

Product Summary

BV_{DSS}	$R_{DS(on)}$	I_D $T_A = +25^\circ C$
-60V	150m Ω @ $V_{GS} = -10V$	-3A
	185m Ω @ $V_{GS} = -4.5V$	-2.7A

Description and Applications

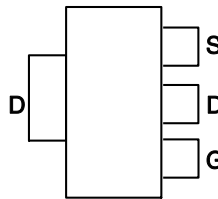
This MOSFET is designed to meet the stringent requirements of Automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use in:

- Motor Control
- Transformer Driving Switch
- DC-DC Converters
- Power Management Functions
- Uninterrupted Power Supply

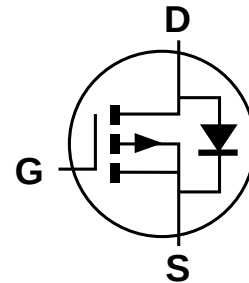
SOT223



Top View



Pin Out - Top



Equivalent Circuit

Features and Benefits

- 100% Unclamped Inductive Switch (UIS) test in production
- Low on-resistance
- Fast switching speed
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

Mechanical Data

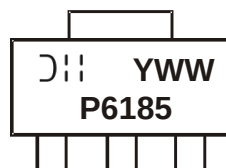
- Case: SOT223
- Case Material: Molded Plastic, "Green" Molding Compound.
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See diagram below
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe.
Solderable per MIL-STD-202, Method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

Ordering Information (Note 5)

Part Number	Case	Packaging
DMP6185SEQ-13	SOT223	2,500 / Tape & Reel

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to http://www.diodes.com/quality/product_compliance_definitions/.
 5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



D = Manufacturer's Marking
 P6185 = Marking Code
 YWW or YWW = Date Code Marking
 Y or Y = Year (ex: 7 = 2017)
 WW = Week (01 - 53)

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source voltage	V _{DSS}	-60	V
Gate-Source voltage	V _{GS}	±20	V
Continuous Drain current (Note 7) V _{GS} = -10V	I _D	T _A = +25°C -3	A
		T _A = +70°C -2.4	
Maximum Body Diode Continuous Current	I _S	-2	A
Pulsed Drain Current (10μs pulse, duty cycle = 1%)	I _{DM}	-15	A
Single Pulsed Avalanche Current (Note 8)	I _{AS}	-16	A
Single Pulsed Avalanche Energy (Note 8)	E _{AS}	13	mJ

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

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 6)	P _D	T _A = +25°C 1.2	W
		T _A = +70°C 0.8	
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	Steady state 104	°C/W
		t < 10s 51	
Total Power Dissipation (Note 7)	P _D	T _A = +25°C 2.2	W
		T _A = +70°C 1.4	
Thermal Resistance, Junction to Ambient (Note 7)	R _{θJA}	Steady state 60	°C/W
		t < 10s 30	
Thermal Resistance, Junction to Case (Note 7)	R _{θJC}	7.6	
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 9)						
Drain-Source Breakdown Voltage	BV _{DSS}	-60	—	—	V	V _{GS} = 0V, I _D = -250μA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	-1	μA	V _{DS} = -48V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	V _{GS(th)}	-1	—	-3	V	V _{DS} = V _{GS} , I _D = -250μA
Static Drain-Source On-Resistance	R _{DS(on)}	—	110	150	mΩ	V _{GS} = -10V, I _D = -2.2A
			130	185		V _{GS} = -4.5V, I _D = -1.8A
Diode Forward Voltage	V _{SD}	—	-0.75	-0.95	V	V _{GS} = 0V, I _S = -1A
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C _{iss}	—	708	—	pF	V _{DS} = -30V, V _{GS} = 0V, f = 1MHz
Output Capacitance	C _{oss}	—	39	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	32	—	pF	
Gate Resistance	R _g	—	17	28	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = -4.5V)	Q _g	—	6.2	—	nC	V _{DS} = -30V, I _D = -12A
Total Gate Charge (V _{GS} = -10V)	Q _g	—	14	—	nC	
Gate-Source Charge	Q _{gs}	—	2.8	—	nC	
Gate-Drain Charge	Q _{gd}	—	3.1	—	nC	
Turn-On Delay Time	t _{D(on)}	—	5.2	—	ns	V _{DS} = -30V, R _L = 2.5Ω V _{GS} = -10V, R _G = 3Ω
Turn-On Rise Time	t _r	—	23	—	ns	
Turn-Off Delay Time	t _{D(off)}	—	33	—	ns	
Turn-Off Fall Time	t _f	—	39	—	ns	
Body Diode Reverse Recovery Time	t _{rr}	—	22	—	ns	I _F = -12A, di/dt = 100A/μs
Body Diode Reverse Recovery Charge	Q _{rr}	—	17	—	nC	

