

SOT-23-6L Plastic-Encapsulate MOSFETS

ZXMP6A17E6

60V P-CHANNEL ENHANCEMENT MODE MOSFET

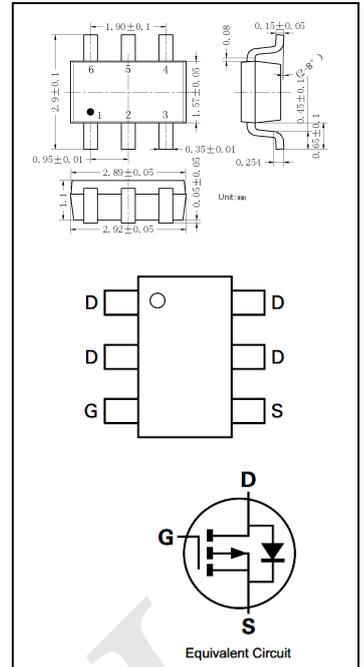
Features

- Low on-resistance
- Fast switching speed
- Low threshold
- Low gate drive
- Low input capacitance
- “Lead Free”, RoHS Compliant
- Halogen and Antimony Free.

Description and Applications

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

- DC-DC Converters
- Power management functions
- Disconnect switches
- Motor control



Maximum Ratings ($T_a=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source voltage	-60	V
V_{GS}	Gate-Source voltage	± 20	
I_D	Continuous Drain current, $V_{GS} = 10V$	2)	-3.0
		$T_A = 70^{\circ}\text{C}$ 2)	-2.4
		4)	-2.3
I_{DM}	Pulsed Drain current, $V_{GS} = 10V$ 3)	-13.6	A
I_S	Continuous Source current (Body diode)	-2.5	
I_{SM}	Pulsed Source current (Body diode)	-13.6	

Thermal Characteristics ($T_a=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Value	Unit
P_D	Power dissipation Linear derating factor	1)	1.1
			8.8
		2)	1.92
$R_{\theta JA}$	Maximum Junction-to-Ambient	1)	113
		2)	65
T_J, T_{STG}	Operating and storage temperature range	-55 to 150	$^{\circ}\text{C}$

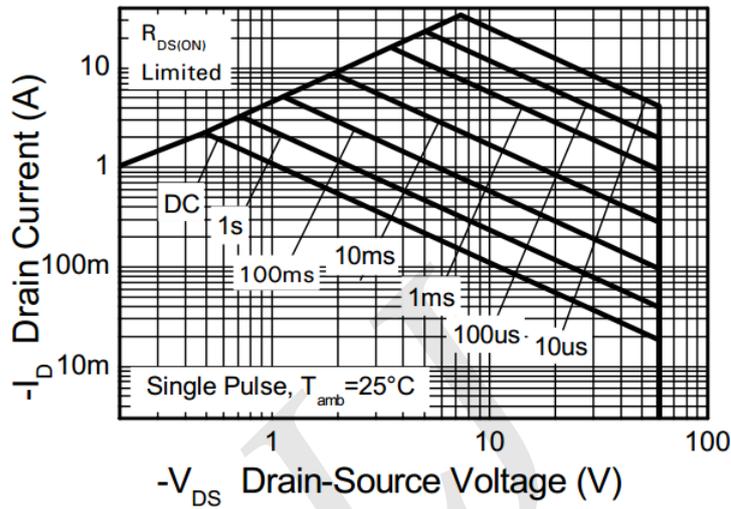
Electrical Characteristics (T_J=25°C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Off Characteristics						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = -250μA	-60			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = -60V, V _{GS} = 0V			1	μA
I _{GSS}	Gate-body Leakage current	V _{DS} = 0V, V _{GS} = ±20V			±100	nA
On Characteristics						
V _{GS(th)}	Gate-Threshold Voltage	V _{DS} = V _{GS} , I _D = -250μA	-1.0		-3.0	V
R _{DS(on)}	Drain-Source On-Resistance ⁴⁾	V _{GS} = -10V, I _D = -2.3A		100	125	mΩ
		V _{GS} = -4.5V, I _D = -1.9A		130	190	
g _{fs}	Forward Trans conductance ^{4,5)}	V _{DS} = -15V, I _D = -2.3A		4.7		S
V _{SD}	Diode Forward Voltage ⁴⁾	I _S = -2A, V _{GS} = 0V		-0.85	-0.95	V
t _{rr}	Body Diode Reverse Recovery Time	I _F = -1.7A, dI/dt = 100 A/μs		2.51		ns
Q _{rr}	Body Diode Reverse Recovery Charge			27.2		μC
Dynamic Characteristics ⁵⁾						
C _{iss}	Input Capacitance	V _{GS} = 0V V _{DS} = -30V f = 1.0MHz		637		pF
C _{oss}	Output Capacitance			70		
C _{rss}	Reverse Transfer Capacitance			53		
Q _g	Total Gate Charge ⁶⁾	V _{GS} = -5.0V		9.8		nC
Q _g	Total Gate Charge ⁶⁾	V _{GS} = -5.0V I _D = -2.3A, V _{DS} = -30V		17.7		
Q _{gs}	Gate-Source Charge ⁶⁾			1.6		
Q _{gd}	Gate-Drain Charge ⁶⁾			4.4		
t _{d(on)}	Turn-On Delay Time ⁶⁾	V _{DD} = -30V, I _D = -1A, R _G = 6Ω, V _{GS} = -10V		2.6		ns
t _r	Rise Time ⁶⁾			3.4		
t _{d(off)}	Turn-Off Delay Time ⁶⁾			26.2		
t _f	Fall Time ⁶⁾			11.3		

