

D2

S₂

30V 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)
30V	120m Ω @ V _{GS} = 10V	3.7A
307	180mΩ @ $V_{GS} = 4.5V$	3.0A

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

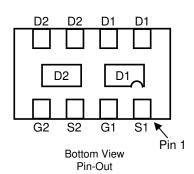
- Low profile package, for thin applications
- Low R_{0JA}, thermally efficient package
- 6mm² footprint, 50% smaller than TSOP6 and SOT23-6
- Low on-resistance
- Fast switching speed
- "Lead-Free", RoHS Compliant (Note 1)
- Halogen and Antimony Free. "Green" Device (Note 2)
- Qualified to AEC-Q101 Standards for High Reliability

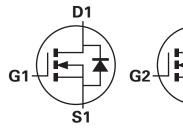
Mechanical Data

- 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)









Equivalent Circuit

Ordering Information (Note 3)

1					
	Part Number	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
	ZXMN3AMCTA	DNB	7	8	3000

Notes:

Top View

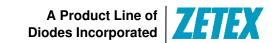
- 1. No purposefully added lead
- 2. Diodes Inc's "Green" policy can be found on our website at http://www.diodes.com.
- 3. For packaging details, go to our website at http://www.diodes.com.

Marking Information



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





Maximum Ratings @TA = 25°C unless otherwise specified

Characteristic			Symbol	Value	Unit
Drain-Source Voltage	Drain-Source Voltage			30	V
Gate-Source Voltage			V_{GSS}	±20	V
		(Notes 4 & 7)		3.7	
Continuous Drain Current	$V_{GS} = 10V$	T _A = 70°C (Notes 4 & 7)	I _D	3.0	
		(Notes 3 & 7)		2.9	
Pulsed Drain Current	$V_{GS} = 10V$	(Notes 6 & 7)	I _{DM}	13	А
Continuous Source Current (Body diode) (Notes 4 & 7)		I _S	3.2		
Pulse Source Current (Body diode) (Notes 6 & 7)		I _{SM}	13		

Thermal Characteristics @TA = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit	
Power Dissipation Linear Derating Factor	(Notes 3 & 7)		1.50 12	W mW/°C
	(Notes 4 & 7)		2.45 19.6	
	(Notes 5 & 7)	P _D	1.13 9	
	(Notes 5 & 8)		1.70 13.6	
	(Notes 3 & 7)		83.3	 [
Thermal Desistance, Investigate Austriant	(Notes 4 & 7)		51.0	1
Thermal Resistance, Junction to Ambient	(Notes 5 & 7)	R _{0JA}	111	°C/W
	(Notes 5 & 8)		73.5	
Thermal Resistance, Junction to Lead	(Notes 7 & 9)	$R_{\theta JL}$	17.1	1
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C	

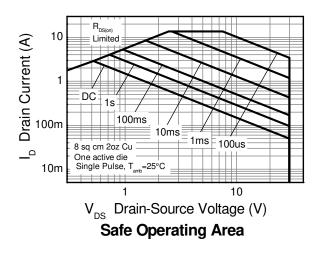
- 3. For a device surface mounted on 28mm x 28mm (8cm²) FR4 PCB with high coverage of single sided 2oz copper, in still air conditions; the device is measured when operating in a steady-state condition. The heatsink is split in half with the exposed drain pads connected to each half.
- 4. Same as note (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 (10cm²) 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 300µs. The pulse current is limited by the maximum junction temperature. 7. For a dual device with one active die.

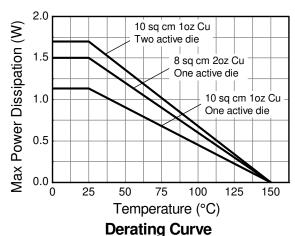
- 9. Thermal resistance from junction to solder-point (at the end of the drain lead).

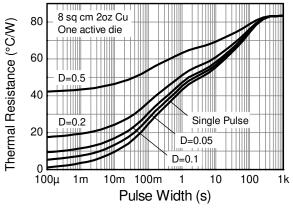
 9. Thermal resistance from junction to solder-point (at the end of the drain lead).

