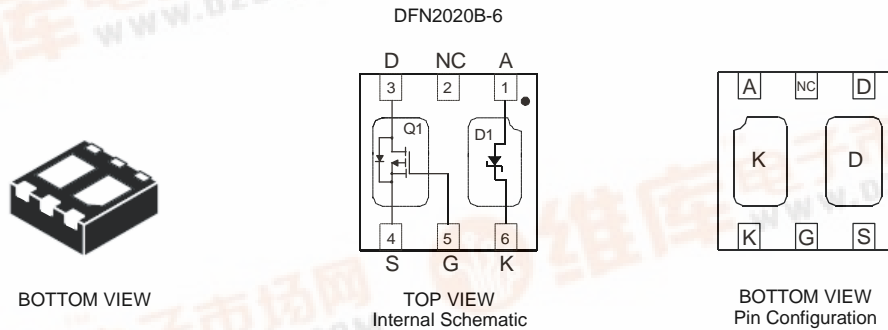


### Features

- Low On-Resistance
  - 95mΩ @V<sub>GS</sub> = -4.5V
  - 120mΩ @V<sub>GS</sub> = -2.5V
  - 86mΩ (typ) @V<sub>GS</sub> = -1.8V
- Low Gate Threshold Voltage, -1.3V Max
- Fast Switching Speed
- Low Input/Output Leakage
- Incorporates Low V<sub>F</sub> Super Barrier Rectifier (SBR<sup>®</sup>)
- Low Profile, 0.5mm Max Height
- Lead Free/RoHS Compliant (Note 2)
- "Green" Device (Note 3)
- Qualified to AEC-Q101 Standards for High Reliability

### Mechanical Data

- Case: DFN2020B-6
- 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 – NiPdAu over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Marking Information: See Page 6
- Ordering Information: See Page 6
- Weight: 0.0065 grams (approximate)



### Maximum Ratings – TOTAL DEVICE @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 1)	P <sub>D</sub>	1.4	W
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	89	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

### Maximum Ratings – P-CHANNEL MOSFET – Q1 @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Value	Units
Drain-Source Voltage	V <sub>DSS</sub>	-20	V
Gate-Source Voltage	V <sub>GSS</sub>	±12	V
Drain Current (Note 1)	I <sub>D</sub>	-3.5	A
Pulsed Drain Current (Note 4)	I <sub>DM</sub>	-12	A

### Maximum Ratings – SBR<sup>®</sup> – D1 @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Peak Repetitive Reverse Voltage	V <sub>R</sub> RM	35	V
Working Peak Reverse Voltage	V <sub>R</sub> WM		
DC Blocking Voltage	V <sub>R</sub>		
RMS Reverse Voltage	V <sub>R(RMS)</sub>	25	V
Average Rectified Output Current	I <sub>O</sub>	1	A
Non-Repetitive Peak Forward Surge Current 8.3ms single half sine-wave superimposed on rated load	I <sub>FSM</sub>	3	A

- Notes:
1. Device mounted on FR-4 PCB, on minimum recommended, 2oz Copper pad layout.
  2. No purposefully added lead.
  3. Diodes Inc.'s "Green" policy can be found on our website at [http://www.diodes.com/products/lead\\_free/index.php](http://www.diodes.com/products/lead_free/index.php).
  4. Repetitive rating, pulse width limited by junction temperature.

