

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$ Max	I_D Max $T_A = +25^\circ\text{C}$ (Note 7)
-60V	125m Ω @ $V_{GS} = -10\text{V}$	-3.0 A
	190m Ω @ $V_{GS} = -4.5\text{V}$	-2.4 A

Description

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

Applications

- DC-DC Converters
- Power Management Functions
- Disconnect Switches
- Motor Control

Features and Benefits

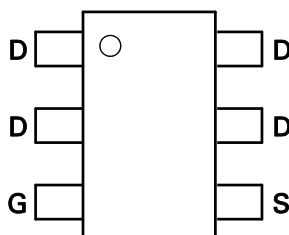
- Low On-Resistance
- Fast Switching Speed
- Low Threshold
- Low Gate Drive
- Low Input Capacitance
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Available (Note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

Mechanical Data

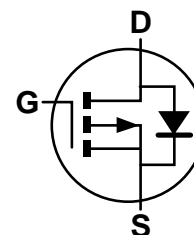
- Case: SOT26
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram Below
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe; Solderable per MIL-STD-202, Method 208 ^{Ⓔ3}
- Weight: 0.018 grams (Approximate)



Top View



Pin Out - Top View



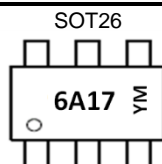
Equivalent Circuit

Ordering Information (Notes 4 & 5)

Part Number	Compliance	Case	Quantity per reel
ZXMP6A17E6QTA	Automotive	SOT26	3,000

- Note:
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. 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



6A17 = Product Type Marking Code
 YM = Date Code Marking
 Y or \bar{Y} = Year (ex: C = 2015)
 M or \bar{M} = Month (ex: 9 = September)

Date Code Key

Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Code	C	D	E	F	G	H	I	J	K	L	M	N

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

Maximum Ratings (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

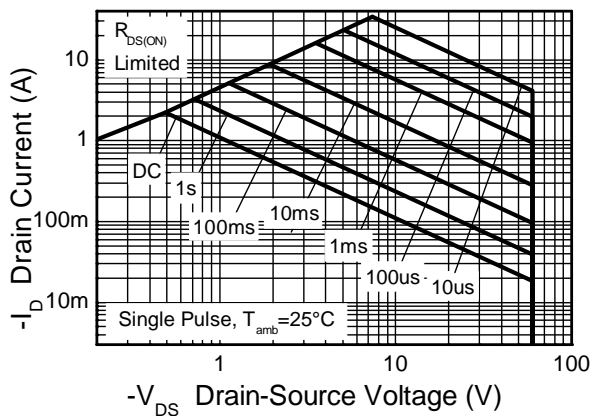
Characteristic		Symbol	Value	Unit	
Drain-Source Voltage		V_{DSS}	-60	V	
Gate-Source Voltage		V_{GS}	± 20	V	
Continuous Drain Current	$V_{GS} = 10\text{V}$	I_D	(Note 7)	-3.0	A
			$T_A = +70^\circ\text{C}$ (Note 7)	-2.4	
			(Note 6)	-2.3	
Pulsed Drain Current	$V_{GS} = 10\text{V}$	I_{DM}	(Note 8)	-13.6	A
Continuous Source Current (Body Diode)		I_S	(Note 7)	-2.5	A
Pulsed Source Current (Body Diode)		I_{SM}	(Note 8)	-13.6	A

Thermal Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

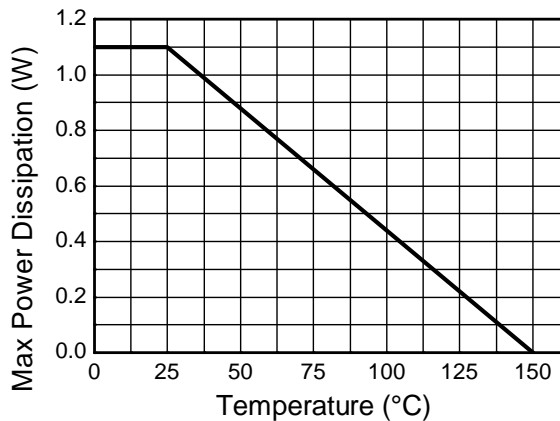
Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating factor	(Note 6)	P_D	1.1	W
			8.8	
			1.92	
Thermal Resistance, Junction to Ambient	(Note 6)	$R_{\theta JA}$	15.4	$^\circ\text{C/W}$
			113	
			65	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

- Notes:
6. 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; the device is measured when operating in a steady-state condition.
 7. Same as Note 6, except the device is measured at $t \leq 5$ sec.
 8. Same as Note 6, except the device is pulsed with $D = 0.02$ and pulse width 300 μs . The pulse current is limited by the maximum junction temperature.

