

**N-CHANNEL ENHANCEMENT MODE MOSFET**

**Product Summary**

$V_{(BR)DSS}$	$R_{DS(ON)}$	Package	$I_D$ $T_C = +25^\circ C$
650V	1.3Ω @ $V_{GS} = 10V$	TO-220AB	9.0 A

**Description**

This new generation complementary dual MOSFET features low on-resistance and fast switching, making it ideal for high-efficiency power management applications.

**Applications**

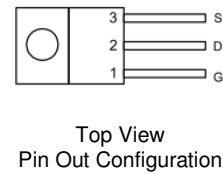
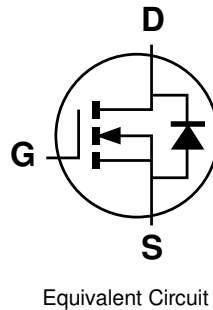
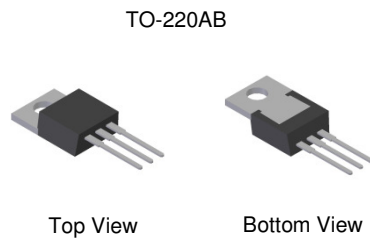
- Motor Control
- Backlighting
- DC-DC Converters
- Power Management Functions

**Features**

- Low Input Capacitance
- High BVDSS rating for Power Application
- Low Input/Output Leakage
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

**Mechanical Data**

- Case: TO-220AB
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Terminals: Matte Tin Finish Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (E3)
- Terminal Connections: See Diagram Below
- Weight: TO-220AB – 1.85 grams (Approximate)



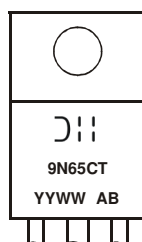
**Ordering Information** (Note 4)

Part Number	Case	Packaging
DMG9N65CT	TO-220AB	50 pieces/tube

- 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](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**

TO-220AB



9N65CT = Product Type Marking Code  
 AB = Foundry and Assembly Code  
 YYWW = Date Code Marking  
 YY = Last two digits of year (ex: 11 = 2011)  
 WW = Week (01 - 53)

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

Characteristic	Symbol	Value	Unit	
Drain-Source Voltage	V <sub>DSS</sub>	650	V	
Gate-Source Voltage	V <sub>GSS</sub>	±30	V	
Continuous Drain Current (Note 5) V <sub>GS</sub> = 10V	Steady State	T <sub>C</sub> = +25°C	9.0	A
		T <sub>C</sub> = +70°C	7.0	
Pulsed Drain Current (Note 6) 10us pulse, pulse duty cycle ≤ 1%	I <sub>DM</sub>	30	A	
Avalanche Current (Note 7) V <sub>DD</sub> = 100V, V <sub>GS</sub> = 10V, L = 60mH	I <sub>AR</sub>	2.7	A	
Repetitive Avalanche Energy (Note 7) V <sub>DD</sub> = 100V, V <sub>GS</sub> = 10V, L = 60mH	E <sub>AR</sub>	260	mJ	

**Thermal Characteristics**

Characteristic	Symbol	Max	Unit
Power Dissipation (Note 5) T <sub>C</sub> = +25°C T <sub>C</sub> = +70°C	P <sub>D</sub>	165	W
		100	
Thermal Resistance, Junction to Case (Note 5)	R <sub>θJC</sub>	0.7	°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 8)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	650	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA
Zero Gate Voltage Drain Current T <sub>J</sub> = +25°C	I <sub>DSS</sub>	—	—	1.0	μA	V <sub>DS</sub> = 650V, 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 8)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	3	—	5	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	0.7	1.3	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 4.5A
Forward Transfer Admittance	Y <sub>fs</sub>	—	8.5	—	S	V <sub>DS</sub> = 40V, I <sub>D</sub> = 4.5A
Diode Forward Voltage	V <sub>SD</sub>	—	0.7	1.0	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 1A
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	C <sub>ISS</sub>	—	2,310	—	pF	V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>OSS</sub>	—	122	—		
Reverse Transfer Capacitance	C <sub>RSS</sub>	—	2.2	—		
Gate Resistance	R <sub>g</sub>	—	2.2	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge V <sub>GS</sub> = 10V	Q <sub>g</sub>	—	39	—	nC	V <sub>GS</sub> = 10V, V <sub>DS</sub> = 520V, I <sub>D</sub> = 8A
Gate-Source Charge	Q <sub>gs</sub>	—	8.5	—		
Gate-Drain Charge	Q <sub>gd</sub>	—	11.9	—		
Turn-On Delay Time	t <sub>D(on)</sub>	—	39	—	ns	V <sub>GS</sub> = 10V, V <sub>DS</sub> = 325V, R <sub>G</sub> = 25Ω, I <sub>D</sub> = 8A
Turn-On Rise Time	t <sub>r</sub>	—	29	—		
Turn-Off Delay Time	t <sub>D(off)</sub>	—	122	—		
Turn-Off Fall Time	t <sub>f</sub>	—	28	—		
Body Diode Reverse Recovery Time	t <sub>rr</sub>	—	570	—		
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>	—	4.17	—	μC	dI/dt = 100A/μs, V <sub>DS</sub> = 100V, I <sub>F</sub> = 8A

