

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$ Max	I_D Max $T_A = +25^\circ\text{C}$ (Note 6)
-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

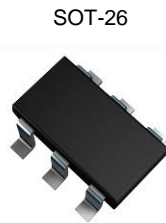
- DC-DC Converters
- Power Management Functions
- Disconnect Switches
- Motor Control

Features and Benefits

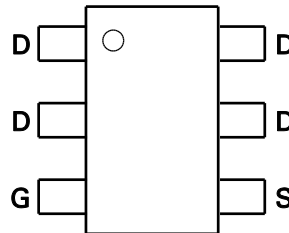
- Low On-Resistance
- Fast Switching Speed
- Low Threshold
- Low Gate Drive
- Low Input Capacitance
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

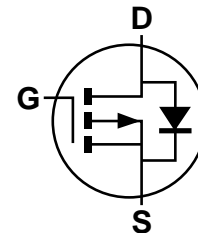
- Case: SOT-26
- Case Material: Molded Plastic; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe; Solderable per MIL-STD-202, Method 208
- Weight: 0.018 grams (Approximate)



Top View



Pin Out - Top View



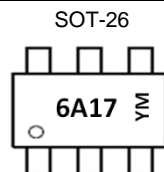
Equivalent Circuit

Ordering Information (Note 4)

Part Number	Compliance	Case	Quantity per reel
ZXMP6A17E6TA	Standard	SOT-26	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. 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°C, unless otherwise specified.)

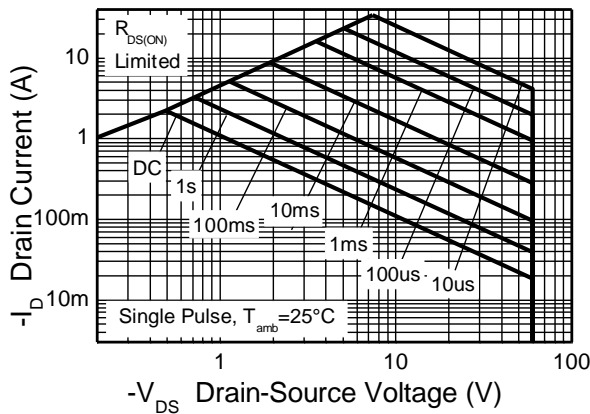
Characteristic		Symbol	Value	Unit	
Drain-Source Voltage		V _{DSS}	-60	V	
Gate-Source Voltage		V _{GS}	±20	V	
Continuous Drain Current	V _{GS} = -10V	I _D	(Note 6)	-3	A
			T _A = +70°C (Note 6)	-2.4	
			(Note 5)	-2.3	
Pulsed Drain Current	V _{GS} = -10V	I _{DM}	-13.6	A	
Continuous Source Current (Body Diode)		I _S	-2.5	A	
Pulsed Source Current (Body Diode)		I _{SM}	-13.6	A	

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

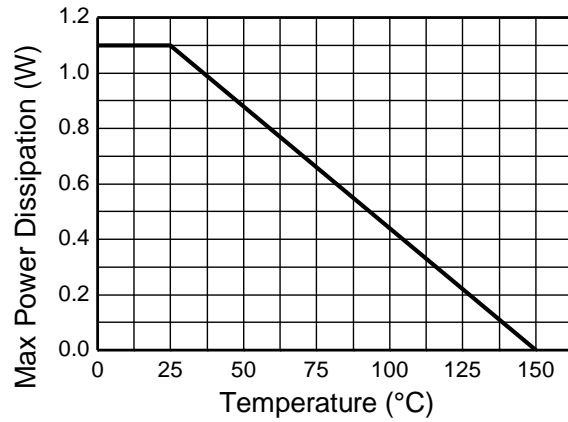
Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P _D	1.1	W
	(Note 6)		8.8	
Linear Derating Factor	(Note 5)	R _{θJA}	1.92	mW/°C
	(Note 6)		15.4	
Thermal Resistance, Junction to Ambient		R _{θJA}	113	°C/W
			65	
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +150	°C

- Notes:
5. 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.
 6. Same as Note 5, except the device is measured at t ≤ 5 sec.
 7. Same as Note 5, except the device is pulsed with D = 0.02 and pulse width 300µs. The pulse current is limited by the maximum junction temperature.

