N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	Package	I_D T_C = +25°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

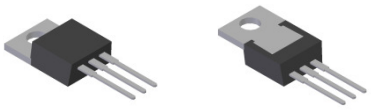
Features

- 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

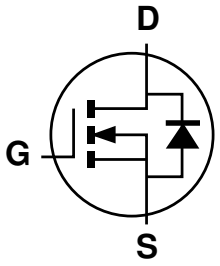
- Case: TO-220AB
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Terminals: Matte Tin Finish Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Terminal Connections: See Diagram Below
- Weight: TO-220AB – 1.85 grams (Approximate)

TO-220AB

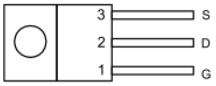


Top View

Bottom View



Equivalent Circuit



Top View
Pin Out Configuration

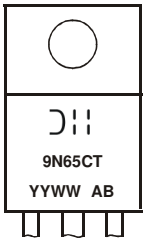
Ordering Information (Note 4)

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

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

Thermal Characteristics

Characteristic	Symbol	Max	Unit
Power Dissipation (Note 5) T_C = +25°C T_C = +70°C	P_D	165 100	W
Thermal Resistance, Junction to Case (Note 5)	$R_{\theta JC}$	0.7	°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 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	650	—	—	V	V_{GS} = 0V, I_D = 250µA
Zero Gate Voltage Drain Current T_J = +25°C	I_{DSS}	—	—	1.0	µA	V_{DS} = 650V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±30V, V_{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(th)}$	3	—	5	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	—	0.7	1.3	Ω	V_{GS} = 10V, I_D = 4.5A
Forward Transfer Admittance	$\|Y_{fs}\|$	—	8.5	—	S	V_{DS} = 40V, I_D = 4.5A
Diode Forward Voltage	V_{SD}	—	0.7	1.0	V	V_{GS} = 0V, I_S = 1A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	2,310	—	pF	V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	122	—		
Reverse Transfer Capacitance	C_{rss}	—	2.2	—		
Gate Resistance	R_g	—	2.2	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge V_{GS} = 10V	Q_g	—	39	—	nC	V_{GS} = 10V, V_{DS} = 520V, I_D = 8A
Gate-Source Charge	Q_{gs}	—	8.5	—		
Gate-Drain Charge	Q_{gd}	—	11.9	—		
Turn-On Delay Time	$t_{D(on)}$	—	39	—	ns	V_{GS} = 10V, V_{DS} = 325V, R_G = 25Ω, I_D = 8A
Turn-On Rise Time	t_r	—	29	—	ns	
Turn-Off Delay Time	$t_{D(off)}$	—	122	—	ns	
Turn-Off Fall Time	t_f	—	28	—	ns	
Body Diode Reverse Recovery Time	t_{rr}	—	570	—	ns	dI/dt = 100A/µs, V_{DS} = 100V, I_F = 8A
Body Diode Reverse Recovery Charge	Q_{rr}	—	4.17	—	µC	

Notes:
5. Device mounted on an infinite heatsink.
6. Repetitive rating, pulse width limited by junction temperature.
7. I_{AR} and E_{AR} rating are based on low frequency and duty cycles to keep T_J = +25°C.
8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to production testing.

