

ZXMN2AMC

20V DUAL N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on) max}$	$I_D max$ $T_A = 25^\circ C$ (Notes 4 & 7)
20V	120m Ω @ $V_{GS} = 4.5V$	3.7A
	300m Ω @ $V_{GS} = 2.5V$	2.3A

Description and Applications

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.

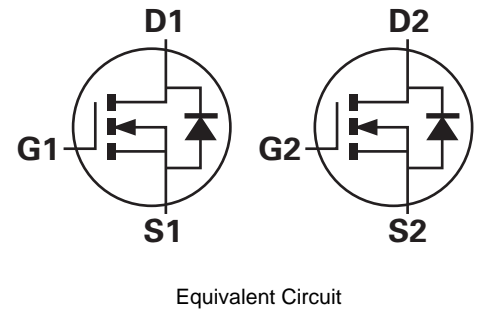
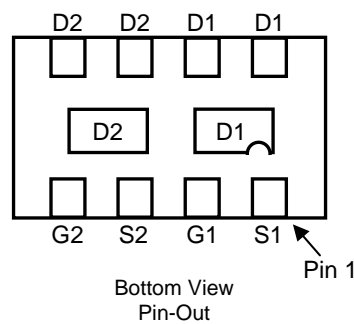
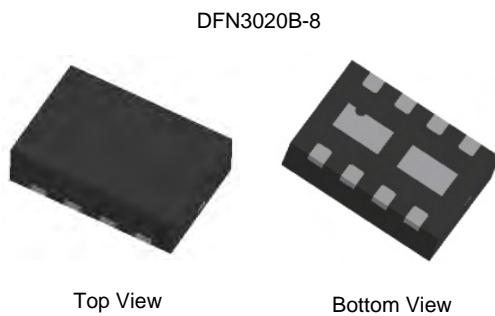
- DC-DC Converters
- Power management functions
- Disconnect switches
- Portable applications

Features and Benefits

- Low profile package, for thin applications
- Low R_{thj-a} , thermally efficient package
- 6mm² footprint, 50% smaller than TSOP6 and SOT23-6
- Low on-resistance
- Fast switching speed
- "Lead-Free", RoHS Compliant (Note 1)
- Halogen and Antimony Free. "Green" Device (Note 2)
- Qualified to AEC-Q101 Standards for High Reliability

Mechanical Data

- Case: DFN3020B-8
- Terminals: Pre-Plated NiPdAu leadframe
- Nominal package height: 0.8mm
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Solderable per MIL-STD-202, Method 208
- Weight: 0.013 grams (approximate)



Ordering Information (Note 3)

Part Number	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMN2AMCTA	DNA	7	8	3000

- Notes:
1. No purposefully added lead
 2. Diodes Inc's "Green" policy can be found on our website at <http://www.diodes.com>.
 3. For packaging details, go to our website at <http://www.diodes.com>.

