ZXMN2AMC

20V DUAL N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

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

Features and Benefits

- Low profile package, for thin applications
- Low Rthj-a, thermally efficient package
- 6mm^2 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**

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.

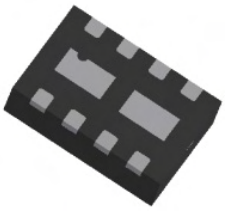
- DC-DC Converters
- Power management functions
- Disconnect switches
- Portable applications

Mechanical Data

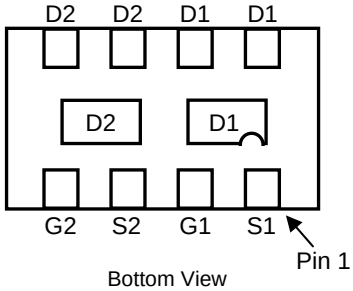
- Case: DFN3020B-8
- Terminals: Pre-Plated NiPdAu leadframe
- Nominal package height: 0.8mm
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Solderable per MIL-STD-202, Method 208
- Weight: 0.013 grams (approximate)

DFN3020B-8

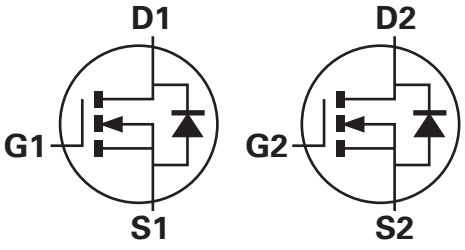
Top View



Bottom View



Bottom View
Pin-Out



Equivalent Circuit

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

Maximum Ratings @T_A = 25°C unless otherwise specified

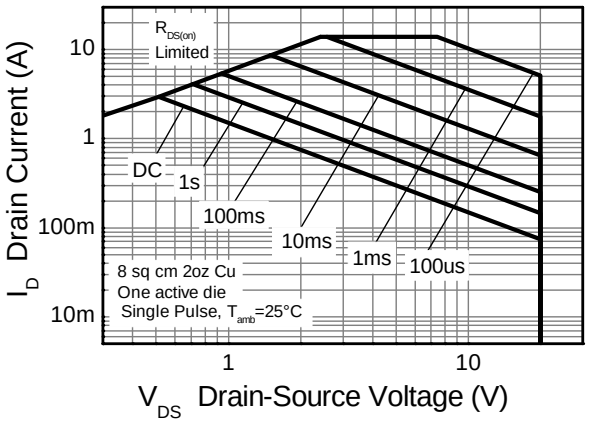
Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	20	V
Gate-Source Voltage			V_{GSS}	±12	
Continuous Drain Current	V_{GS} = 4.5V	(Notes 4 & 7)	I_D	3.7	A
		T_A = 70°C (Notes 4 & 7)		3.0	
		(Notes 3 & 7)		2.9	
Pulsed Drain Current	V_{GS} = 4.5V	(Notes 6 & 7)	I_{DM}	13	
Continuous Source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

Thermal Characteristics @T_A = 25°C unless otherwise specified

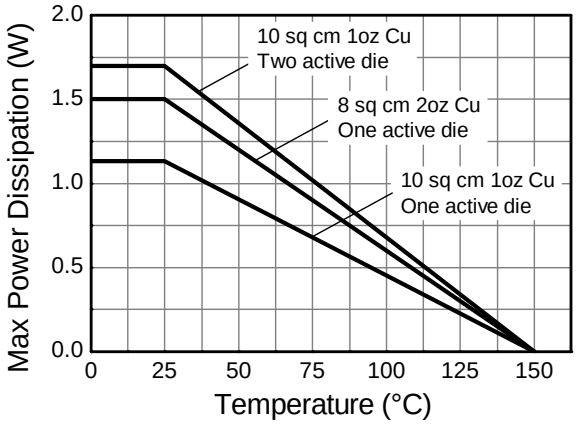
Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Notes 3 & 7)	P_D	1.50 12	W mW/°C
	(Notes 4 & 7)		2.45 19.6	
	(Notes 5 & 7)		1.13 9	
	(Notes 5 & 8)		1.70 13.6	
Thermal Resistance, Junction to Ambient	(Notes 3 & 7)	$R_{\theta JA}$	83.3	°C/W
	(Notes 4 & 7)		51.0	
	(Notes 5 & 7)		111	
	(Notes 5 & 8)		73.5	
Thermal Resistance, Junction to Lead	(Notes 7 & 9)	$R_{\theta JL}$	17.1	
Operating and Storage Temperature Range		T_J, T_{STG}	-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).