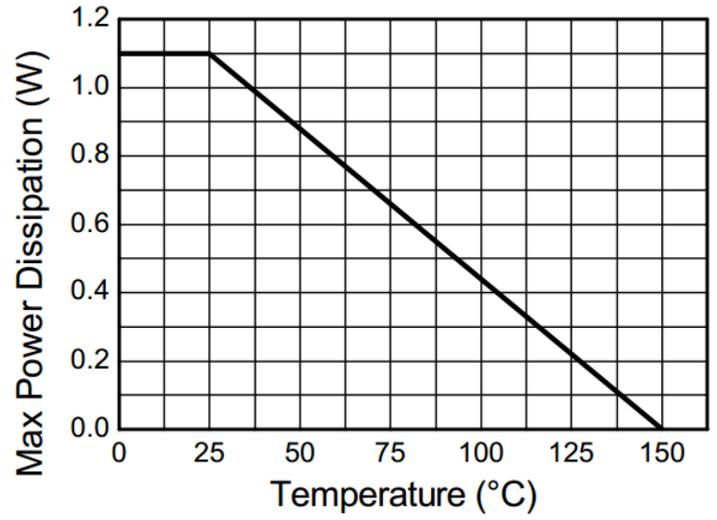
Notes

1. 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.
2. Same as note (4), except the device is measured at t ≤ 5 sec.
3. Same as note (4), except the device is pulsed with D = 0.02 and pulse width 300 μs. The pulse current is limited by the maximum junction temperature.
4. Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤ 2%
5. For design aid only, not subject to production testing.
6. Switching characteristics are independent of operating junction temperatures.