Marking Information



DNA = Product Type Marking Code
Top View, Dot Denotes Pin 1

ZXMN2AMC

Maximum Ratings @T_A = 25°C unless otherwise specified

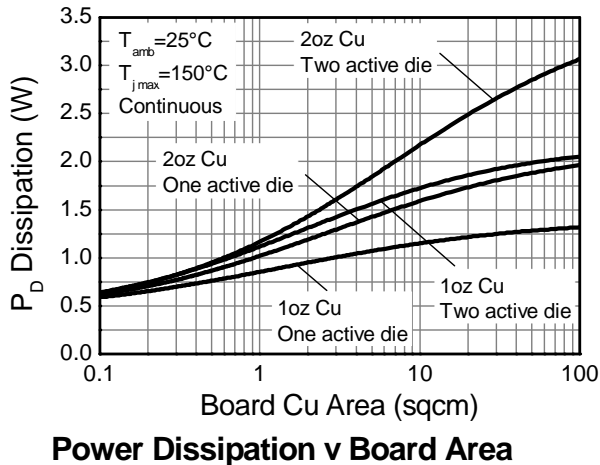
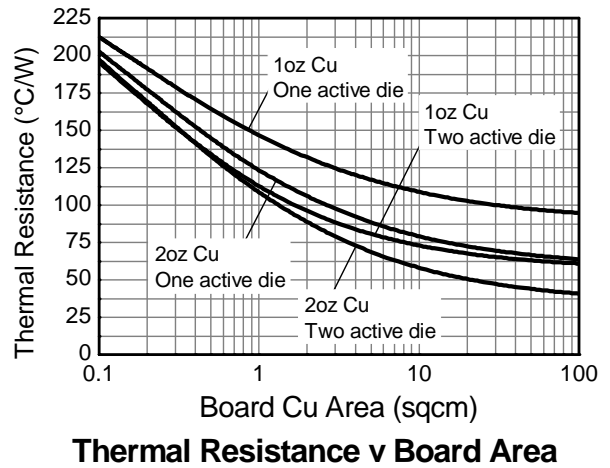
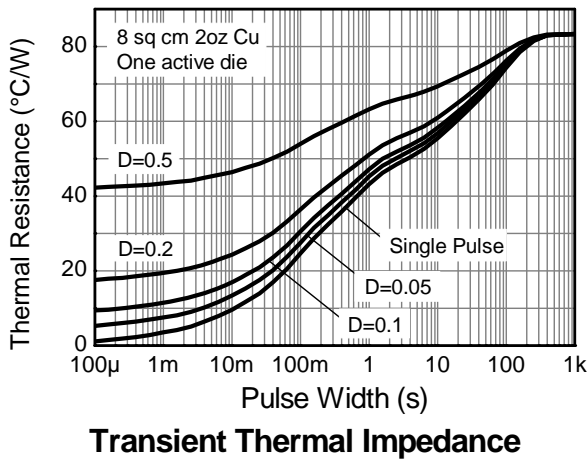
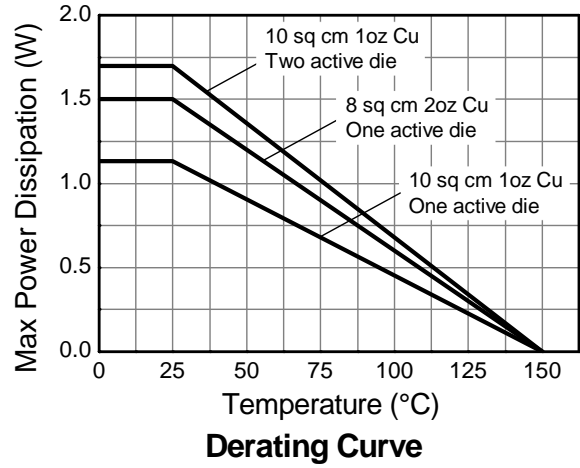
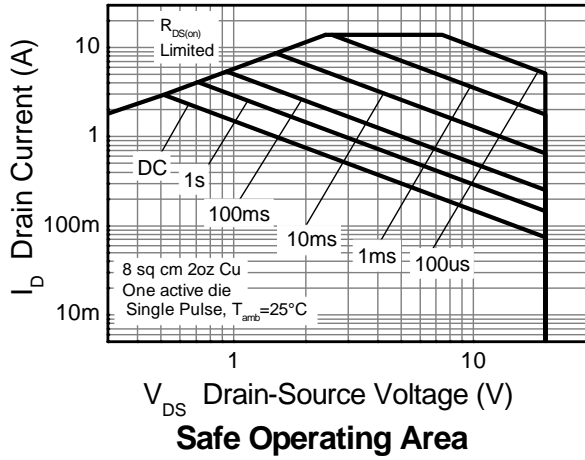
Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	20	V
Gate-Source Voltage			V _{GSS}	±12	
Continuous Drain Current	V _{GS} = 4.5V	(Notes 4 & 7)	I _D	3.7	A
		T _A = 70°C (Notes 4 & 7)		3.0	
		(Notes 3 & 7)		2.9	
Pulsed Drain Current	V _{GS} = 4.5V	(Notes 6 & 7)	I _{DM}	13	
Continuous Source Current (Body diode)			I _S	3.0	
Pulse Source Current (Body diode)			I _{SM}	13	