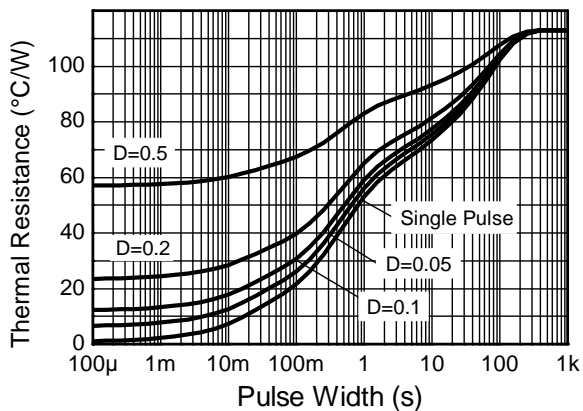
Thermal Characteristics



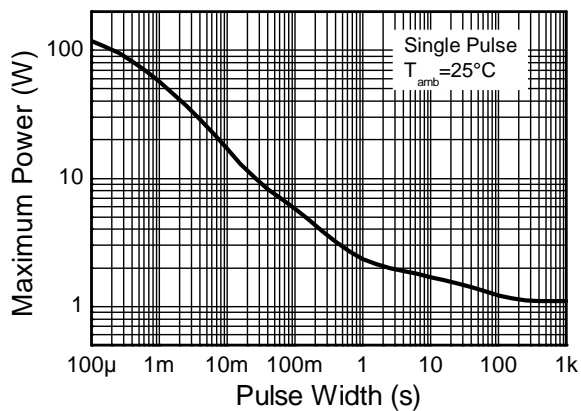
P-channel Safe Operating Area



Derating Curve



Transient Thermal Impedance



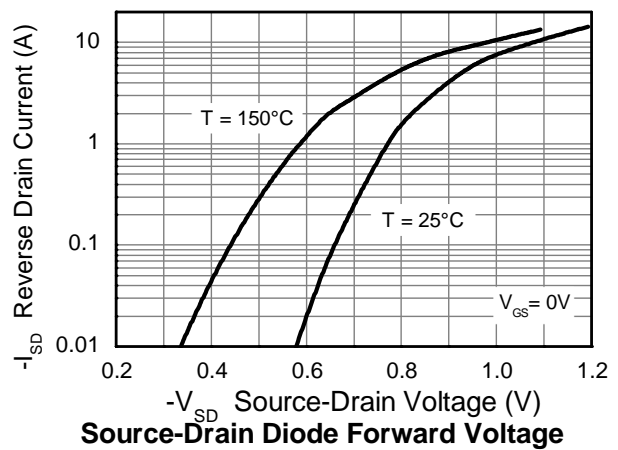
