

N-CHANNEL ENHANCEMENT MODE MOSFET
Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	Package	I_D $T_C = 25^\circ C$
650V	$3.0\Omega @ V_{GS} = 10V$	TO220-3	4.0 A

Description

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

Applications

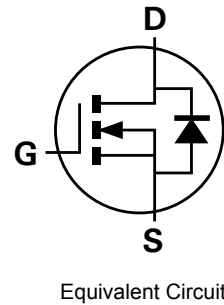
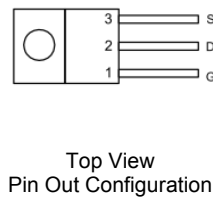
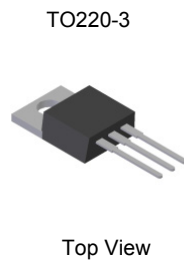
- Motor control
- Backlighting
- DC-DC Converters
- Power management functions

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**

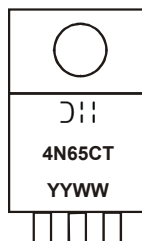
Mechanical Data

- Case: TO220-3
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish-Matte Tin annealed over Copper Leadframe Solderable per MIL-STD-202, Method 208 (e3)
- Terminal Connections: See Diagram Below
- Weight: 0.008 grams (approximate)


Ordering Information (Note 4)

Part Number	Case	Packaging
DMG4N65CT	TO220-3	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> 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>.

Marking Information


4N65CT = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last two digits of year (ex: 12 = 2012)
 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	I _D	4.0	A
		T _C = +70°C		3.0	
Pulsed Drain Current (Note 7)			I _{DM}	6	A
Avalanche Current (Note 8) V _{DD} = 100V, V _{GS} = 10V, L = 60mH			I _{AS}	3.9	A
Repetitive avalanche energy (Note 7)			E _{AS}	456	mJ

Thermal Characteristics

Characteristic	Symbol	Max	Unit
Power Dissipation (Note 5)	P _D	2.19	W
Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 5)	R _{θJA}	58.5	°C/W
Power Dissipation (Note 6)	P _D	9.14	W
Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 6)	R _{θJA}	2.85	°C/W
Thermal Resistance, Junction to Case @T _A = +25°C (Note 6)	R _{θJC}	0.86	°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 9)						
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 9)						
Gate Threshold Voltage	V _{GS(th)}	3	-	5	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(on)}	-	2.1	3.0	Ω	V _{GS} = 10V, I _D = 2A
Forward Transfer Admittance	Y _{fs}	-	3.7	-	S	V _{DS} = 40V, I _D = 2A
Diode Forward Voltage	V _{SD}	-	0.7	1.0	V	V _{GS} = 0V, I _S = 1A
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C _{iSS}	-	900	-	pF	V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	-	50	-		
Reverse Transfer Capacitance	C _{rss}	-	1.1	-		
Gate Resistance	R _g	-	2.4	-	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge V _{GS} = 10V	Q _g	-	13.5	-	nC	V _{GS} = 10V, V _{DS} = 520V, I _D = 4A
Gate-Source Charge	Q _{gs}	-	2.7	-		
Gate-Drain Charge	Q _{gd}	-	3.8	-		
Turn-On Delay Time	t _{D(on)}	-	15.1	-	ns	V _{GS} = 10V, V _{DS} = 325V, R _G = 25Ω, I _D = 4A
Turn-On Rise Time	t _r	-	13.8	-	ns	
Turn-Off Delay Time	t _{D(off)}	-	40	-	ns	
Turn-Off Fall Time	t _f	-	16	-	ns	
Body Diode Reverse Recovery Time	t _{rr}	-	515	-	ns	dI/dt = 100A/μs, V _{DS} = 100V,
Body Diode Reverse Recovery Charge	Q _{rr}	-	2330	-	nC	I _F = 4A

- Notes:
- Device mounted on FR-4 PCB with minimum recommended pad layout, single sided.
 - Device mounted on an infinite heatsink
 - Repetitive rating, pulse width limited by junction temperature.
 - I_{AS} and E_{AS} rating are based on low frequency and duty cycles to keep T_J = +25°C.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to production testing.

