20V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ Max	I_D T_A = +25°C
20V	55mΩ @ V_{GS} = 4.5V	4.6A
	100mΩ @ V_{GS} = 2.5V	3.4A

Description

This new generation MOSFET is 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
- Backlighting

Features and Benefits

- Low Input Capacitance
- Low On-Resistance
- Fast Switching Speed
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

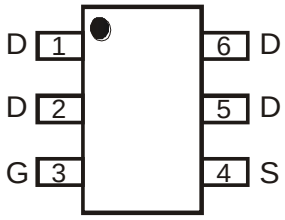
Mechanical Data

- Case: SOT26
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish – Tin Finish Annealed over Copper Leadframe; Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.018 grams (Approximate)

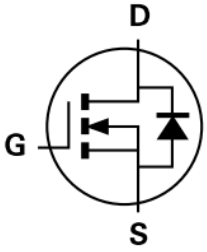
SOT26



Top View



Top View
Pin Configuration



Equivalent Circuit

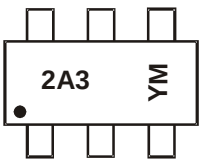
Ordering Information (Note 4)

Part Number	Case	Packaging
ZXMN2A03E6TA	SOT26	3,000/Tape & Reel

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/quality/lead_free.html 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/products/packages.html.

Marking Information

SOT26



2A3 = Product Type Marking Code
YM = Date Code Marking
Y or $\overline{Y}$ = Year (ex: C = 2015)
M or $\overline{M}$ = Month (ex: 9 = September)

Date Code Key

Year	2015	2016	2017	2018	2019	2020	2021	2022
Code	C	D	E	F	G	H	I	J

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

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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, V_{GS} = 10V	Steady State	T_A = +25°C (Note 6) T_A = +70°C (Note 6) T_A = +25°C (Note 5)	I_D	4.6 3.7 3.7	A
Maximum Body Diode Forward Current (Note 6)			I_S	2.7	A
Pulsed Drain Current (Note 7)			I_{DM}	16	A
Pulsed Source Current (Note 7)			I_{SM}	16	A

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

Characteristic		Symbol	Value	Unit
Total Power Dissipation Linear Derating Factor	T_A = +25°C (Note 5)	P_D	1.1 8.8	W mW/°C
Total Power Dissipation Linear Derating Factor	T_A = +25°C (Note 6)	P_D	1.7 13.6	W mW/°C
Thermal Resistance, Junction to Ambient	Steady State (Note 5)	$R_{\theta JA}$	113	°C/W
	Steady State (Note 6)		70	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

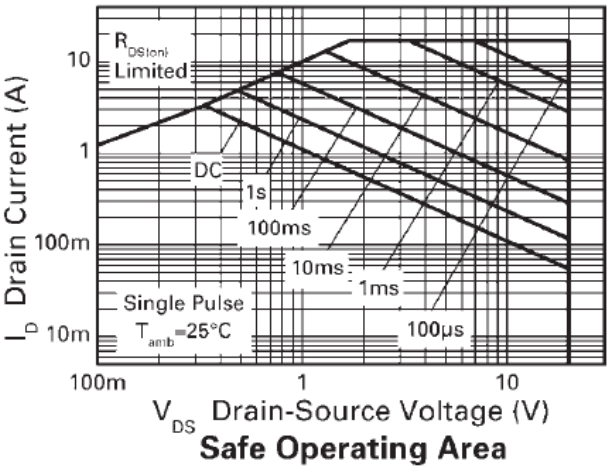
Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 9)						
Drain-Source Breakdown Voltage	BV_{DSS}	20	—	—	V	V_{GS} = 0V, I_D = 250µA
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 (Note 9)						
Gate Threshold Voltage	$V_{GS(TH)}$	0.7	—	—	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance (Note 8)	$R_{DS(ON)}$	—	—	55	mΩ	V_{GS} = 4.5V, I_D = 7.2A
		—	—	100		V_{GS} = 2.5V, I_D = 4.6A
Diode Forward Voltage (Note 8)	V_{SD}	—	0.85	0.95	V	V_{GS} = 0V, I_S = 4.1A
Forward Transconductance (Notes 8 & 10)	g_{fs}	—	13	—	S	V_{DS} = 10V, I_D = 7.2A
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C_{iss}	—	837	—	pF	V_{DS} = 10V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{oss}	—	168	—		
Reverse Transfer Capacitance	C_{rss}	—	90	—		
Total Gate Charge	Q_g	—	8.2	—	nC	V_{DS} = 10V, I_D = 7.2A, V_{GS} = 4.5V
Gate-Source Charge	Q_{gs}	—	2.3	—		
Gate-Drain Charge	Q_{gd}	—	2.0	—		
Turn-On Delay Time	$t_{D(ON)}$	—	4.7	—	ns	V_{GS} = 4.5V, V_{DD} = 10V, R_G = 6.0Ω, I_D= 1.0A
Turn-On Rise Time	t_R	—	5.7	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	18.5	—		
Turn-Off Fall Time	t_F	—	10.5	—		
Body Diode Reverse Recovery Time	t_{RR}	—	12	—	ns	I_F = 1.9A, dI/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q_{RR}	—	4.9	—	nC	