Thermal Characteristics @T_A = 25°C unless otherwise specified

Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Notes 3 & 7)	P _D	1.50	W mW/°C
	(Notes 4 & 7)		12	
	(Notes 5 & 7)		2.45	
	(Notes 5 & 8)		19.6	
	(Notes 5 & 8)		1.13	
Thermal Resistance, Junction to Ambient	(Notes 3 & 7)	R _{θJA}	9	°C/W
	(Notes 4 & 7)		1.70	
	(Notes 5 & 7)		13.6	
	(Notes 5 & 8)		83.3	
Thermal Resistance, Junction to Lead	(Notes 7 & 9)	R _{θJL}	51.0	°C/W
Operating and Storage Temperature Range	(Notes 7 & 9)	T _J , T _{STG}	111	
			73.5	
			17.1	
			-55 to +150	°C

- Notes:
3. For a device surface mounted on 28mm x 28mm (8 sq cm) FR4 PCB with high coverage of single sided 2oz copper, in still air conditions; the device is measured when operating in a steady-state condition. The heatsink is split in half with the exposed drain pads connected to each half.
 4. Same as note (3) except the device is measured at t < 5 sec.
 5. Same as note (3), except the device is surface mounted on 31mm x 31mm (10 sq cm) FR4 PCB with high coverage of single sided 1oz copper.
 6. Same as note (3), except the device is pulsed with D = 0.02 and pulse width 300 μs. The pulse current is limited by the maximum junction temperature.
 7. For a dual device with one active die.
 8. For dual device with 2 active die running at equal power.
 9. Thermal resistance from junction to solder-point (at the end of the drain lead).

