

## Product Summary

$V_{(BR)DSS}$	$R_{DS(on) \max}$	$I_D$ $T_A = +25^\circ\text{C}$
-30V	80m $\Omega$ @ $V_{GS} = -10\text{V}$	-4.0A
	140m $\Omega$ @ $V_{GS} = -4.5\text{V}$	—

## Description

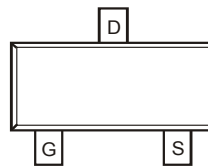
This new generation Trench MOSFET has been designed to minimize the on-state resistance ( $R_{DS(ON)}$ ) and yet maintain superior switching performance.

## Applications

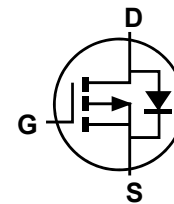
- Power management functions
- Portable Equipment
- Battery Charging



Top View



Pin Configuration



Equivalent Circuit

## Features and Benefits

- Low On-Resistance
- Fast Switching Speed
- 4.5V Gate Drive Capability
- Thermally Enhanced SOT23 package
- **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

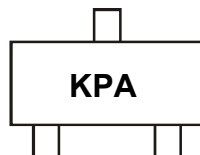
- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound  
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin annealed over Copper leadframe  
Solderable per MIL-STD-202, Method 208 (e3)
- Terminal Connections: See Diagram
- Weight: 0.008 grams (approximate)

## Ordering Information (Note 4)

Part Number	Compliance	Case	Packaging
ZXMP3F30FHTA	Standard	SOT23	3,000/Tape & Reel

- Notes:
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](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



KPA = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: A = 2013)  
 M = Month (ex: 9 = September)

### Date Code Key

Year	2008	2009	2010	2011	2012	2013	2014	2015
Code	V	W	X	Y	Z	A	B	C

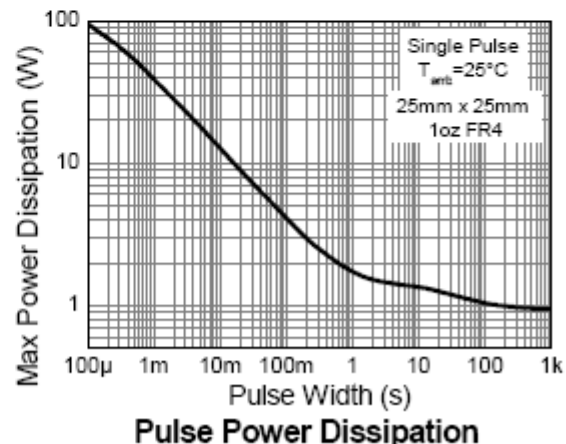
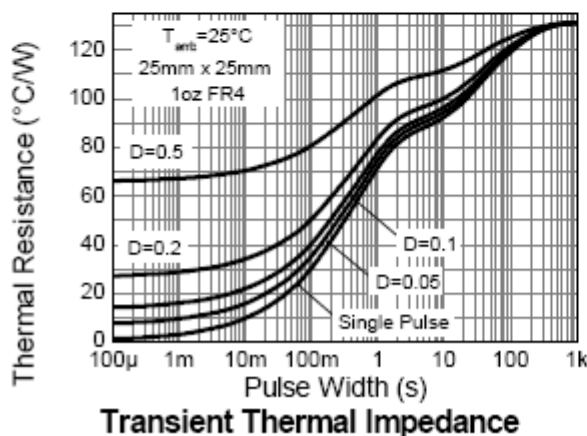
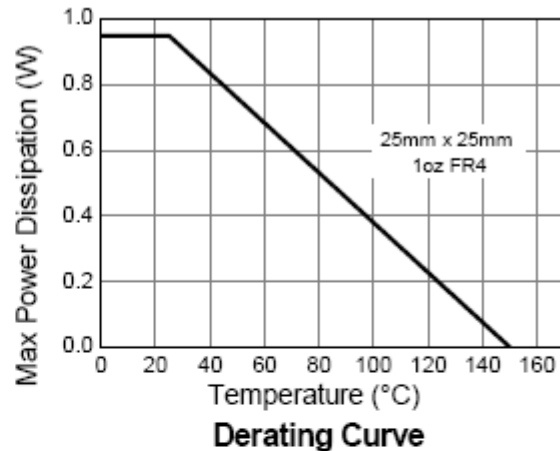
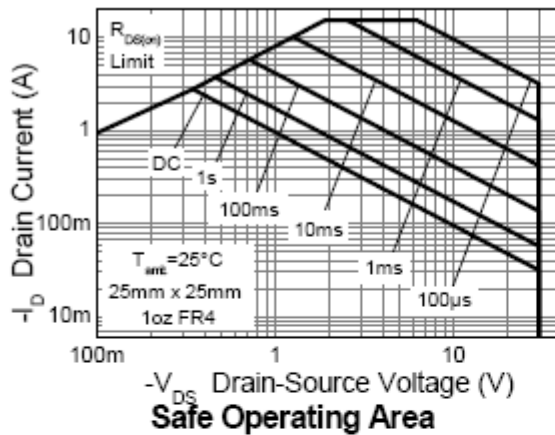
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Units
Drain-Source Voltage	V <sub>DSS</sub>	-30	V
Gate-Source Voltage	V <sub>GSS</sub>	±20	V
Drain Current, V <sub>GS</sub> = -10V	I <sub>D</sub>	T <sub>A</sub> = +25°C (Note 6)	-3.4
		T <sub>A</sub> = +70°C (Note 6)	-2.7
		T <sub>A</sub> = +25°C (Note 5)	-2.8
		T <sub>L</sub> = +25°C (Note 8)	-4.0
Pulsed Drain Current (Note 7)	I <sub>DM</sub>	-15.3	A
Continuous Source Current (Body Diode) (Note 6)	I <sub>S</sub>	-2	A
Pulsed Source Current (Body Diode) (Note 7)	I <sub>SM</sub>	-15.3	A