**Electrical Characteristics – P-CHANNEL MOSFET – Q1** @  $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 5)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	-20	—	—	V	$V_{GS} = 0V, I_D = -250\mu A$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	-1	$\mu A$	$V_{DS} = -20V, V_{GS} = 0V$
Gate-Source Leakage	$I_{GSS}$	—	—	$\pm 100$ $\pm 800$	nA	$V_{GS} = \pm 8V, V_{DS} = 0V$ $V_{GS} = \pm 12V, V_{DS} = 0V$
<b>ON CHARACTERISTICS (Note 5)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	-0.45	—	-1.3	V	$V_{DS} = V_{GS}, I_D = -250\mu A$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	60	95	m $\Omega$	$V_{GS} = -4.5V, I_D = -2.8A$
		—	74	120		$V_{GS} = -2.5V, I_D = -2.0A$
		—	86	—		$V_{GS} = -1.8V, I_D = -1.0A$
Forward Transfer Admittance	$ Y_{fs} $	—	8	—	S	$V_{DS} = -5V, I_D = -2.8A$
Diode Forward Voltage (Note 5)	$V_{SD}$	—	0.7	-1.2	V	$V_{GS} = 0V, I_S = -1.6A$
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	$C_{iss}$	—	632	—	pF	$V_{DS} = -10V, V_{GS} = 0V$ $f = 1.0\text{MHz}$
Output Capacitance	$C_{oss}$	—	65	—	pF	
Reverse Transfer Capacitance	$C_{rss}$	—	54	—	pF	

**Electrical Characteristics – SBR<sup>®</sup> – D1** @  $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Breakdown Voltage (Note 5)	$V_{(BR)R}$	35	40	—	V	$I_R = 1\text{mA}$
Forward Voltage	$V_F$	—	354	0.42	V	$I_F = 0.5A$
		—	415	0.49		$I_F = 1.0A$
Reverse Current (Note 5)	$I_R$	—	—	100	$\mu A$	$V_R = 20V$

Notes: 5. Short duration pulse test used to minimize self-heating effect.

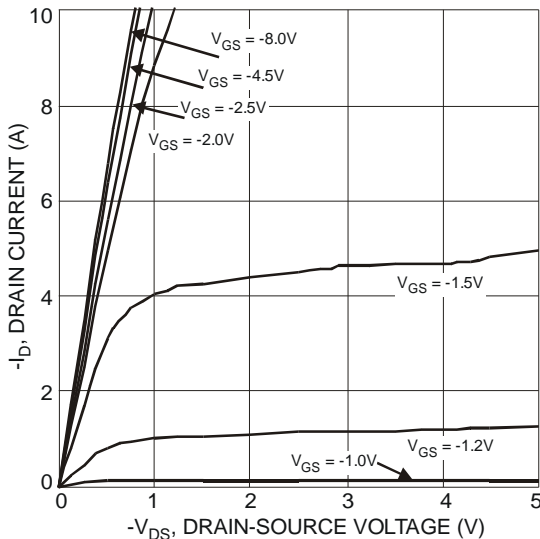
**Q1, P-CHANNEL MOSFET**


Fig. 1 Typical Output Characteristics

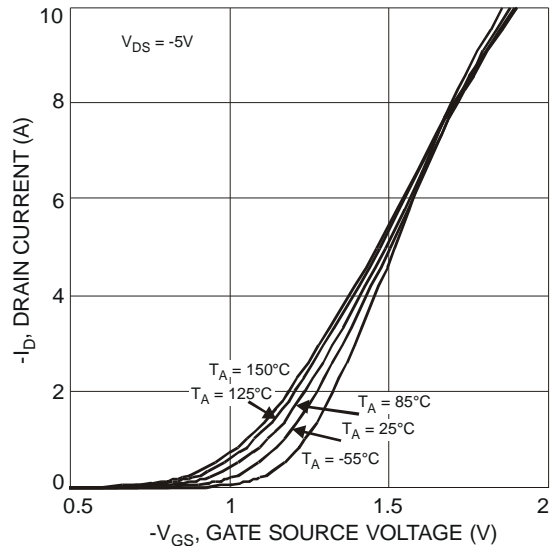


Fig. 2 Typical Transfer Characteristics

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**Q1, P-CHANNEL MOSFET - Continued**