Thermal Characteristics

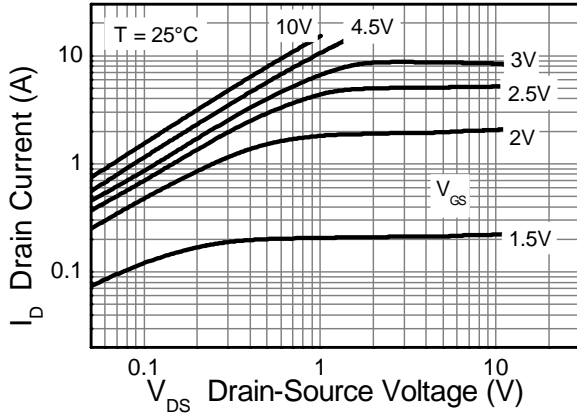


Electrical Characteristics @T_A = 25°C unless otherwise specified

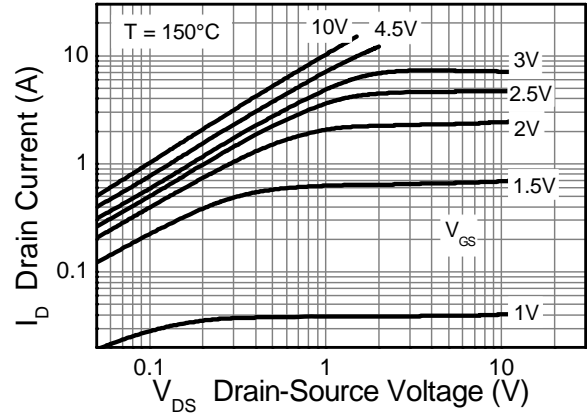
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	20	-	-	V	I _D = 250μA, V _{GS} = 0V
Zero Gate Voltage Drain Current	I _{DSS}	-	-	1	μA	V _{DS} = 20V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	-	-	±100	nA	V _{GS} = ±12V, V _{DS} = 0V
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(th)}	0.7	-	3.0	V	I _D = 250μA, V _{DS} = V _{GS}
Static Drain-Source On-Resistance (Note 10)	R _{DS(on)}	-	0.085	0.120	Ω	V _{GS} = 4.5V, I _D = 4A
			0.140	0.300		V _{GS} = 2.5V, I _D = 1.5A
Forward Transconductance (Note 10 & 11)	g _{fs}	-	6.2	-	S	V _{DS} = 10V, I _D = 4A
Diode Forward Voltage (Note 10)	V _{SD}	-	0.9	0.95	V	I _S = 3.2A, V _{GS} = 0V
Reverse Recover Time (Note 11)	t _{rr}	-	23	-	ns	I _S = 4A, di/dt = 100A/μs
Reverse Recover Charge (Note 11)	Q _{rr}	-	5.7	-	nC	
DYNAMIC CHARACTERISTICS (Note 11)						
Input Capacitance	C _{iSS}	-	299	-	pF	V _{DS} = 15V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	-	60	-	pF	
Reverse Transfer Capacitance	C _{rSS}	-	33	-	pF	
Total Gate Charge (Note 12)	Q _g	-	0.8	-	nC	V _{GS} = 2.5V
Total Gate Charge (Note 12)	Q _g	-	3.1	-	nC	V _{GS} = 4.5V
Gate-Source Charge (Note 12)	Q _{gs}	-	0.7	-	nC	
Gate-Drain Charge (Note 12)	Q _{gd}	-	1.0	-	nC	
Turn-On Delay Time (Note 12)	t _{D(on)}	-	2.3	-	ns	V _{DS} = 10V, I _D = 4A V _{GS} = 5V, R _G = 6Ω
Turn-On Rise Time (Note 12)	t _r	-	2.6	-	ns	
Turn-Off Delay Time (Note 12)	t _{D(off)}	-	1.6	-	ns	
Turn-Off Fall Time (Note 12)	t _f	-	1.3	-	ns	

