

Product Summary

BV_{DSS}	$R_{DS(on)}$	I_D $T_A = +25^\circ\text{C}$
-60V	125m Ω @ $V_{GS} = -10\text{V}$	-4.3A
	190m Ω @ $V_{GS} = -4.5\text{V}$	-3.5A

Description

This MOSFET is designed to minimize the on-state resistance yet maintain superior switching performance, which makes it ideal for high-efficiency power management applications.

Applications

- Motor Control
- DC-DC Converters
- Power Management Functions
- Uninterrupted Power Supply

Features and Benefits

- Fast Switching Speed
- Low Gate Drive
- Low Input Capacitance
- **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)**

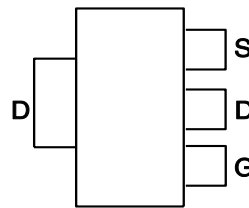
Mechanical Data

- Case: SOT223
- Case Material: Molded Plastic, UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish—Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208③
- Weight: 0.112 grams (Approximate)

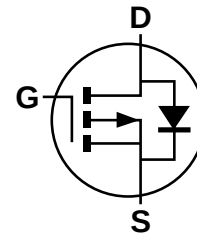
SOT223



Top View



Pin Out—Top View



Equivalent Circuit

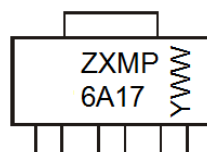
Ordering Information (Notes 4 & 5)

Part Number	Compliance	Case	Packaging
ZXMP6A17GQTA	Automotive	SOT223	1000/Tape & Reel
ZXMP6A17GQTC	Automotive	SOT223	4000/Tape & Reel

- Notes:
1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
 2. See <https://www.diodes.com/quality/lead-free/> 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. Refer to <https://www.diodes.com/quality/>.
 5. For packaging details, see <http://www.diodes.com/products/packages.html>.

Marking Information

SOT223



ZXMP6A17 = Product Type Marking Code
 YWW = Date Code Marking
 Y or Y = Year (ex: 8 = 2018)
 WW or WW = Week (01 - 53)

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

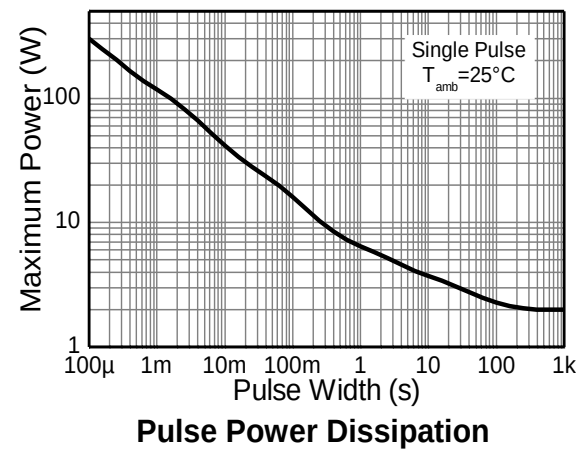
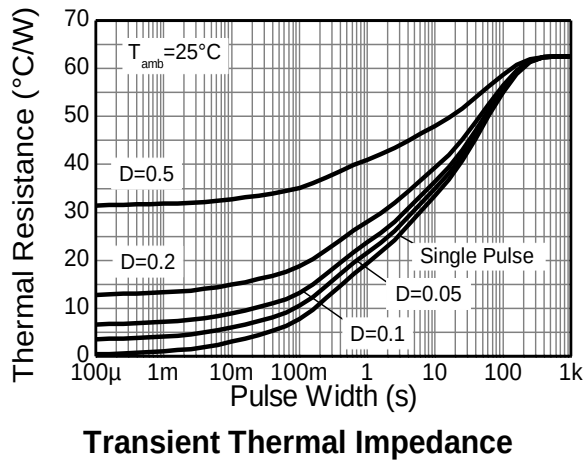
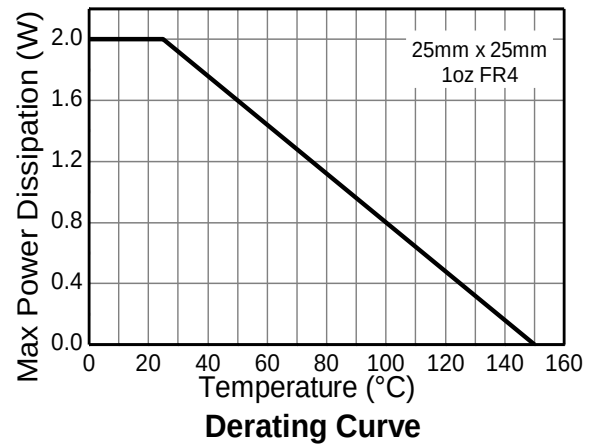
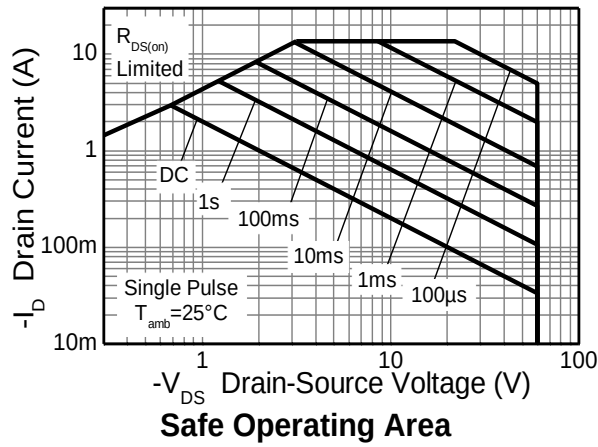
Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	-60	V
Gate-Source Voltage			V _{GS}	±20	V
Continuous Drain Current	V _{GS} = 10V	(Note 7)	I _D	-4.3	A
		T _A = +70°C (Note 7)		-3.5	
		(Note 6)		-3	
Pulsed Drain Current	V _{GS} = 10V	(Note 8)	I _{DM}	-13.7	A
Continuous Source Current (Body Diode)		(Note 7)	I _S	-4.8	A
Pulsed Source Current (Body Diode)		(Note 8)	I _{SM}	-13.7	A