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 - Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
 - UIS in production with L = 0.1mH, starting T_A = +25°C.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

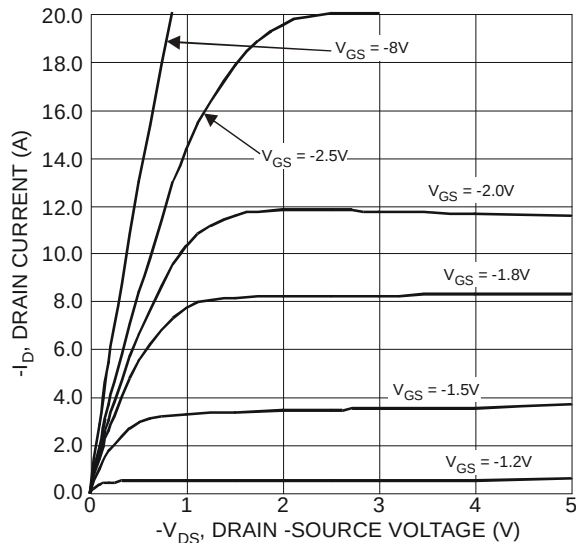


Figure 1 Typical Output Characteristics

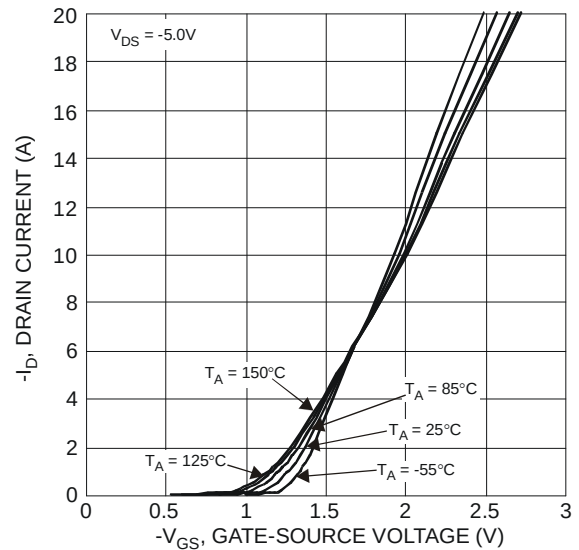


Figure 2 Typical Transfer Characteristics

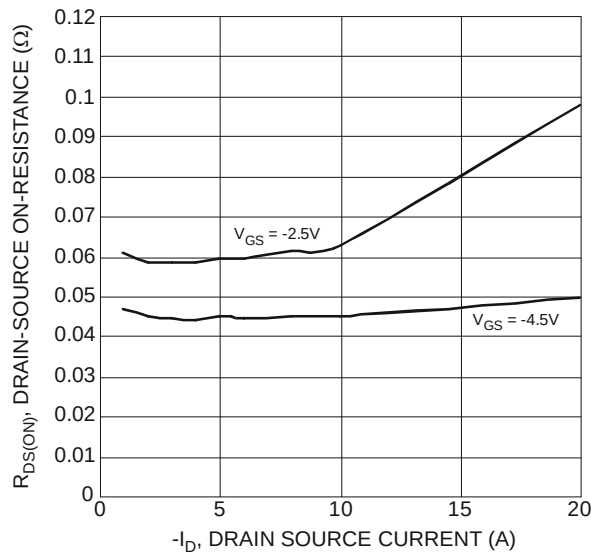


