



**THE DATASHEET OF  
DMP45H21DHE-13**



**450V P-CHANNEL ENHANCEMENT MODE MOSFET**
**Product Summary**

<b>BV<sub>DSS</sub></b>	<b>R<sub>DS(ON)</sub></b>	<b>I<sub>D</sub></b> <b>T<sub>C</sub> = +25°C</b>
-450V	21Ω @ V <sub>GS</sub> = -10V	-0.6A

**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.

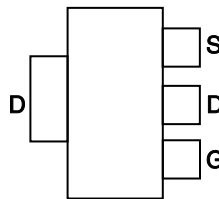
**Applications**

- Load Switching
- Uninterrupted Power Supply

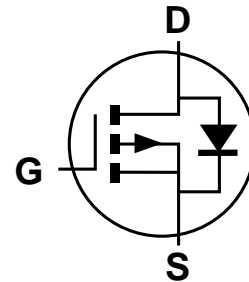
SOT223



Top View



Pin Out - Top View



Equivalent Circuit

**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 Lead Frame. Solderable per MIL-STD-202, Method 208 **e3**
- Weight: 0.112 grams (Approximate)

**Ordering Information (Note 4)**

Part Number	Qualification	Case	Packaging
DMP45H21DHE-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.
  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**


= Manufacturer's Marking  
 P450HE = Marking Code  
 YWW = Date Code Marking  
 Y or Y = Year (ex: 7 = 2017)  
 WW = Week (01 to 53)

**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 <sub>GSS</sub>	±30	V	
Continuous Drain Current (Note 6) V <sub>GS</sub> = 10V	T <sub>C</sub> = +25°C	I <sub>D</sub>	-0.6	A
	T <sub>C</sub> = +70°C	I <sub>D</sub>	-0.4	A
Pulsed Drain Current (10µs pulse, duty cycle = 1%)(Note5)	I <sub>DM</sub>	-1.2	A	
Maximum Body Diode Continuous Current (Note5)	I <sub>S</sub>	-0.9	A	
Avalanche Energy (Note 8) L=60mH	E <sub>AS</sub>	30	mJ	
Avalanche Current (Note 8) L=60mH	I <sub>AS</sub>	-1	A	
Peak Diode Recovery dv/dt (I <sub>SD</sub> ≤ 1.0A, di/dt ≤ 100A/µs)	dv/dt	26	V/ns	

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

Characteristic	Symbol	Value	Unit	
Total Power Dissipation (Note 6)	P <sub>D</sub>	T <sub>C</sub> = +25°C	12.5	W
		T <sub>C</sub> = +70°C	8	
Thermal Resistance, Junction to Ambient	(Note 5)	R <sub>θJA</sub>	108	°C/W
Thermal Resistance, Junction to Case	(Note 6)	R <sub>θJC</sub>	10	°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	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 6)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-450	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250µA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	-1	µA	V <sub>DS</sub> = -450V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = ±30V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 6)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	-3.0	-4	-5.0	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250µA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	13	21	Ω	V <sub>GS</sub> = -10V, I <sub>D</sub> = -0.3A
Diode Forward Voltage	V <sub>SD</sub>	—	-0.84	-1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = -1A
<b>DYNAMIC CHARACTERISTICS (Note 7)</b>						
Input Capacitance	C <sub>ISS</sub>	—	1,003	—	pF	V <sub>DS</sub> = -25V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>OSS</sub>	—	25.5	—		
Reverse Transfer Capacitance	C <sub>RSS</sub>	—	2.3	—		
Gate Resistance	R <sub>G</sub>	—	615	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1.0MHz
Total Gate Charge	Q <sub>g</sub>	—	4.2	—	nC	V <sub>DS</sub> = -225V, I <sub>D</sub> = -1A, V <sub>GS</sub> = -10V
Gate-Source Charge	Q <sub>gs</sub>	—	1.1	—		
Gate-Drain Charge	Q <sub>gd</sub>	—	2.1	—		
Turn-On Delay Time	t <sub>D(ON)</sub>	—	17	—	ns	V <sub>DD</sub> = -225V, R <sub>G</sub> = 3.0Ω, I <sub>D</sub> = -1A
Turn-On Rise Time	t <sub>R</sub>	—	22	—		
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	18	—		
Turn-Off Fall Time	t <sub>F</sub>	—	21	—		
Body Diode Reverse Recovery Time	t <sub>RR</sub>	—	113	—	ns	V <sub>GS</sub> = 0V, V <sub>DD</sub> = -200V, I <sub>S</sub> = -1A, di/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q <sub>RR</sub>	—	540	—	nC	V <sub>GS</sub> = 0V, V <sub>DD</sub> = -200V, I <sub>S</sub> = -1A, di/dt = 100A/µs

