



#### 450V P-CHANNEL ENHANCEMENT MODE MOSFET

# **Product Summary**

BV <sub>DSS</sub>	R <sub>DS(ON)</sub>	I <sub>D</sub> T <sub>A</sub> = +25°C
-450V	150Ω @ V <sub>GS</sub> = -10V	-0.25A

### **Description**

This 450V enhancement mode P-channel MOSFET provides users with a competitive specification offering efficient power handling capability, high impedance and is free from thermal runaway and thermally induced secondary breakdown. Applications benefiting from this device include a variety of Telecom and general high voltage switching circuits.

### **Applications**

- Load Switching
- Uninterrupted Power Supply

#### **Features and Benefits**

- Low Gate Drive
- Low Input Capacitance
- Fast Switching Speed
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)

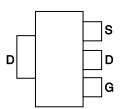
#### **Mechanical Data**

- Case: SOT223
- Case Material: Molded Plastic, "Green" Molding Compound.
   UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram Below
- Terminals: Finish Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (3)
- Weight: 0.112 grams (Approximate)

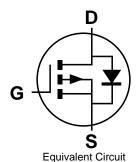
SOT223



Top View



Pin Out - Top View



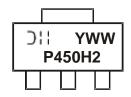
## **Ordering Information** (Note 4)

Part Number	Qualification	Case	Packaging
DMP45H150DHE-13	Standard	SOT223	2,500/Tape & Reel

Notes:

- 1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
- 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**



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

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V <sub>DSS</sub>	-450	V
Gate-Source Voltage	$V_{GSS}$	±30	V
Continuous Drain Current (Note 5) V <sub>GS</sub> =- 10V	I <sub>D</sub>	-0.25 -0.20	А
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)	I <sub>DM</sub>	-0.45	Α
Maximum Body Diode Continuous Current	I <sub>S</sub>	-0.45	Α
Avalanche Energy (Note 6) L=60mH	E <sub>AS</sub>	4	mJ
Avalanche Current (Note 6) L=60mH	I <sub>AS</sub>	0.25	Α
Peak Diode Recovery dv/dt (I <sub>SD</sub> ≤ 1.0A, di/dt ≤ 100A/μs)	dv/dt	4.5	V/ns

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

Characteristic		Symbol	Value	Unit
Total Dower Discinction (Note 6)	T <sub>C</sub> = +25°C	D	13.9	W
Total Power Dissipation (Note 6)	T <sub>C</sub> = +70°C	$P_{D}$	8.9	°C/W
Thermal Resistance, Junction to Ambient	(Note 6)	R <sub>0JA</sub>	59.4	W
Thermal Resistance, Junction to Case	(Note 6)	R <sub>0JC</sub>	8.9	°C/W
Operating and Storage Temperature Range		T <sub>J,</sub> T <sub>STG</sub>	-55 to +150	°C

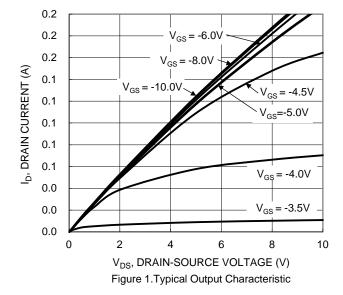
# **Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