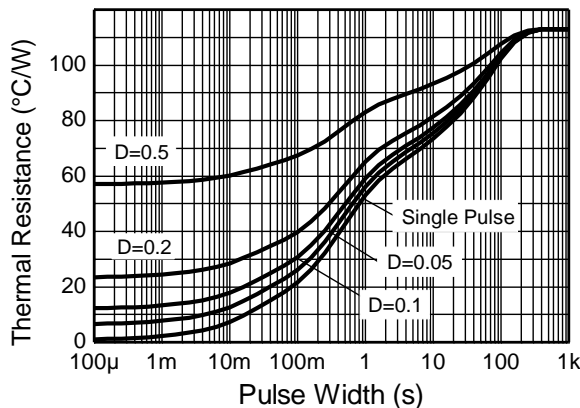
Thermal Characteristics



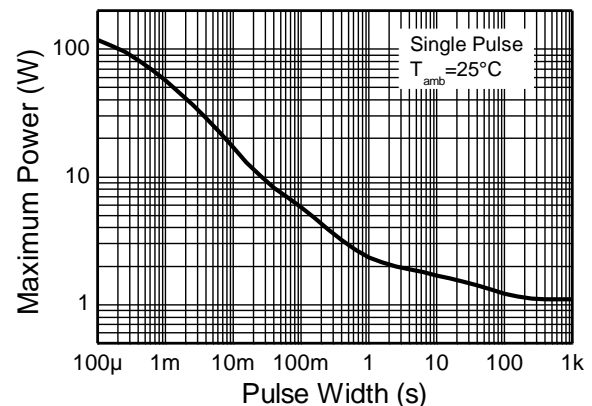
P-channel Safe Operating Area



Derating Curve



Transient Thermal Impedance



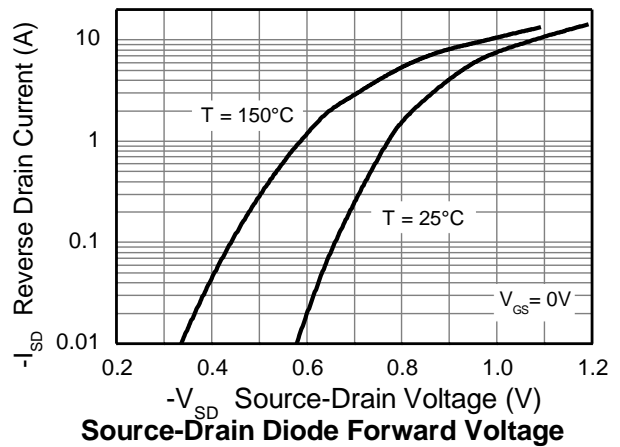