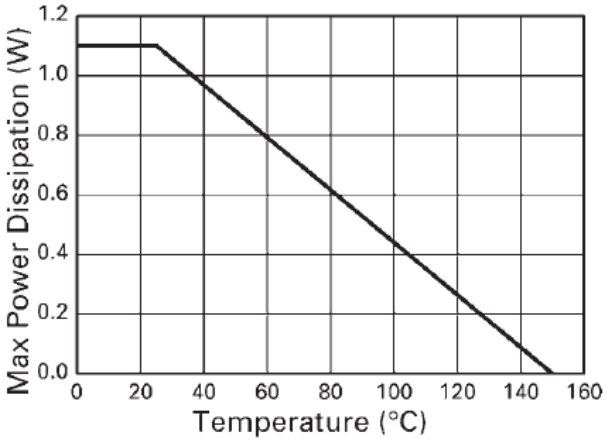
Notes:
5. For a device surface mounted on 25mm x 25mm FR-4 PCB with high coverage of single sided 1oz copper, in still air conditions.
6. For a device surface mounted on FR-4 PCB measured at t ≤5 secs.
7. Repetitive rating 25mm x 25mm FR-4 PCB, D = 0.05, pulse width 10µs - pulse width limited by maximum junction temperature. Refer to Transient Thermal Impedance graph.
8. Measured under pulsed conditions. Width=300µs. Duty cycle ≤ 2%.
9. Short duration pulse test used to minimize self-heating effect.
10. Guaranteed by design. Not subject to product testing.

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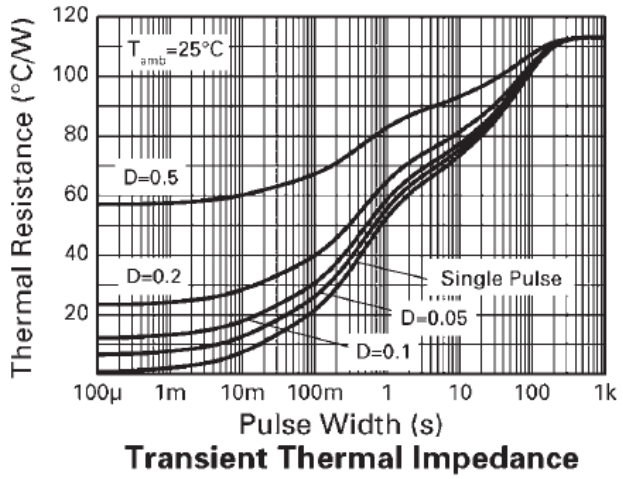
TYPICAL CHARACTERISTICS