- Notes:
- Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
  - Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper pad layout
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to production testing.

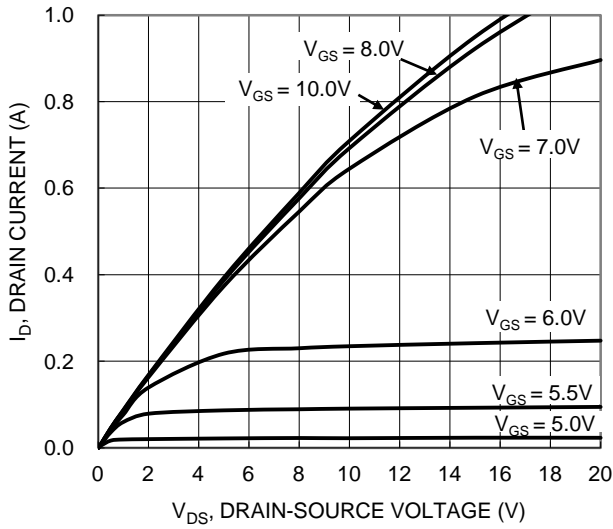


Figure 1. Typical Output Characteristic

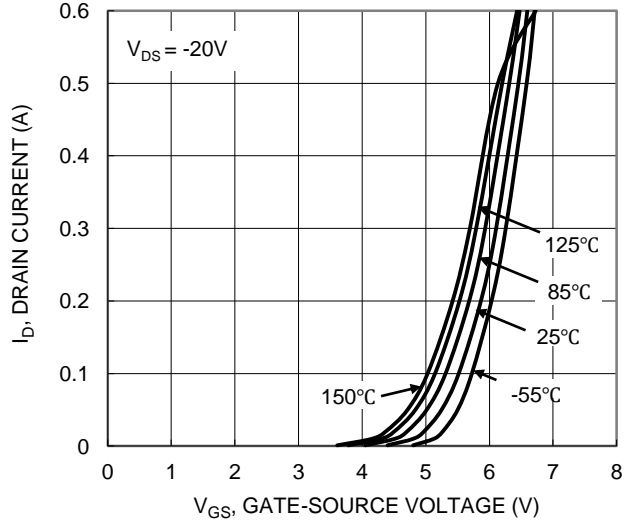


