Lead-free Green

450V P-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV_{DSS}	$R_{DS(ON)}$	I_D T_C = +25°C
-450V	21Ω @ V_{GS} = -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

Features and Benefits

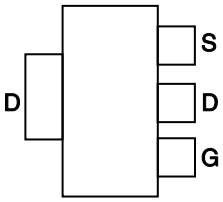
- Low Gate Drive
- Low Input Capacitance
- Fast Switching Speed
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

Mechanical Data

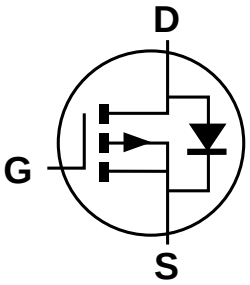
- Case: SOT223
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram Below
- Terminals: Finish - Matte Tin Annealed over Copper Lead Frame. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.112 grams (Approximate)

SOT223

Top View



Pin Out - Top View



Equivalent Circuit

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 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_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V_{DSS}	-450	V
Gate-Source Voltage		V_{GSS}	±30	V
Continuous Drain Current (Note 6) V_{GS} = 10V	T_C = +25°C	I_D	-0.6	A
	T_C = +70°C	I_D	-0.4	A
Pulsed Drain Current (10µs pulse, duty cycle = 1%)(Note5)		I_{DM}	-1.2	A
Maximum Body Diode Continuous Current (Note5)		I_S	-0.9	A
Avalanche Energy (Note 8) L=60mH		E_{AS}	30	mJ
Avalanche Current (Note 8) L=60mH		I_{AS}	-1	A
Peak Diode Recovery dv/dt ($I_{SD} \leq$ 1.0A, di/dt $\leq$ 100A/µs)		dv/dt	26	V/ns

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 6)	TC = +25°C	P_D	12.5	W
	TC = +70°C		8	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	108	°C/W
Thermal Resistance, Junction to Case	(Note 6)	$R_{\theta JC}$	10	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 6)						
Drain-Source Breakdown Voltage	BV_{DSS}	-450	—	—	V	V_{GS} = 0V, I_D = -250µA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1	µA	V_{DS} = -450V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±30V, V_{DS} = 0V
ON CHARACTERISTICS (Note 6)						
Gate Threshold Voltage	$V_{GS(TH)}$	-3.0	-4	-5.0	V	V_{DS} = V_{GS}, I_D = -250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	13	21	Ω	V_{GS} = -10V, I_D = -0.3A
Diode Forward Voltage	V_{SD}	—	-0.84	-1.2	V	V_{GS} = 0V, I_S = -1A
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C_{iss}	—	1,003	—	pF	V_{DS} = -25V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	25.5	—		
Reverse Transfer Capacitance	C_{rss}	—	2.3	—		
Gate Resistance	R_G	—	615	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz
Total Gate Charge	Q_g	—	4.2	—	nC	V_{DS} = -225V, I_D = -1A, V_{GS} = -10V
Gate-Source Charge	Q_{gs}	—	1.1	—		
Gate-Drain Charge	Q_{gd}	—	2.1	—		
Turn-On Delay Time	$t_{D(ON)}$	—	17	—	ns	V_{DD} = -225V, R_G = 3.0Ω , I_D = -1A
Turn-On Rise Time	t_R	—	22	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	18	—		
Turn-Off Fall Time	t_F	—	21	—		
Body Diode Reverse Recovery Time	t_{RR}	—	113	—	ns	V_{GS} = 0V, V_{DD} = -200V, I_S = -1A, di/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q_{RR}	—	540	—	nC	V_{GS} = 0V, V_{DD} = -200V, I_S = -1A, di/dt = 100A/µs

Notes: 5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper pad layout
7 .Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to production testing.