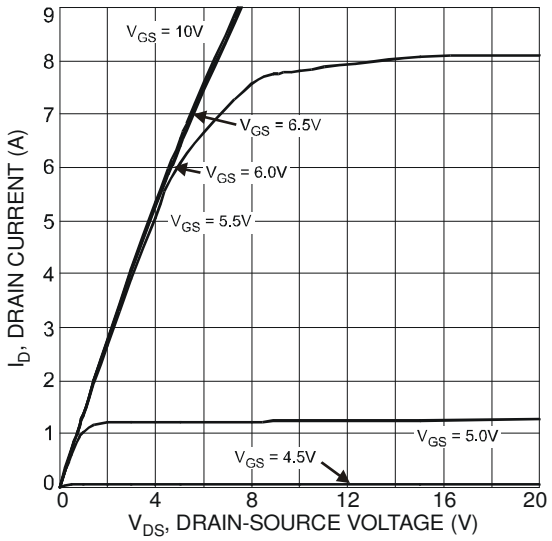


Fig. 1 Typical Output Characteristic

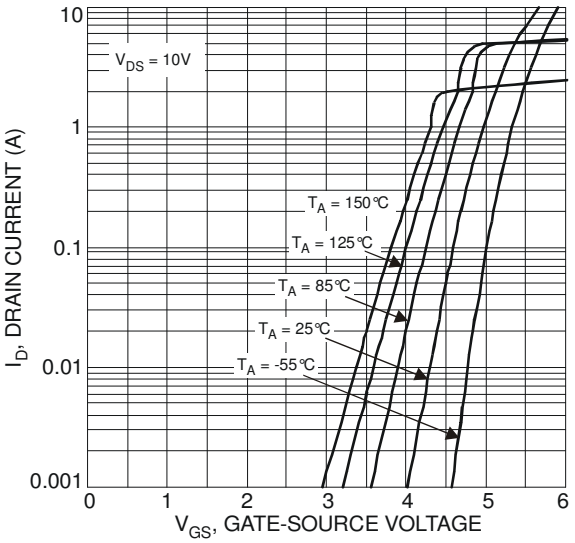


Fig. 2 Typical Transfer Characteristics

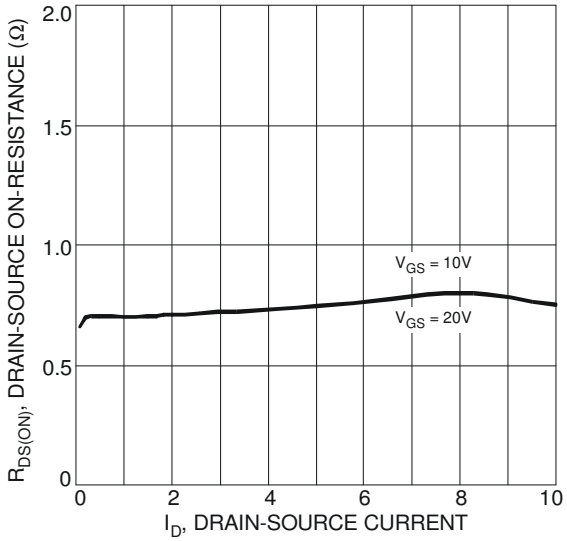


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

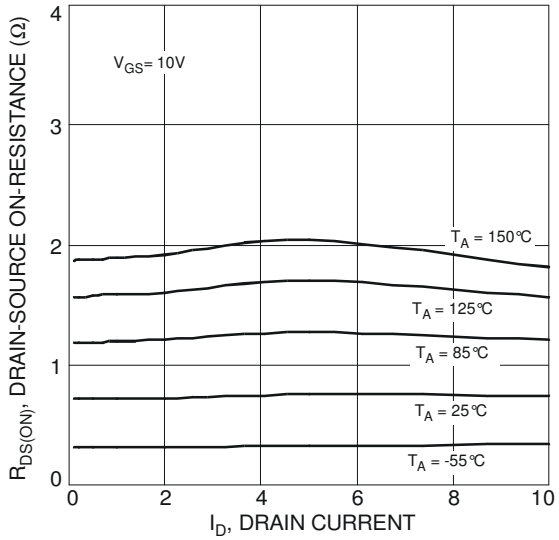


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