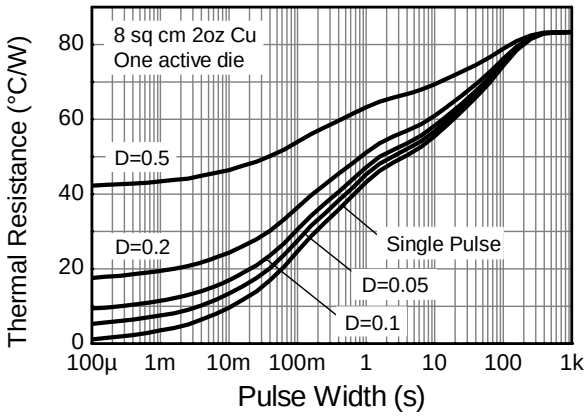
Thermal Characteristics



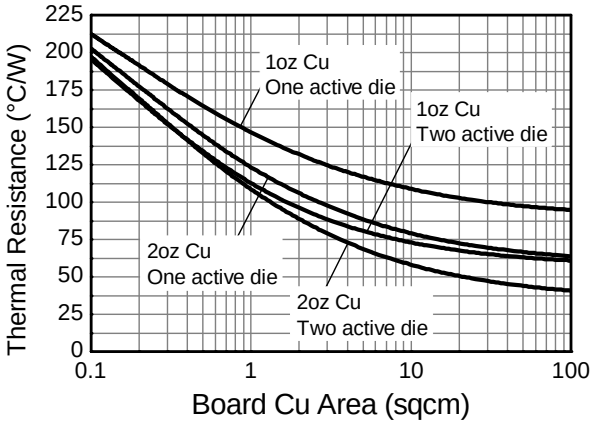
Safe Operating Area



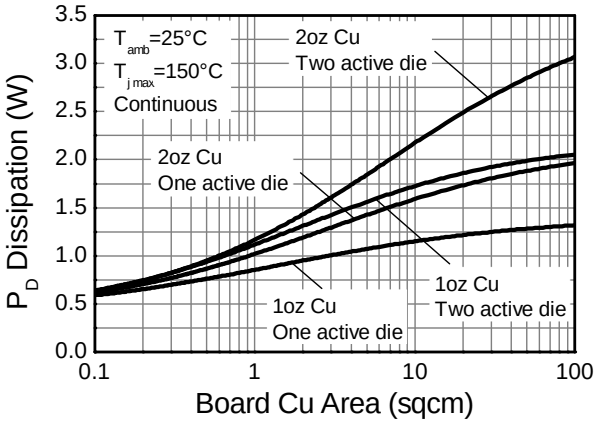
Derating Curve



Transient Thermal Impedance



Thermal Resistance v Board Area



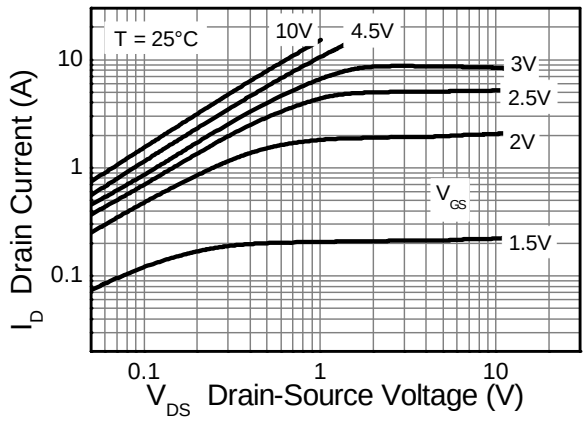
Power Dissipation v Board Area

Electrical Characteristics @T_A = 25°C unless otherwise specified

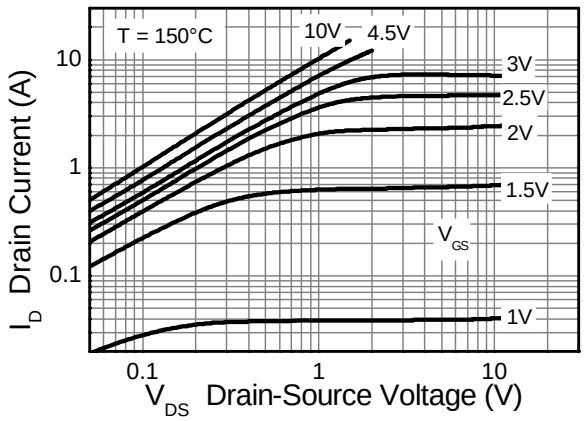
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	20	-	-	V	I_D = 250µA, V_{GS} = 0V
Zero Gate Voltage Drain Current	I_{DSS}	-	-	1	µA	V_{DS} = 20V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	-	-	±100	nA	V_{GS} = ±12V, V_{DS} = 0V
ON CHARACTERISTICS						
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; V_{DS} = 10V, I_D = 4A
Total Gate Charge (Note 12)	Q_g	-	3.1	-	nC	V_{GS} = 4.5V; V_{DS} = 10V, I_D = 4A
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.