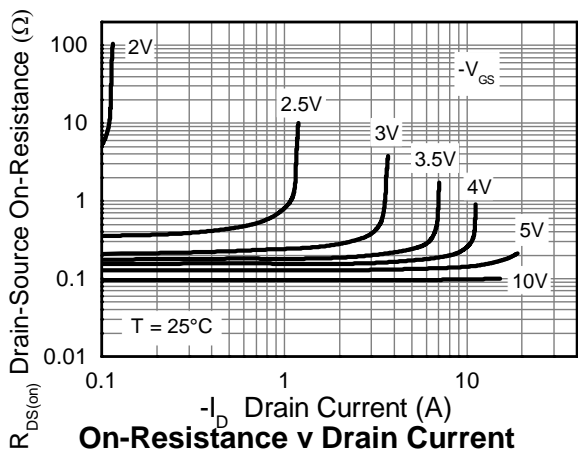
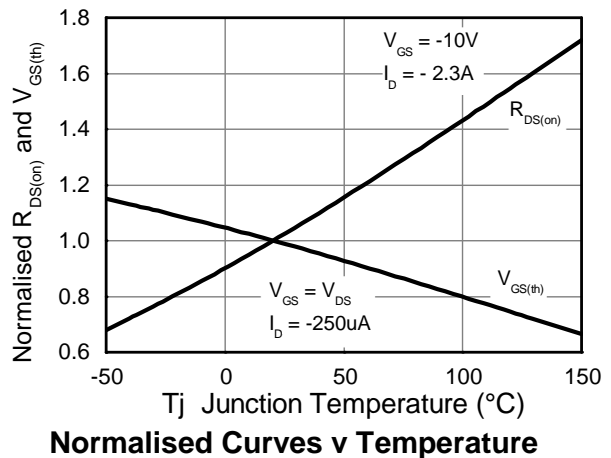
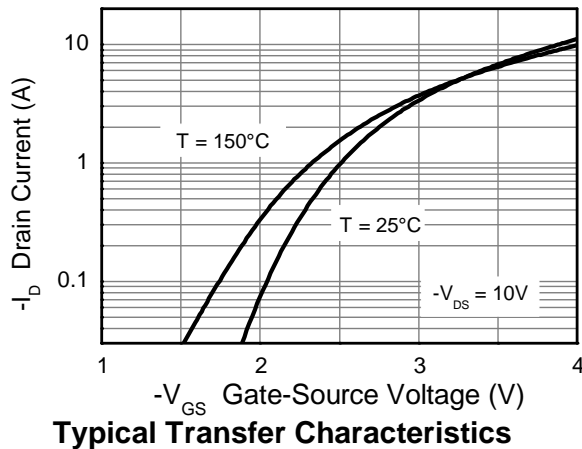
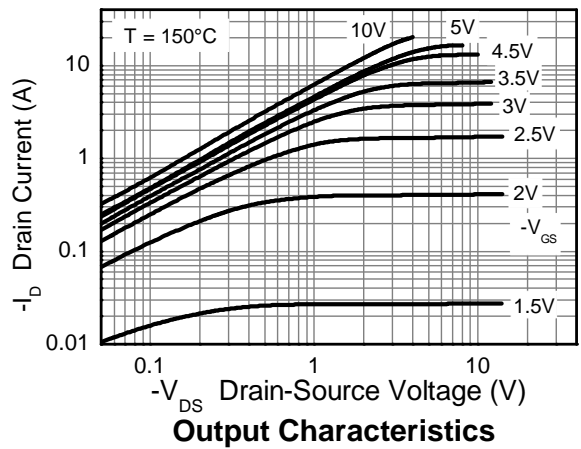
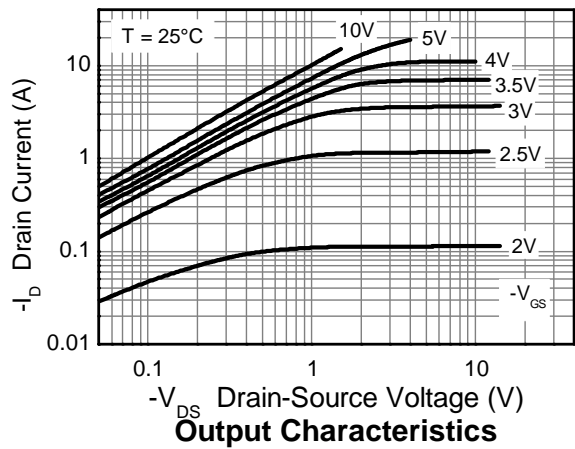
Pulse Power Dissipation