Figure 2. Typical Transfer Characteristic

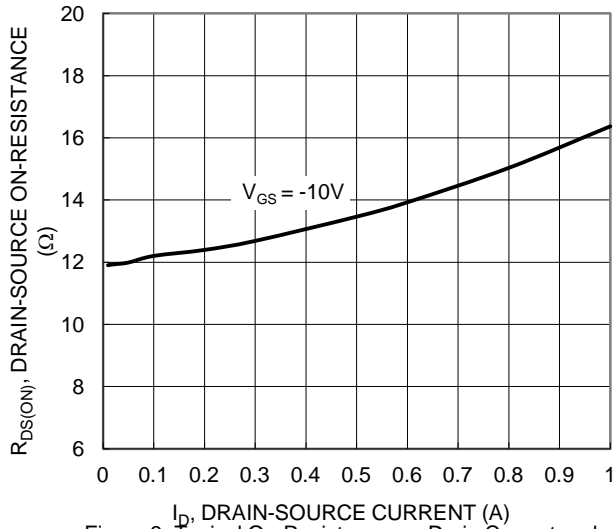


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

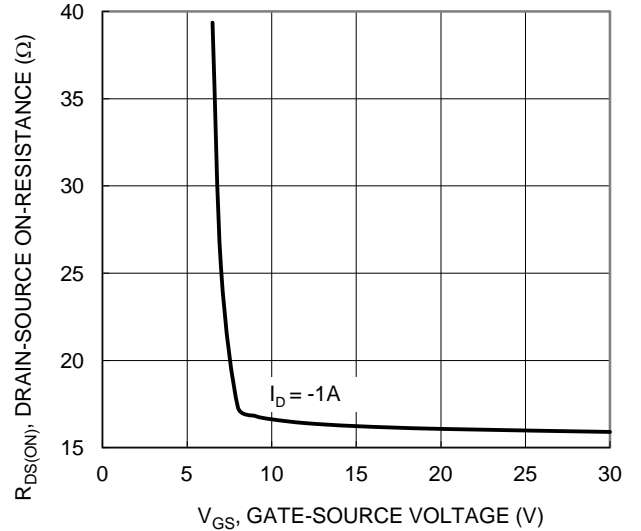


Figure 4. Typical Transfer Characteristic

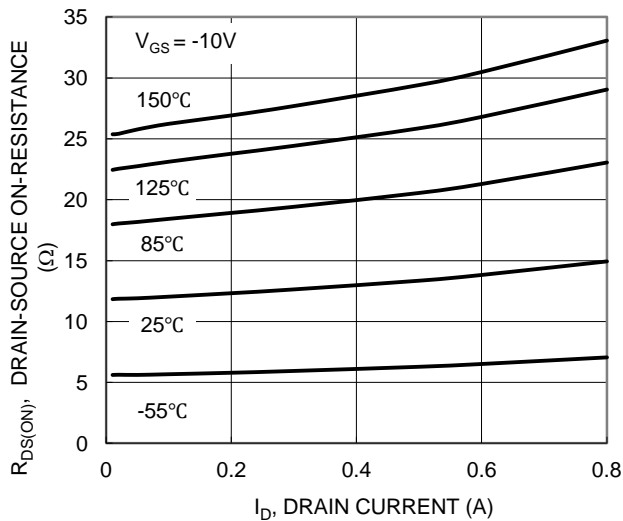


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