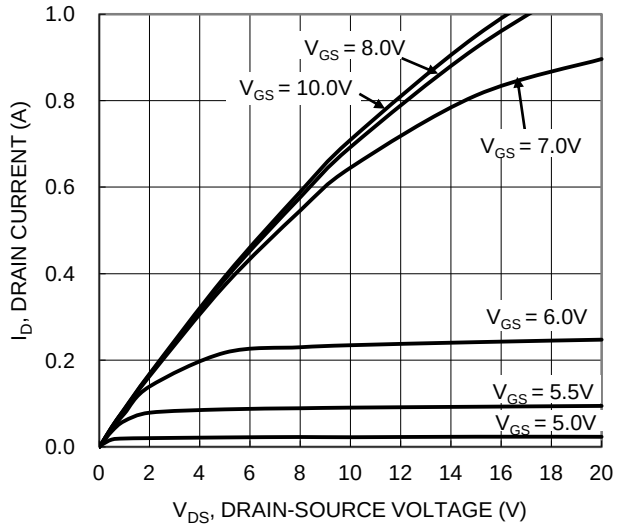


Figure 1. Typical Output Characteristic

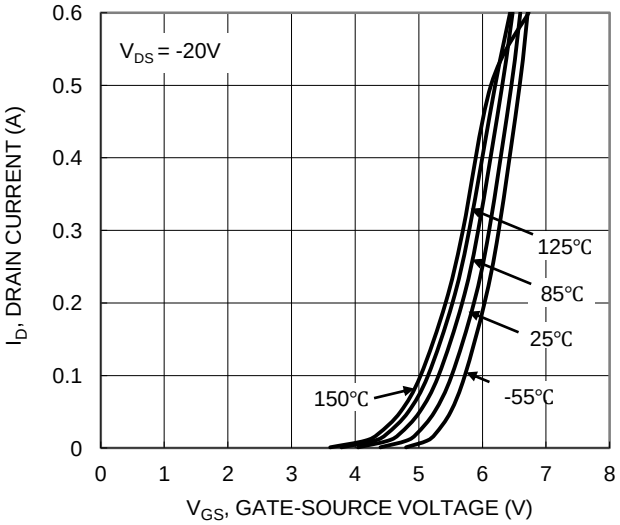


Figure 2. Typical Transfer Characteristic

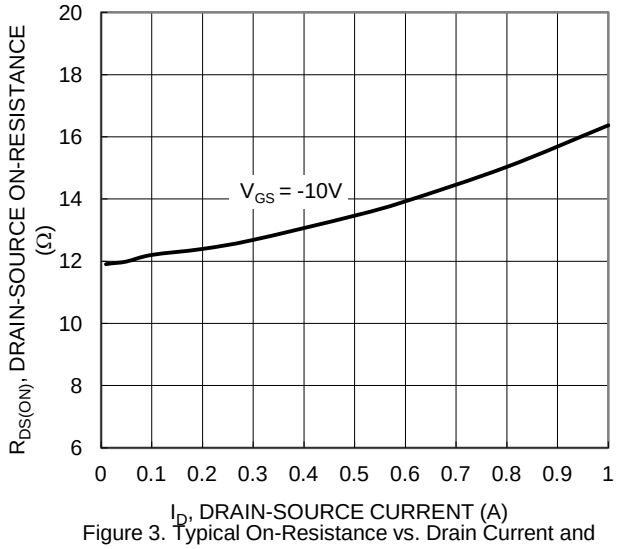


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

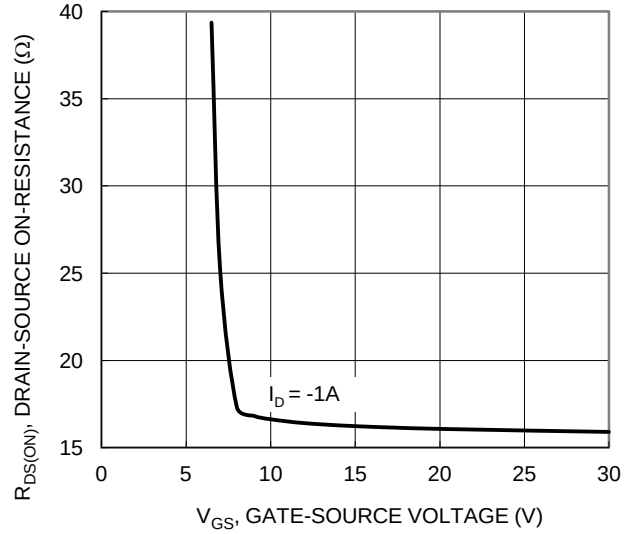


Figure 4. Typical Transfer Characteristic

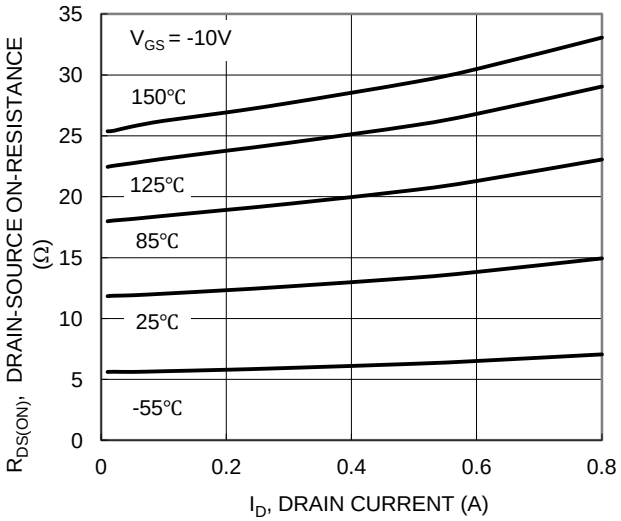