NEW PRODUCT

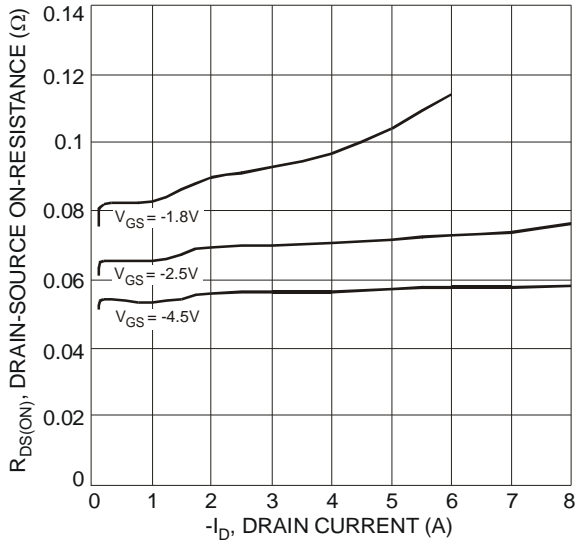


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

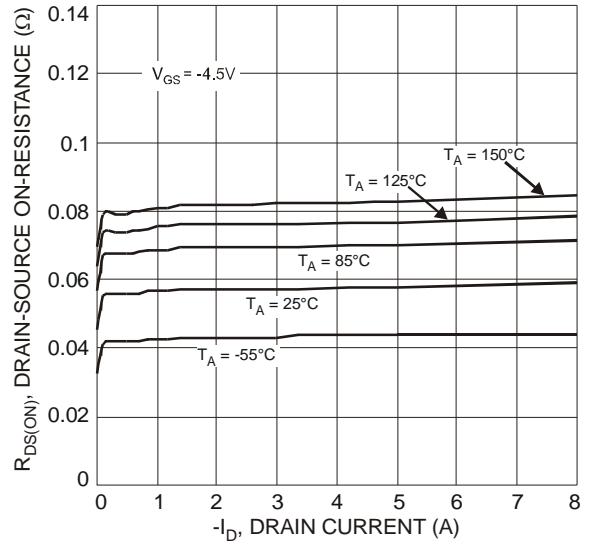


Fig. 4 Typical Drain-Source On-Resistance vs. Drain Current and Temperature

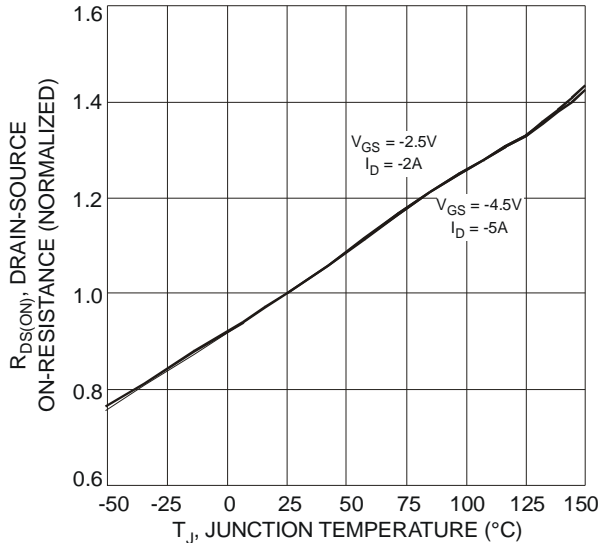


Fig. 5 On-Resistance Variation with Temperature

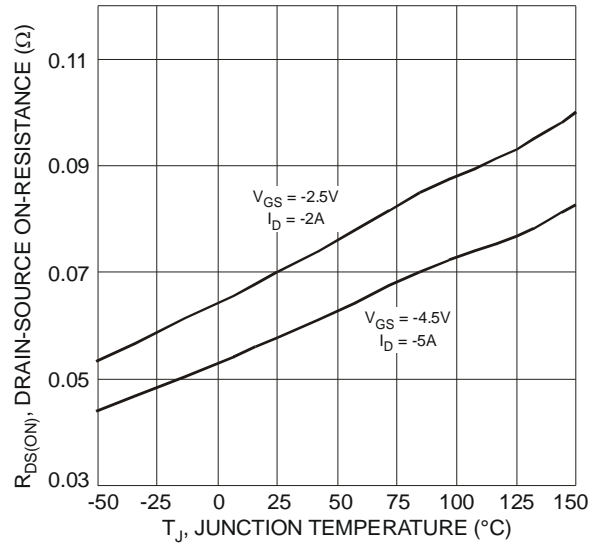


