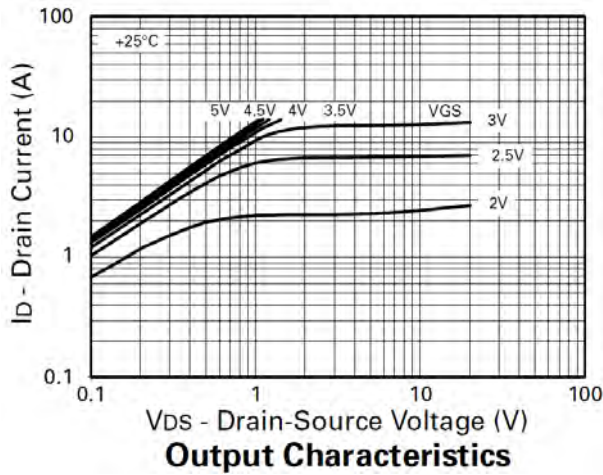
Pulse Power Dissipation

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

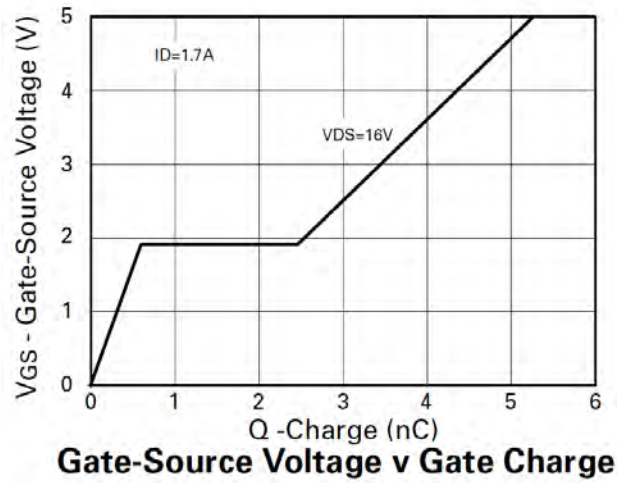
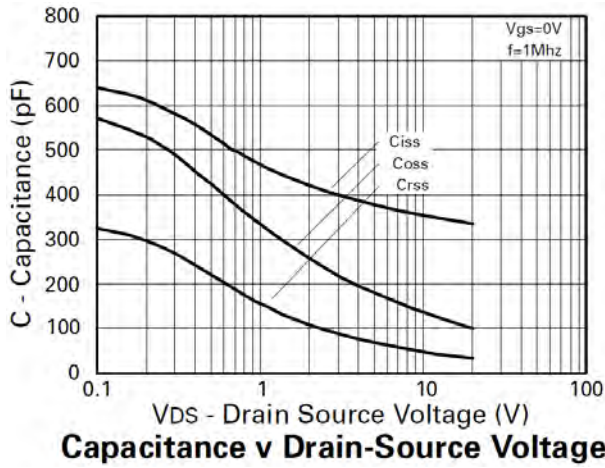
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	20	-	-	V	V _{GS} = 0V, I _D = 250μA
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	-	-	1.0	μA	V _{DS} = 20V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	-	-	100	nA	V _{GS} = ±12V, V _{DS} = 0V
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(th)}	0.7	-	3	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance (Note 11)	R _{DS(on)}	-	65	130	mΩ	V _{GS} = 4.5V, I _D = 1.7A
			90	150		V _{GS} = 2.7V, I _D = 0.85A
Forward Transconductance (Notes 11 & 13)	g _{fs}	2.6	-	-	S	V _{DS} = 10V, I _D = 0.85A
Diodes Forward Voltage (Note 11)	V _{SD}	-	0.85	0.95	V	T _J = 25°C, I _S = 1.7A, V _{GS} = 0V
DYNAMIC CHARACTERISTICS						
Input Capacitance (Note 12 & 13)	C _{iss}	-	350	700	pF	V _{DS} = 15V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance (Notes 12 & 13)	C _{oss}	-	120	250		
Reverse Transfer Capacitance (Notes 12 & 13)	C _{rss}	-	50	100		
Gate Resistance (Notes 12 & 13)	R _g	-	3.8	7.6	Ω	f = 1MHz, V _{GS} = 0V, V _{DS} = 0V
Total Gate Charge (Notes 12 & 13)	Q _g	-	4.5	6	nC	V _{GS} = 4.5V, V _{DS} = 16V, I _D = 1.7A
Gate-Source Charge (Notes 12 & 13)	Q _{gs}	-	0.5	0.65		
Gate-Drain Charge (Notes 12 & 13)	Q _{gd}	-	2	2.5		
Reverse Recovery Time (Note 13)	t _{rr}	-	15	30	ns	T _J = +25°C, I _F = 1.7A, di/dt = 100A/μs
Reverse Recovery Charge (Note 13)	Q _{rr}	-	5.9	-	nC	
Turn-On Delay Time (Notes 12 & 13)	t _{D(on)}	-	3.4	-	ns	V _{DD} = 10V, I _D = 1.7A, R _G = 6Ω, R _D = 5.7Ω,
Turn-On Rise Time (Notes 12 & 13)	t _r	-	8.1	-		
Turn-Off Delay Time (Notes 12 & 13)	t _{D(off)}	-	13.5	-		
Turn-Off Fall Time (Notes 12 & 13)	t _f	-	9.1	-		

- Notes:
11. Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤ 2%.
 12. Switching characteristics are independent of operating junction temperature.
 13. For design aid only, not subject to production testing.

