70V P-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV_{DSS}	$R_{DS(on)}$ max	I_D T_A = +25°C
-70V	160mΩ @ V_{GS}= -10V	-5.7A
	250mΩ @ V_{GS}= -4.5V	-5.3A

Description

This new generation of trench MOSFETs utilizes a unique structure that combines the benefits of low on-resistance with fast switching speed. The ZXMP7A17KQ is ideal for high efficiency, low voltage power management applications.

Applications

- DC-DC Converters
- Power Management Functions
- Disconnect Switches
- Motor Control
- Class D Audio Output Stages

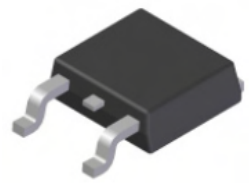
Features and Benefits

- Low On-Resistance
- Fast Switching Speed
- Low Threshold
- Low Gate Drive
- DPAK Package
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

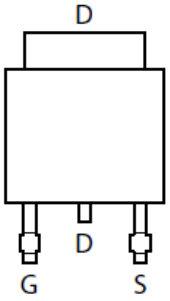
Mechanical Data

- Case: TO252 (DPAK)
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram Below
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe; Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.315 grams (Approximate)

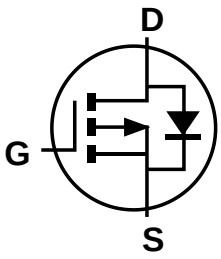
TO252



Top View



Top View
Pin Out



Equivalent Circuit

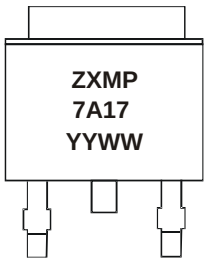
Ordering Information (Note 5)

Part Number	Case	Packaging
ZXMP7A17KQTC	TO252	2,500/Tape & Reel

Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
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. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to http://www.diodes.com/quality/product_grade_definitions/.
5. For packaging details, go to our website at http://www.diodes.com/products/packages.html.

Marking Information

TO252



ZXMP7A17 = Product Type Marking Code
YYWW = Date Code Marking
YY = Year (ex: 10 = 2010)
WW = Week (01 - 53)

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	-70	V
Gate-Source Voltage			V_{GS}	±20	V
Continuous Drain Current	V_{GS} = 10V	(Note 7)	I_D	-5.7	A
		T_A = +70°C (Note 7)		-4.6	
		(Note 6)		-3.8	
Pulsed Drain Current	V_{GS}= 10V	(Note 8)	I_{DM}	-17.7	A
Continuous Source Current (Body diode)		(Note 7)	I_S	-9.2	A
Pulsed Source Current (Body diode)		(Note 8)	I_{SM}	-17.7	A

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

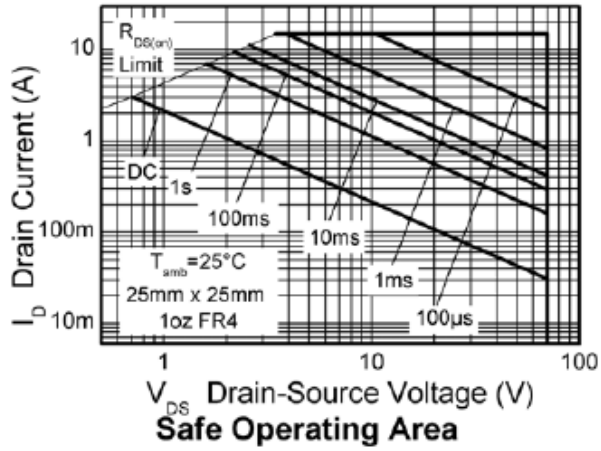
Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Note 6)	P_D	4.17 33.3	W mW/°C
	(Note 7)		9.25 74	
	(Note 9)		2.11 16.8	
Thermal Resistance, Junction to Ambient	(Note 6)	$R_{\theta JA}$	30	°C/W
	(Note 7)		13.5	
	(Note 8)		59.1	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