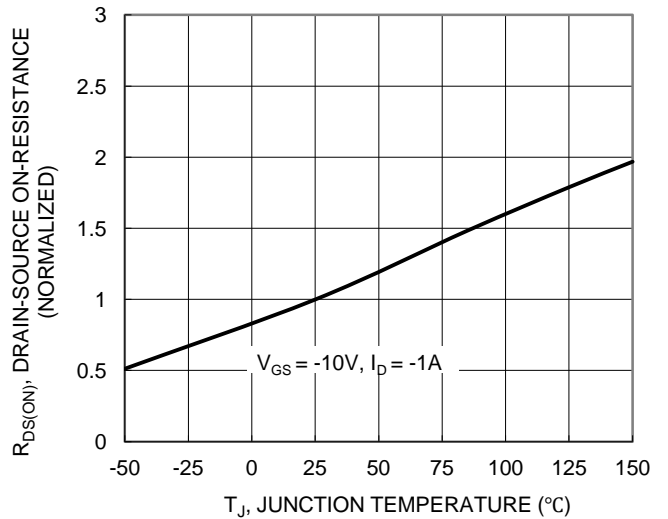


Figure 6. On-Resistance Variation with Temperature

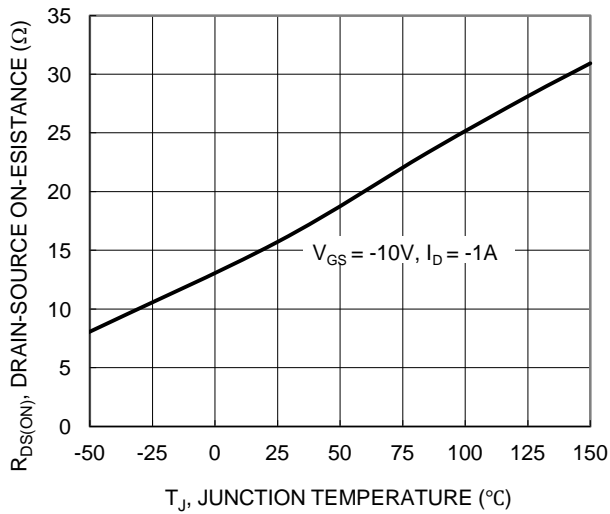


Figure 7. On-Resistance Variation with Temperature

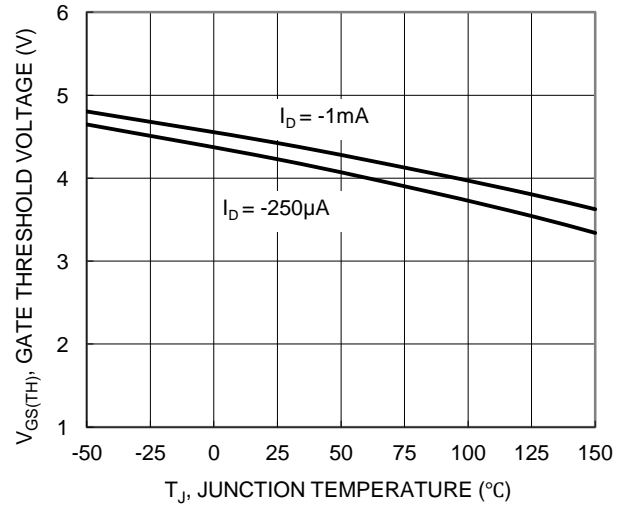


Figure 8. Gate Threshold Variation vs. Ambient Temperature

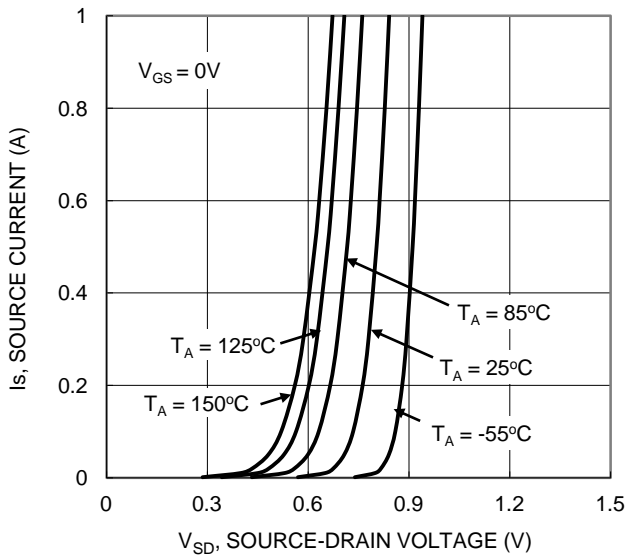