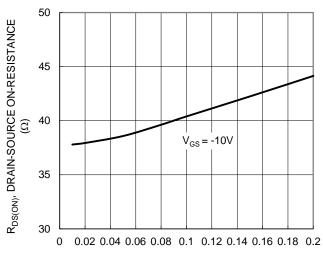
Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 5)							
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-450	_	_	V	$V_{GS} = 0V, I_D = -250\mu A$	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	_	_	-1	μΑ	$V_{DS} = -450V, V_{GS} = 0V$	
Gate-Source Leakage	I <sub>GSS</sub>	_	_	±100	nA	$V_{GS} = \pm 30V, V_{DS} = 0V$	
ON CHARACTERISTICS (Note 5)							
Gate Threshold Voltage	V <sub>GS(TH)</sub>	-2.0	-3.0	-4.0	V	$V_{DS} = V_{GS}, I_{D} = -250 \mu A$	
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	_	40	150	Ω	$V_{GS} = -10V, I_D = -50mA$	
Diode Forward Voltage	V <sub>SD</sub>	_	-0.8	-1.2	V	$V_{GS} = 0V, I_{S} = -50mA$	
DYNAMIC CHARACTERISTICS (Note 6)				•		•	
Input Capacitance	C <sub>ISS</sub>	_	59.2	_			
Output Capacitance	Coss	_	11	_	pF	$V_{DS} = -25V$ , $V_{GS} = 0V$ , $f = 1.0MHz$	
Reverse Transfer Capacitance	C <sub>RSS</sub>	_	1	_			
Forward Transconductance	<b>g</b> FS	40	_	_	ms	V <sub>DS</sub> =-25V,I <sub>D</sub> =-50mA	
Gate Resistance	R <sub>G</sub>	_	50	_	Ω	$V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz$	
Total Gate Charge	Q <sub>G</sub>	_	1.8	_		.,	
Gate-Source Charge	Q <sub>GS</sub>	_	0.3	_	nC	$V_{DS} = -225V$ , $I_{D} = -100$ mA, $V_{GS} = -100$	
Gate-Drain Charge	$Q_{GD}$	_	0.9	_		10V	
Turn-On Delay Time	t <sub>D(ON)</sub>	_	12	_		V 005V D 000 L 400vA	
Turn-On Rise Time	t <sub>R</sub>	_	9	_	1		
Turn-Off Delay Time	t <sub>D(OFF)</sub>	_	19	_	ns	$V_{DD}$ = -225V, $R_G$ = 3.0 $\Omega$ , $I_D$ = -100mA	
Turn-Off Fall Time	t <sub>F</sub>	_	87	_			
Body Diode Reverse Recovery Time	t <sub>RR</sub>	_	108	_	ns	$V_{GS} = 0V$ , $I_{S} = -100$ mA, $V_{DD} = -100$ V, $di/dt = 100$ A/ $\mu$ S	
Body Diode Reverse Recovery Charge	Q <sub>RR</sub>	_	391	_	nC	V <sub>GS</sub> = 0V, I <sub>S</sub> =-100mA, VDD=-100V ,di/dt = 100A/μs	

Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with 1 inch square copper pad layout.

<sup>6.</sup> Guaranteed by design. Not subject to production testing.







I<sub>D</sub>, DRAIN-SOURCE CURRENT (A) Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