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

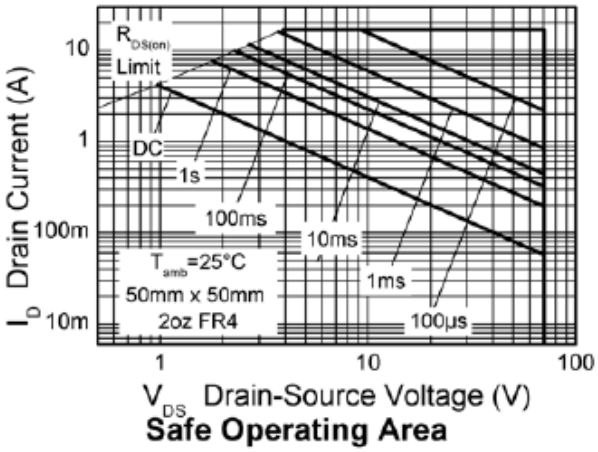
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	-70	—	—	V	I_D = -250µA, V_{GS}= 0V
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1	µA	V_{DS}= -70V, V_{GS}= 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS}= ±20V, V_{DS}= 0V
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(th)}$	-1.0	—	—	V	I_D= -250µA, V_{DS}= V_{GS}
Static Drain-Source On-Resistance (Note 10)	$R_{DS(ON)}$	—	—	0.16	Ω	V_{GS}= -10V, I_D= -2.1A
				0.25		V_{GS}= -4.5V, I_D= -1.7A
Forward Transconductance (Notes 10 & 11)	g_{fs}	—	4.4	—	S	V_{DS}= -15V, I_D= -2.1A
Diode Forward Voltage (Note 10)	V_{SD}	—	-0.85	-0.95	V	I_S= -2.0A, V_{GS}= 0V, T_J = +25°C
Reverse Recovery Time (Note 11)	t_{rr}		29.8	—	ns	I_S= -2.1A, di/dt= 100A/µs
Reverse Recovery Charge (Note 11)	Q_{rr}	—	38.5	—	nC	
DYNAMIC CHARACTERISTICS (Note 11)						
Input Capacitance	C_{iss}	—	635	—	pF	V_{DS}= -40V, V_{GS}= 0V f= 1MHz
Output Capacitance	C_{oss}	—	52	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	42.5	—	pF	
Total Gate Charge (Note 12)	Q_g	—	9.6	—	nC	V_{GS}= -5V; V_{DS}= -35V, I_D= -2.1A
Total Gate Charge (Note 12)	Q_g	—	18	—	nC	V_{GS}= -10V; V_{DS}= -35V, I_D= -2.1A
Gate-Source Charge (Note 12)	Q_{gs}	—	1.77	—	nC	V_{GS}= -10V; V_{DS}= -35V, I_D= -2.1A
Gate-Drain Charge (Note 12)	Q_{gd}	—	3.66	—	nC	V_{GS}= -10V; V_{DS}= -35V, I_D= -2.1A
Turn-On Delay Time (Note 12)	$t_{D(on)}$	—	2.5	—	ns	V_{DD}= -35V, V_{GS}= -10V I_D= -1A, $R_G \cong 6.0\Omega$
Turn-On Rise Time (Note 12)	t_r	—	3.4	—	ns	
Turn-Off Delay Time (Note 12)	$t_{D(off)}$	—	27.9	—	ns	
Turn-Off Fall Time (Note 12)	t_f	—	8	—	ns	

Notes:
6. For a device surface mounted on 50mm x 50mm x 1.6mm FR4 PCB with high coverage of single sided 2oz copper, in still air conditions.
7. For a device surface mounted on FR4 PCB measured at t ≤10 sec.
8. Repetitive rating 50mm x 50mm x 1.6mm FR4 PCB, D=0.02 pulse width=300µs - pulse width limited by maximum junction temperature.
9. For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.
10. Measured under pulsed conditions. Pulse width ≤300µs; duty cycle ≤ 2%.
11. Switching characteristics are independent of operating junction temperature.
12. For design aid only, not subject to production testing.