Figure 9. Diode Forward Voltage vs. Current

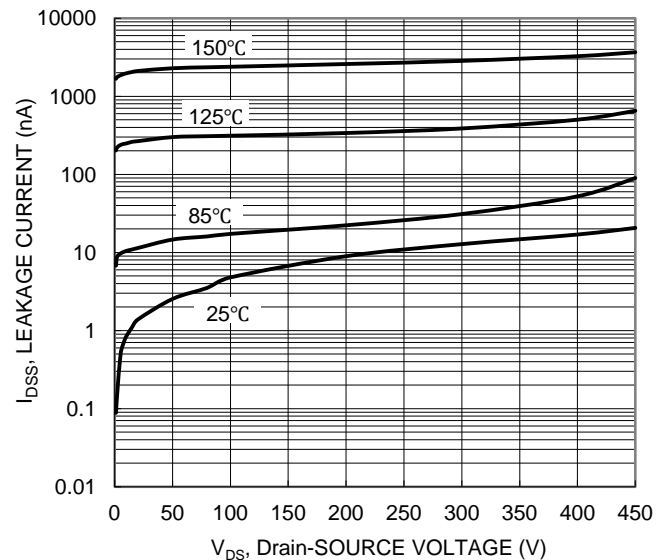


Figure 10. Typical Drain-Source Leakage Current vs. Voltage

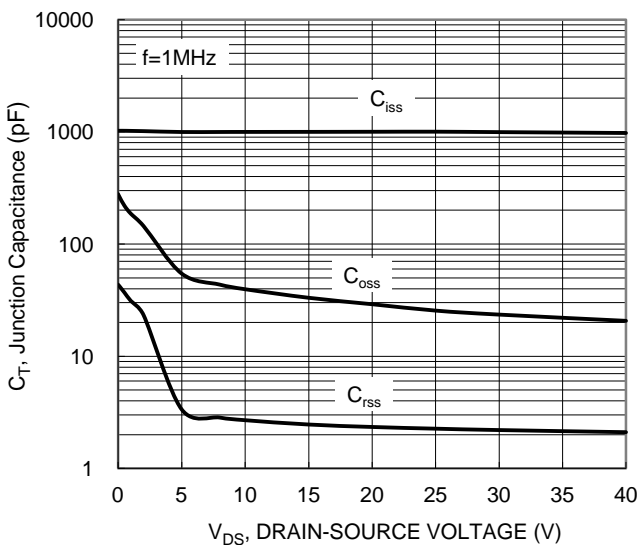


Figure 11. Typical Junction Capacitance

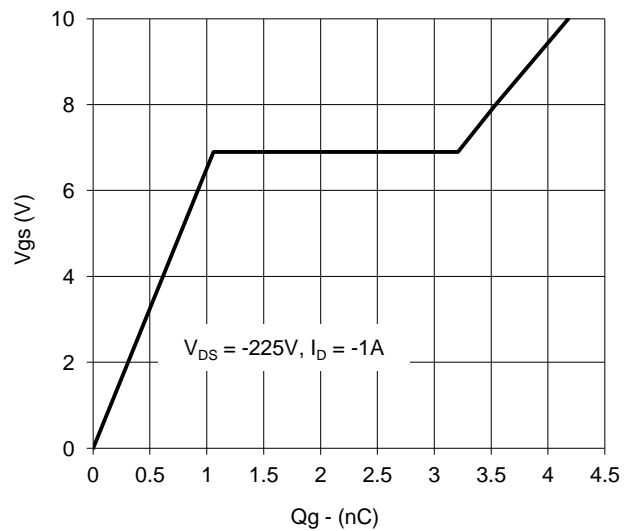
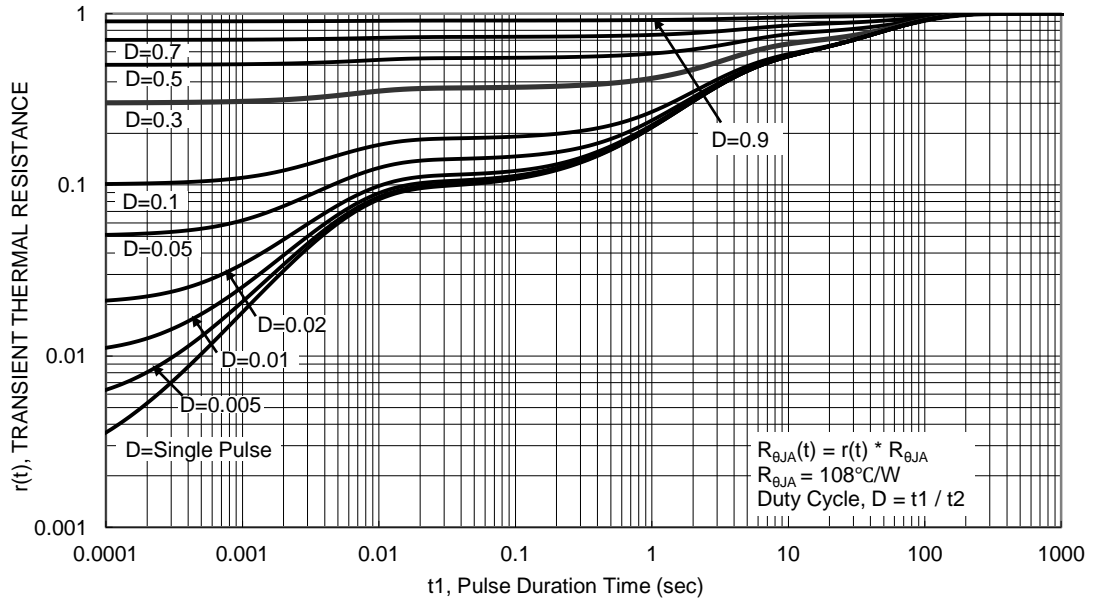
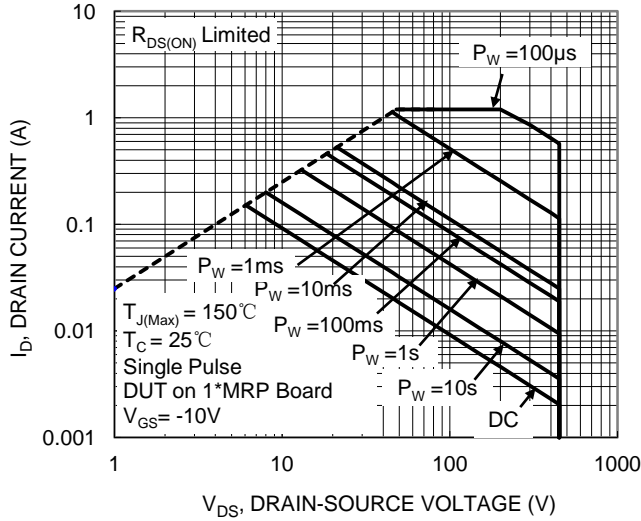