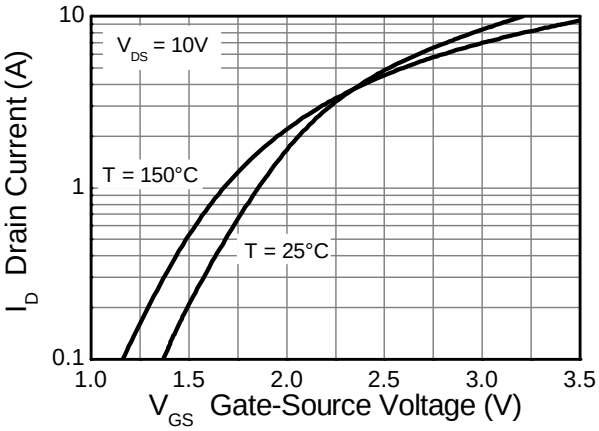
Typical Electrical Characteristics



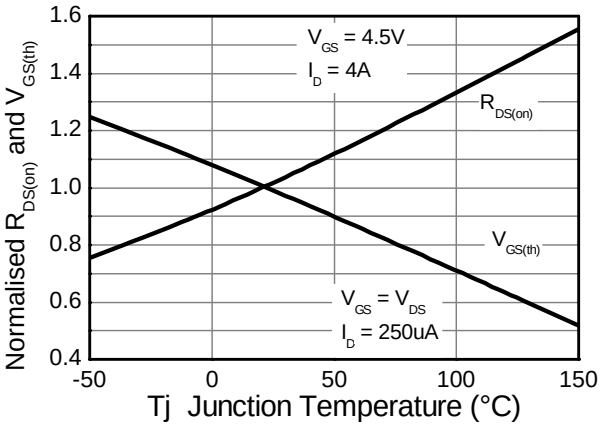
Output Characteristics



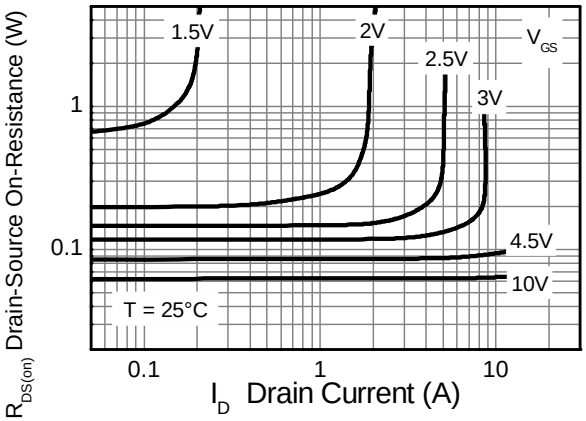
Output Characteristics



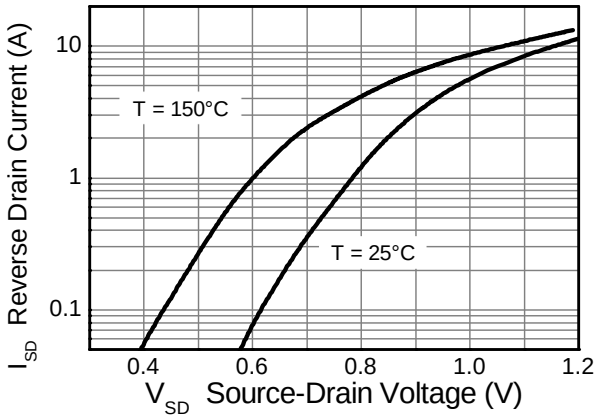
Typical Transfer Characteristics



Normalised Curves v Temperature

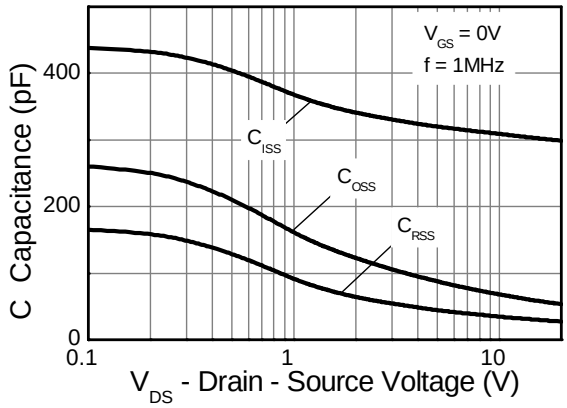


On-Resistance v Drain Current

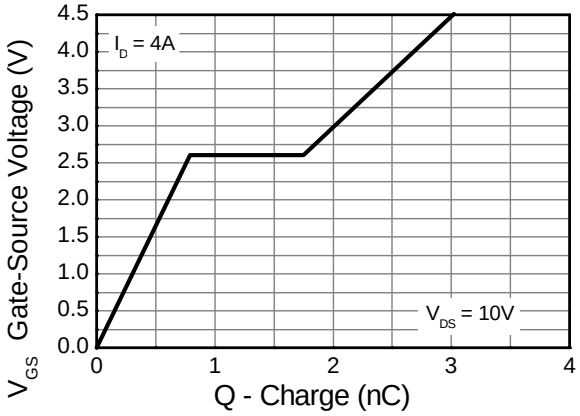


Source-Drain Diode Forward Voltage

Typical Electrical Characteristics - Continued