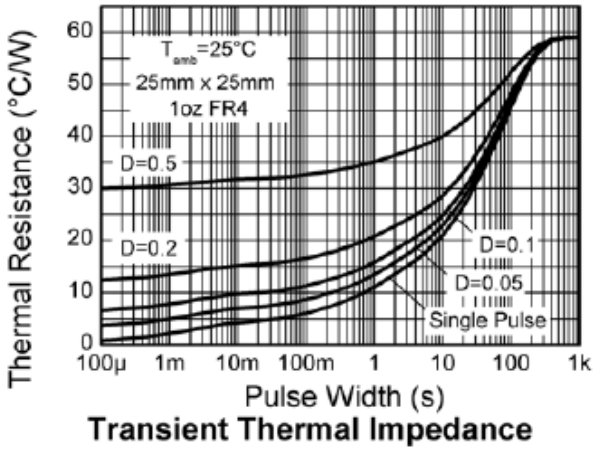
Thermal Characteristics



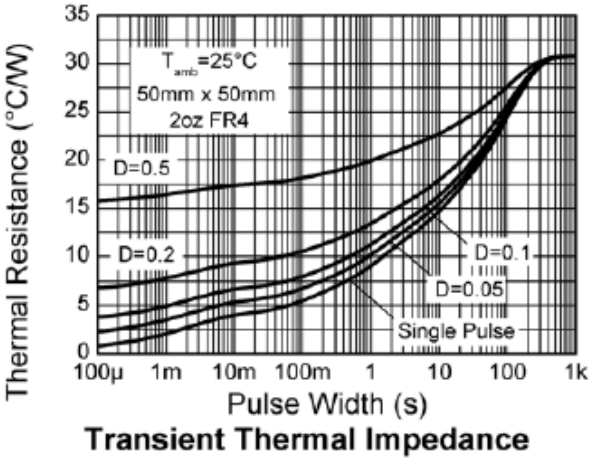
Safe Operating Area



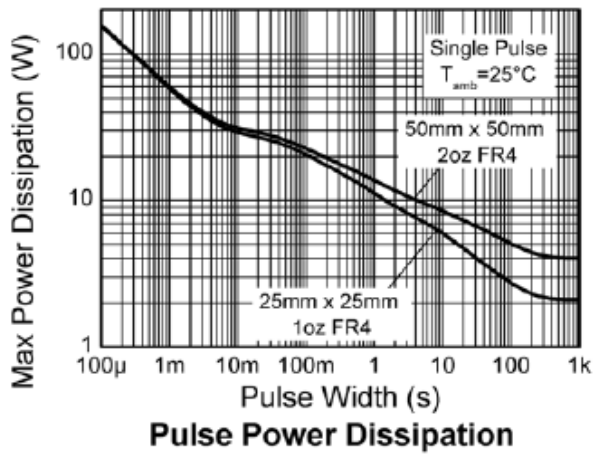
Safe Operating Area



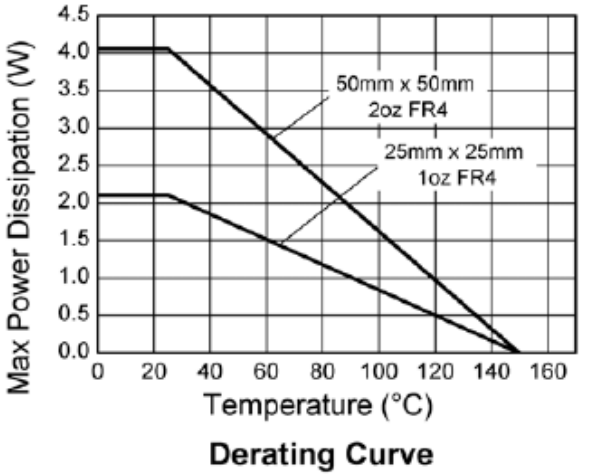
Transient Thermal Impedance



Transient Thermal Impedance

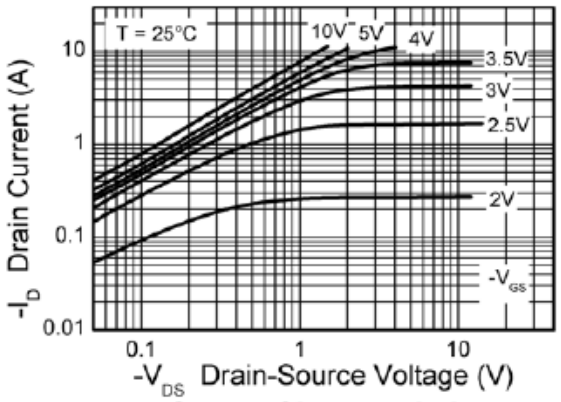


Pulse Power Dissipation

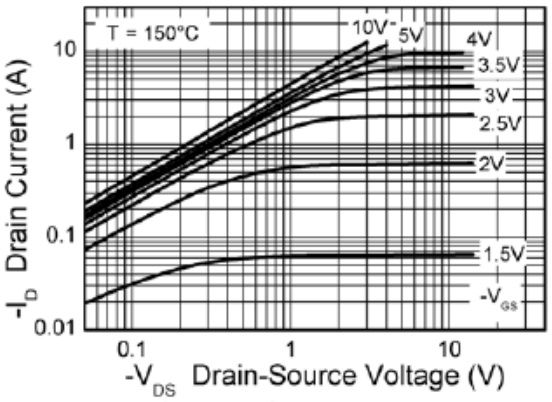


Derating Curve

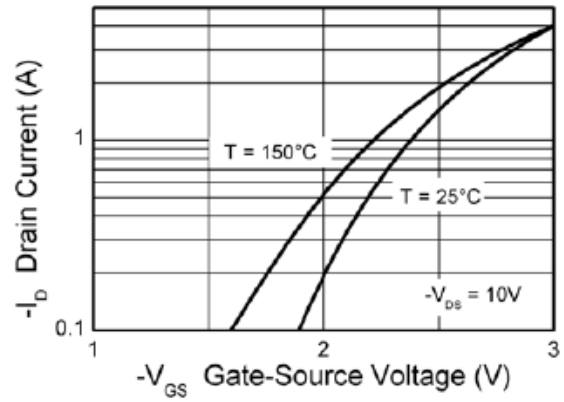
Typical Characteristics



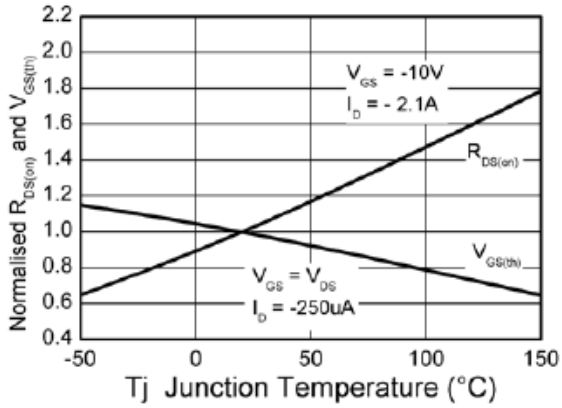
Output Characteristics