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

Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Note 6)	P _D	2 16	W mW/°C
	(Note 7)		3.9 31	
Thermal Resistance, Junction to Ambient	(Note 6)	R _{θJA}	62.5	°C/W
	(Note 7)		32	
Thermal Resistance, Junction to Lead	(Note 9)	R _{θJL}	9.8	
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +150	°C

- Notes:
6. For a device surface mounted on 25mm × 25mm × 1.6mm FR4 PCB with high coverage of single-sided 1oz copper. In still air conditions; the device is measured when operating in a steady-state condition.
 7. Same as Note 6 except the device is measured at t ≤ 10s.
 8. Same as Note 6 except the device is pulsed with D = 0.02 and pulse width of 300μs. The pulse current is limited by the maximum junction temperature.
 9. Thermal resistance from junction to solder point (at the end of the drain lead).

Thermal Characteristics



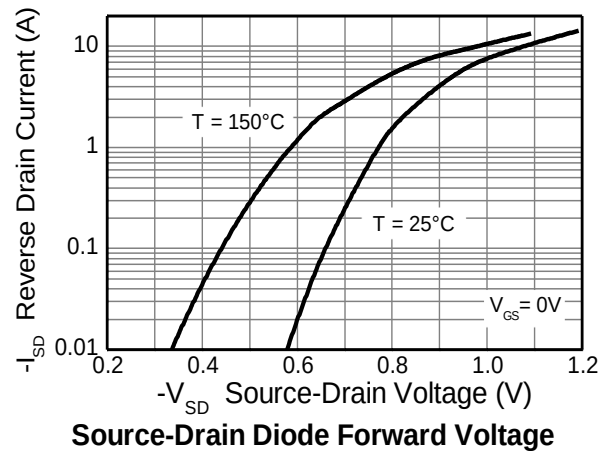
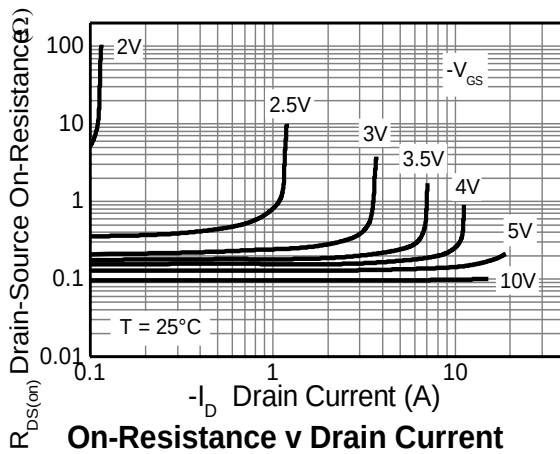
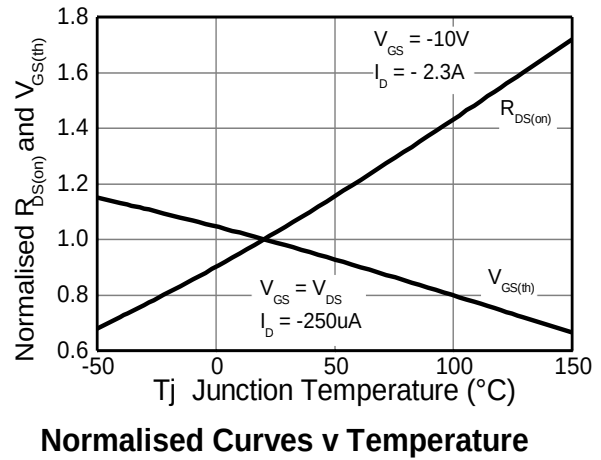
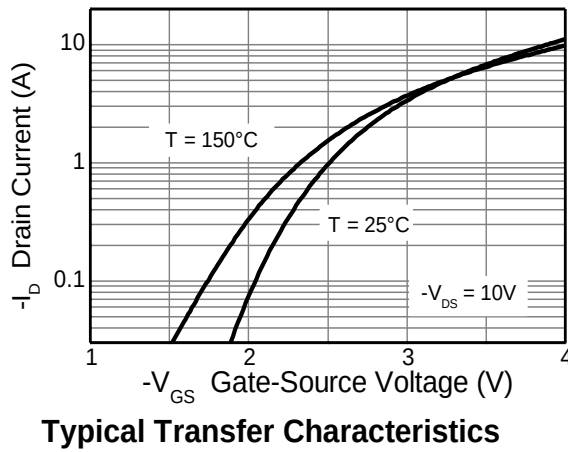
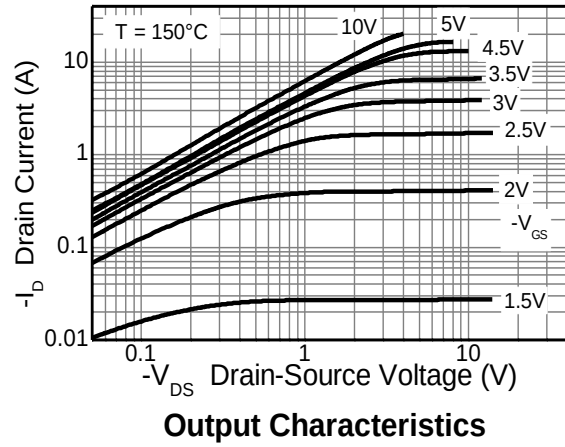
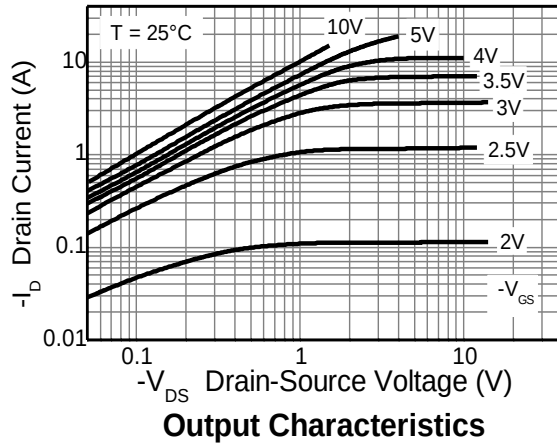
Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition	
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage	BV _{DSS}	-60	—	—	V	I _D = -250μA, V _{GS} = 0V	