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

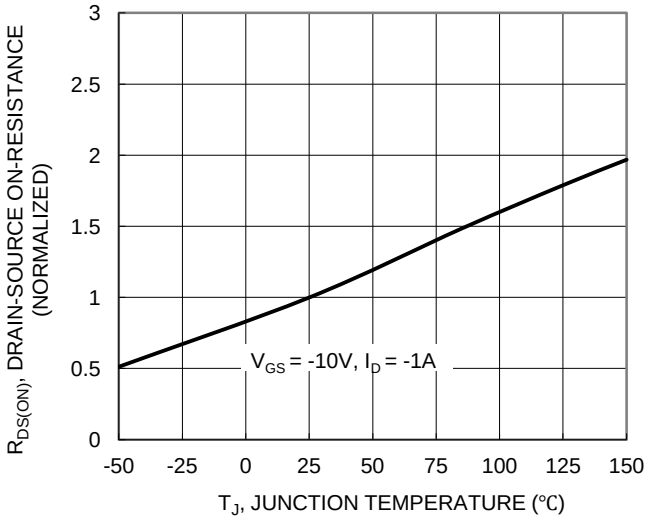


Figure 6. On-Resistance Variation with Temperature

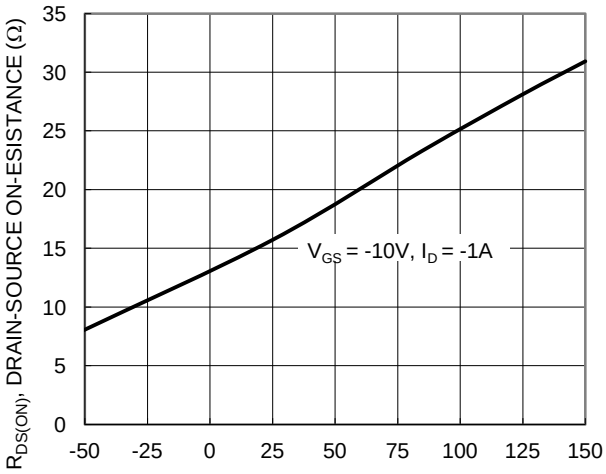


Figure 7. On-Resistance Variation with Temperature

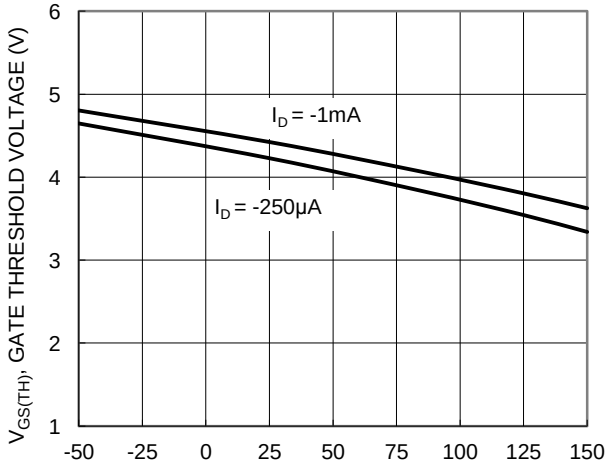


Figure 8. Gate Threshold Variation vs. AmbientTemperature

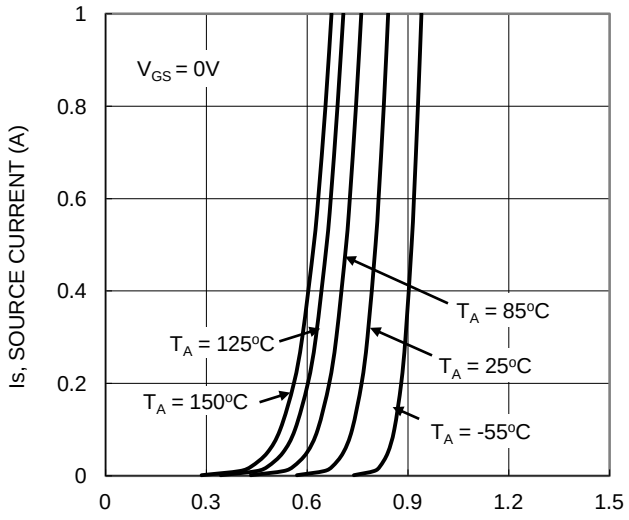