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

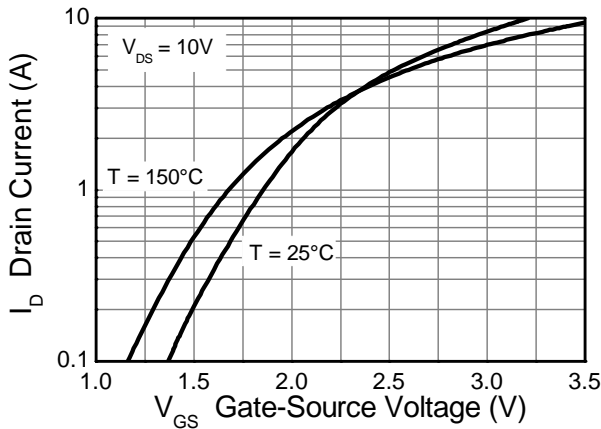
Typical Electrical Characteristics



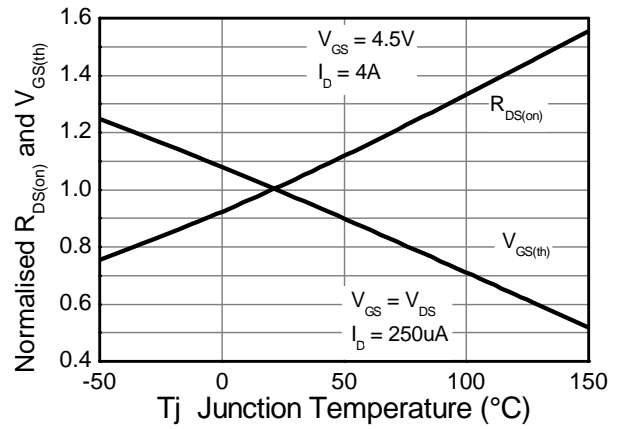
Output Characteristics



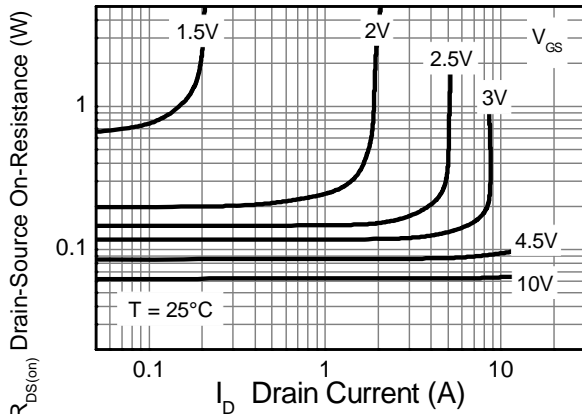
Output Characteristics



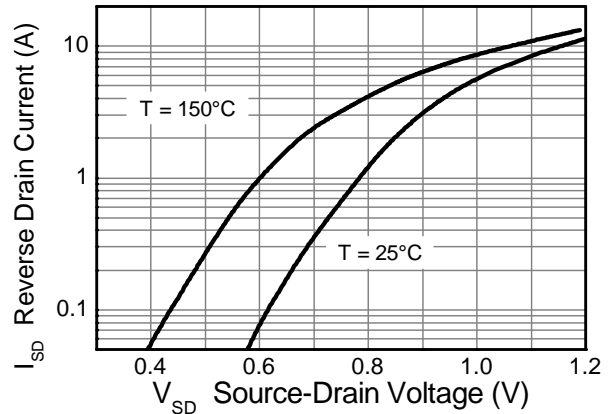
Typical Transfer Characteristics



Normalised Curves v Temperature

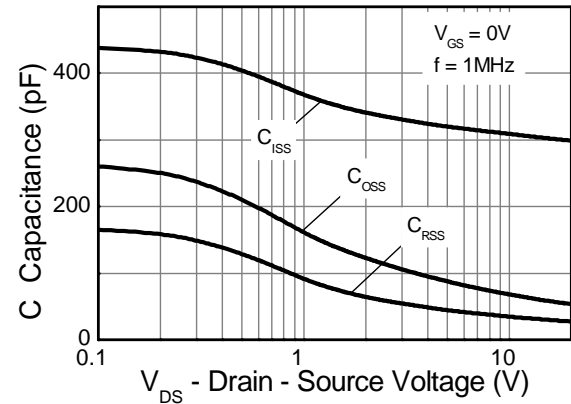


On-Resistance v Drain Current

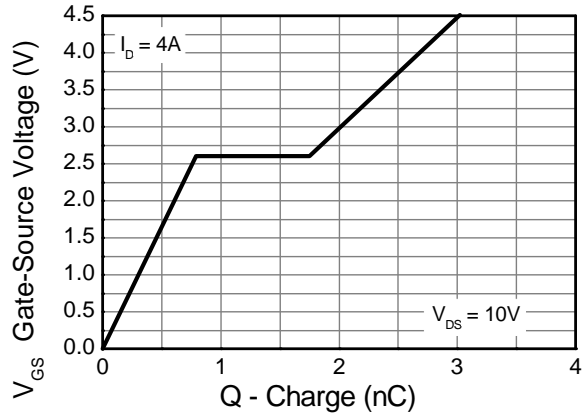


Source-Drain Diode Forward Voltage

Typical Electrical Characteristics - Continued

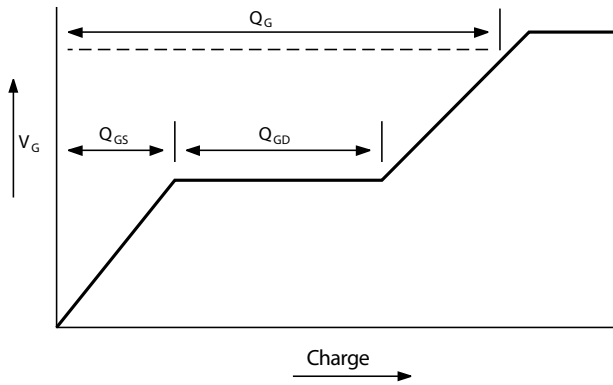


Capacitance v Drain-Source Voltage

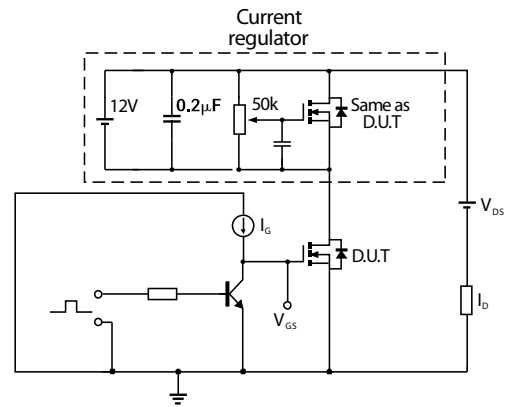


Gate-Source Voltage v Gate Charge

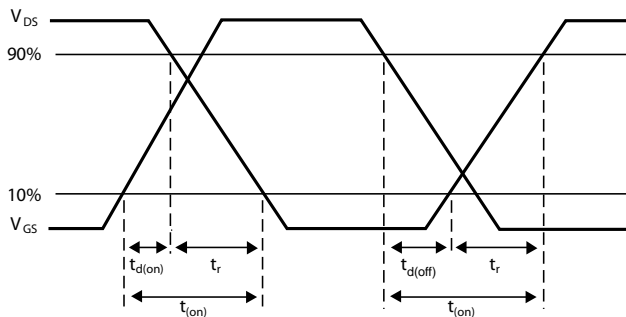