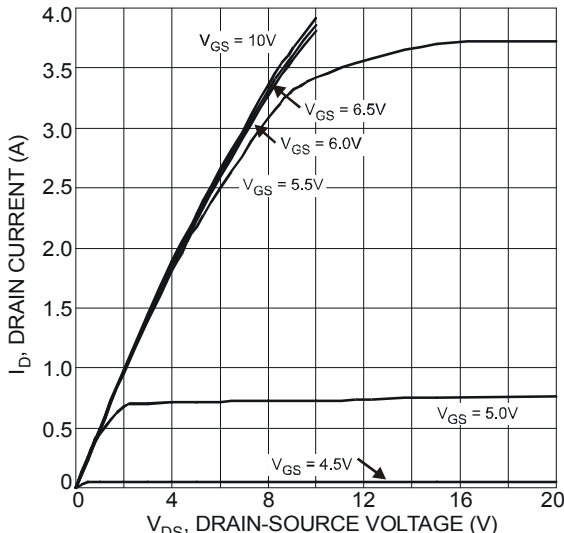


Fig. 1 Typical Output Characteristic

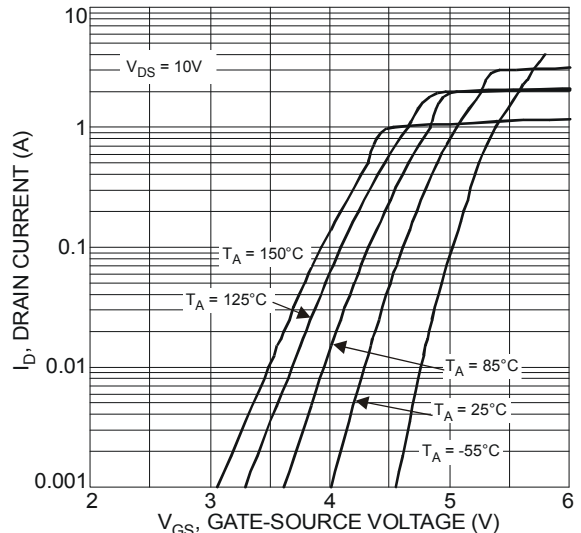


Fig. 2 Typical Transfer Characteristics

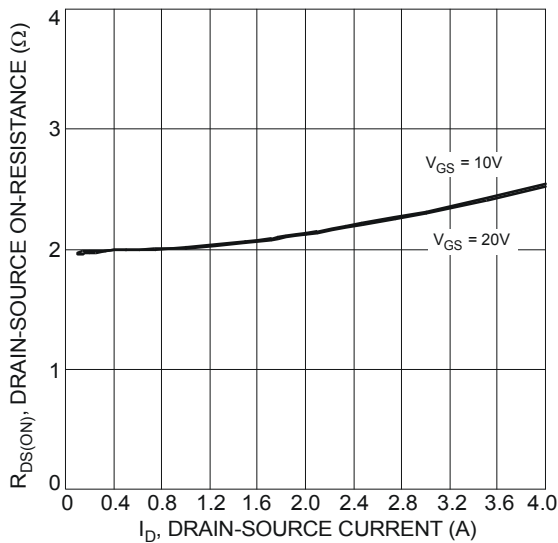


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

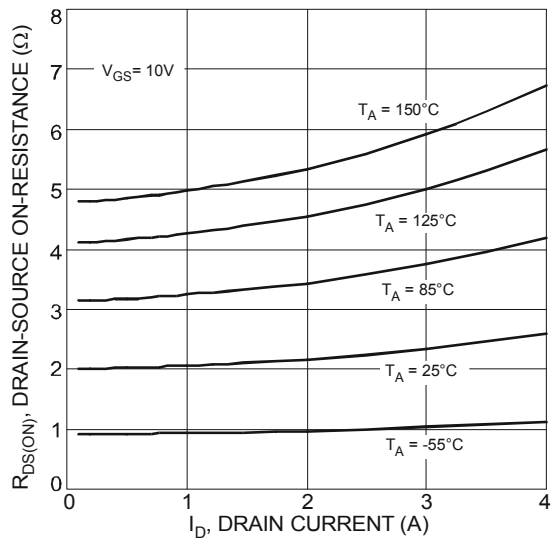


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

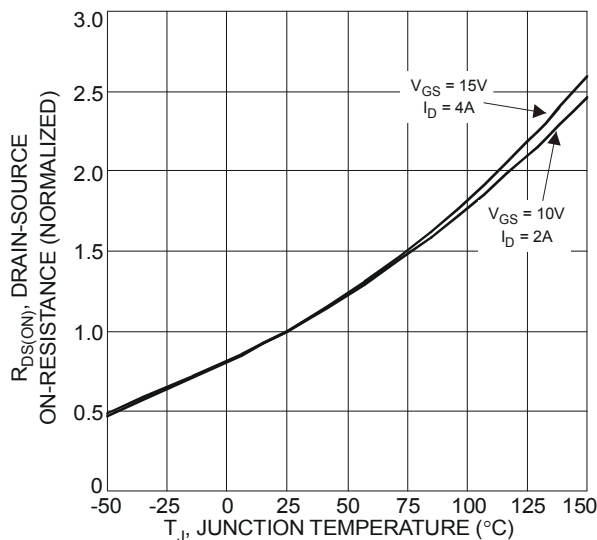


Fig. 5 On-Resistance Variation with Temperature