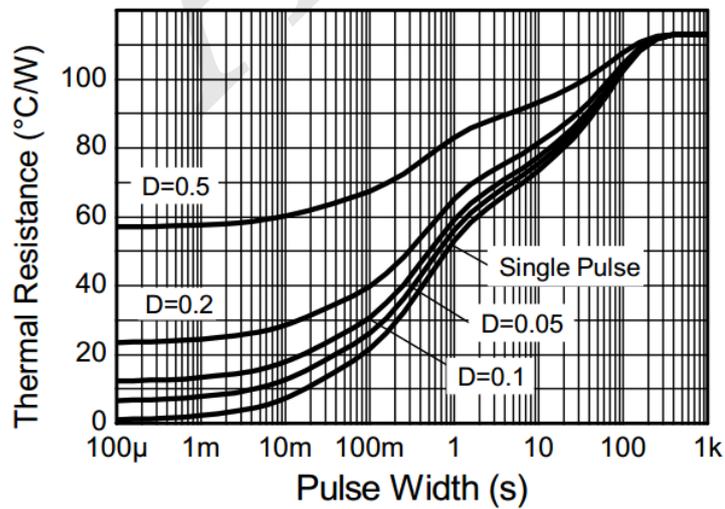
Typical Characteristics



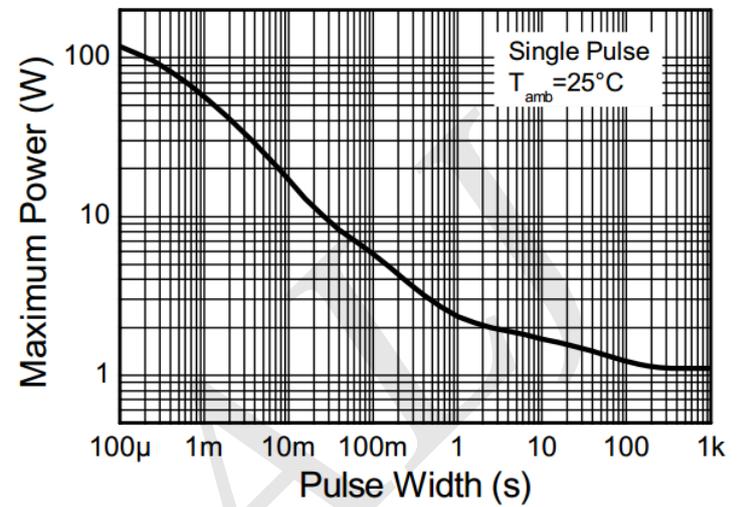
P-channel Safe Operating Area



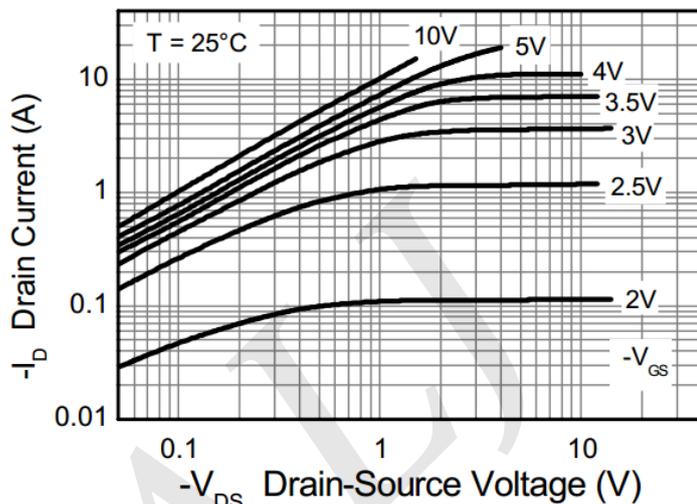
Derating Curve



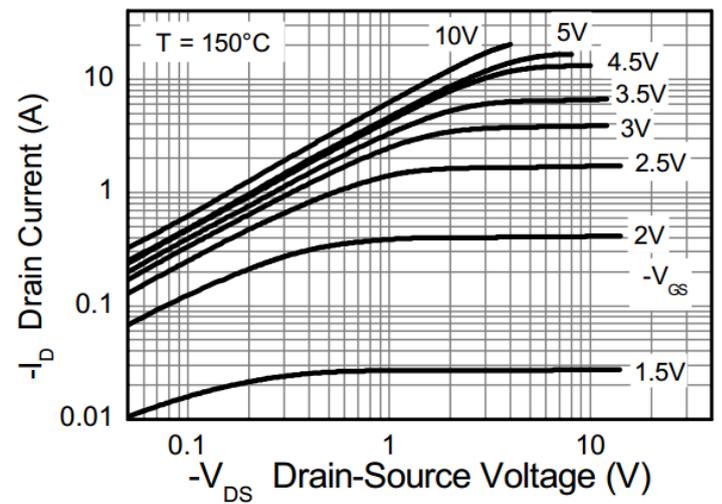
