ZXMP4A57E6

40V P-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$ max	I_D max T_A = 25°C
-40V	80mΩ @ V_{GS}= -10V	-3.7 A
	150mΩ @ V_{GS}= -4.5V	-2.8 A

Features and Benefits

- Fast switching speed
- Low gate drive
- Low input capacitance
- **"Lead Free", RoHS Compliant (Note 1)**
- **Halogen and Antimony Free. "Green" Device (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Description and Applications

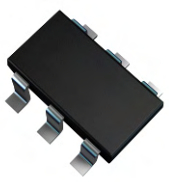
This MOSFET has been designed to minimize the on-state resistance and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

- Motor control
- DC-DC Converters
- Power management functions
- Uninterrupted power supply

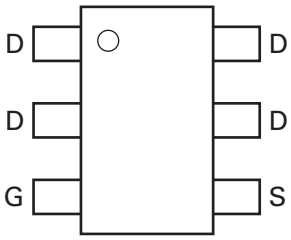
Mechanical Data

- Case: SOT26
- 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 lead frame. Solderable per MIL-STD-202, Method 208
- Weight 0.018 grams (approximate)

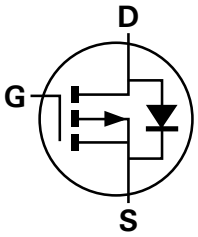
SOT26



Top View



Top View
Pin-Out



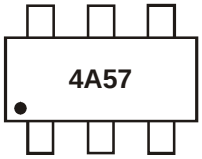
Equivalent Circuit

Ordering Information (Note 3)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMP4A57E6TA	4A57	7	8	3,000

Notes:
1. No purposefully added lead
2. Diodes Inc's "Green" policy can be found on our website at http://www.diodes.com.
3. For packaging details, go to our website at http://www.diodes.com.

Marking Information



4A57 = Product Type Marking Code

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Maximum Ratings @T_A = 25°C unless otherwise specified

Characteristic			Symbol	Value	Unit
Drain-Source voltage			V_{DSS}	-40	V
Gate-Source voltage			V_{GS}	±20	V
Continuous Drain current	V_{GS} = 10V	(Note 5)	I_D	-3.7	A
		T_A = 70°C (Note 5)		-2.9	
		(Note 4)		-2.9	
Pulsed Drain current	V_{GS} = 10V	(Note 6)	I_{DM}	-18	A
Continuous Source current (Body diode)		(Note 5)	I_S	-2.6	A
Pulsed Source current (Body diode)		(Note 6)	I_{SM}	-18	A

Thermal Characteristics @T_A = 25°C unless otherwise specified

Characteristic		Symbol	Value	Unit
Power dissipation Linear derating factor	(Note 4)	P_D	1.1 8.8	W mW/°C
	(Note 5)		1.7 13.7	
Thermal Resistance, Junction to Ambient	(Note 4)	$R_{\theta JA}$	113	°C/W
	(Note 5)		73	
Operating and storage temperature range		T_J, T_{STG}	-55 to 150	°C

Notes:
4. 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.
5. Same as note (4), except the device is measured at t ≤ 5 sec.
6. Same as note (4), except the device is pulsed with D = 0.02 and pulse width 300µs. The pulse current is limited by the maximum junction temperature.