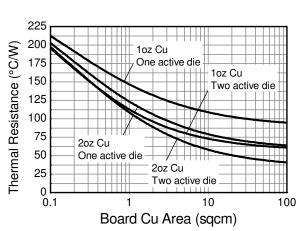


Thermal Characteristics



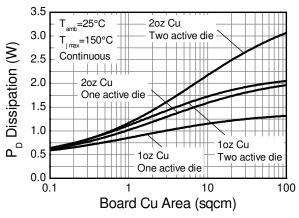






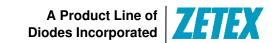
Transient Thermal Impedance

Thermal Resistance v Board Area



Power Dissipation v Board Area





Electrical Characteristics @TA = 25°C unless otherwise specified

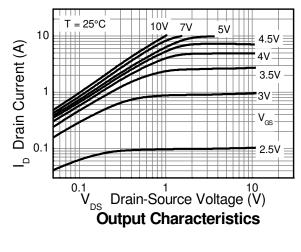
Characteristic	Symbol	Min	Тур	Max	Unit	Test C	ondition
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage	BV _{DSS}	30	-	-	V	$I_D = 250 \mu A, V_{GS}$	S = 0V
Zero Gate Voltage Drain Current	I _{DSS}	-	-	0.5	μΑ	$V_{DS} = 30V, V_{GS}$; = 0V
Gate-Source Leakage	IGSS	-	-	±100	nA	$V_{GS} = \pm 20V, V_{D}$	os = 0V
ON CHARACTERISTICS							
Gate Threshold Voltage	$V_{GS(th)}$	1.0	-	3.0	V	$I_D = 250 \mu A, V_{DS}$	s = V _{GS}
Static Drain Source On Decistores (Note 10)			0.100	0.120	0	V _{GS} = 10V, I _D = 2.5A	
Static Drain-Source On-Resistance (Note 10)	R _{DS(ON)}	-	0.140	0.180	Ω	$V_{GS} = 4.5V, I_{D} =$	= 2.0A
Forward Transconductance (Note 10 & 11)	9 _{fs}	-	3.5	-	S	$V_{DS} = 10V, I_{D} =$	2.5A
Diode Forward Voltage (Note 10)	V _{SD}	-	0.85	0.95	V	I _S = 1.7A, V _{GS} =	= 0V
Reverse Recover Time (Note 11)	t _{rr}	-	17.7	-	ns	I _S = 2.5A, di/dt = 100A/μs	
Reverse Recover Charge (Note 11)	Q _{rr}	-	13.0	-	nC		
DYNAMIC CHARACTERISTICS (Note 11)			•			•	
Input Capacitance	C _{iss}	-	190	-	рF), of),)	0) /
Output Capacitance	Coss	1	38	-	рF	$V_{DS} = 25V, V_{GS} = 0V,$ f = 1.0MHz	
Reverse Transfer Capacitance	C _{rss}	-	20	-	рF	1 = 1.0WI12	
Total Gate Charge (Note 12)	Qg	-	2.3	-	nC	$V_{GS} = 4.5V$	
Total Gate Charge (Note 12)	Qq	-	3.9	-	nC		$V_{DS} = 15V$
Gate-Source Charge (Note 12)	Q _{gs}	-	0.6	-	nC	$V_{GS} = 10V$ $I_{D} = 2.5A$	
Gate-Drain Charge (Note 12)	Q _{qd}	-	0.9	-	nC		
Turn-On Delay Time (Note 12)	t _{D(on)}	-	1.7	-	ns	$V_{DS} = 15V, I_{D} = 2.5A$ $V_{GS} = 10V, R_{G} = 6\Omega$	
Turn-On Rise Time (Note 12)	t _r	-	2.3	-	ns		
Turn-Off Delay Time (Note 12)	t _{D(off)}	-	6.6	-	ns		
Turn-Off Fall Time (Note 12)	t _f	-	2.9	-	ns		

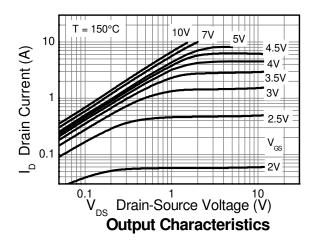
Notes:

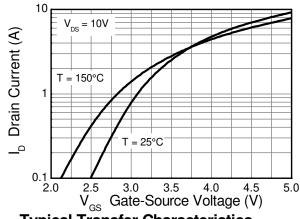
- 10. Measured under pulsed conditions. Width \leq 300 μ s. Duty cycle \leq 2%.
- For design aid only, not subject to production testing.
 Switching characteristics are independent of operating junction temperature.