Fig. 6 On-Resistance Variation with Temperature

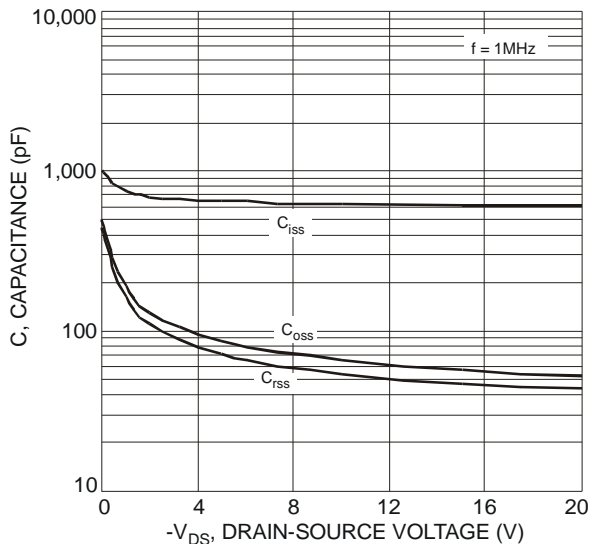


Fig. 7 Typical Capacitance

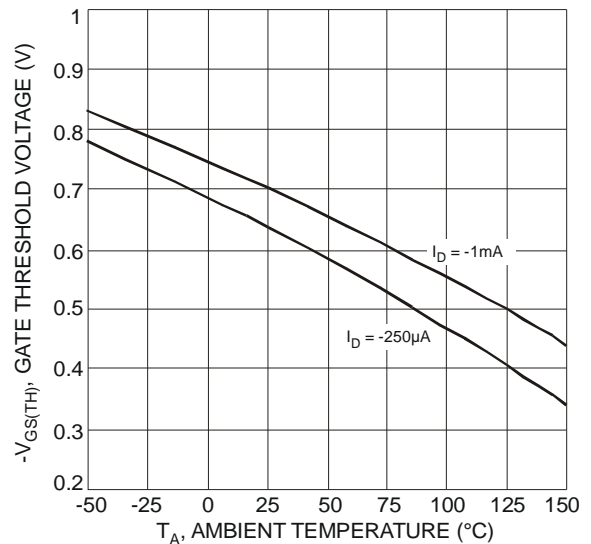


Fig. 8 Gate Threshold Variation vs. Ambient Temperature

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**Q1, P-CHANNEL MOSFET - Continued**

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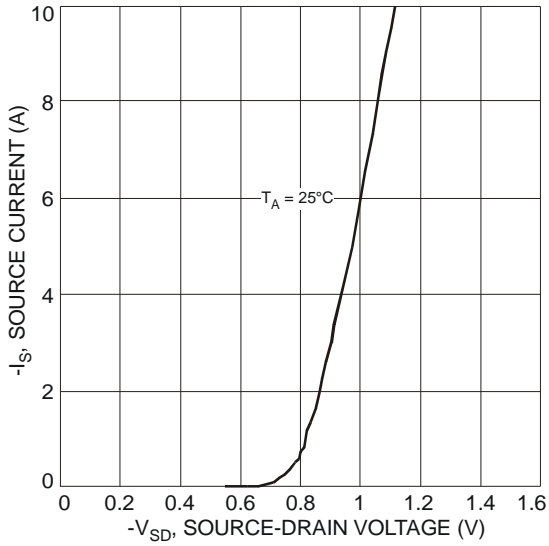