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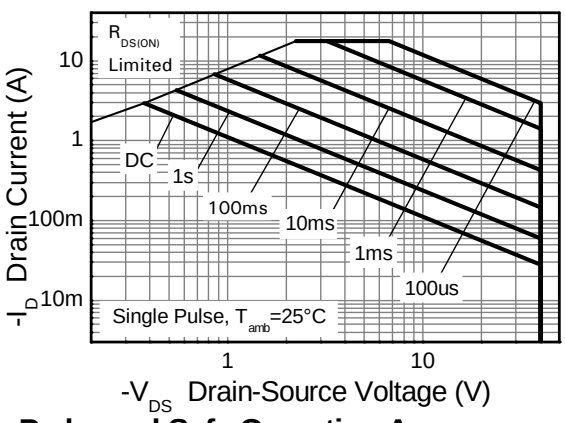
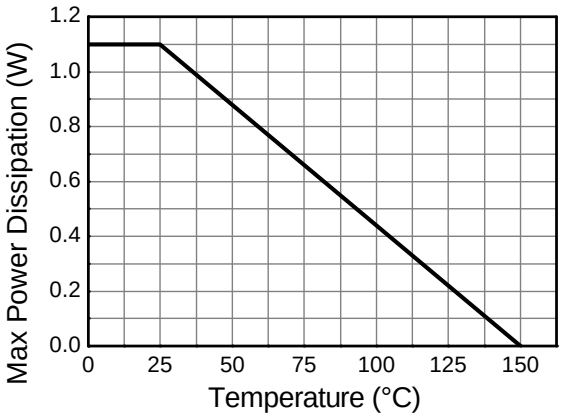
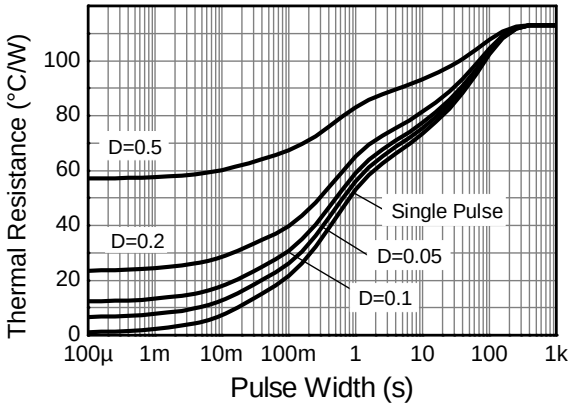
Thermal Characteristics



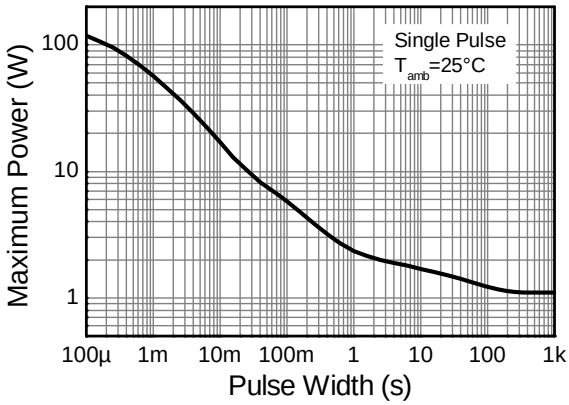
P-channel Safe Operating Area



Derating Curve



Transient Thermal Impedance



Pulse Power Dissipation

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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}	-40	—	—	V	I_D = -250μA, V_{GS} = 0V
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-0.5	μA	V_{DS} = -40V, 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 7)	$R_{DS(on)}$	—	—	0.080	Ω	V_{GS} = -10V, I_D = -4A
		—	—	0.150		V_{GS} = -4.5V, I_D = -2A
Forward Transconductance (Notes 7 & 8)	g_{fs}	—	7.6	—	S	V_{DS} = -15V, I_D = -4A
Diode Forward Voltage (Note 7)	V_{SD}	—	-0.86	-0.95	V	I_S = -4A, V_{GS} = 0V
Reverse recovery time (Note 8)	t_{rr}	—	17.4	—	ns	I_S = -1.8A, di/dt = 100A/μs
Reverse recovery charge (Note 8)	Q_{rr}	—	11.1	—	nC	
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	833	—	pF	V_{DS} = -20V, V_{GS} = 0V f = 1MHz
Output Capacitance	C_{oss}	—	122	—		
Reverse Transfer Capacitance	C_{rss}	—	78	—		
Total Gate Charge (Note 9)	Q_g	—	7	—	nC	V_{GS} = -4.5V; V_{DS} = -20V, I_D = -4A
Total Gate Charge (Note 9)	Q_g	—	15.8	—		V_{GS} = -10V; V_{DS} = -20V, I_D = -4A
Gate-Source Charge (Note 9)	Q_{gs}	—	3.6	—		
Gate-Drain Charge (Note 9)	Q_{gd}	—	2.7	—		
Turn-On Delay Time (Note 9)	$t_{D(on)}$	—	2.5	—	ns	V_{DD} = -20V, V_{GS} = -10V I_D = -1A, R_G ≅ 6.0Ω
Turn-On Rise Time (Note 9)	t_r	—	3.3	—		
Turn-Off Delay Time (Note 9)	$t_{D(off)}$	—	47	—		
Turn-Off Fall Time (Note 9)	t_f	—	21	—		

