

**ZXMP4A57E6**

**40V P-CHANNEL ENHANCEMENT MODE MOSFET**

**Product Summary**

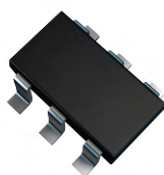
$V_{(BR)DSS}$	$R_{DS(on)}$ max	$I_D$ max $T_A = 25^\circ\text{C}$
-40V	80m $\Omega$ @ $V_{GS} = -10\text{V}$	-3.7 A
	150m $\Omega$ @ $V_{GS} = -4.5\text{V}$	-2.8 A

**Description and Applications**

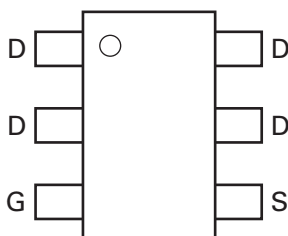
This MOSFET has been designed to minimize the on-state resistance and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

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

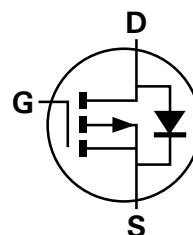
SOT26



Top View



Top View  
Pin-Out



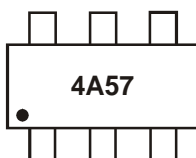
Equivalent Circuit

**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

## Maximum Ratings @T<sub>A</sub> = 25°C unless otherwise specified

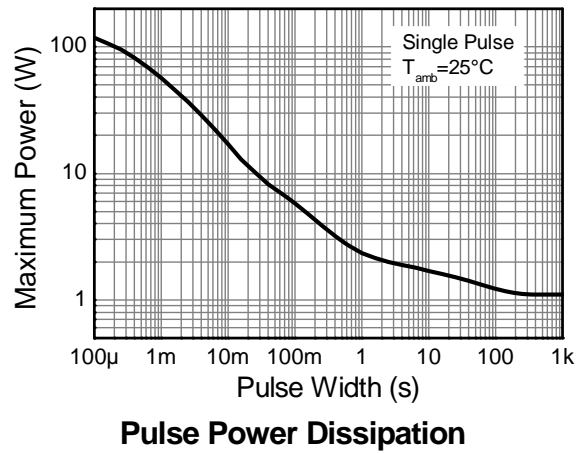
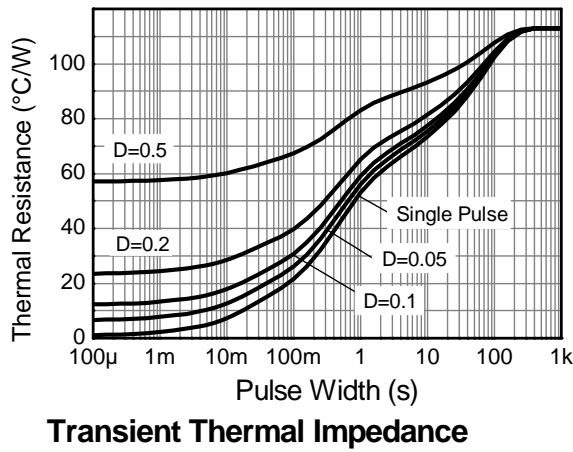
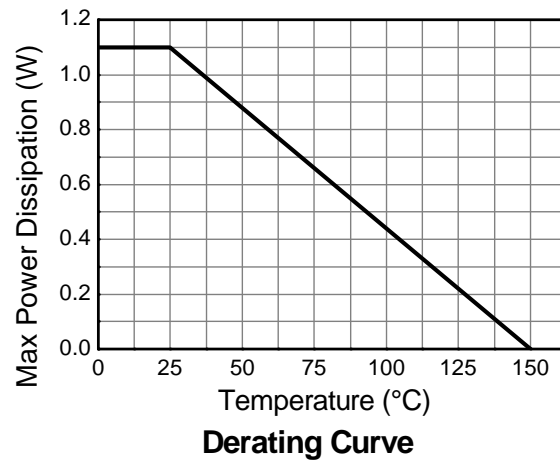
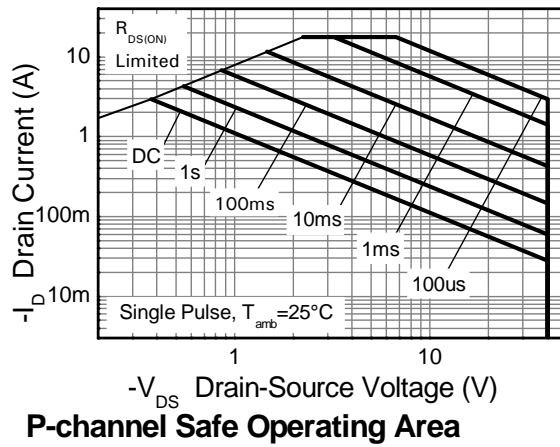
Characteristic			Symbol	Value	Unit
Drain-Source voltage			V <sub>DSS</sub>	-40	V
Gate-Source voltage			V <sub>GS</sub>	±20	V
Continuous Drain current	V <sub>GS</sub> = 10V	(Note 5)	I <sub>D</sub>	-3.7	A
		T <sub>A</sub> = 70°C (Note 5)		-2.9	
		(Note 4)		-2.9	
Pulsed Drain current	V <sub>GS</sub> = 10V	(Note 6)	I <sub>DM</sub>	-18	A
Continuous Source current (Body diode)			I <sub>S</sub>	-2.6	A
Pulsed Source current (Body diode)			I <sub>SM</sub>	-18	A