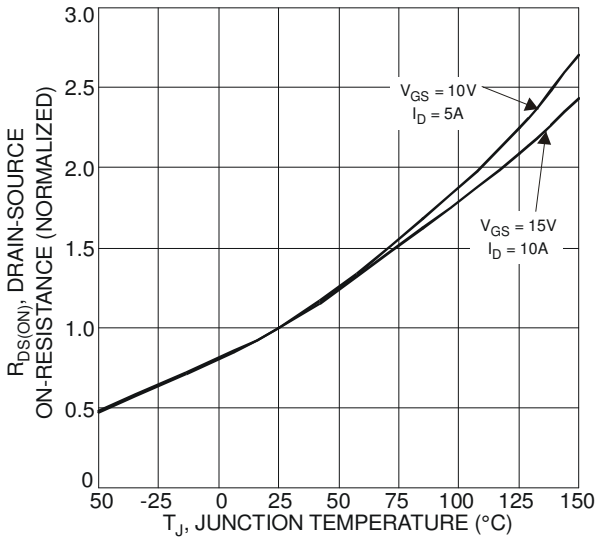


Fig. 5 On-Resistance Variation with Temperature

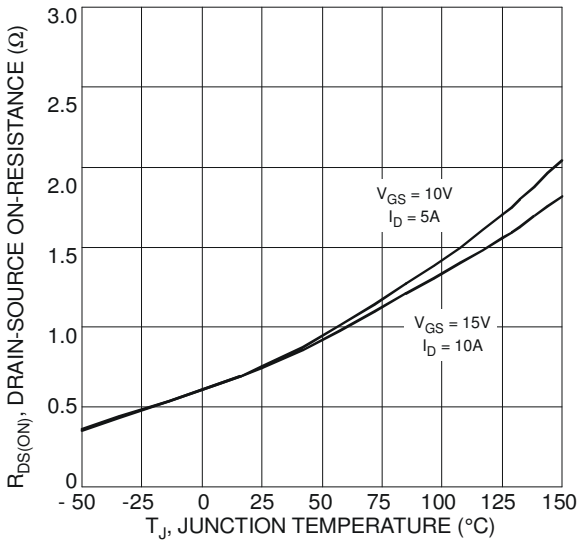


Fig. 6 On-Resistance Variation with Temperature

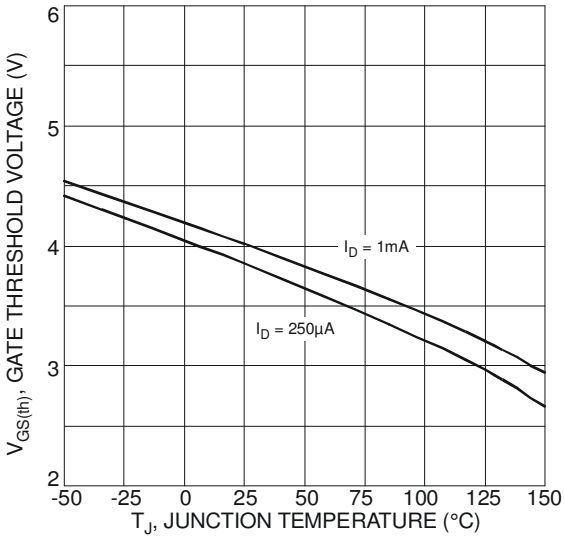


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

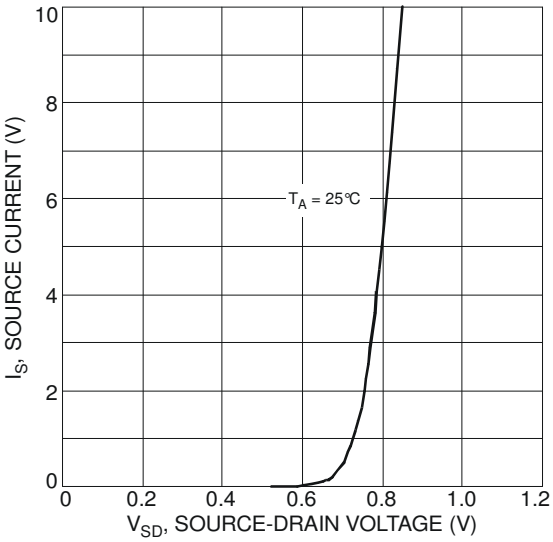


