**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 | ITO-220AB | 9.0A |

## 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

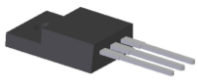
## Features

- 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**

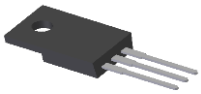
## Mechanical Data

- Case: ITO-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: ITO-220AB – 1.85 grams (Approximate)

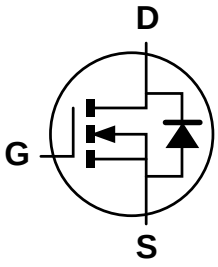
ITO-220AB



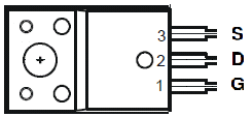
Top View



Bottom View




Equivalent Circuit




Top View
Pin Out Configuration

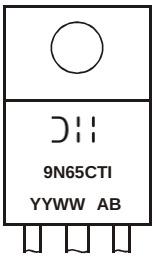
## Ordering Information (Note 4)

| Part Number | Case | Packaging |
|---|---|---|
| DMG9N65CTI | ITO-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

ITO-220AB




9N65CTI = Product Type Marking Code
YYWW = Date Code Marking
YY = Last Two Digits of Year (ex: 13 = 2013)
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 (Notes 5 & 6) $V_{GS}$ = 10V | Steady State | $T_C$ = +25°C<br>$T_C$ = +70°C | $I_D$ | 9.0<br>7.0 | A |
| Pulsed Drain Current (Note 7) 10µs pulse, pulse duty cycle<=1% | | | $I_{DM}$ | 30 | A |
| Avalanche Current (Note 8) $V_{DD}$ = 100V, $V_{GS}$ = 10V, L = 60mH | | | $I_{AR}$ | 2.7 | A |
| Repetitive avalanche energy (Note 8) $V_{DD}$ = 100V, $V_{GS}$ = 10V, L = 60mH | | | $E_{AR}$ | 260 | mJ |

## Thermal Characteristics

| Characteristic | | Symbol | Max | Unit |
|---|---|---|---|---|
| Power Dissipation (Note 5) | $T_C$ = +25°C<br>$T_C$ = +70°C | $P_D$ | 13<br>8 | W |
| Thermal Resistance, Junction to Case (Note 5) | $T_C$ = +25°C | $R_{\theta JC}$ | 8.84 | °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 | $R_{DS\ (ON)}$ | - | 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 10)** | | | | | | |
| Input Capacitance | $C_{iss}$ | - | 2310 | - | 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. Drain current limited by maximum junction temperature.
7. Repetitive rating, pulse width limited by junction temperature.
8. $I_{AR}$ and $E_{AR}$ rating are based on low frequency and duty cycles to keep $T_J$ = +25°C.
9. Short duration pulse test used to minimize self-heating effect.
10. Guaranteed by design. Not subject to production testing.