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

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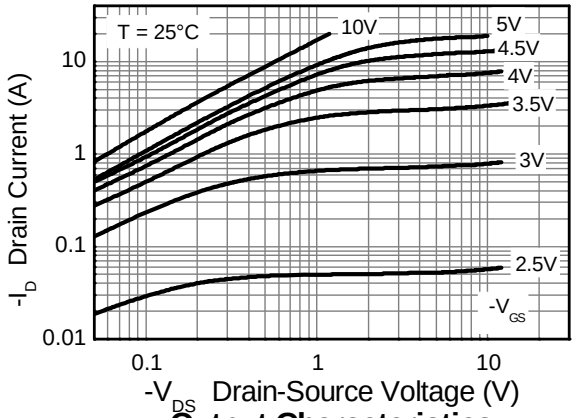
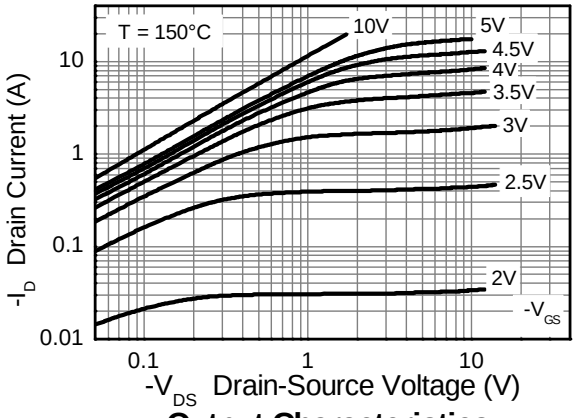
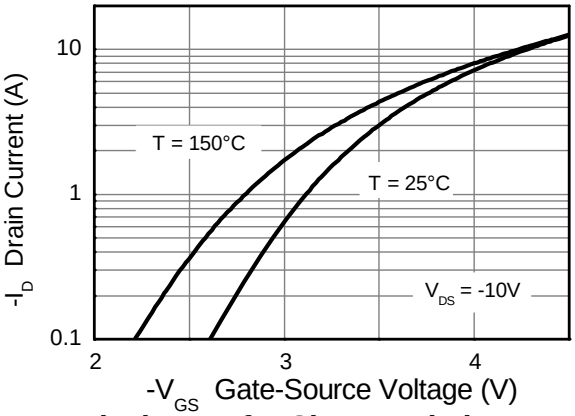
Typical Characteristics