Figure 9. Diode Forward Voltage vs. Current

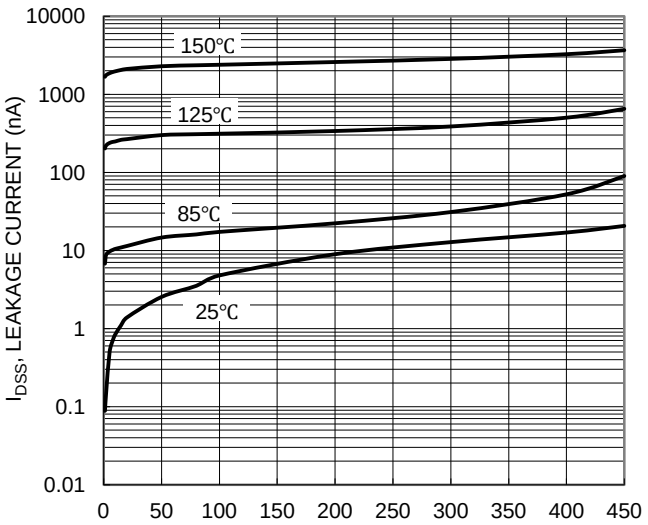


Figure 10. Typical Drain-Source Leakge Current vs. Voltage

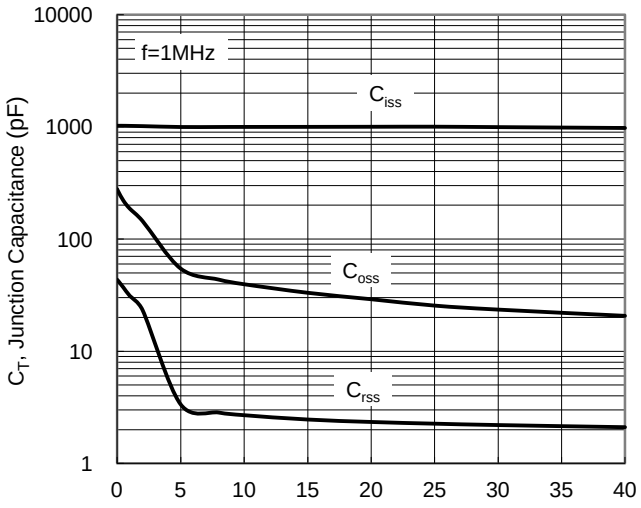


Figure11. Typical Junction Capacitance

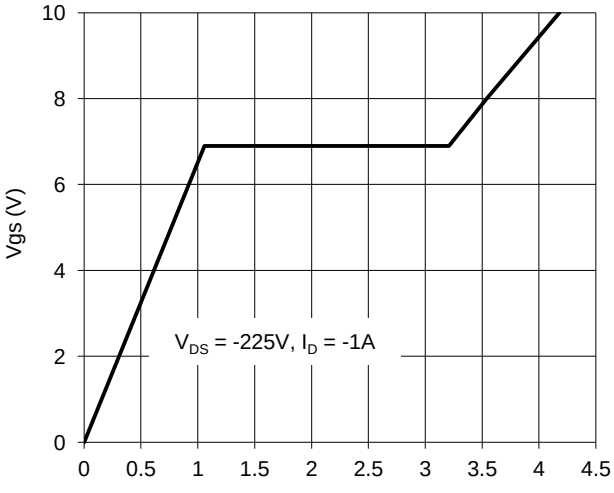


Figure 12. Gate Charge

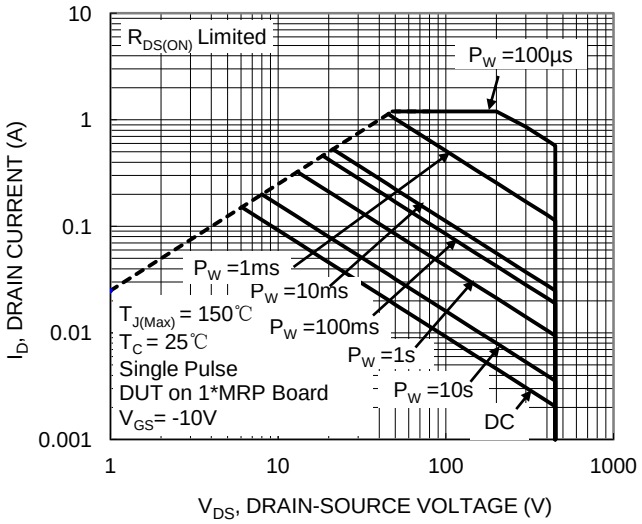


Figure 13. SOA, Safe Operation Area

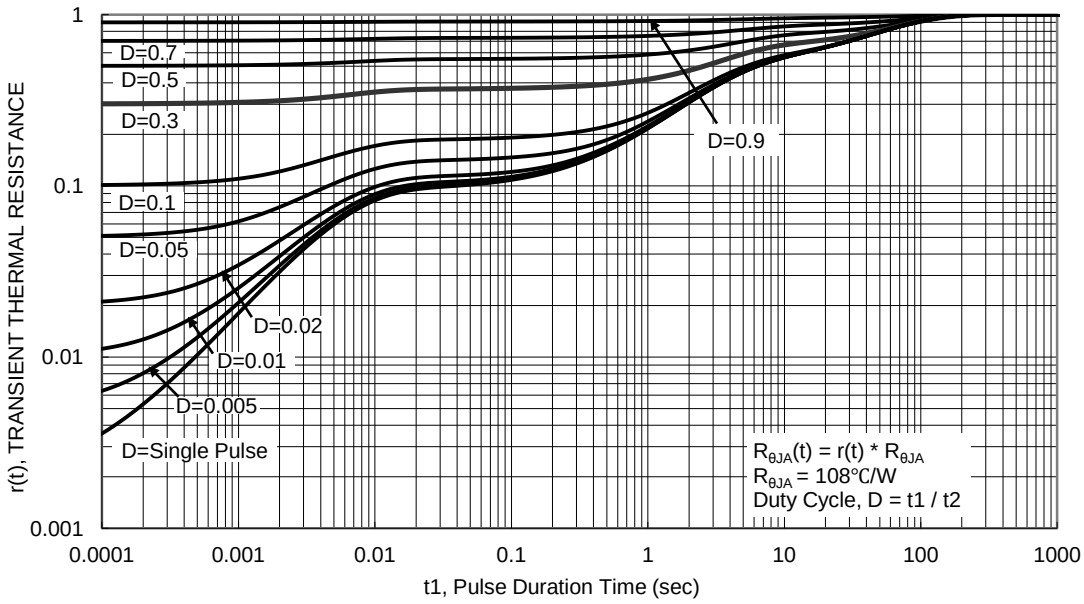