- Notes:
- Device mounted on an infinite heatsink.
  - Repetitive rating, pulse width limited by junction temperature.
  - I<sub>AR</sub> and E<sub>AR</sub> rating are based on low frequency and duty cycles to keep T<sub>J</sub> = +25°C.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to production testing.

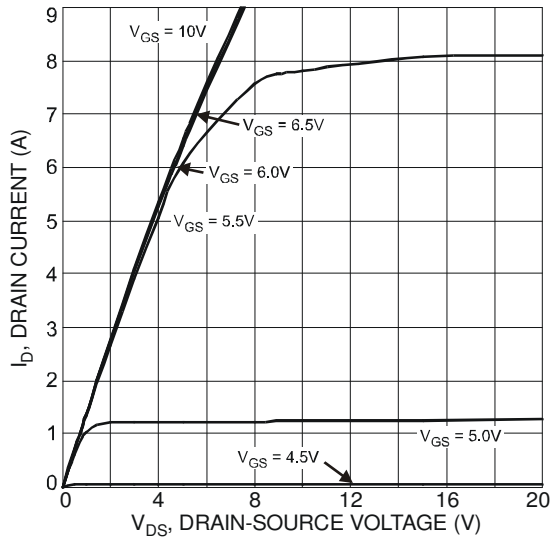


Fig. 1 Typical Output Characteristic

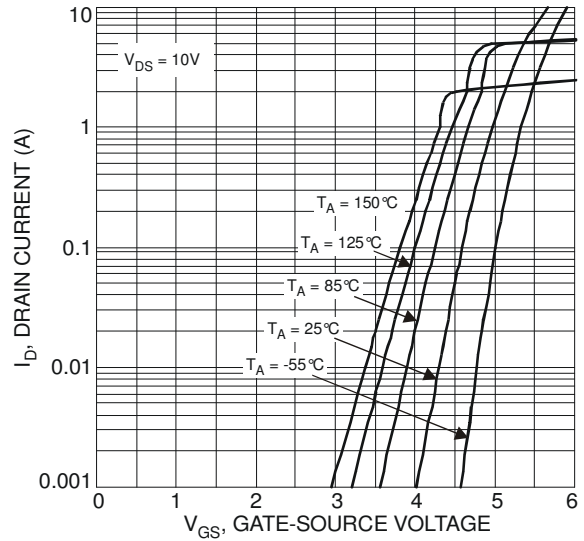


Fig. 2 Typical Transfer Characteristics

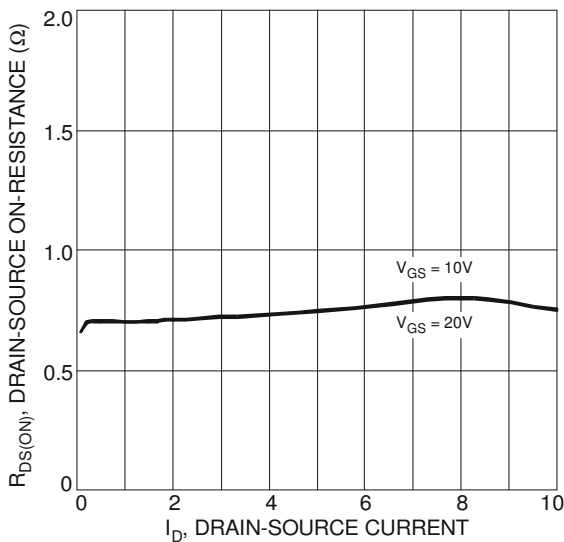


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

