N-CHANNEL ENHANCEMENT MODE FIELD EFFECT TRANSISTOR

NEW PRODUCT

Features

- Low On-Resistance
  - 70mΩ @V_{GS} = 4.5V
  - 100mΩ @V_{GS} = 2.5V
  - 170mΩ @V_{GS} = 1.5V
- Very Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- **Lead, Halogen and Antimony Free, RoHS Compliant "Green" Device (Notes 2, 3 and 6)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **ESD Protected Gate**

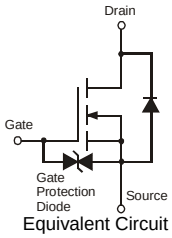
Mechanical Data

- Case: SOT-23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminal Connections: See Diagram
- Terminals: Finish — Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Marking Information: See Page 3
- Ordering & Date Code Information: See Page 3
- Weight: 0.008 grams (approximate)

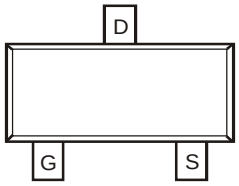
ESD PROTECTED TO 3kV

SOT-23

TOP VIEW



Equivalent Circuit



TOP VIEW

Maximum Ratings @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Value	Units
Drain-Source Voltage	V_{DSS}	20	V
Gate-Source Voltage	V_{GSS}	±12	V
Drain Current (Note 1)	I_D	2.3	A
Pulsed Drain Current (Note 4)	I_{DM}	8	A

Thermal Characteristics

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 1)	P_D	600	mW
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	208	°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 5)						
Drain-Source Breakdown Voltage	BV_{DSS}	20	28	—	V	V_{GS} = 0V, I_D = 10μA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	μA	V_{DS} = 20V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±10	μA	V_{GS} = ±12V, V_{DS} = 0V
ON CHARACTERISTICS (Note 5)						
Gate Threshold Voltage	$V_{GS(th)}$	0.45	—	1.0	V	V_{DS} = V_{GS}, I_D = 250μA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	—	50	70	mΩ	V_{GS} = 4.5V, I_D = 3A
			70	100		V_{GS} = 2.5V, I_D = 2.3A
			125	170		V_{GS} = 1.5V, I_D = 0.5A
Forward Transfer Admittance	$\|Y_{fs}\|$	—	6	—	S	V_{DS} =5V, I_D = 2.4A
Diode Forward Voltage (Note 5)	V_{SD}	—	0.7	0.9	V	V_{GS} = 0V, I_S = 1.05A
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{iss}	—	217	—	pF	V_{DS} = 10V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{oss}	—	62	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	34	—	pF	

Notes:
1. Device mounted on FR-4 PCB, on minimum recommended, 2oz Copper pad layout.
2. No purposefully added lead. Halogen and Antimony Free.
3. Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com/products/lead_free/index.php.
4. Repetitive rating, pulse width limited by junction temperature.
5. Short duration pulse test used to minimize self-heating effect.
6. Product manufactured with Green Molding Compound and does not contain Halogens or Sb_2O_3 Fire Retardants.