Zero Gate Voltage Drain Current	I _{DSS}	—	—	-0.5	μA	V _{DS} = -60V, 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	—	—	V	I _D = -250μA, V _{DS} = V _{GS}	
Static Drain-Source On-Resistance (Note 10)	R _{DS(ON)}	—	0.096	0.125	Ω	V _{GS} = -10V, I _D = -2.2A	
			0.12	0.19		V _{GS} = -4.5V, I _D = -1.8A	
Forward Transconductance (Notes 10 & 11)	g _{fs}	—	4.7	—	S	V _{DS} = -15V, I _D = -2.2A	
Diode Forward Voltage (Note 10)	V _{SD}	—	-0.85	-0.95	V	I _S = -2A, V _{GS} = 0V, T _J = +25°C	
Reverse Recovery Time (Note 11)	t _{rr}		25.1	—	ns	I _S = -1.7A, di/dt = 100A/μs, T _J = +25°C	
Reverse Recovery Charge (Note 11)	Q _{rr}	—	27.2	—	nC		
DYNAMIC CHARACTERISTICS (Note 11)							
Input Capacitance	C _{iss}	—	637	—	pF	V _{DS} = -30V, V _{GS} = 0V f = 1MHz	
Output Capacitance	C _{oss}	—	70	—	pF		
Reverse Transfer Capacitance	C _{rss}	—	53	—	pF		
Total Gate Charge (Note 12)	Q _g	—	9	—	nC	V _{GS} = -4.5V	V _{DS} = -30V I _D = -2.2A
Total Gate Charge (Note 12)	Q _g	—	17.7	—	nC	V _{GS} = -10V	
Gate-Source Charge (Note 12)	Q _{gs}	—	1.6	—	nC		
Gate-Drain Charge (Note 12)	Q _{gd}	—	4.4	—	nC		
Turn-On Delay Time (Note 12)	t _{D(on)}	—	2.6	—	ns	V _{DD} = -30V, V _{GS} = -10V I _D = -1A, R _G ≅ 6Ω	
Turn-On Rise Time (Note 12)	t _r	—	3.4	—	ns		
Turn-Off Delay Time (Note 12)	t _{D(off)}	—	26.2	—	ns		
Turn-Off Fall Time (Note 12)	t _f	—	11.3	—	ns		