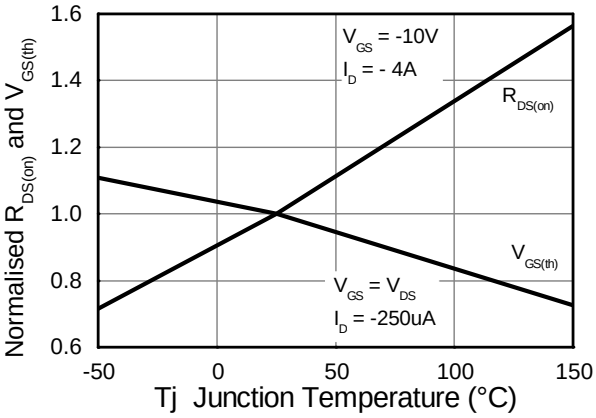
Output Characteristics



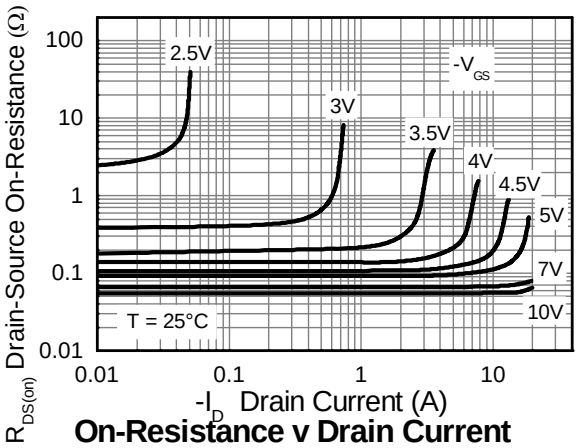
Output Characteristics



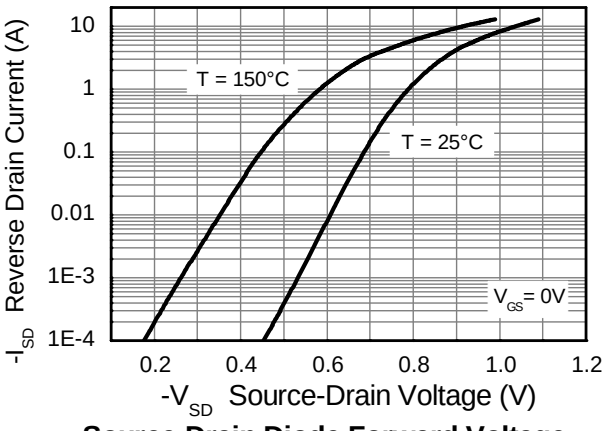
Typical Transfer Characteristics



Normalised Curves v Temperature



On-Resistance v Drain Current



Source-Drain Diode Forward Voltage

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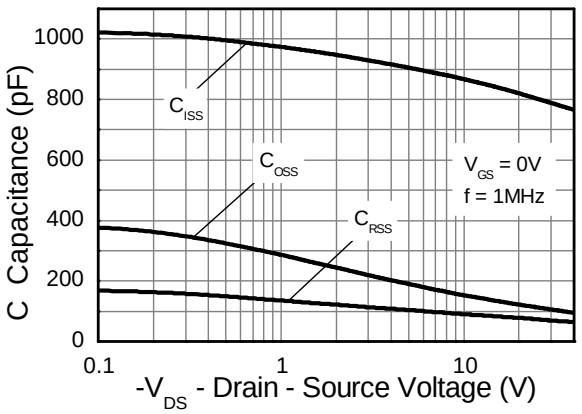
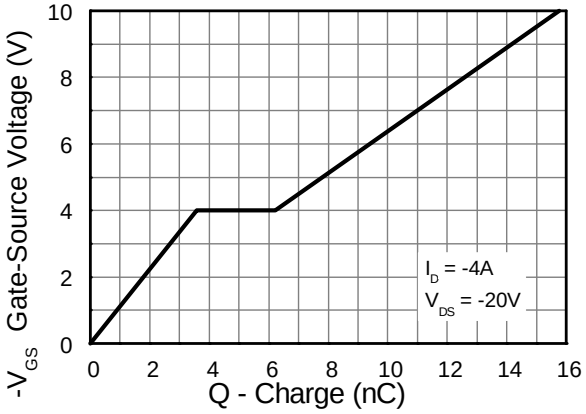
Typical Characteristics - continued