NEW PRODUCT

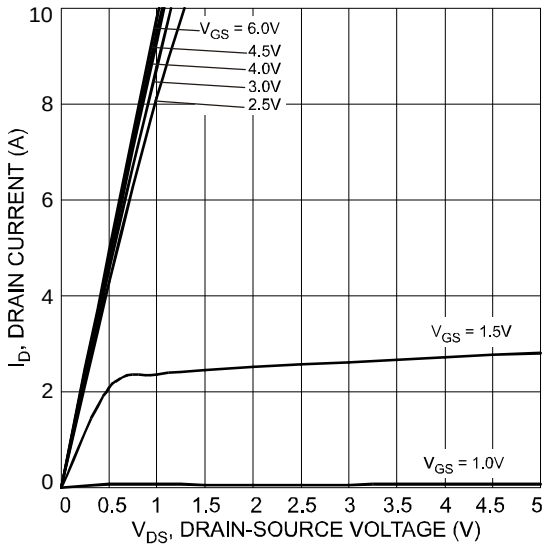


Fig. 1 Typical Output Characteristic

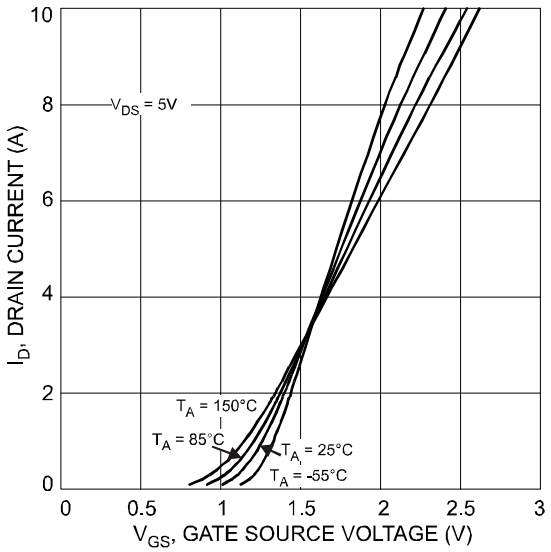


Fig. 2 Typical Transfer Characteristics

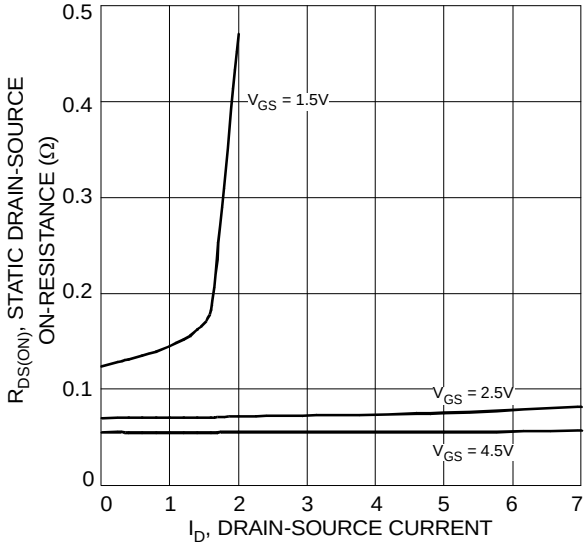


Fig. 3 On-Resistance vs.
Drain-Source Current & Gate Voltage

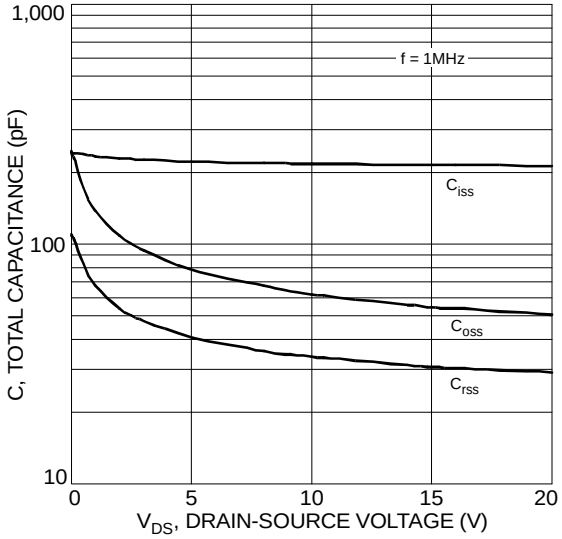


Fig. 4 Typical Total Capacitance

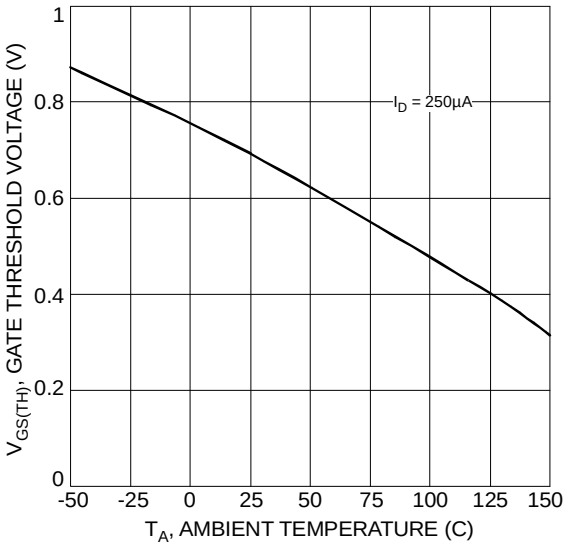


Fig. 5 Gate Threshold Variation with Ambient Temperature

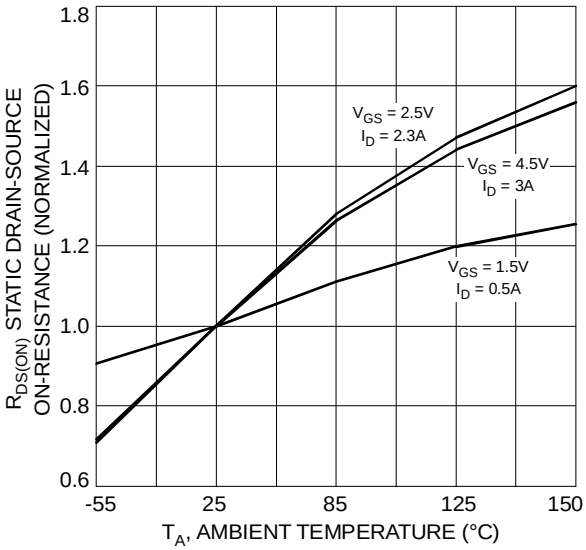


Fig. 6 Normalized Static Drain-Source On-Resistance
vs. Ambient Temperature

NEW PRODUCT

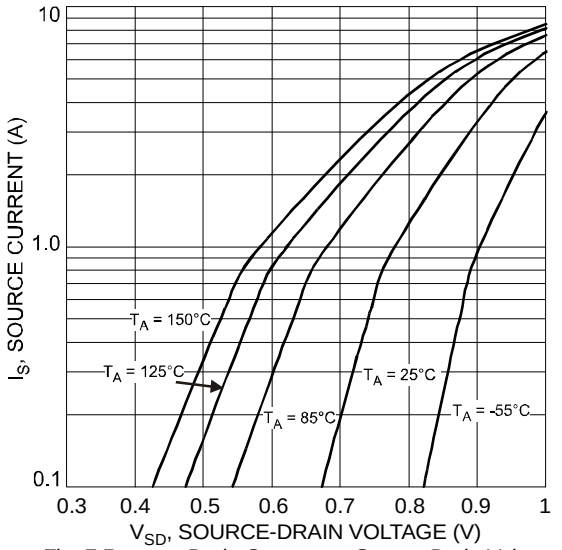


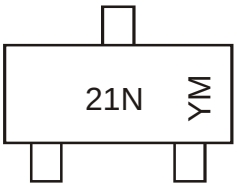
Fig. 7 Reverse Drain Current vs. Source-Drain Voltage

Ordering Information (Note 7)

Part Number	Case	Packaging