Transient Thermal Impedance



Pulse Power Dissipation

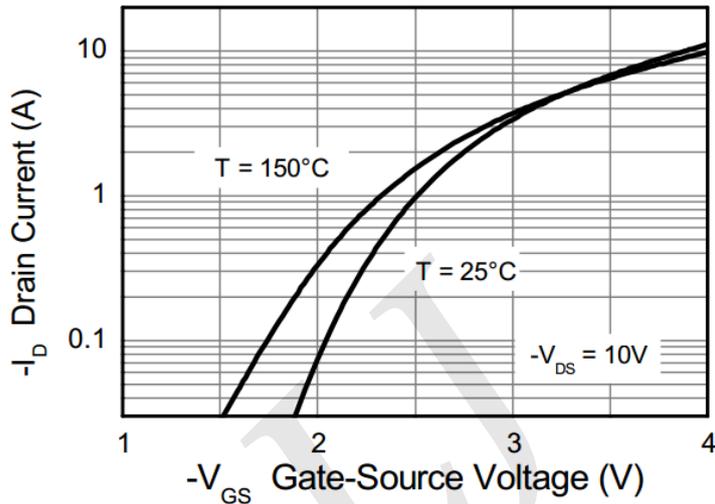


Output Characteristics

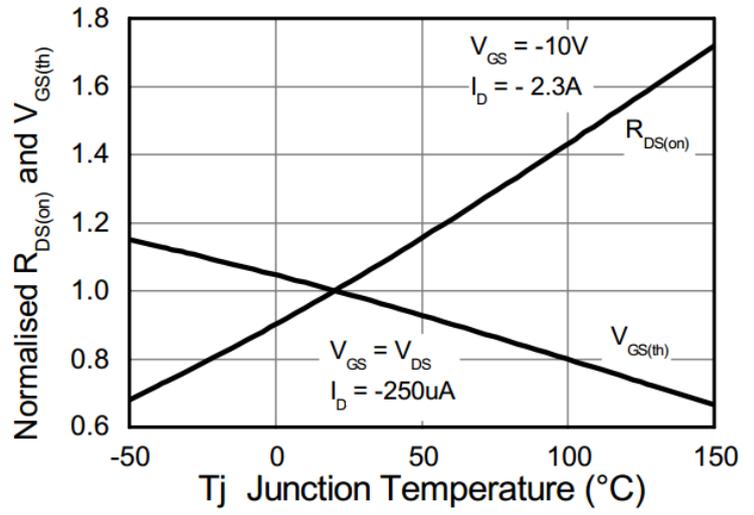


Output Characteristics

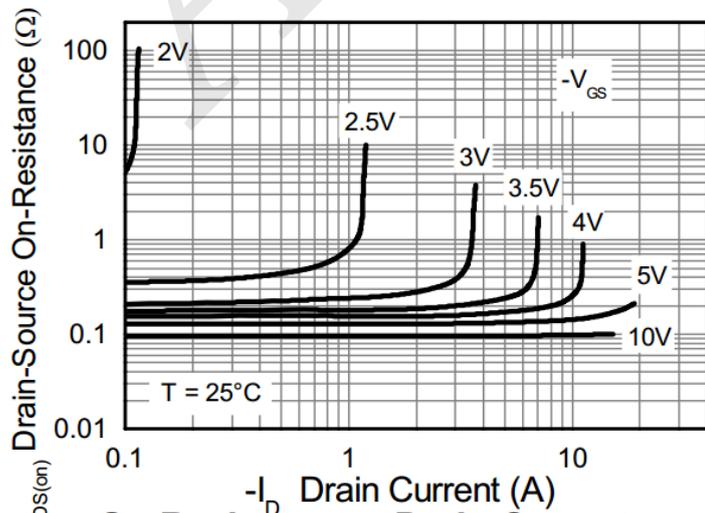
Typical Characteristics (Cont.)