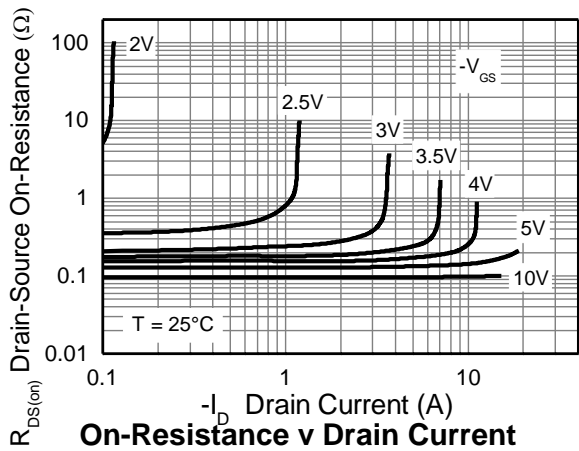
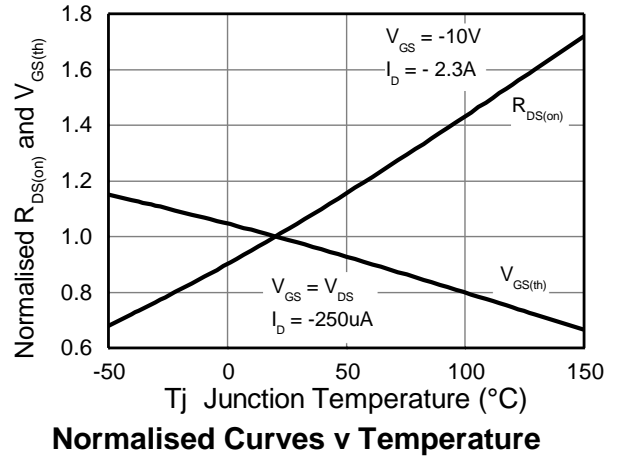
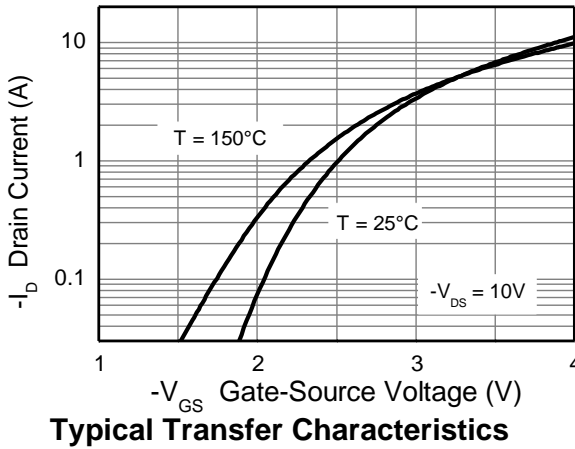
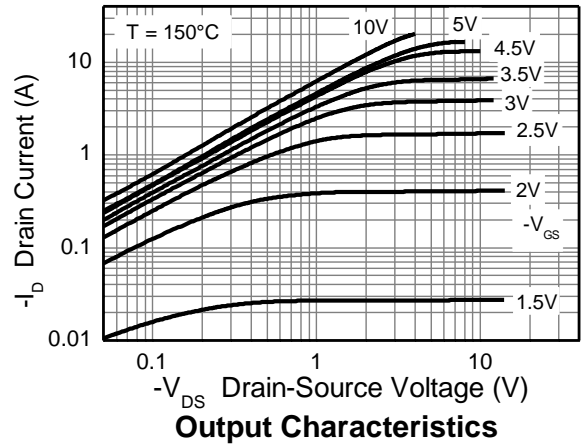
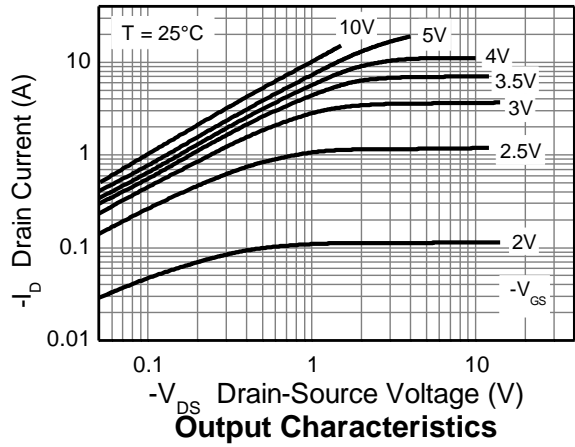
Pulse Power Dissipation