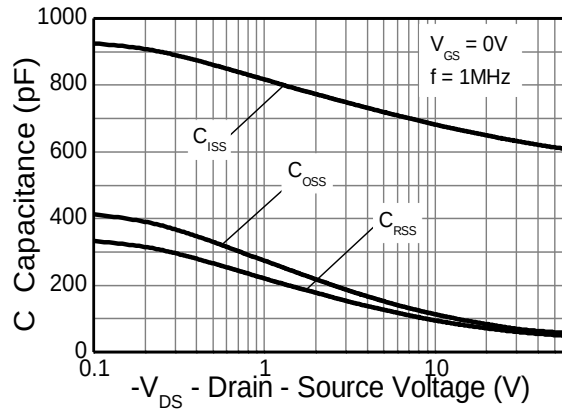
Notes:

10. Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤ 2%.
11. For design aid only—not subject to production testing.
12. Switching characteristics are independent of operating junction temperatures.

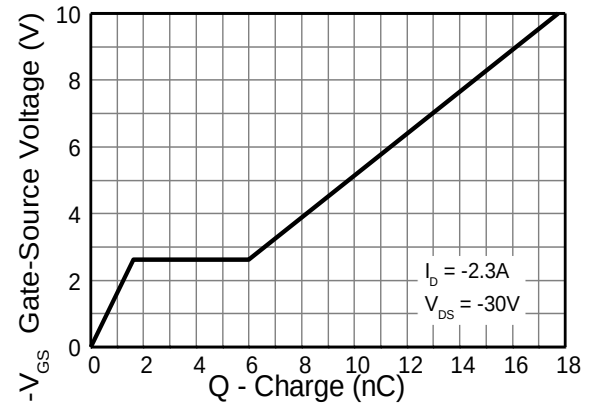
Typical Characteristics



Typical Characteristics (continued)