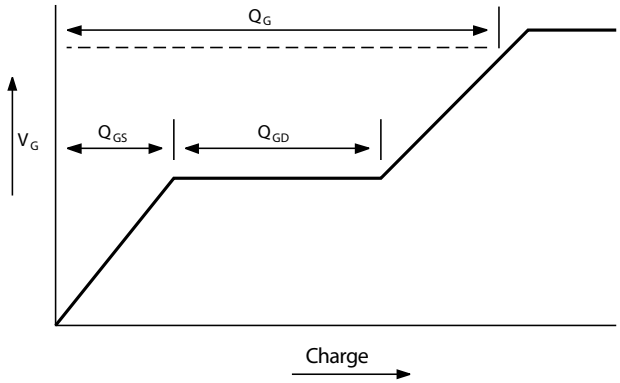


Capacitance v Drain-Source Voltage

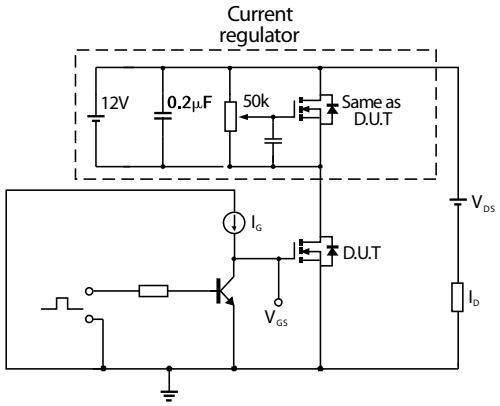


Gate-Source Voltage v Gate Charge

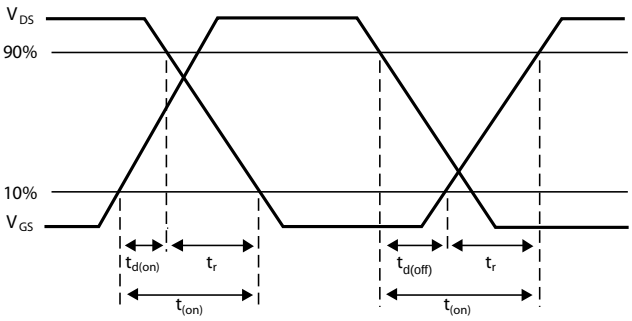
Test Circuits



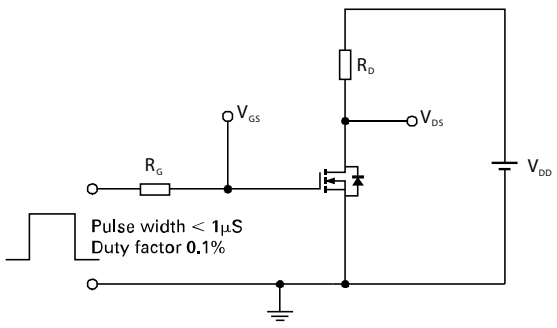
Basic gate charge waveform



Gate charge test circuit

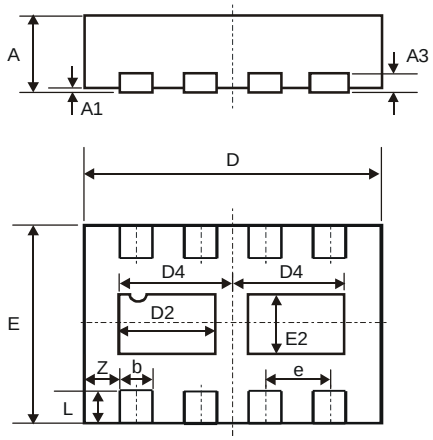


Switching time waveforms



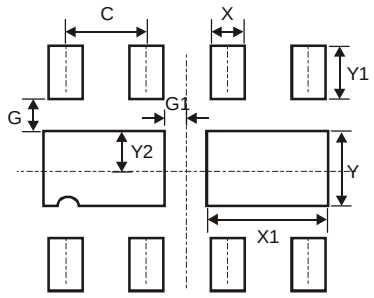
Switching time test circuit

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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