## Thermal Characteristics @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic		Symbol	Value	Unit
Power dissipation	(Note 4)	P <sub>D</sub>	1.1	W
			8.8	
Linear derating factor	(Note 5)		1.7	mW/°C
			13.7	
Thermal Resistance, Junction to Ambient	(Note 4)	R <sub>θJA</sub>	113	°C/W
	(Note 5)		73	
Operating and storage temperature range		T <sub>J</sub> , T <sub>STG</sub>	-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.

## Thermal Characteristics

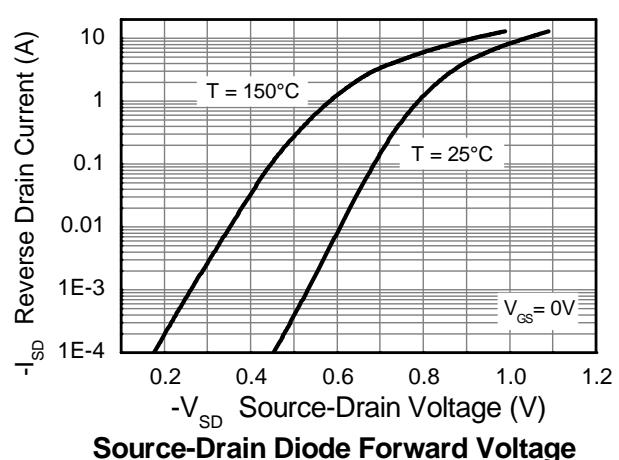
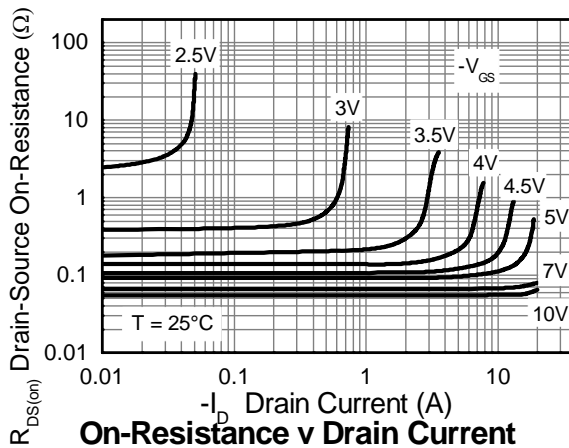
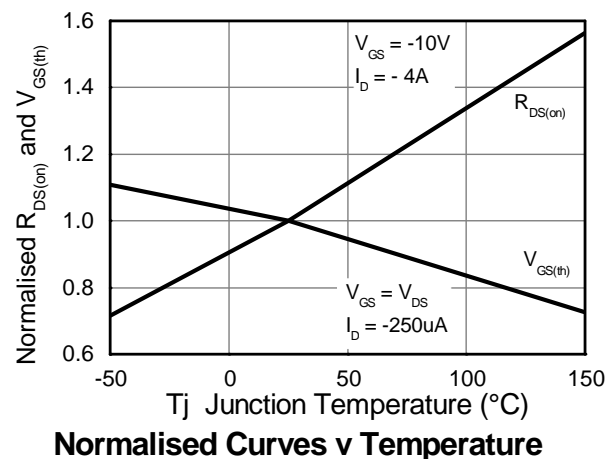
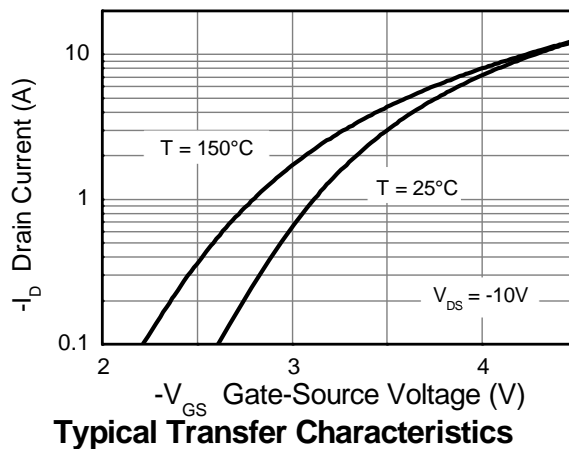
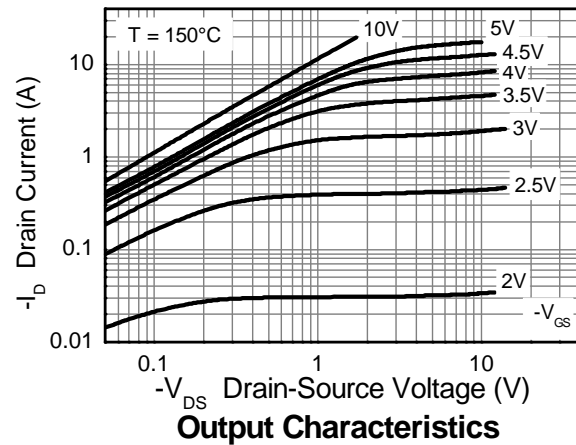
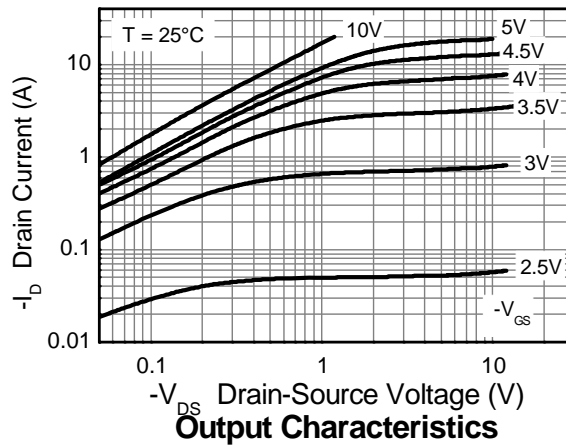