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5) Linear Derating Factor	P <sub>D</sub>	T <sub>A</sub> = +25°C (Note 5)	0.95
		T <sub>A</sub> = +25°C (Note 6)	7.6
		T <sub>A</sub> = +25°C (Note 6)	1.4
		T <sub>A</sub> = +25°C (Note 6)	11.2
		T <sub>L</sub> = +25°C (Note 8)	1.96
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	(Note 5)	131
		(Note 6)	89
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

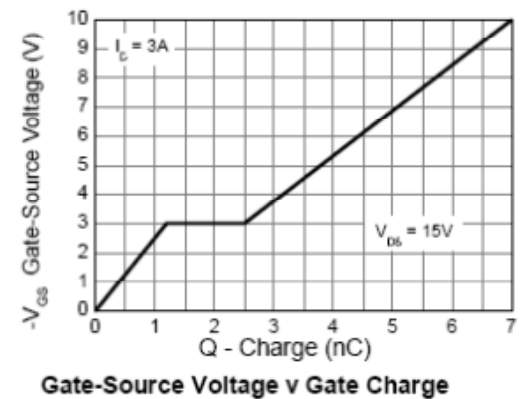
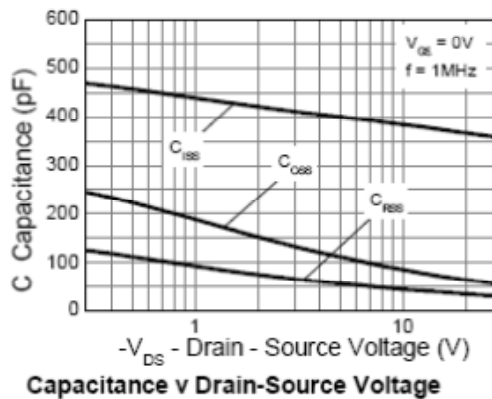
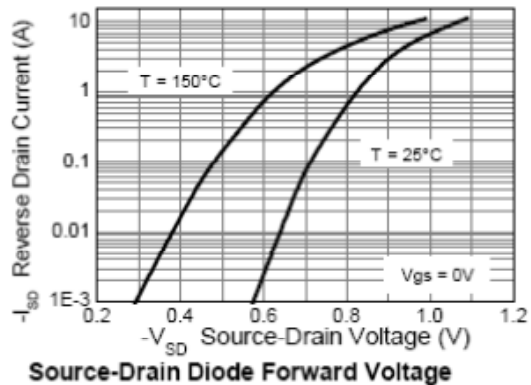
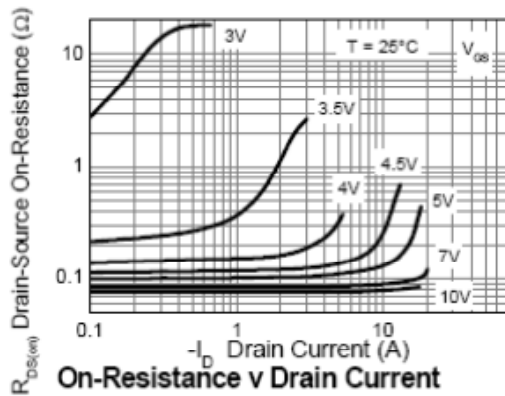
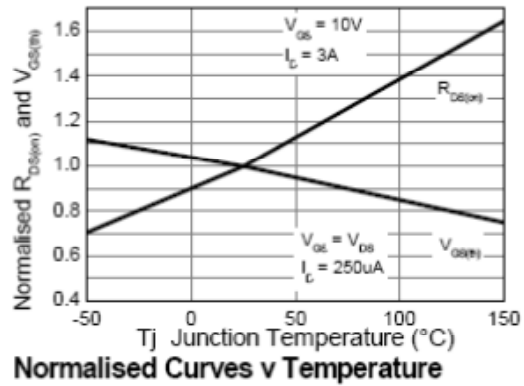
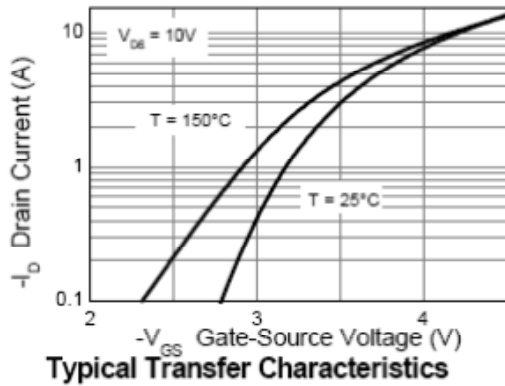
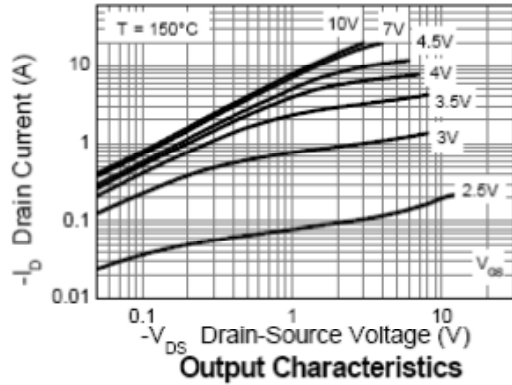
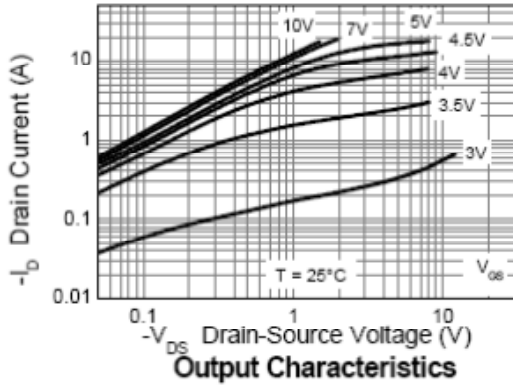