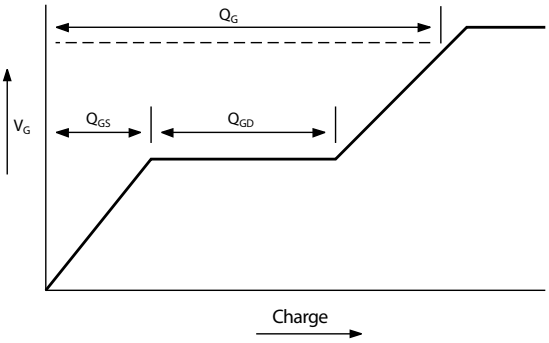


Capacitance v Drain-Source Voltage

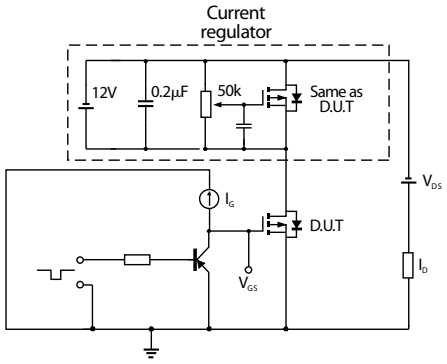


Gate-Source Voltage v Gate Charge

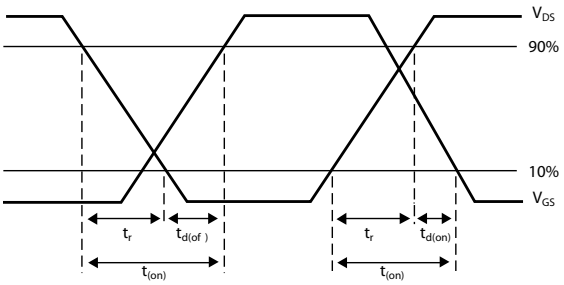
Test Circuits



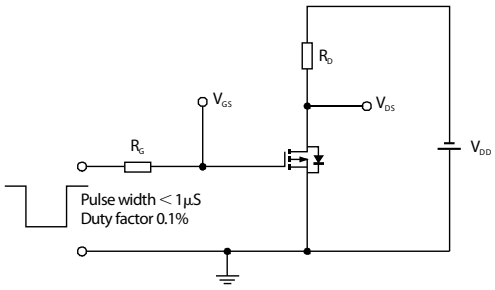
Basic gate charge waveform



Gate charge test circuit



Switching time waveforms



Switching time test circuit

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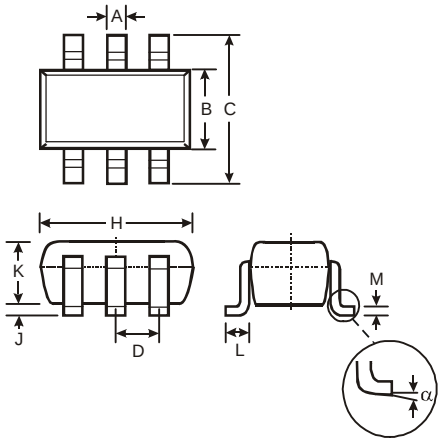
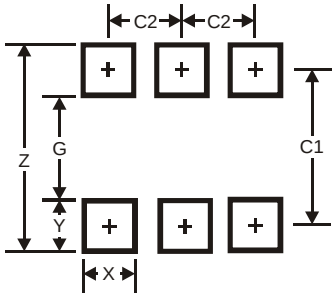
Package Outline Dimensions



SOT-26			
Dim	**Min**	**Max**	**Typ**
A	0.35	0.50	0.38
B	1.50	1.70	1.60
C	2.70	3.00	2.80
D	—	—	0.95
H	2.90	3.10	3.00
J	0.013	0.10	0.05
K	1.00	1.30	1.10
L	0.35	0.55	0.40
M	0.10	0.20	0.15
α	0°	8°	—
All Dimensions in mm			

Suggested Pad Layout



Dimensions	Value (in mm)
Z	3.20
G	1.60
X	0.55
Y	0.80
C1	2.40
C2	0.95

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