**Electrical Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

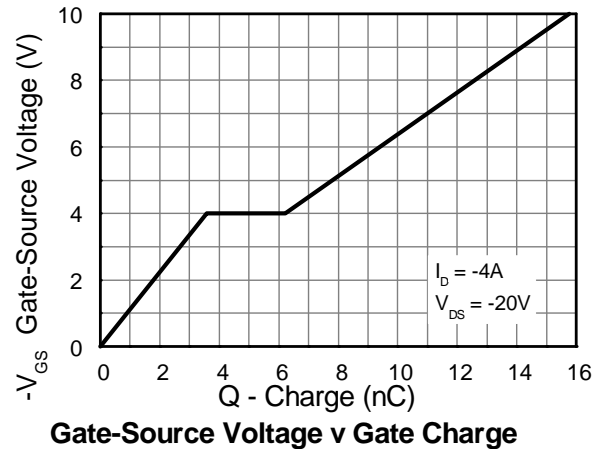
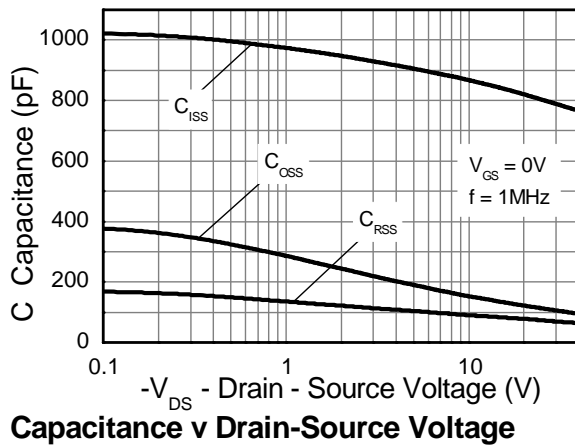
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition	
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-40	—	—	V	I <sub>D</sub> = -250μA, V <sub>GS</sub> = 0V	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	-0.5	μA	V <sub>DS</sub> = -40V, V <sub>GS</sub> = 0V	
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V	
ON CHARACTERISTICS							
Gate Threshold Voltage	V <sub>GS(th)</sub>	-1.0	—	-3.0	V	I <sub>D</sub> = -250μA, V <sub>DS</sub> = V <sub>GS</sub>	
Static Drain-Source On-Resistance (Note 7)	R <sub>DS(on)</sub>	—	—	0.080	Ω	V <sub>GS</sub> = -10V, I <sub>D</sub> = -4A	
		—	—	0.150		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -2A	
Forward Transconductance (Notes 7 & 8)	g <sub>fs</sub>	—	7.6	—	S	V <sub>DS</sub> = -15V, I <sub>D</sub> = -4A	
Diode Forward Voltage (Note 7)	V <sub>SD</sub>	—	-0.86	-0.95	V	I <sub>S</sub> = -4A, V <sub>GS</sub> = 0V	
Reverse recovery time (Note 8)	t <sub>rr</sub>	—	17.4	—	ns	I <sub>S</sub> = -1.8A, di/dt = 100A/μs	
Reverse recovery charge (Note 8)	Q <sub>rr</sub>	—	11.1	—	nC		
DYNAMIC CHARACTERISTICS (Note 8)							
Input Capacitance	C <sub>iss</sub>	—	833	—	pF	V <sub>DS</sub> = -20V, V <sub>GS</sub> = 0V f = 1MHz	
Output Capacitance	C <sub>oss</sub>	—	122	—			
Reverse Transfer Capacitance	C <sub>rss</sub>	—	78	—			
Total Gate Charge (Note 9)	Q <sub>g</sub>	—	7	—	nC	V <sub>GS</sub> = -4.5V	V <sub>DS</sub> = -20V I <sub>D</sub> = -4A
Total Gate Charge (Note 9)	Q <sub>g</sub>	—	15.8	—		V <sub>GS</sub> = -10V	
Gate-Source Charge (Note 9)	Q <sub>gs</sub>	—	3.6	—			
Gate-Drain Charge (Note 9)	Q <sub>gd</sub>	—	2.7	—			
Turn-On Delay Time (Note 9)	t <sub>D(on)</sub>	—	2.5	—	ns	V <sub>DD</sub> = -20V, V <sub>GS</sub> = -10V I <sub>D</sub> = -1A, R <sub>G</sub> ≅ 6.0Ω	
Turn-On Rise Time (Note 9)	t <sub>r</sub>	—	3.3	—			
Turn-Off Delay Time (Note 9)	t <sub>D(off)</sub>	—	47	—			
Turn-Off Fall Time (Note 9)	t <sub>f</sub>	—	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.