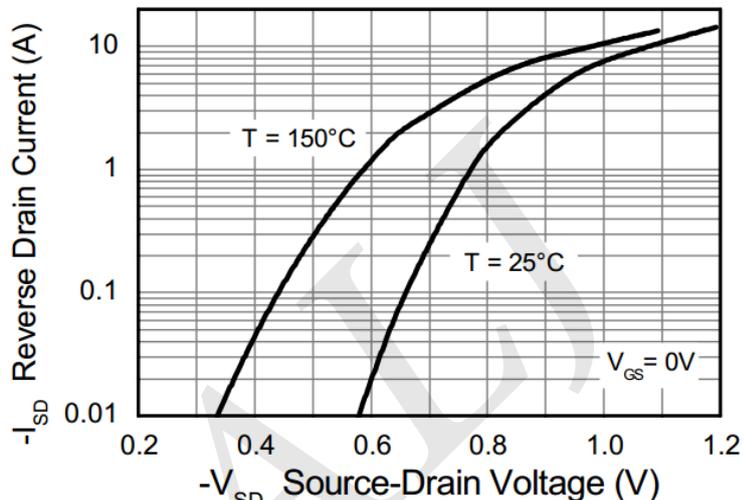
Typical Transfer Characteristics



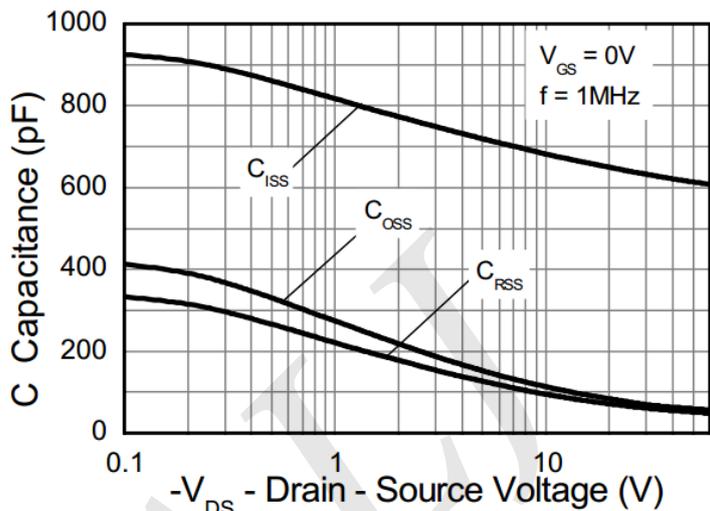
Normalised Curves v Temperature



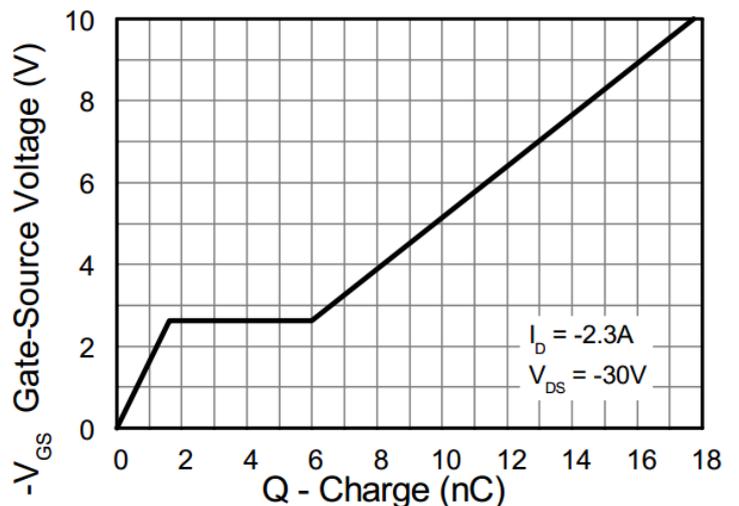
On-Resistance v Drain Current



Source-Drain Diode Forward Voltage

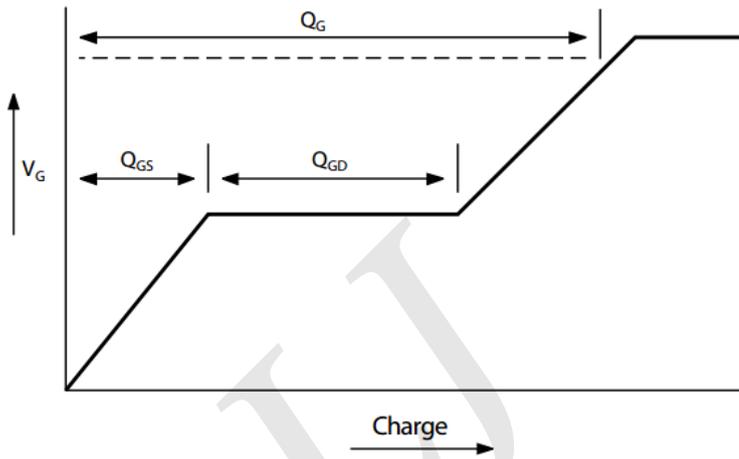