Test Circuits



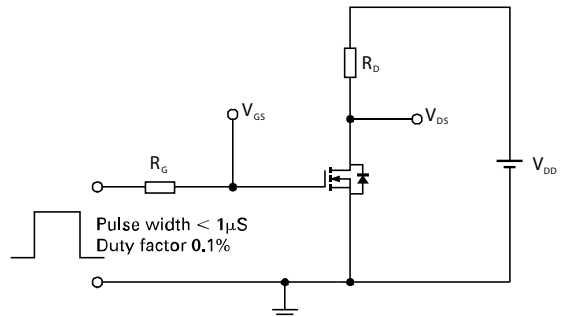
Basic gate charge waveform



Gate charge test circuit



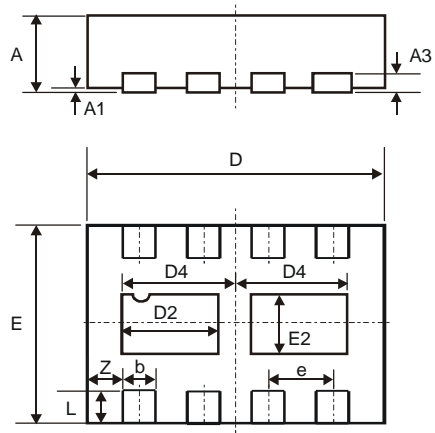
Switching time waveforms



Switching time test circuit

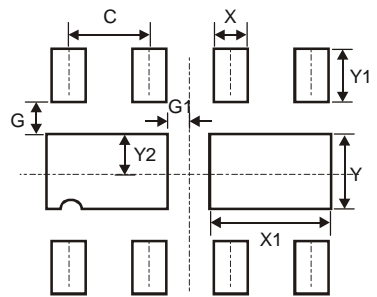
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Package Outline Dimensions



DFN3020B-8			
Dim	Min	Max	Typ
A	0.77	0.83	0.80
A1	0	0.05	0.02
A3	-	-	0.15
b	0.25	0.35	0.30
D	2.95	3.075	3.00
D2	0.82	1.02	0.92
D4	1.01	1.21	1.11
e	-	-	0.65
E	1.95	2.075	2.00
E2	0.43	0.63	0.53
L	0.25	0.35	0.30
Z	-	-	0.375
All Dimensions in mm			

Suggested Pad Layout



Dimensions	Value (in mm)
C	0.650
G	0.285
G1	0.090
X	0.400
X1	1.120
Y	0.730
Y1	0.500
Y2	0.365

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