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

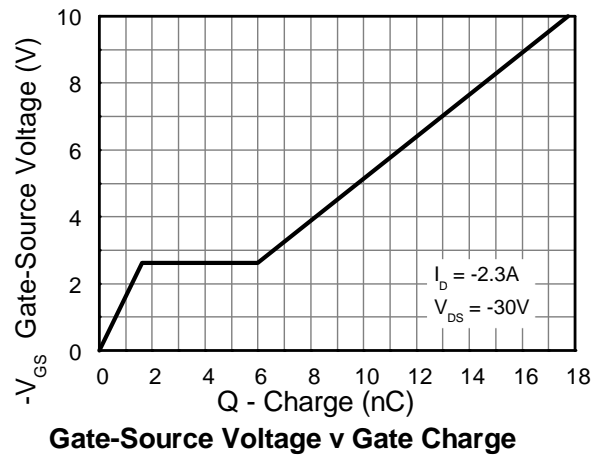
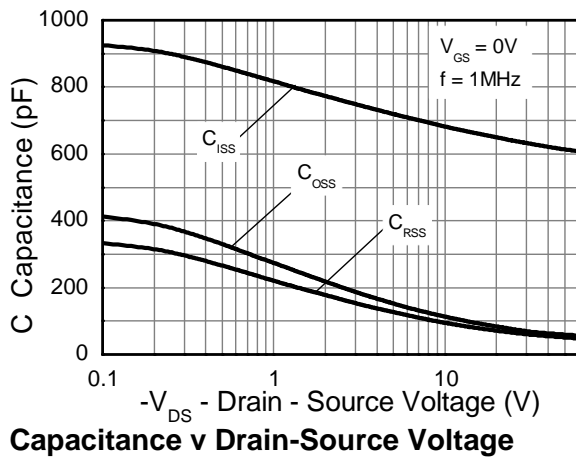
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	-60	—	—	V	I _D = -250μA, V _{GS} = 0V
Zero Gate Voltage Drain Current	I _{DSS}	—	—	-1.0	μA	V _{DS} = -60V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(th)}	-1.0	—	-3.0	V	I _D = -250μA, V _{DS} = V _{GS}
Static Drain-Source On-Resistance (Note 9)	R _{DS(on)}	—	0.100	0.125	Ω	V _{GS} = -10V, I _D = -2.3A
			0.130	0.190		V _{GS} = -4.5V, I _D = -1.9A
Forward Transconductance (Notes 9 & 10)	g _{fs}	—	4.7	—	S	V _{DS} = -15V, I _D = -2.3A
Diode Forward Voltage (Note 9)	V _{SD}	—	-0.85	-0.95	V	I _S = -2.0A, V _{GS} = 0V
Reverse Recovery Time (Note 10)	t _{rr}	—	25.1	—	ns	I _F = -1.7A, di/dt = 100A/μs
Reverse Recovery Charge (Note 10)	Q _{rr}	—	27.2	—	nC	
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C _{iss}	—	637	—	pF	V _{DS} = -30V, V _{GS} = 0V f = 1.0MHz
Output Capacitance	C _{oss}	—	70	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	53	—	pF	
Total Gate Charge (Note 11)	Q _g	—	9.8	—	nC	V _{GS} = -5.0V
Total Gate Charge (Note 11)	Q _g	—	17.7	—	nC	V _{GS} = -10V
Gate-Source Charge (Note 11)	Q _{gs}	—	1.6	—	nC	
Gate-Drain Charge (Note 11)	Q _{gd}	—	4.4	—	nC	
Turn-On Delay Time (Note 11)	t _{D(on)}	—	2.6	—	ns	V _{DD} = -30V, V _{GS} = -10V I _D = -1.0A, R _G ≅ 6.0Ω
Turn-On Rise Time (Note 11)	t _r	—	3.4	—	ns	
Turn-Off Delay Time (Note 11)	t _{D(off)}	—	26.2	—	ns	
Turn-Off Fall Time (Note 11)	t _f	—	11.3	—	ns	