Fig. 8 Diode Forward Voltage vs. Current

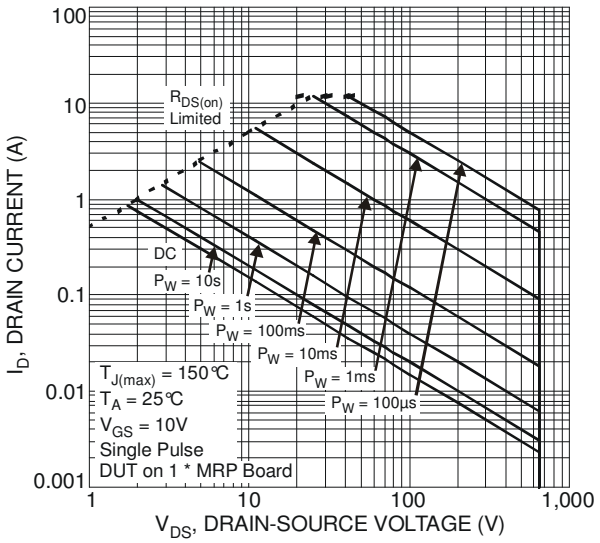


Fig. 9 SOA, Safe Operation Area

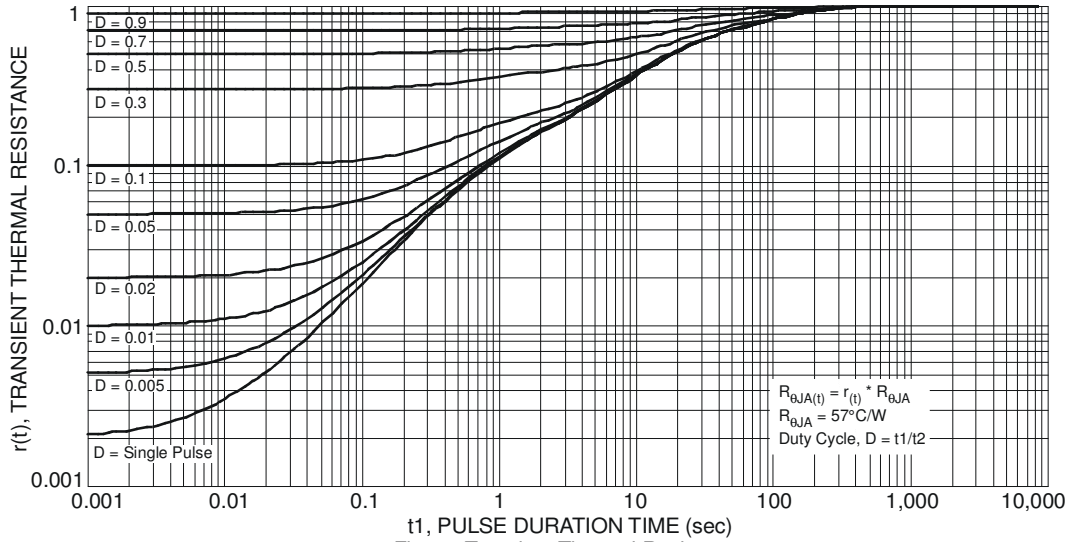
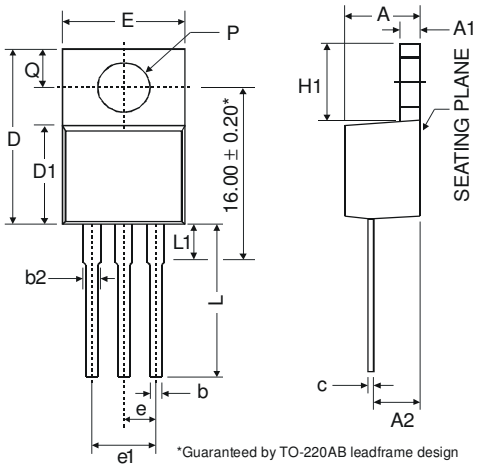


Fig. 10 Transient Thermal Resistance

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
All Dimensions in mm			