**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

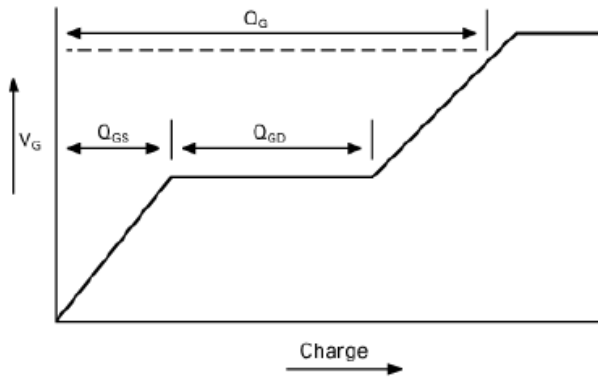
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-30	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	-1	nA	V <sub>DS</sub> = -30V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	-1	—	-3	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA
Static Drain-Source On-Resistance (Note 9)	R <sub>DS(on)</sub>	—	—	80 140	mΩ	V <sub>GS</sub> = -10V, I <sub>D</sub> = -2.5A V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -1.9A
Forward Transconductance (Note 9 & 10)	g <sub>fs</sub>	—	5	—	S	V <sub>DS</sub> = -15V, I <sub>D</sub> = -3A
Diode Forward Voltage (Note 9)	V <sub>SD</sub>	—	-0.8	-1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = -1.7A
<b>DYNAMIC CHARACTERISTICS (Note 10)</b>						
Input Capacitance	C <sub>iss</sub>	—	370	—	pF	V <sub>DS</sub> = -15V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	72	—	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	—	38	—	pF	
<b>GATE CHARACTERISTICS</b>						
Total Gate Charge	Q <sub>g</sub>	—	7	—	nC	V <sub>DS</sub> = -15V, V <sub>GS</sub> = -10V, I <sub>D</sub> = -3A
Gate-Source Charge	Q <sub>gs</sub>	—	1.2	—		
Gate-Drain Charge	Q <sub>gd</sub>	—	1.3	—		
<b>SWITCHING CHARACTERISTICS (Note 10 &amp; 11)</b>						
Turn-On Delay Time	t <sub>d(on)</sub>	—	1.3	—	ns	V <sub>DS</sub> = -15V, V <sub>GS</sub> = -10V, I <sub>D</sub> = -1A, R <sub>G</sub> = 6.0Ω
Rise Time	t <sub>r</sub>	—	2.6	—		
Turn-Off Delay Time	t <sub>d(off)</sub>	—	49	—		
Rise Time	t <sub>f</sub>	—	22	—		
<b>SOURCE-DRAIN DIODE CHARACTERISTICS (Note 11)</b>						
Reverse Recovery Time	t <sub>rr</sub>	—	14.6	—	ns	S  = -1.5A, di/dt = 100A/μs
Reverse Recovery Charge	Q <sub>rr</sub>	—	9.5	—	nC	