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

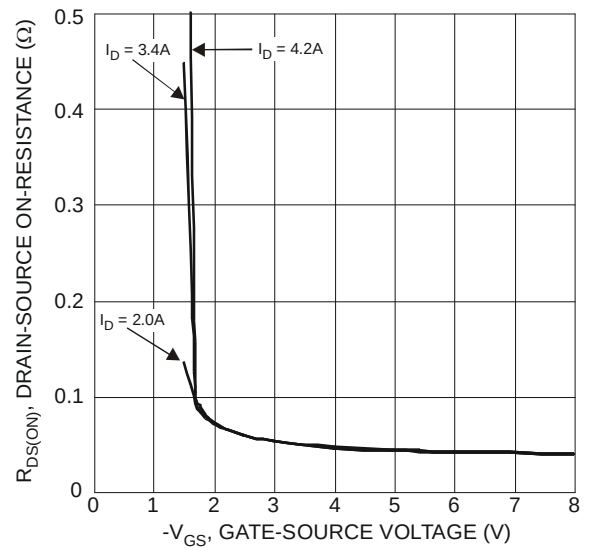


Figure 4 Typical Transfer Characteristics

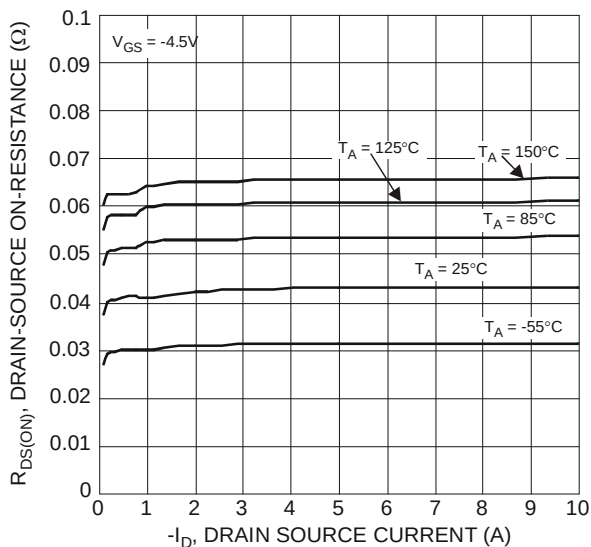


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

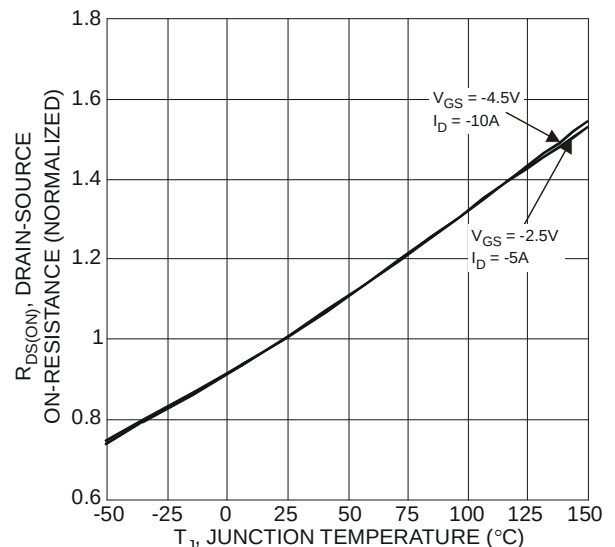


Figure 6 On-Resistance Variation with Temperature

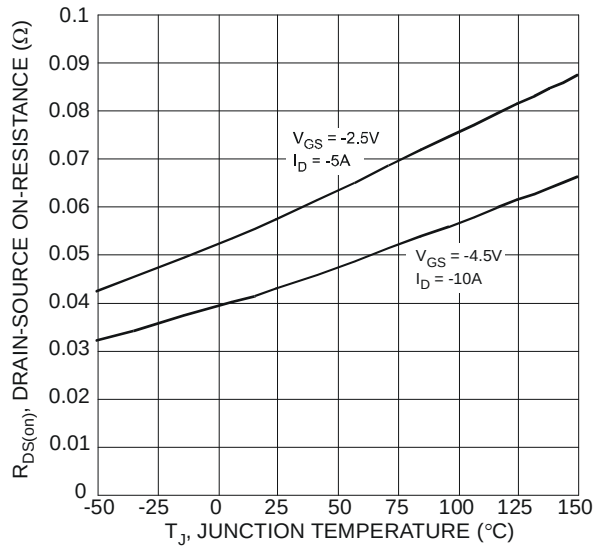


Figure 7 On-Resistance Variation with Temperature