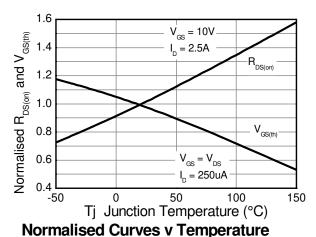


Typical Electrical Characteristics

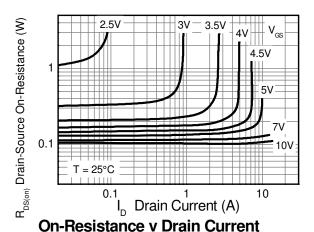


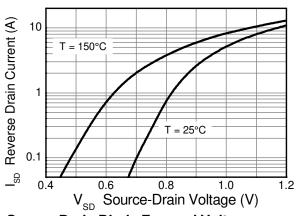






Typical Transfer Characteristics

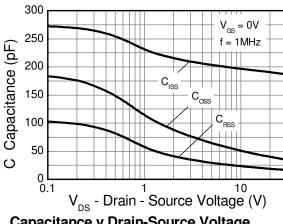


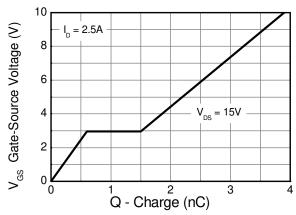


Source-Drain Diode Forward Voltage



Typical Electrical Characteristics - Continued

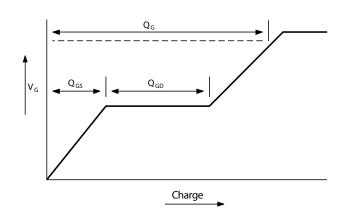




Capacitance v Drain-Source Voltage

Gate-Source Voltage v Gate Charge

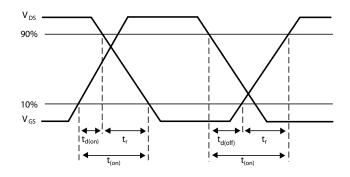
Test Circuits

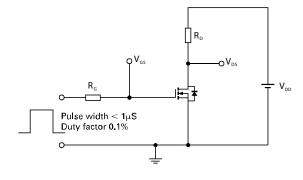


Current regulator (1) Ic J**⊑**ir d.U.T

Basic gate charge waveform

Gate charge test circuit



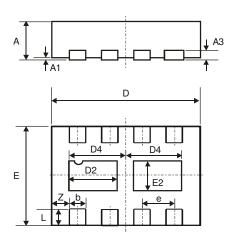


Switching time waveforms

Switching time test circuit

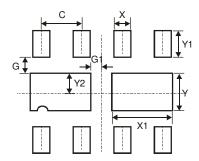


Package Outline Dimensions



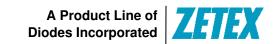
DFN3020B-8					
Dim	Dim Min Max		Тур		
Α	0.77	0.83	0.80		
A1	0	0.05	0.02		
A3	1	1	0.15		
b	0.25	0.35	0.30		
D	2.95	3.075	3.00		
D2	0.82	1.02	0.92		
D4	1.01	1.21	1.11		
е	-	-	0.65		
Е	1.95	2.075	2.00		
E2	0.43	0.63	0.53		
L	0.25	0.35	0.30		
Z	-	-	0.375		
All Dimensions in mm					

Suggested Pad Layout



Dimensions	Value (in mm)
С	0.650
G	0.285
G1	0.090
Х	0.400
X1	1.120
Υ	0.730
Y1	0.500
Y2	0.365





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