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

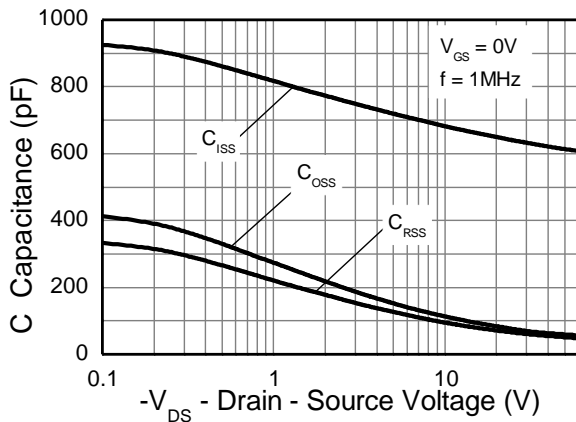
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	-60	—	—	V	$I_D = -250\mu\text{A}$, $V_{GS} = 0\text{V}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1	μA	$V_{DS} = -60\text{V}$, $V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(th)}$	-1	—	-3	V	$I_D = -250\mu\text{A}$, $V_{DS} = V_{GS}$
Static Drain-Source On-Resistance (Note 8)	$R_{DS(on)}$	—	0.100	0.125	Ω	$V_{GS} = -10\text{V}$, $I_D = -2.3\text{A}$
			0.130	0.190		$V_{GS} = -4.5\text{V}$, $I_D = -1.9\text{A}$
Forward Transconductance (Notes 8 & 9)	g_{fs}	—	4.7	—	S	$V_{DS} = -15\text{V}$, $I_D = -2.3\text{A}$
Diode Forward Voltage (Note 8)	V_{SD}	—	-0.85	-0.95	V	$I_S = -2\text{A}$, $V_{GS} = 0\text{V}$
Reverse Recovery Time (Note 9)	t_{rr}	—	25.1	—	ns	$I_F = -1.7\text{A}$, $di/dt = 100\text{A}/\mu\text{s}$
Reverse Recovery Charge (Note 9)	Q_{rr}	—	27.2	—	nC	
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	637	—	pF	$V_{DS} = -30\text{V}$, $V_{GS} = 0\text{V}$ $f = 1\text{MHz}$
Output Capacitance	C_{oss}	—	70	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	53	—	pF	
Total Gate Charge (Note 10)	Q_g	—	9.8	—	nC	$V_{GS} = -5\text{V}$
Total Gate Charge (Note 10)	Q_{g1}	—	17.7	—	nC	$V_{GS} = -10\text{V}$ $V_{DS} = -30\text{V}$ $I_D = -2.3\text{A}$
Gate-Source Charge (Note 10)	Q_{gs}	—	1.6	—	nC	
Gate-Drain Charge (Note 10)	Q_{gd}	—	4.4	—	nC	
Turn-On Delay Time (Note 10)	$t_{D(on)}$	—	2.6	—	ns	$V_{DD} = -30\text{V}$, $V_{GS} = -10\text{V}$ $I_D = -1\text{A}$, $R_G \cong 6\Omega$
Turn-On Rise Time (Note 10)	t_r	—	3.4	—	ns	
Turn-Off Delay Time (Note 10)	$t_{D(off)}$	—	26.2	—	ns	
Turn-Off Fall Time (Note 10)	t_f	—	11.3	—	ns	

- Notes:
8. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$.
 9. For design aid only, not subject to production testing.
 10. Switching characteristics are independent of operating junction temperatures.

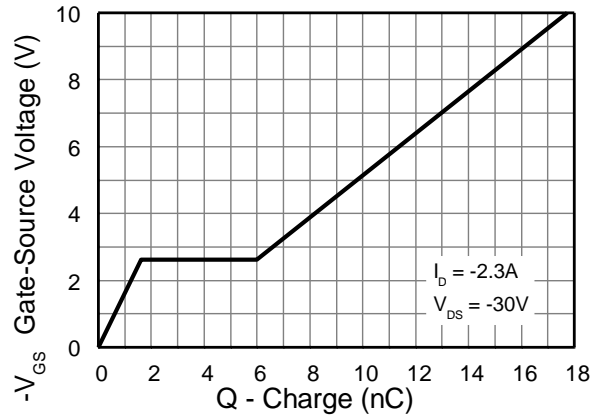
Typical Characteristics



Typical Characteristics (cont.)