Capacitance v Drain-Source Voltage

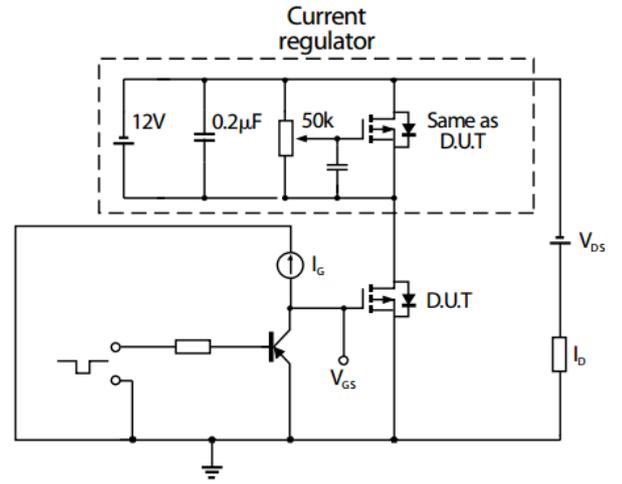


Gate-Source Voltage v Gate Charge

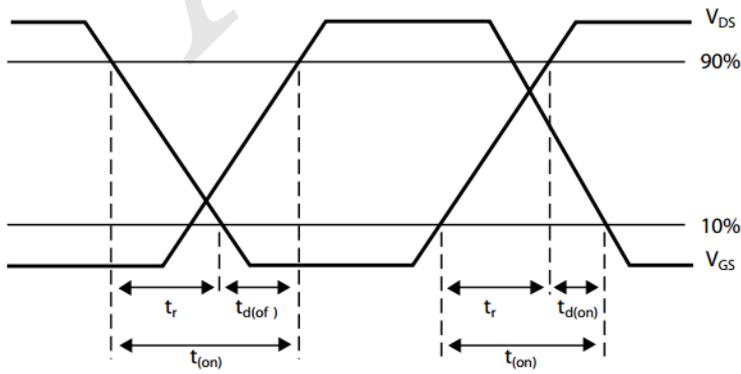
Test Circuits



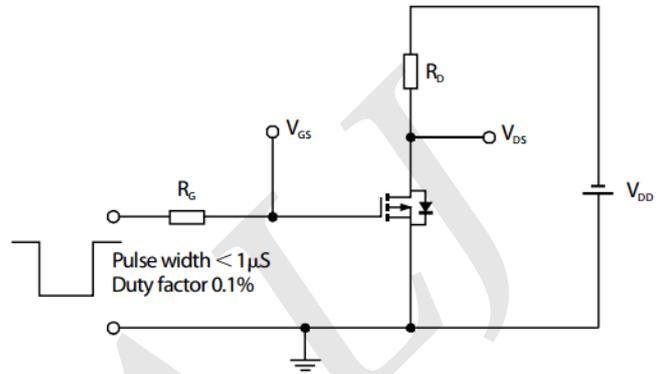
Basic gate charge waveform



Gate charge test circuit



Switching time waveforms



Switching time test circuit