- 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.
  6. Mounted on FR4 PCB measured at t ≤ 10 sec.
  7. Repetitive rating on 25mm x 25mm FR4 PCB, D=0.02, pulse width 300μs – pulse width limited by maximum junction temperature.
  8. Thermal resistance from junction to solder-point (at the end of the drain lead).
  9. Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤ 2%.
  10. Switching characteristics are independent of operating junction temperature.
  11. For design aid only, not subject to production testing.

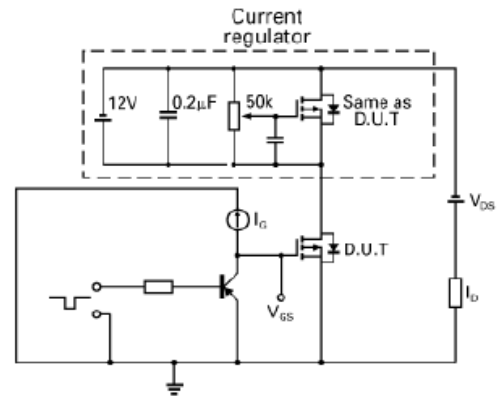
**Typical Characteristics**



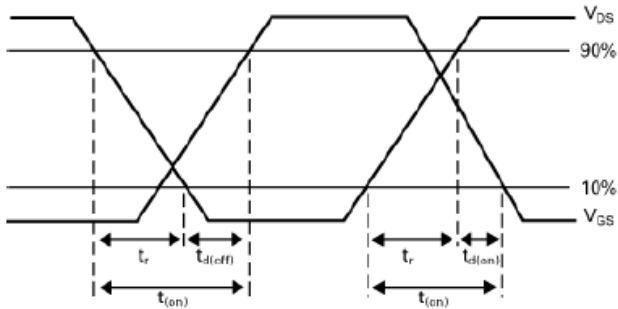
**Test Circuits**



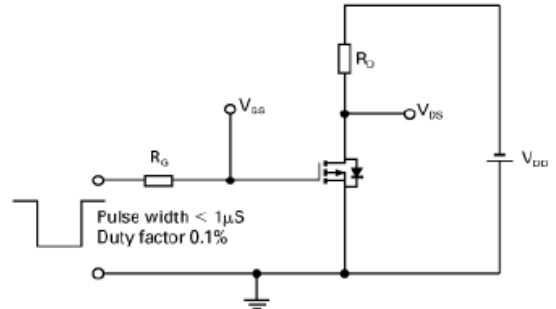
**Basic gate charge waveform**



**Gate charge test circuit**



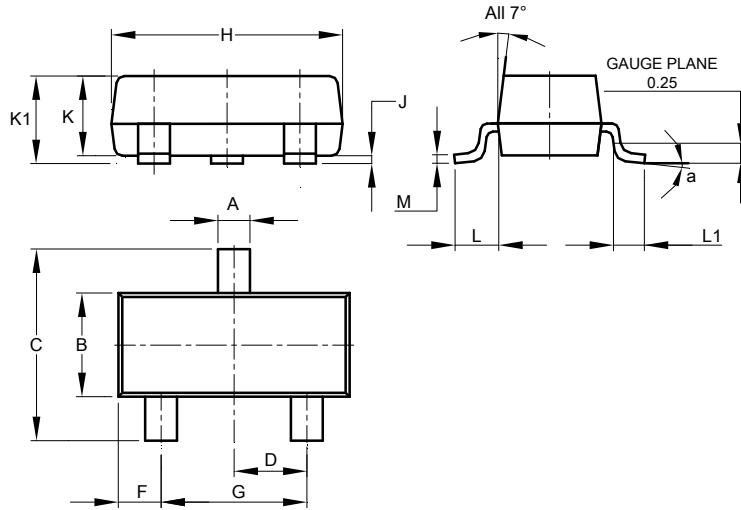
**Switching time waveforms**



**Switching time test circuit**

**Package Outline Dimensions**

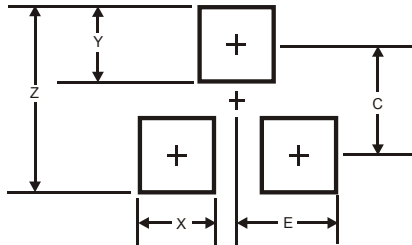
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
α	8°		
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)
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

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