Figure 14. Transient Thermal Resistance

Package Outline Dimensions

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

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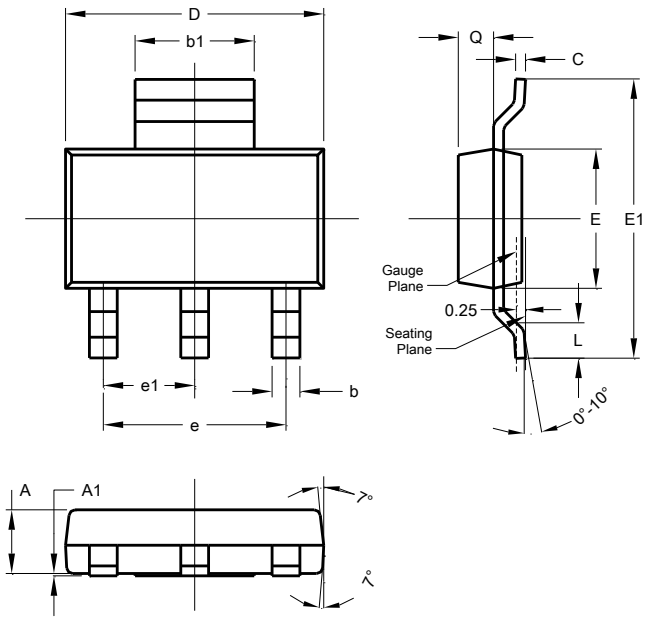

SOT223			
Dim	**Min**	**Max**	**Typ**
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b	0.60	0.80	0.70
b1	2.90	3.10	3.00
C	0.20	0.30	0.25
D	6.45	6.55	6.50
E	3.45	3.55	3.50
E1	6.90	7.10	7.00
e	-	-	4.60
e1	-	-	2.30
L	0.85	1.05	0.95
Q	0.84	0.94	0.89
All Dimensions in mm			

Suggested Pad Layout

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

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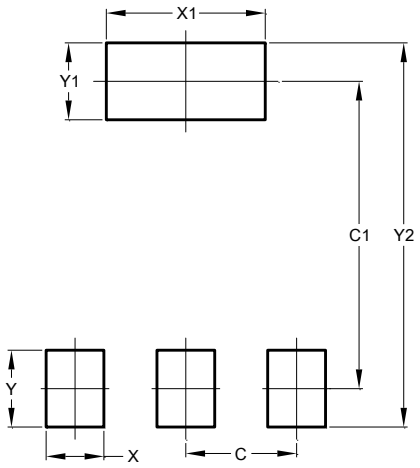

Dimensions	Value (in mm)
C	2.30
C1	6.40
X	1.20
X1	3.30
Y	1.60
Y1	1.60
Y2	8.00

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