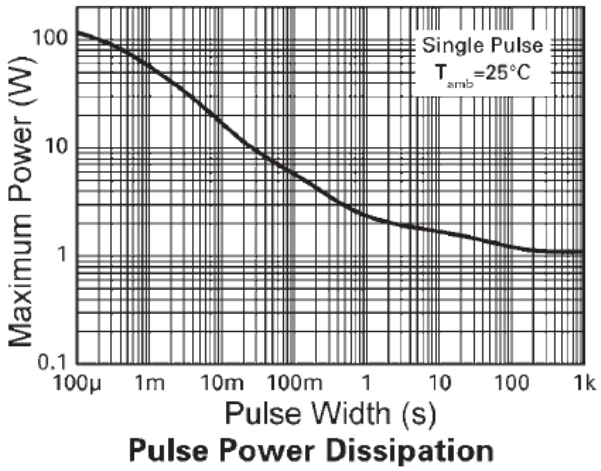
Safe Operating Area



Derating Curve



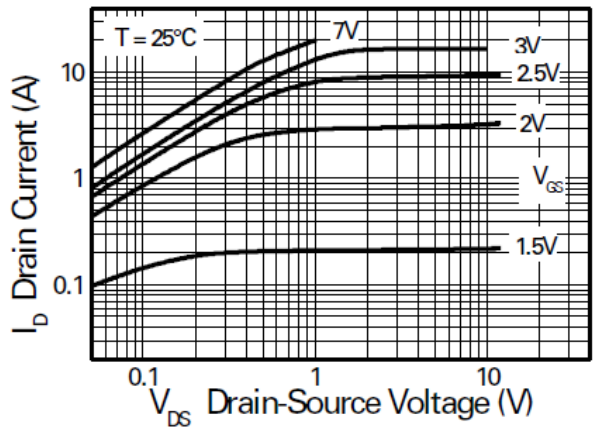
Transient Thermal Impedance



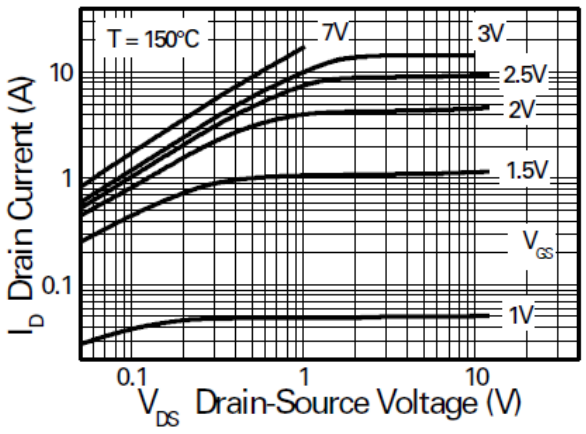
Pulse Power Dissipation

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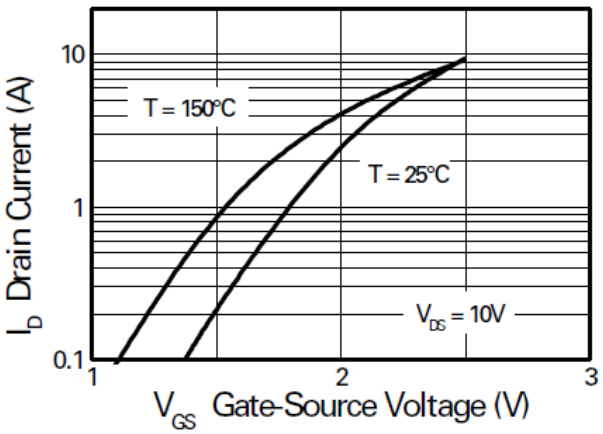
TYPICAL CHARACTERISTICS