Fig. 9 Diode Forward Voltage vs. Current

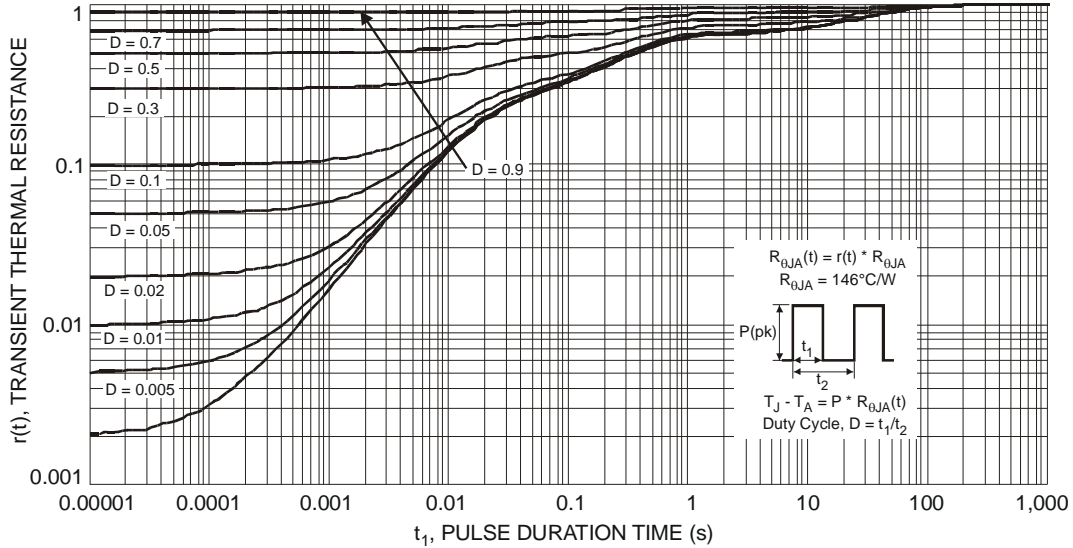


Fig. 10 Transient Thermal Response

**D1, SBR®**

NEW PRODUCT

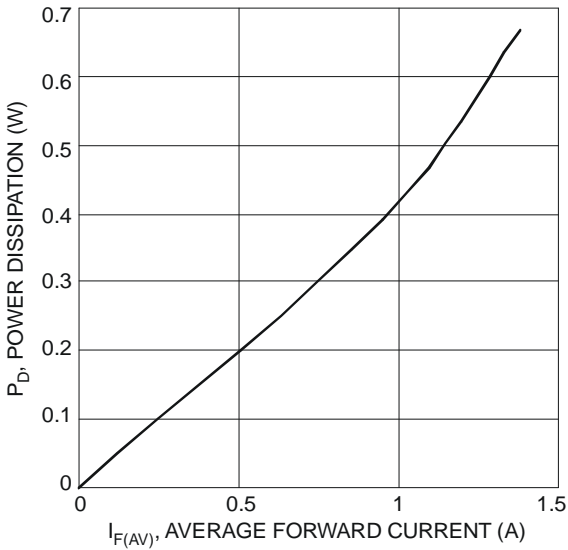


Fig. 11 Forward Power Dissipation

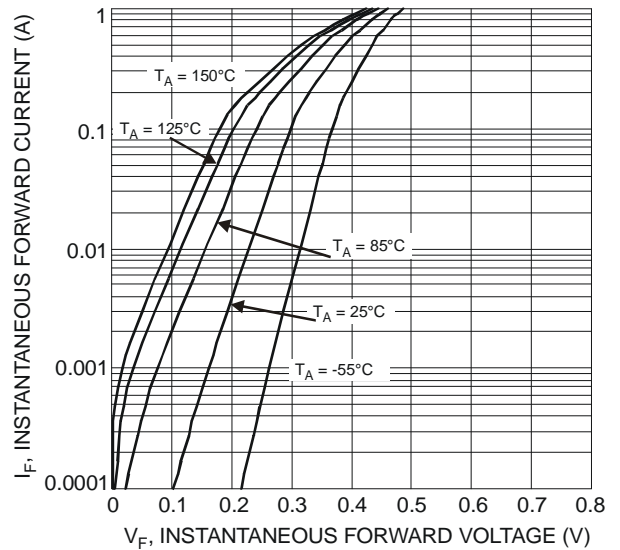


Fig. 12 Typical Forward Characteristics

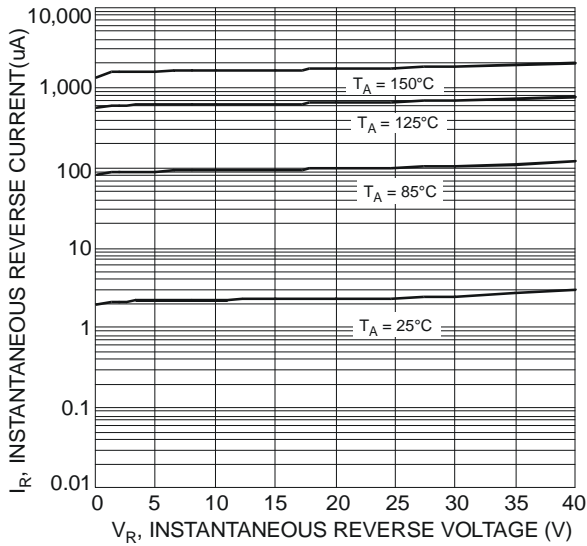


Fig. 13 Typical Reverse Characteristics

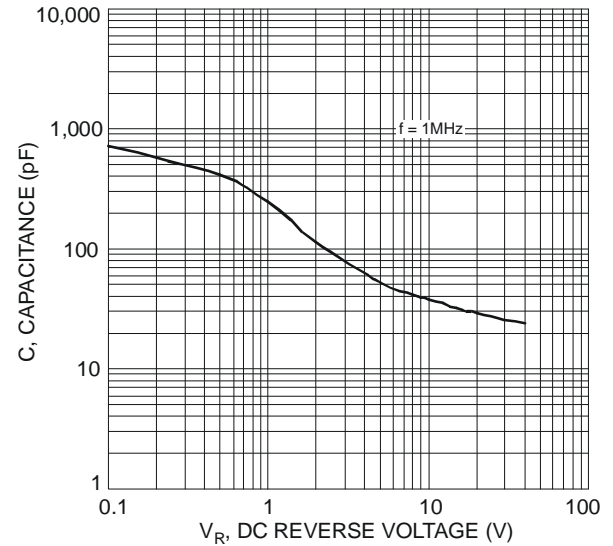


Fig. 14 Total Capacitance vs. Reverse Voltage

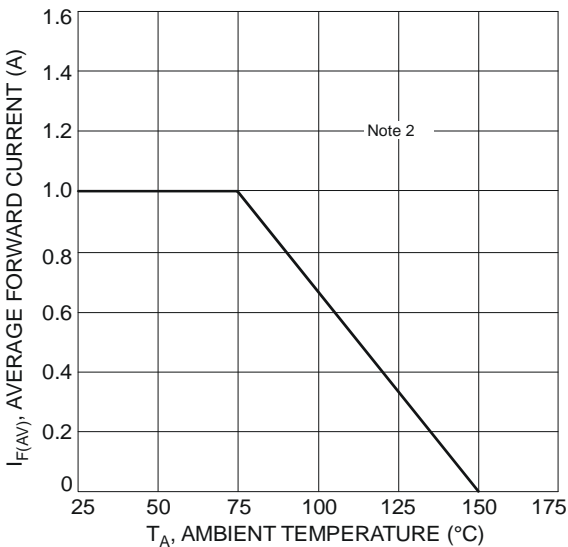


Fig. 15 Forward Current Derating Curve