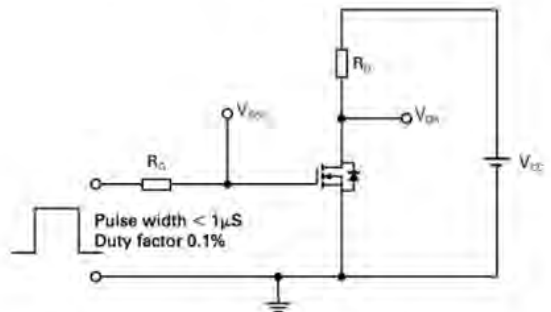
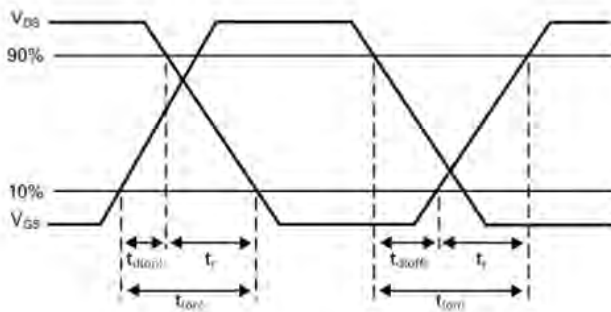
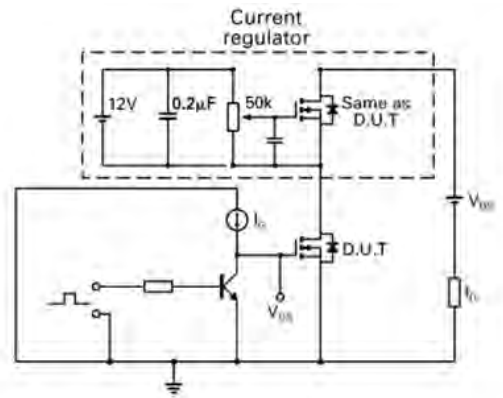
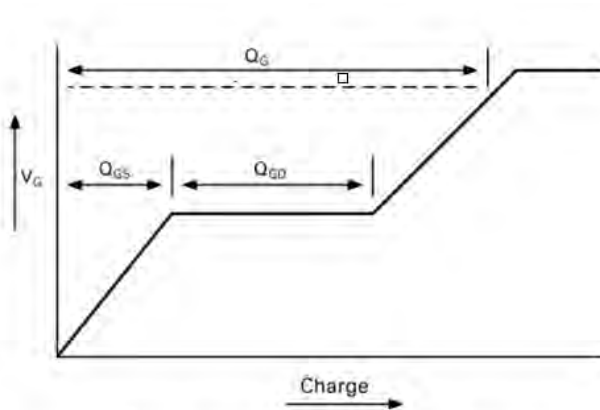
Typical Characteristics



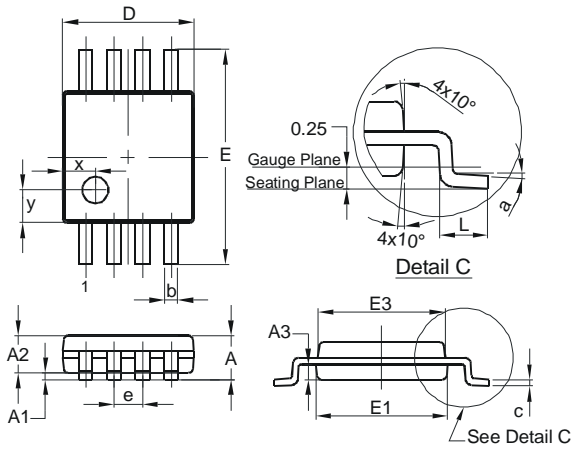
Typical Characteristics (cont.)



Test Circuits

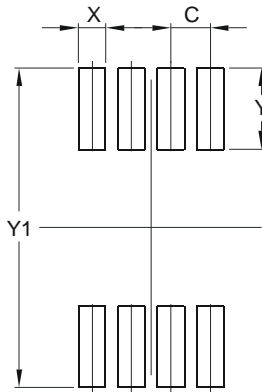


Package Outline Dimensions



MSOP-8			
Dim	Min	Max	Typ
A	-	1.10	-
A1	0.05	0.15	0.10
A2	0.75	0.95	0.86
A3	0.29	0.49	0.39
b	0.22	0.38	0.30
c	0.08	0.23	0.15
D	2.90	3.10	3.00
E	4.70	5.10	4.90
E1	2.90	3.10	3.00
E3	2.85	3.05	2.95
e	-	-	0.65
L	0.40	0.80	0.60
a	0°	8°	4°
x	-	-	0.750
y	-	-	0.750
All Dimensions in mm			

Suggested Pad Layout



Dimensions	Value (in mm)
C	0.650
X	0.450
Y	1.350
Y1	5.300

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