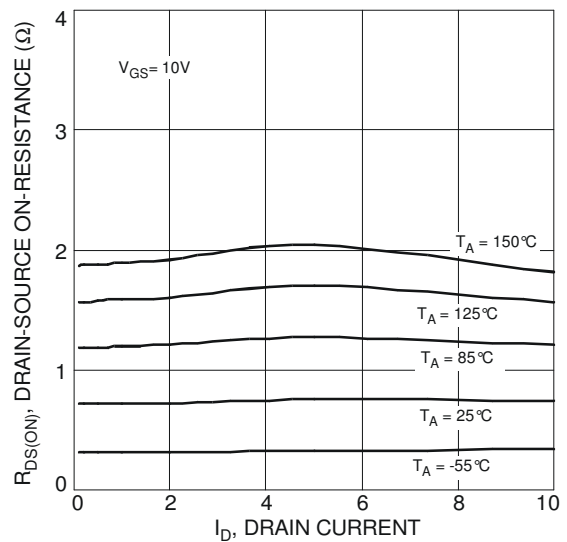


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

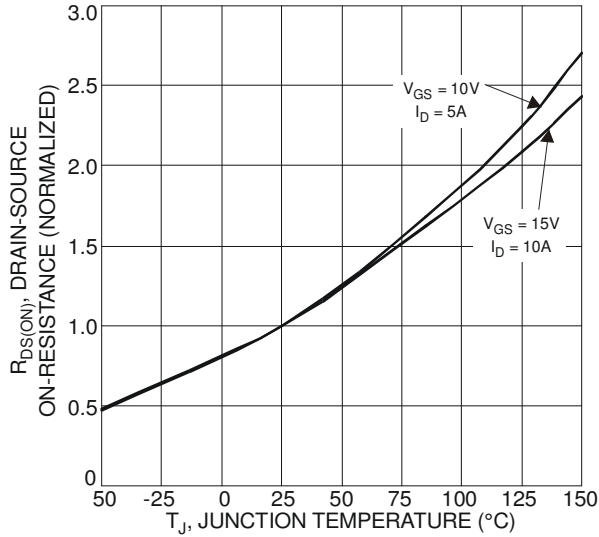


Fig. 5 On-Resistance Variation with Temperature

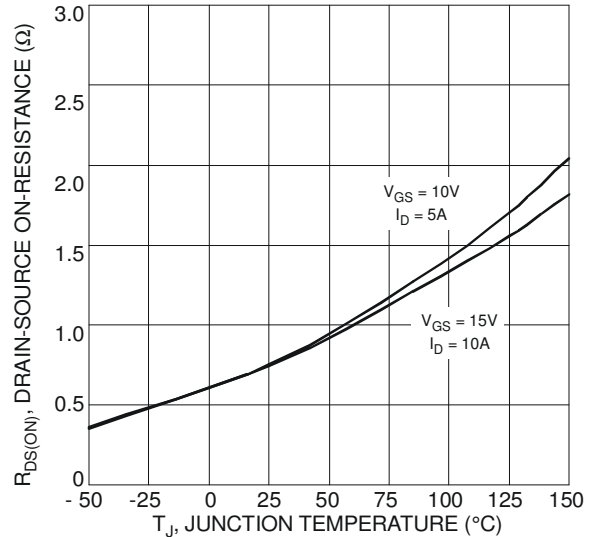


Fig. 6 On-Resistance Variation with Temperature

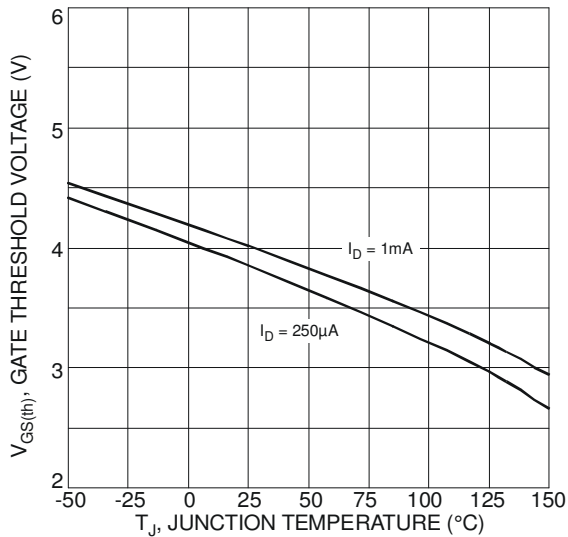


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

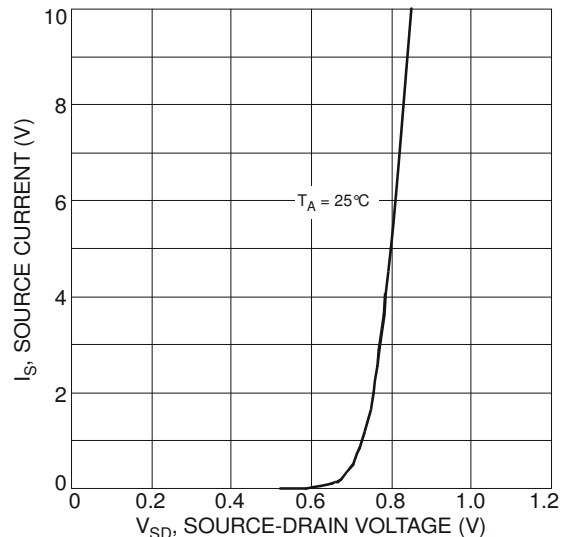


Fig. 8 Diode Forward Voltage vs. Current

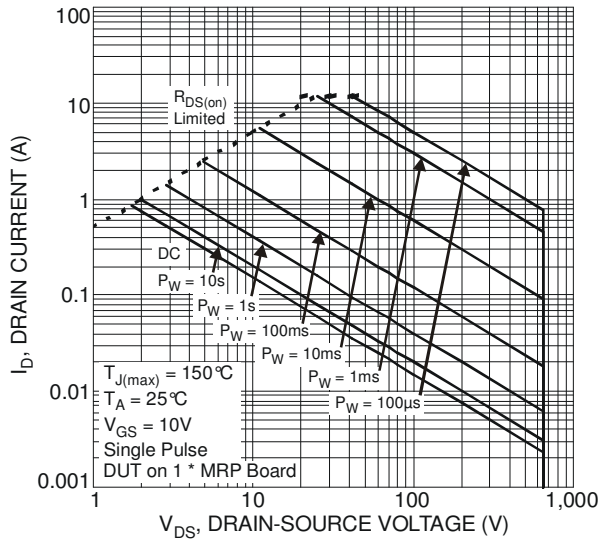


Fig. 9 SOA, Safe Operation Area