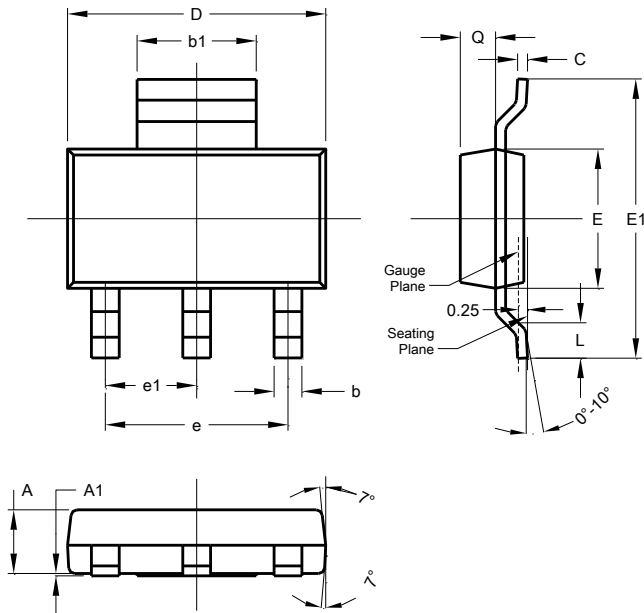
Figure 12. Gate Charge



**Package Outline Dimensions**

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

**SOT223**

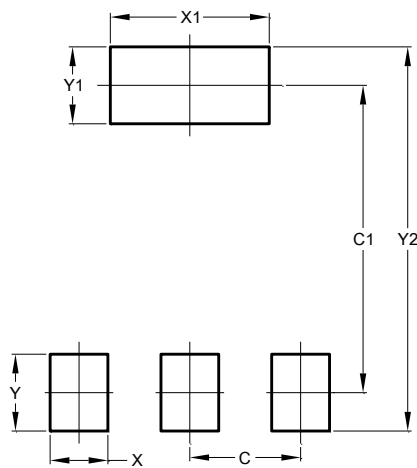


SOT223			
Dim	Min	Max	Typ
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b	0.60	0.80	0.70
b1	2.90	3.10	3.00
C	0.20	0.30	0.25
D	6.45	6.55	6.50
E	3.45	3.55	3.50
E1	6.90	7.10	7.00
e	-	-	4.60
e1	-	-	2.30
L	0.85	1.05	0.95
Q	0.84	0.94	0.89
All Dimensions in mm			

**Suggested Pad Layout**

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

**SOT223**



Dimensions	Value (in mm)
C	2.30
C1	6.40
X	1.20
X1	3.30
Y	1.60
Y1	1.60
Y2	8.00

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