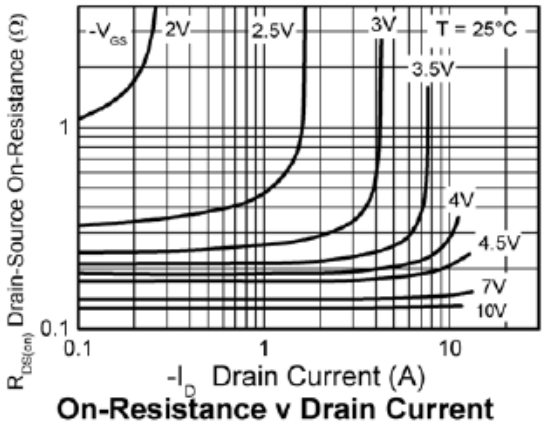
Output Characteristics



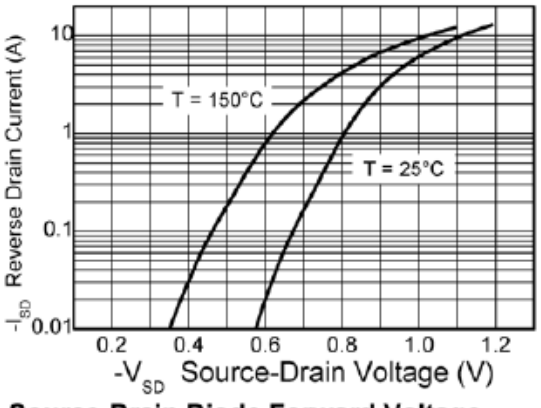
Typical Transfer Characteristics



Normalised Curves v Temperature

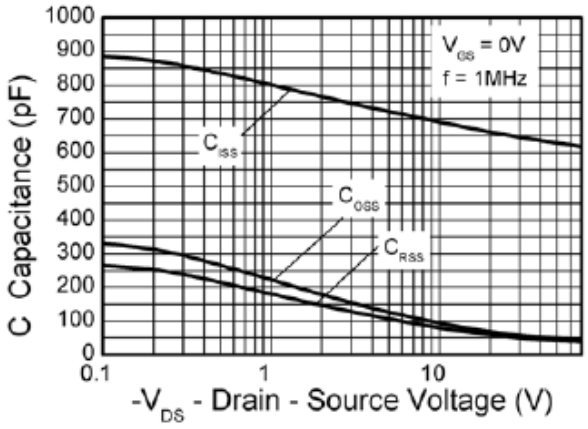


On-Resistance v Drain Current

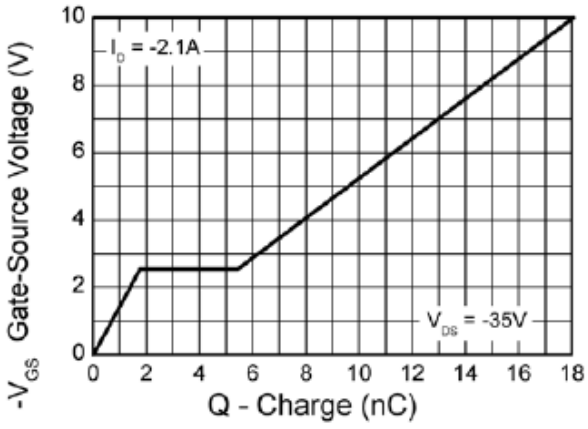


Source-Drain Diode Forward Voltage

Typical Characteristics (cont.)



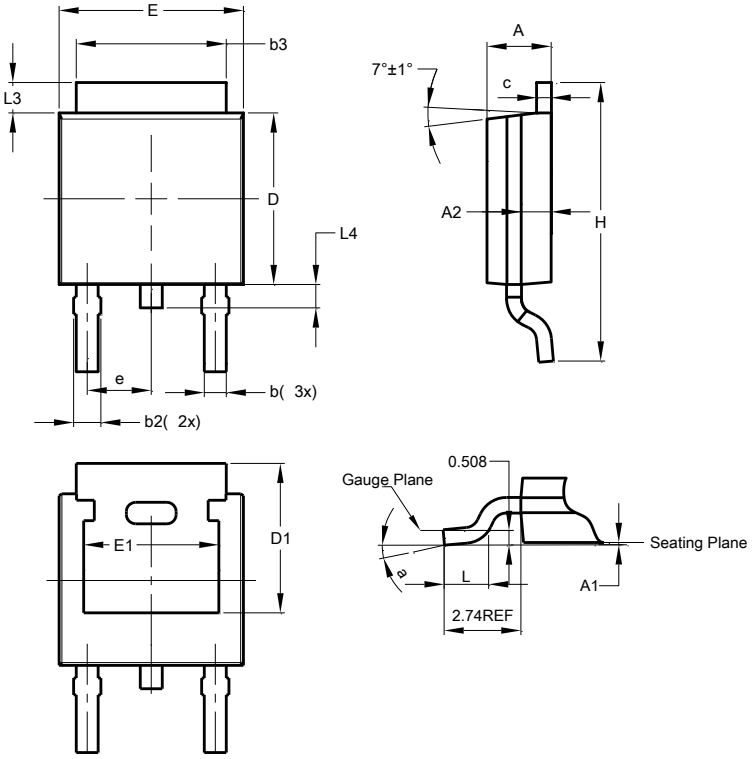
Capacitance v Drain-Source Voltage



Gate-Source Voltage v Gate Charge

Package Outline Dimensions

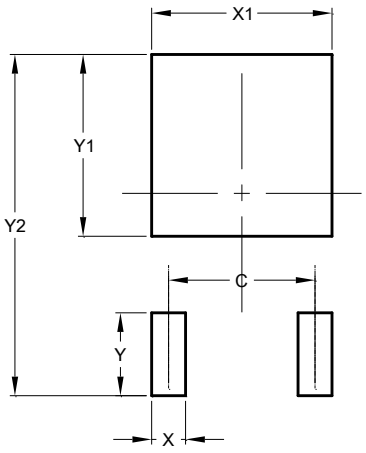
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.



TO252 (DPAK)			
Dim	**Min**	**Max**	**Typ**
A	2.19	2.39	2.29
A1	0.00	0.13	0.08
A2	0.97	1.17	1.07
b	0.64	0.88	0.783
b2	0.76	1.14	0.95
b3	5.21	5.46	5.33
c	0.45	0.58	0.531
D	6.00	6.20	6.10
D1	5.21	-	-
e	-	-	2.286
E	6.45	6.70	6.58
E1	4.32	-	-
H	9.40	10.41	9.91
L	1.40	1.78	1.59
L3	0.88	1.27	1.08
L4	0.64	1.02	0.83
a	0°	10°	-
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	4.572
X	1.060
X1	5.632
Y	2.600
Y1	5.700
Y2	10.700

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