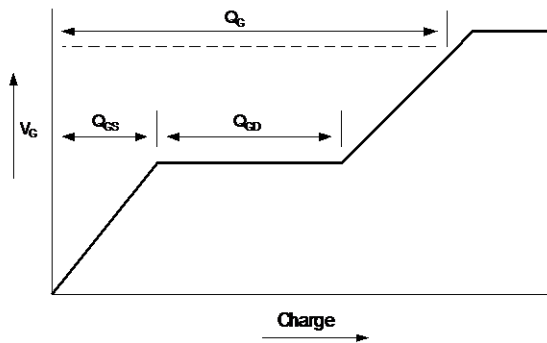


Capacitance v Drain-Source Voltage

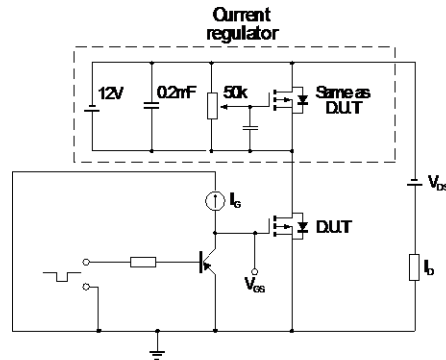


Gate-Source Voltage v Gate Charge

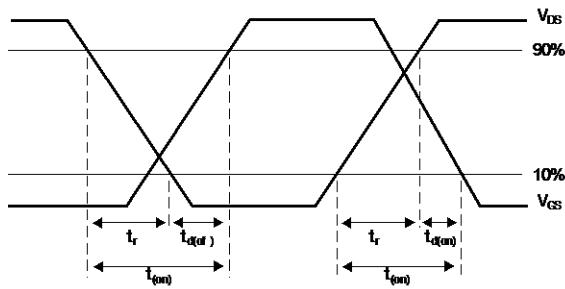
Test Circuits



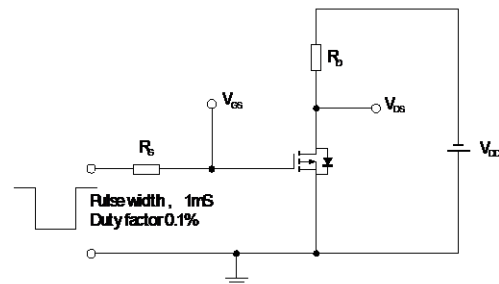
Basic gate charge waveform



Gate charge test circuit



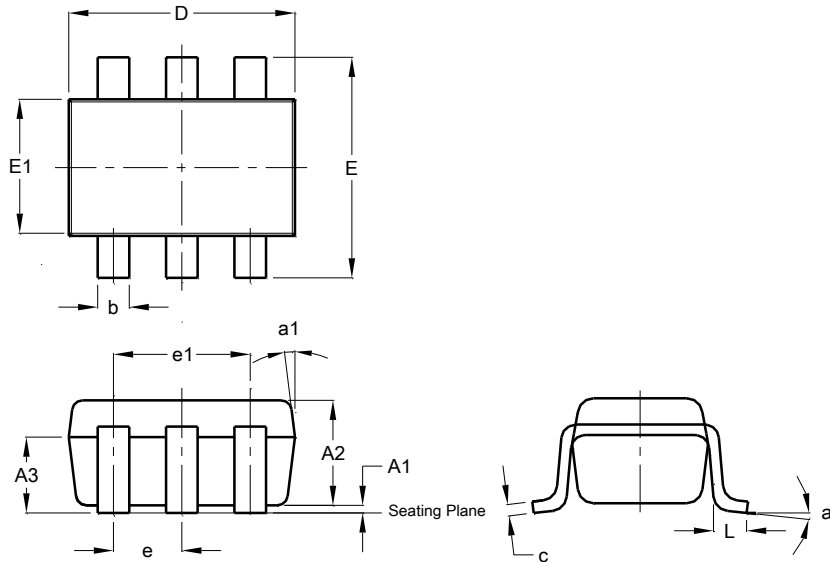
Switching time waveforms



Switching time test circuit

Package Outline Dimensions

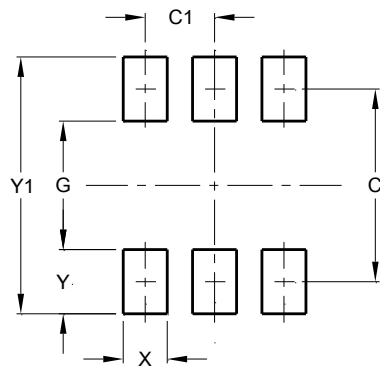
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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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