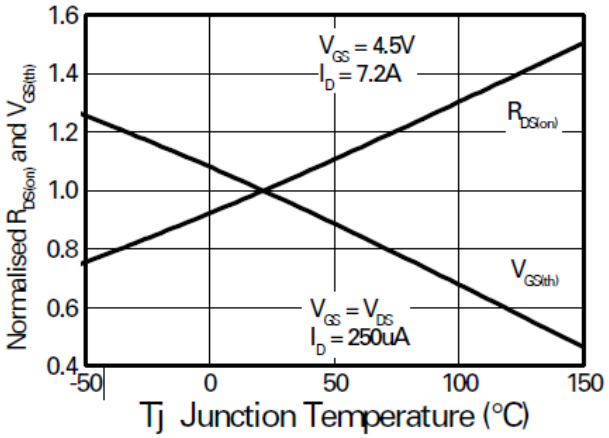
Output Characteristics



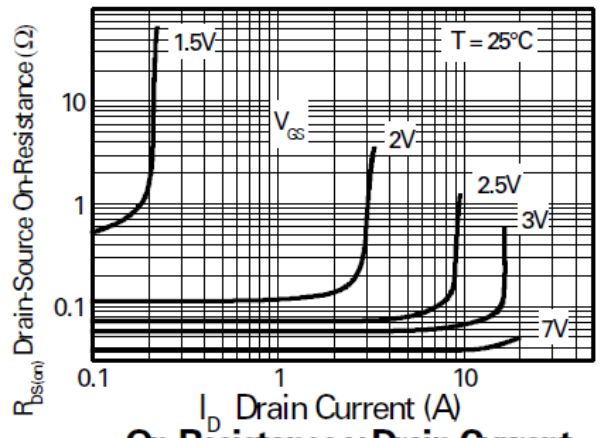
Output Characteristics



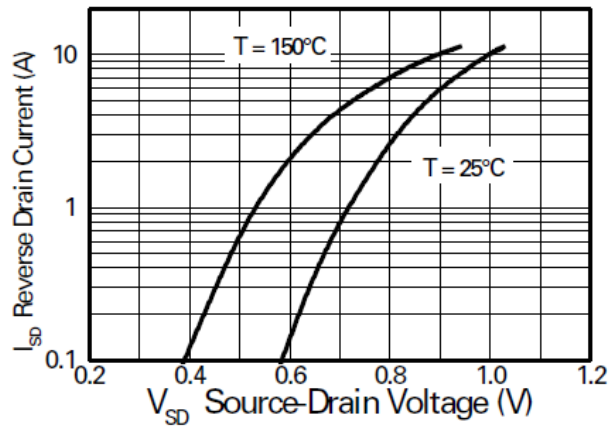
Typical Transfer Characteristics



Normalised Curves v Temperature



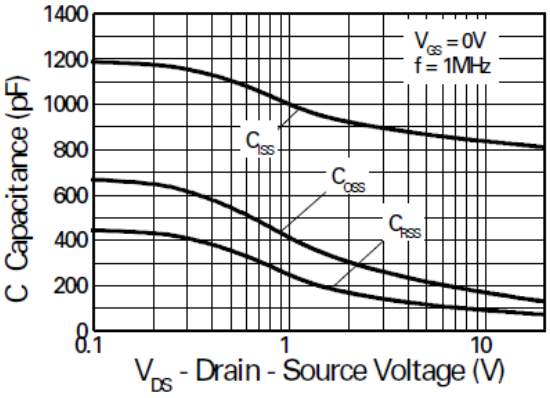
On-Resistance v Drain Current



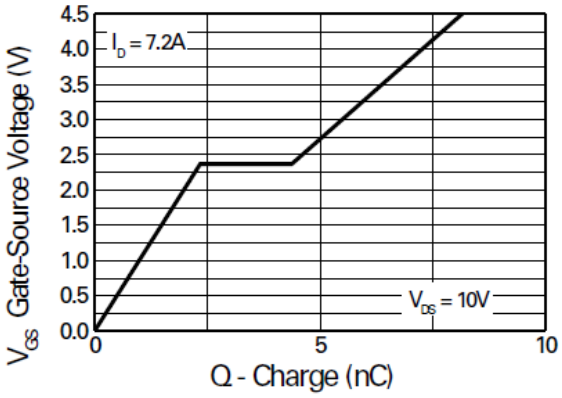
Source-Drain Diode Forward Voltage

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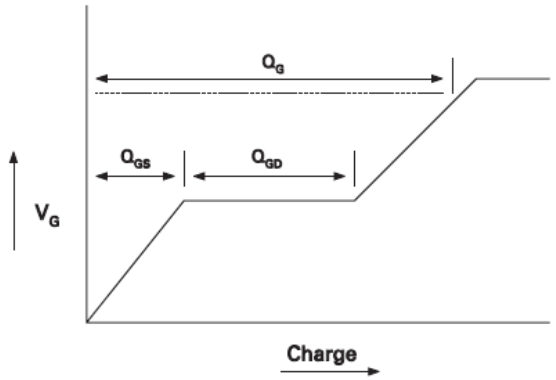
TYPICAL CHARACTERISTICS