DMN2170U-7	SOT-23	3000/Tape & Reel

Notes: 7. For packaging details, go to our website at http://www.diodes.com/datasheets/ap02007.pdf.

Marking Information



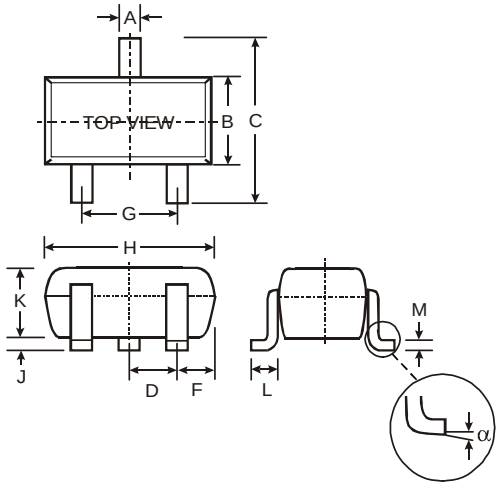
21N = Marking Code
YM = Date Code Marking
Y = Year ex: U = 2007
M = Month ex: 9 = September

Date Code Key (If Applicable)

Year	2007	2008	2009	2010	2011	2012
Code	U	V	W	X	Y	Z

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

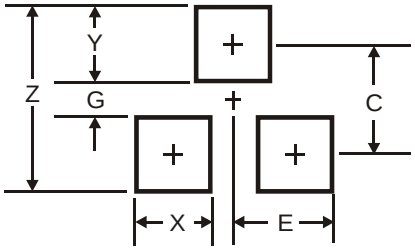
Package Outline Dimensions



SOT-23		
Dim	Min	Max
A	0.37	0.51
B	1.20	1.40
C	2.30	2.50
D	0.89	1.03
F	0.45	0.60
G	1.78	2.05
H	2.80	3.00
J	0.013	0.10
K	0.903	1.10
L	0.45	0.61
M	0.085	0.180
α	0°	8°
All Dimensions in mm		

NEW PRODUCT

Suggested Pad Layout



Dimensions	Value (in mm)
Z	3.4
G	0.7
X	0.9
Y	1.4
C	2.0
E	0.9