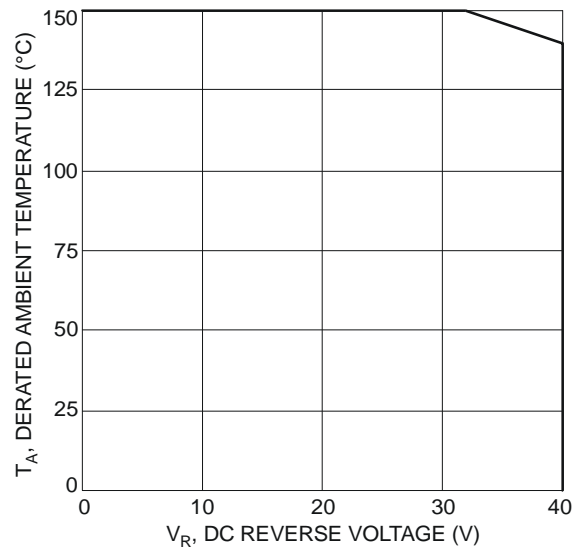


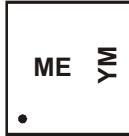
Fig. 16 Operating Temperature Derating

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**Ordering Information** (Note 6)

Part Number	Case	Packaging
DMS2220LFDB-7	DFN2020B-6	3000/Tape & Reel

 Notes: 6. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

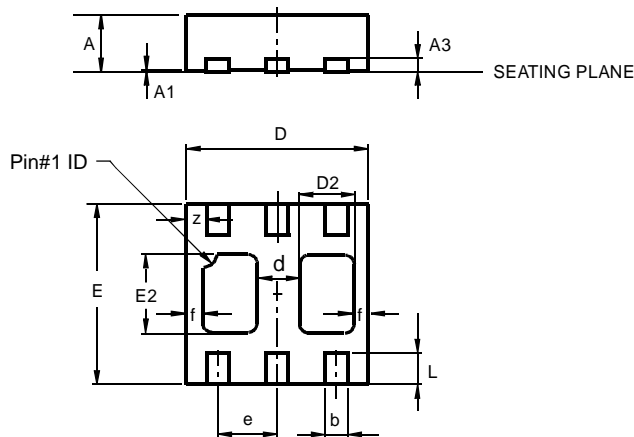
**Marking Information**


ME = Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: V = 2008)  
 M = Month (ex: 9 = September)  
 Dot denotes Pin 1

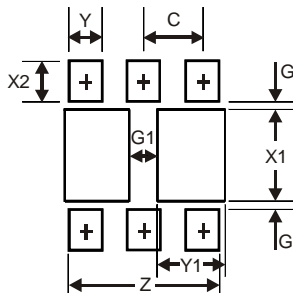
## Date Code Key

Year	2008	2009	2010	2011	2012	2013	2014	2015
Code	V	W	X	Y	Z	A	B	C

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**


DFN2020B-6			
Dim	Min	Max	Typ
A	0.47	0.53	0.50
A1	0	0.05	0.02
A3	—	—	0.13
b	0.20	0.30	0.25
D	1.95	2.075	2.00
d	—	—	0.45
D2	0.50	0.70	0.60
e	—	—	0.65
E	1.95	2.075	2.00
E2	0.90	1.10	1.00
f	—	—	0.15
L	0.25	0.35	0.30
z	—	—	0.225
All Dimensions in mm			

**Suggested Pad Layout**


Dimensions	Value (in mm)
Z	1.67
G	0.20
G1	0.40
X1	1.0
X2	0.45
Y	0.37
Y1	0.70
C	0.65

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