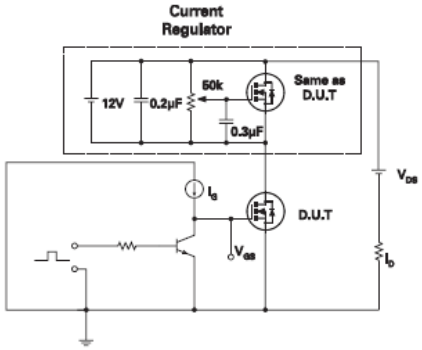
Capacitance v Drain-Source Voltage



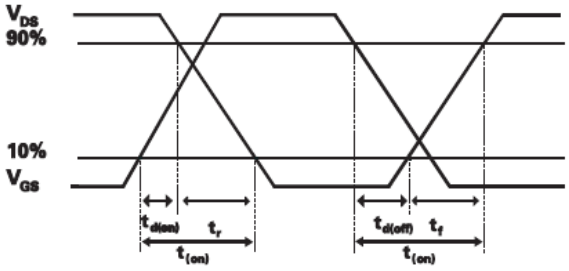
Gate-Source Voltage v Gate Charge



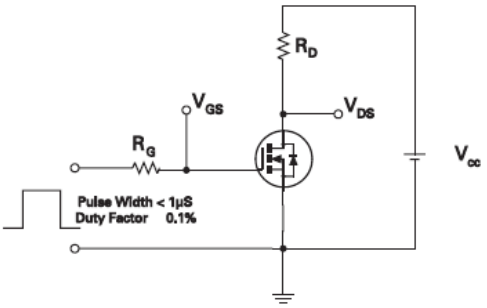
Basic Gate Charge Waveform



Gate Charge Test Circuit



Switching Time Waveforms

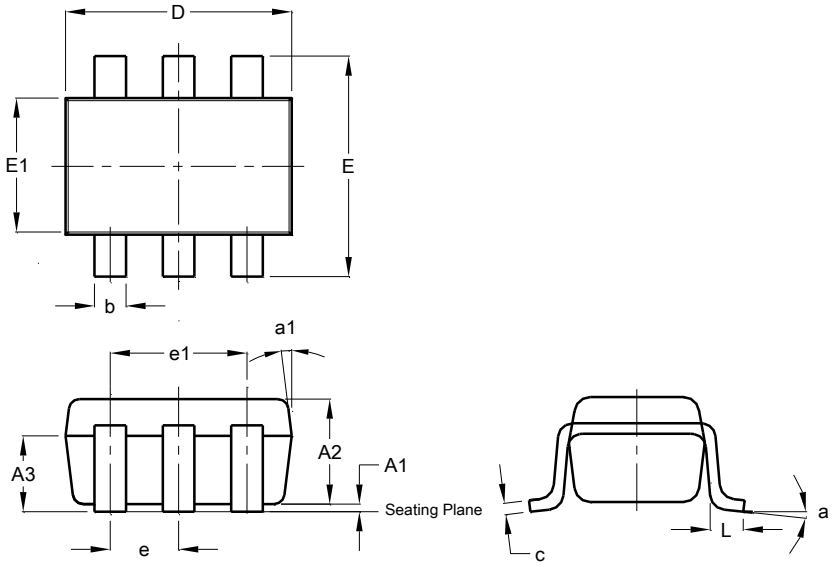


Switching Time Test Circuit

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Package Outline Dimensions

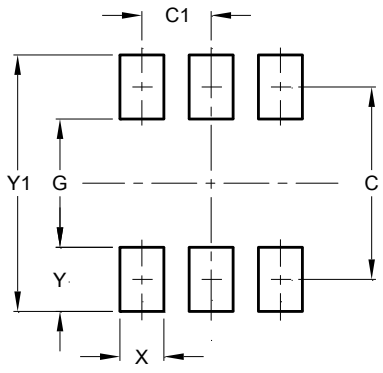
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.



SOT26			
Dim	**Min**	**Max**	**Typ**
A1	0.013	0.10	0.05
A2	1.00	1.30	1.10
A3	0.70	0.80	0.75
b	0.35	0.50	0.38
c	0.10	0.20	0.15
D	2.90	3.10	3.00
e	-	-	0.95
e1	-	-	1.90
E	2.70	3.00	2.80
E1	1.50	1.70	1.60
L	0.35	0.55	0.40
a	-	-	8°
a1	-	-	7°
All Dimensions in mm			

Suggested Pad Layout

Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version.



Dimensions	Value (in mm)
C	2.40
C1	0.95
G	1.60
X	0.55
Y	0.80
Y1	3.20

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