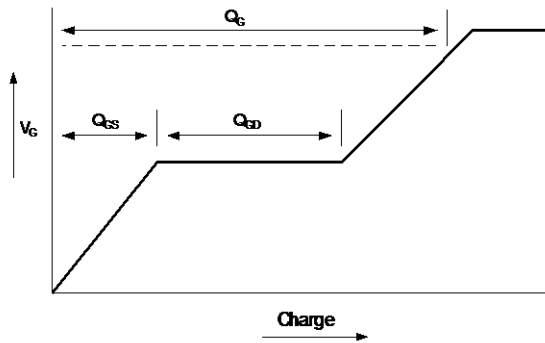


Capacitance v Drain-Source Voltage

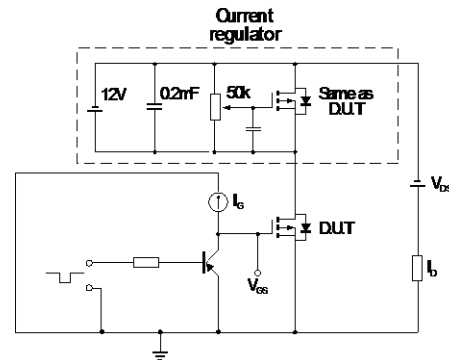


Gate-Source Voltage v Gate Charge

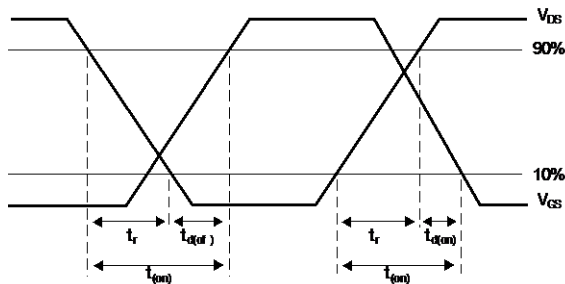
Test Circuits



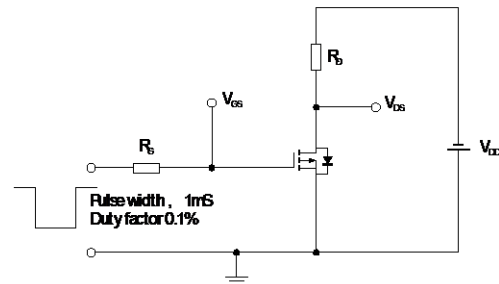
Basic gate charge waveform



Gate charge test circuit



Switching time waveforms

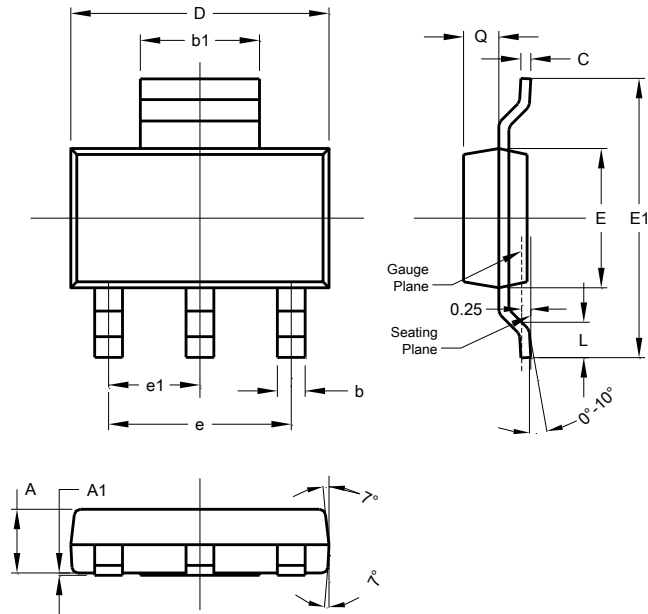


Switching time test circuit

Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT223

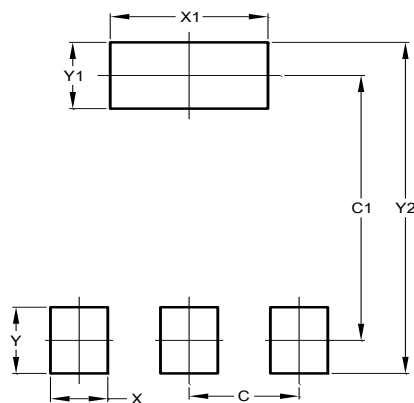


SOT223			
Dim	Min	Max	Typ
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b	0.60	0.80	0.70
b1	2.90	3.10	3.00
C	0.20	0.30	0.25
D	6.45	6.55	6.50
E	3.45	3.55	3.50
E1	6.90	7.10	7.00
e	-	-	4.60
e1	-	-	2.30
L	0.85	1.05	0.95
Q	0.84	0.94	0.89
All Dimensions in mm			

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT223



Dimensions	Value (in mm)
C	2.30
C1	6.40
X	1.20
X1	3.30
Y	1.60
Y1	1.60
Y2	8.00

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