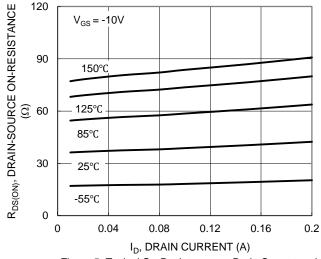


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

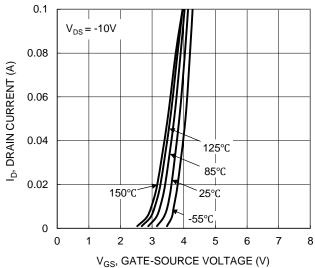


Figure 2. Typical Transfer Characteristic

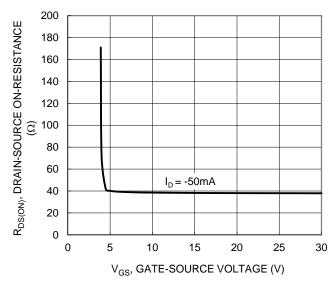


Figure 4. Typical Transfer Characteristic

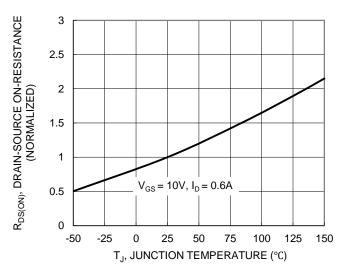


Figure 6. On-Resistance Variation with Temperature



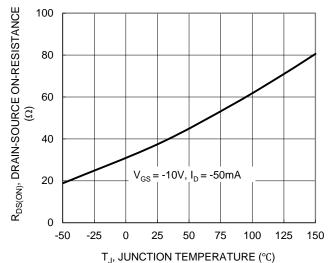
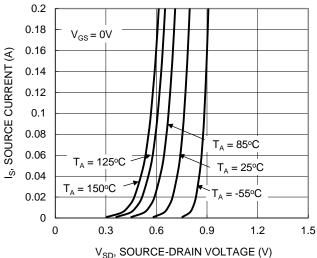


Figure 7. On-Resistance Variation with Temperature



V<sub>SD</sub>, SOURCE-DRAIN VOLTAGE (V)
Figure 9. Diode Forward Voltage vs. Current

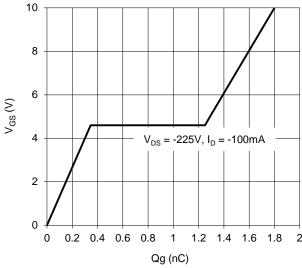
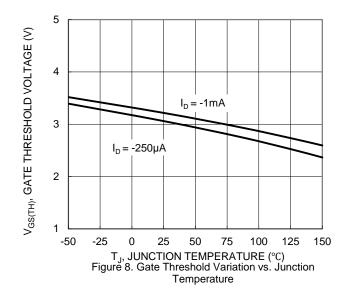


Figure 11. Gate Charge



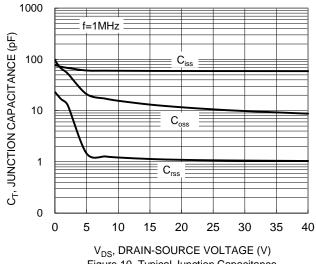


Figure 10. Typical Junction Capacitance

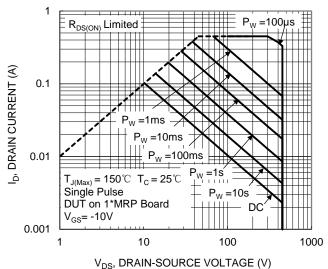


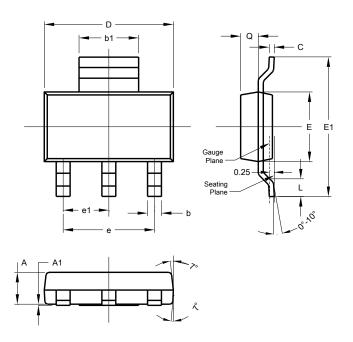
Figure 12. SOA, Safe Operation Area



# **Package Outline Dimensions**

Please see http://www.diodes.com/package-outlines.html for the latest version.

#### **SOT223**

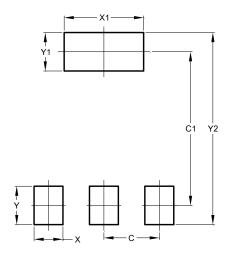


SOT223					
Dim	Min	Max	Тур		
Α	1.55	1.65	1.60		
A1	0.010	0.15	0.05		
b	0.60	0.80	0.70		
b1	2.90	3.10	3.00		
С	0.20	0.30	0.25		
D	6.45	6.55	6.50		
Е	3.45	3.55	3.50		
E1	6.90	7.10	7.00		
е	-	-	4.60		
e1	-	-	2.30		
L	0.85	1.05	0.95		
Q	0.84	0.94	0.89		
All Dimensions in mm					

# **Suggested Pad Layout**

 $\label{prop:lease} Please see \ http://www.diodes.com/package-outlines.html \ for \ the \ latest \ version.$ 

#### SOT223



Dimensions	Value (in mm)			
С	2.30			
C1	6.40			
Х	1.20			
X1	3.30			
Y	1.60			
Y1	1.60			
V2	8 00			



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