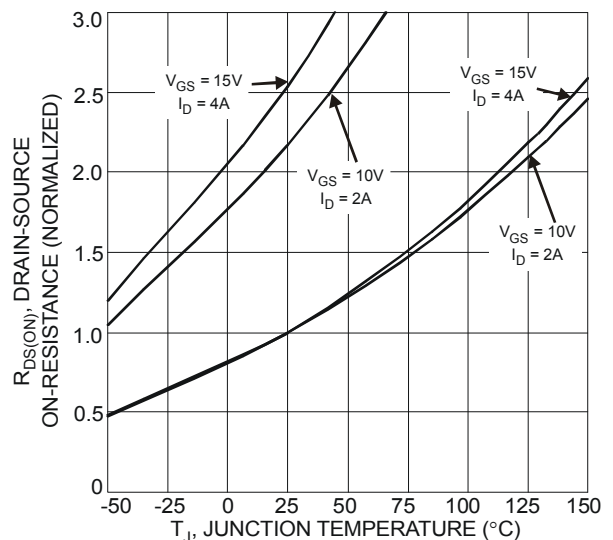


Fig. 6 On-Resistance Variation with Temperature

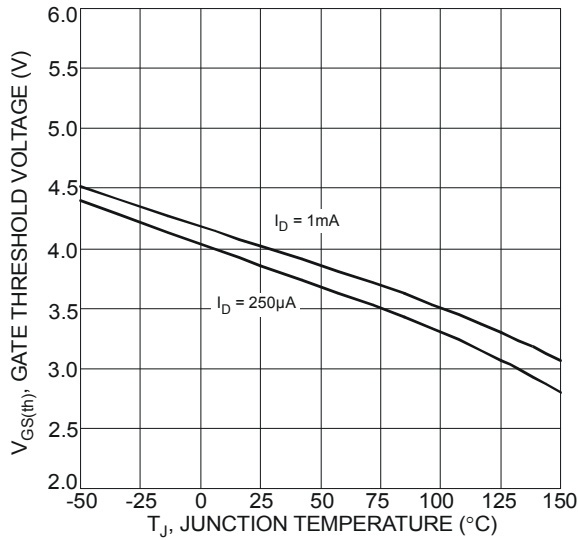


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

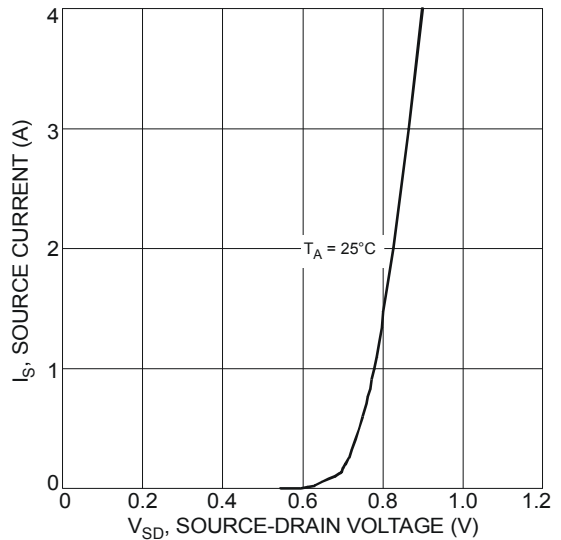


Fig.8 Diode Forward Voltage vs. Current

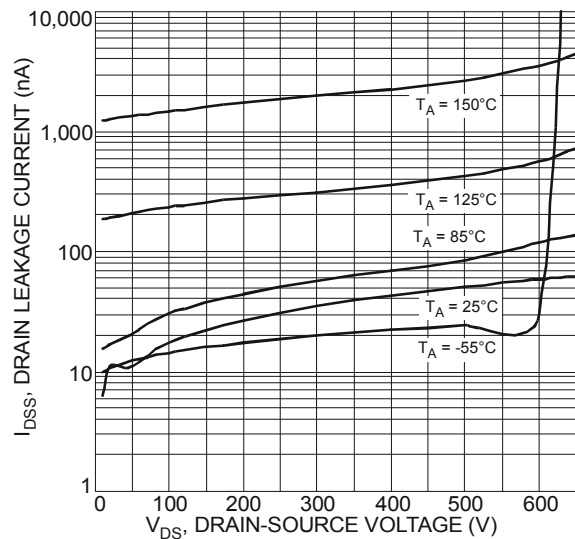


Fig. 9 Typical Drain-Source Leakage Current vs. Voltage

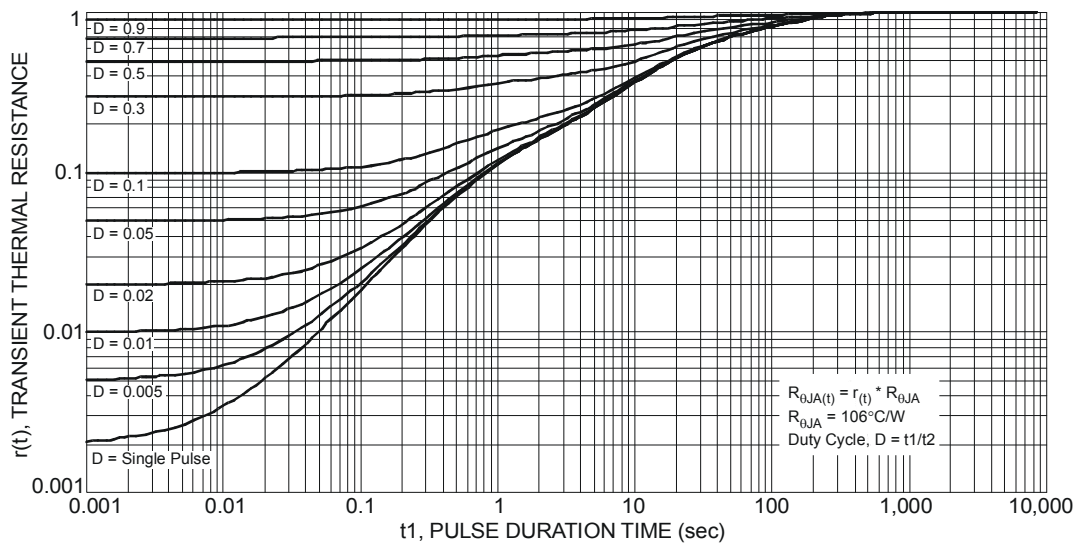
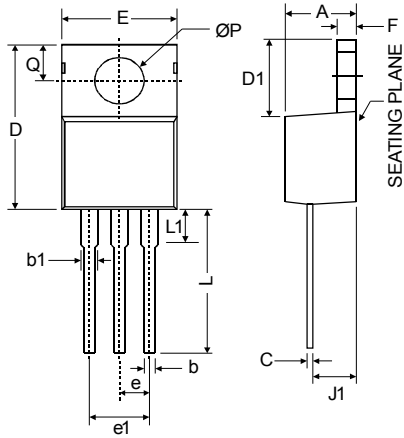


Fig. 10 Transient Thermal Resistance

Package Outline Dimensions

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



TO220-3		
Dim	Min	Max
A	3.55	4.85
b	0.51	1.14
b1	1.14	1.78
C	0.31	1.14
D	14.20	16.50
D1	5.84	6.86
E	9.70	10.70
e	2.79	2.99
e1	4.83	5.33
F	0.51	1.40
J1	2.03	2.92
L	12.72	14.72
L1	3.66	6.35
P	3.53	4.09
Q	2.54	3.43
All Dimensions in mm		

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