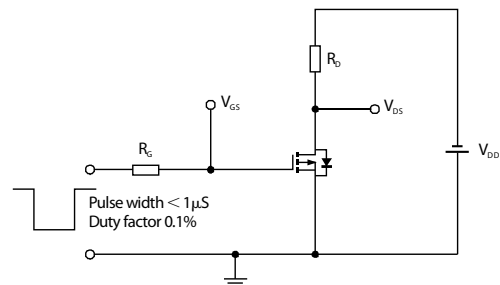
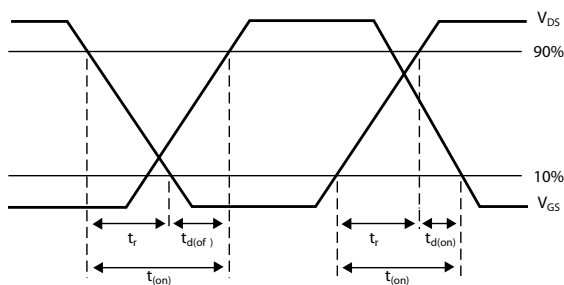
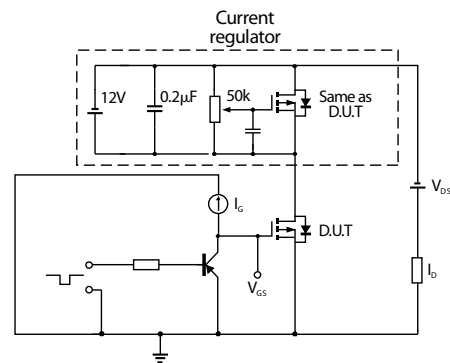
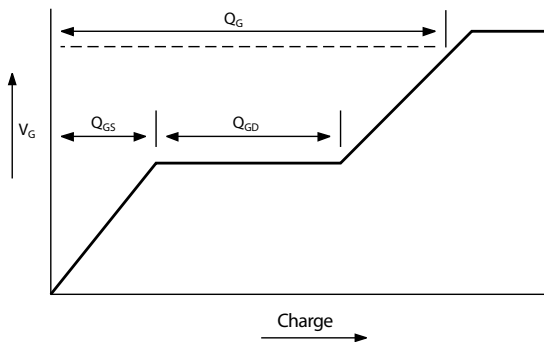
## Typical Characteristics



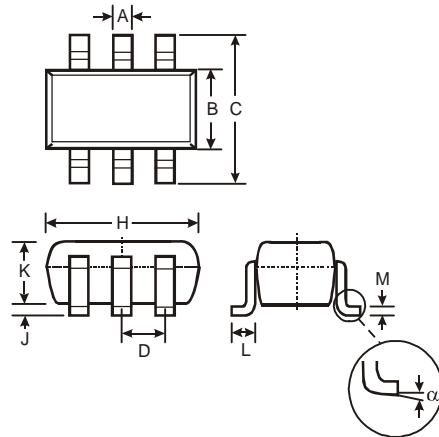
## Typical Characteristics - continued



## Test Circuits

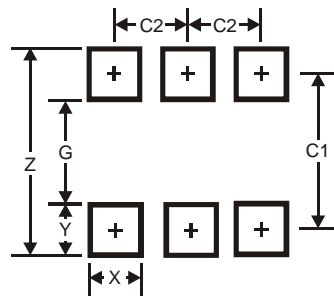


## Package Outline Dimensions



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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