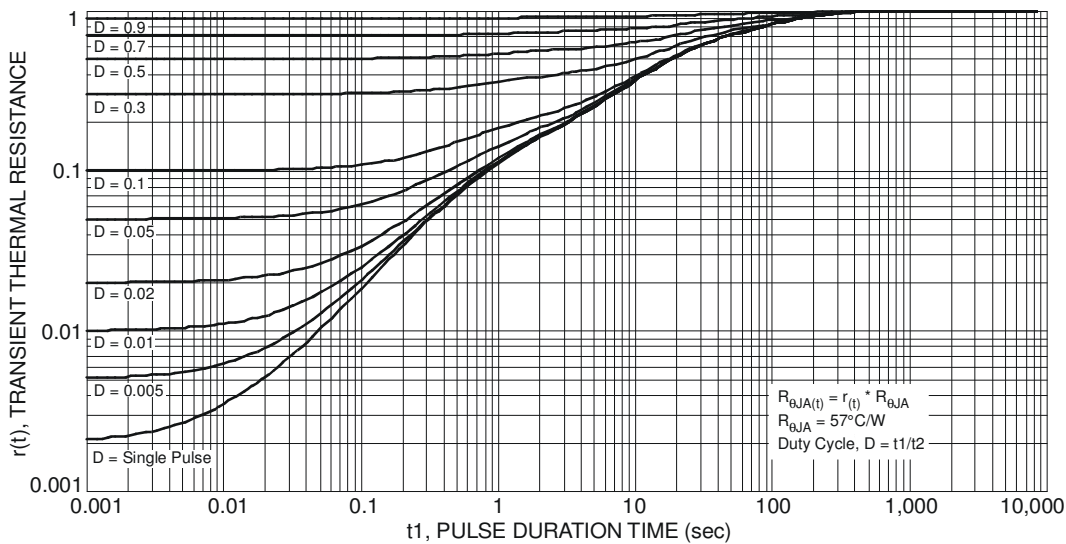
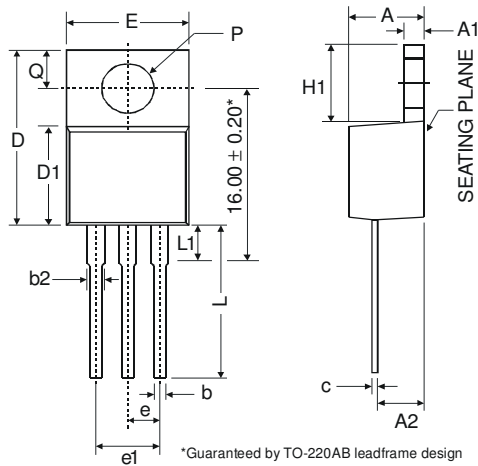


Fig. 10 Transient Thermal Resistance

## Package Outline Dimensions

Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



TO220AB			
Dim	Min	Typ	Max
A	3.56	-	4.82
A1	0.51	-	1.39
A2	2.04	-	2.92
b	0.39	0.81	1.01
b2	1.15	1.24	1.77
c	0.356	-	0.61
D	14.22	-	16.51
D1	8.39	-	9.01
e	2.54		
e1	5.08		
E	9.66	-	10.66
H1	5.85	-	6.85
L	12.70	-	14.73
L1	-	-	6.35
P	3.54	-	4.08
Q	2.54	-	3.42
<b>All Dimensions in mm</b>			

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