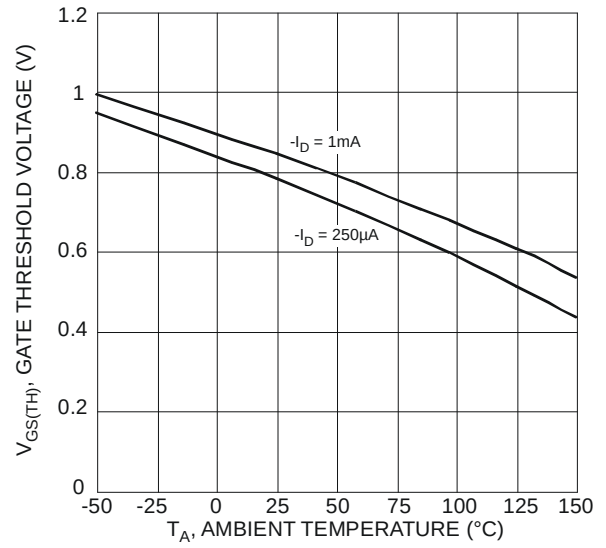


Figure 8 Gate Threshold Variation vs. Ambient Temperature

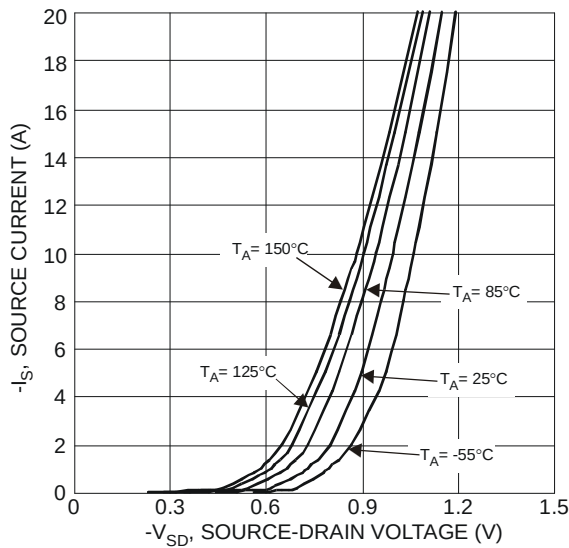


Figure 9 Diode Forward Voltage vs. Current

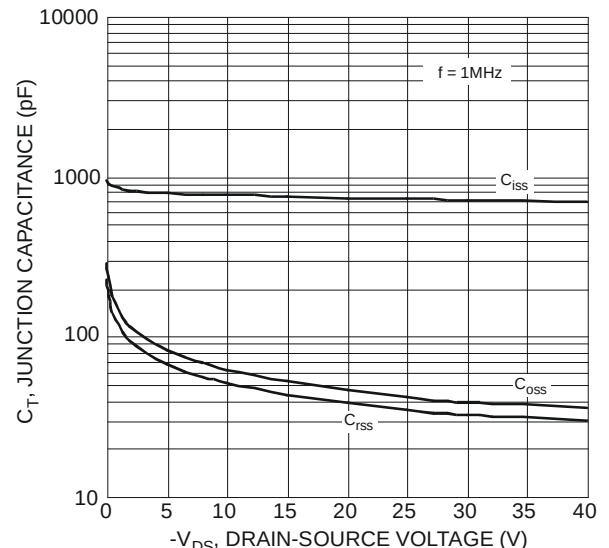


Figure 10 Typical Junction Capacitance

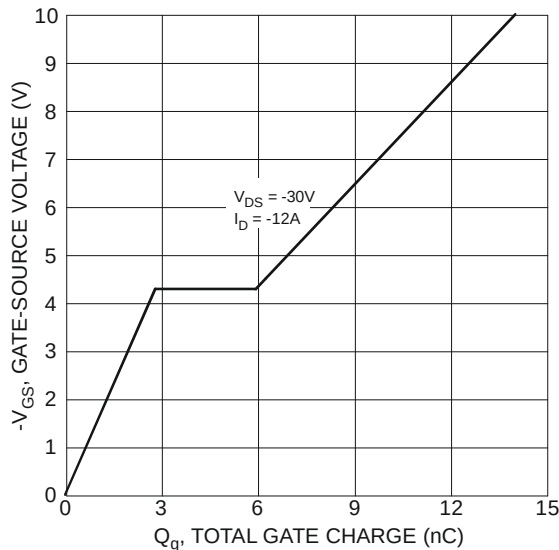
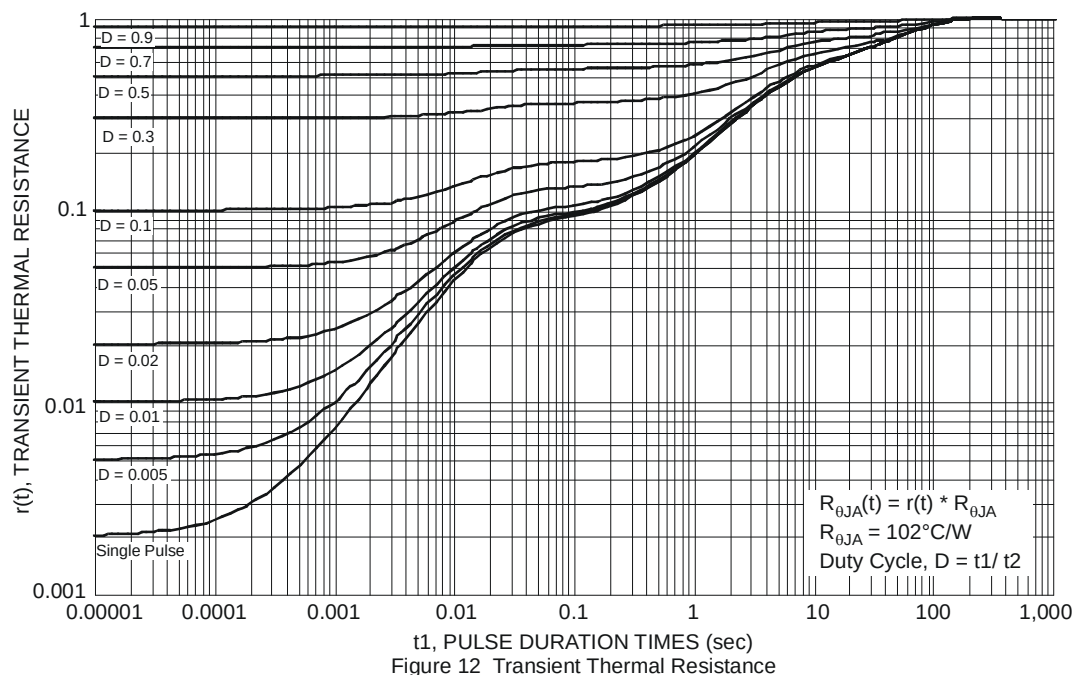
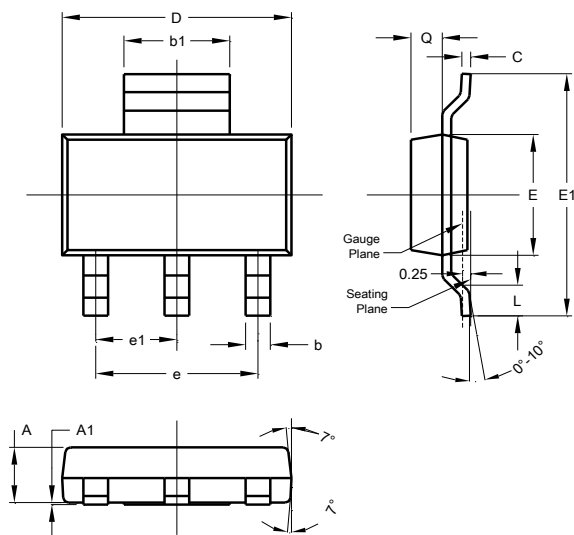


Figure 11 Gate-Charge Characteristics



Package Outline Dimensions

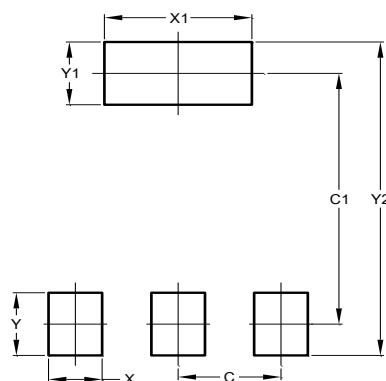
Please see <http://www.diodes.com/package-outlines.html> for the latest version.



SOT223			
Dim	Min	Max	Typ
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b1	2.90	3.10	3.00
b2	0.60	0.80	0.70
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.



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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