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

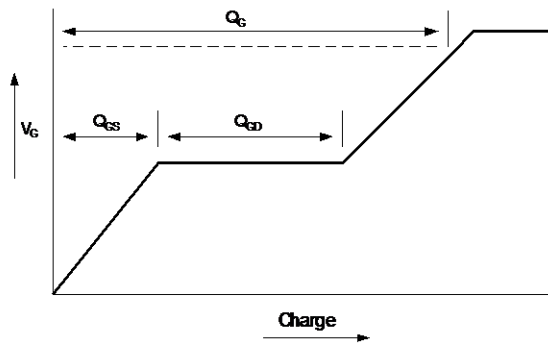
Typical Characteristics



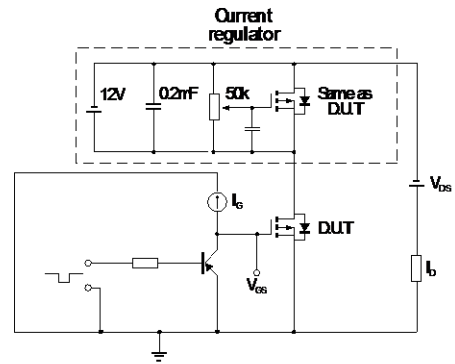
Typical Characteristics (cont.)



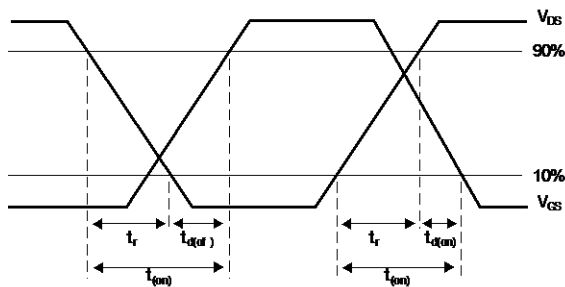
Test Circuits



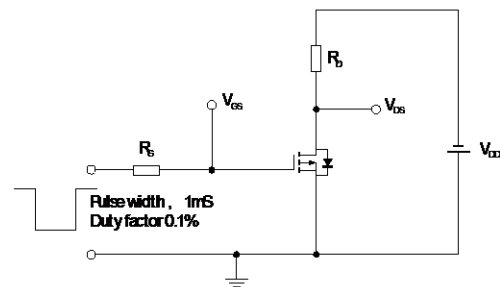
Basic gate charge waveform



Gate charge test circuit



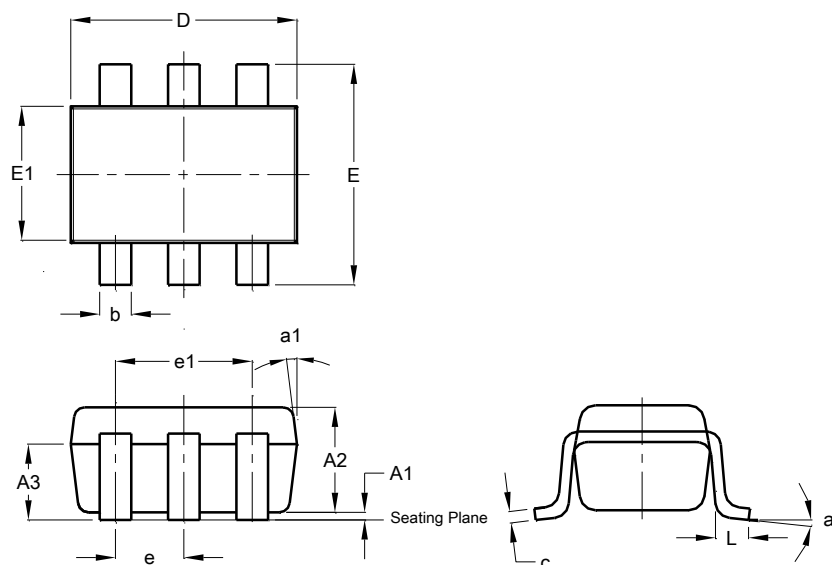
Switching time waveforms



Switching time test circuit

Package Outline Dimensions

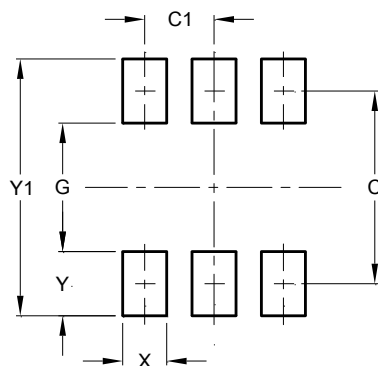
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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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