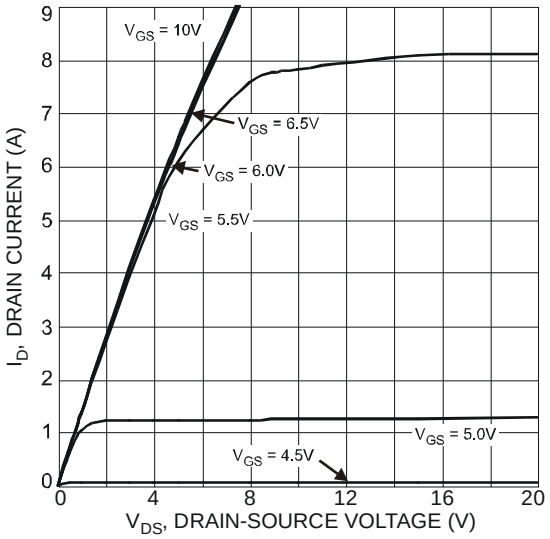



Fig. 1 Typical Output Characteristic

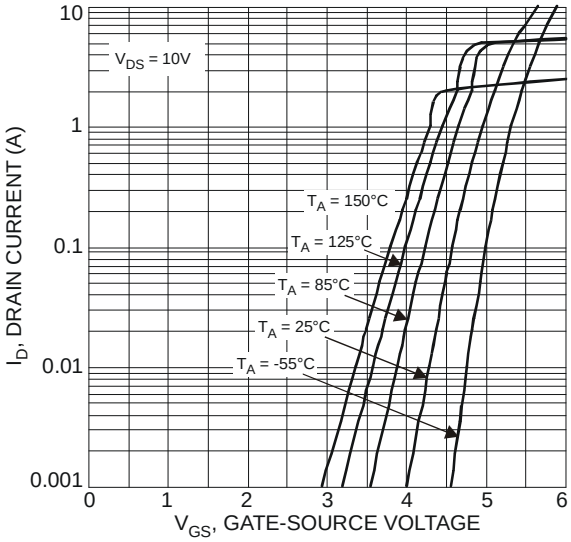



Fig. 2 Typical Transfer Characteristics

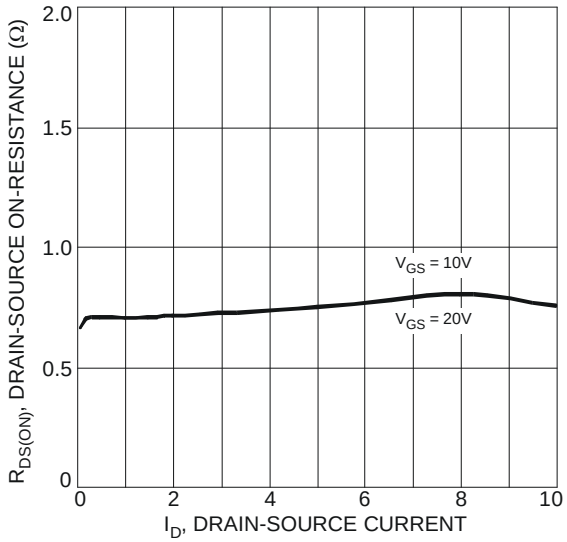



Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

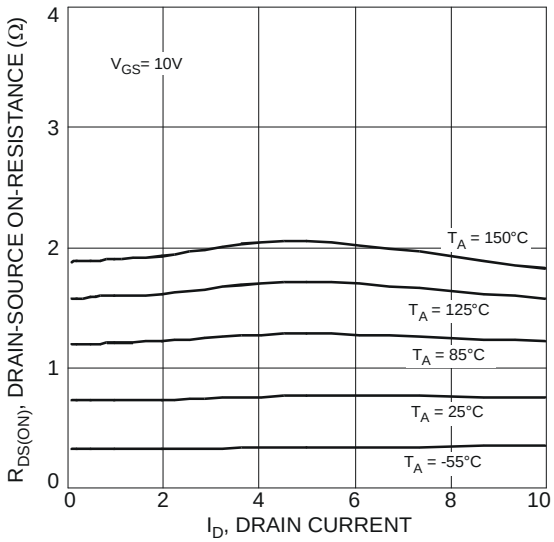



Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

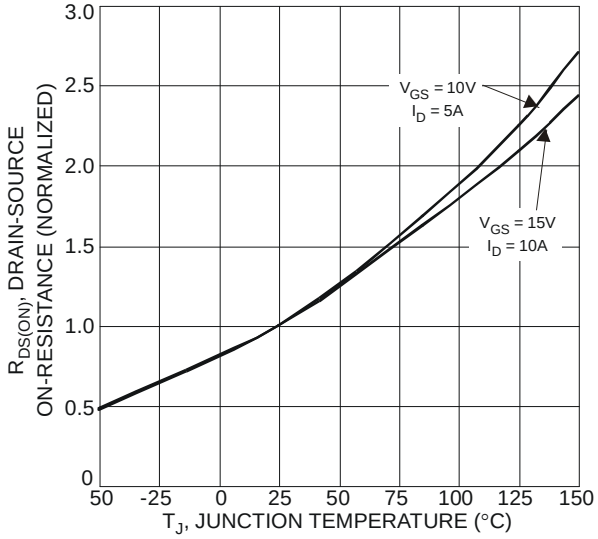



Fig. 5 On-Resistance Variation with Temperature

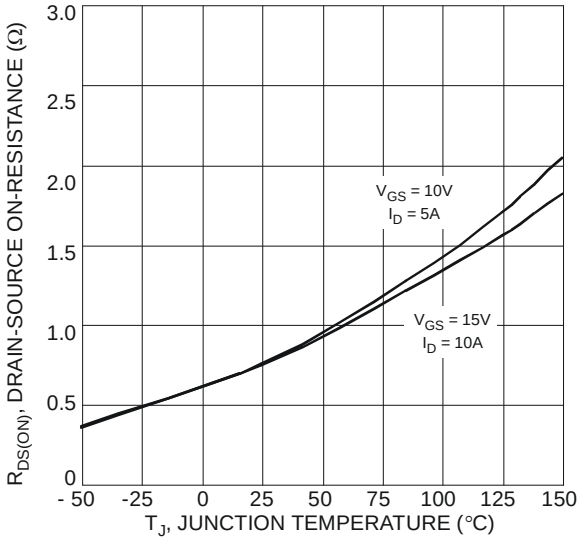



Fig. 6 On-Resistance Variation with Temperature

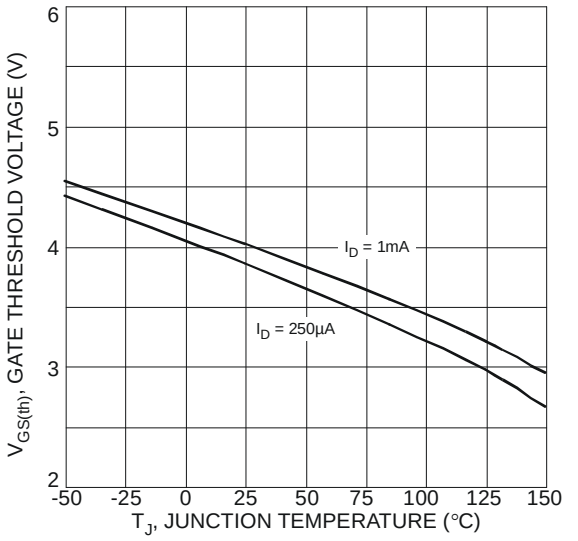



Fig. 7 Gate Threshold Variation vs. Ambient Temperature

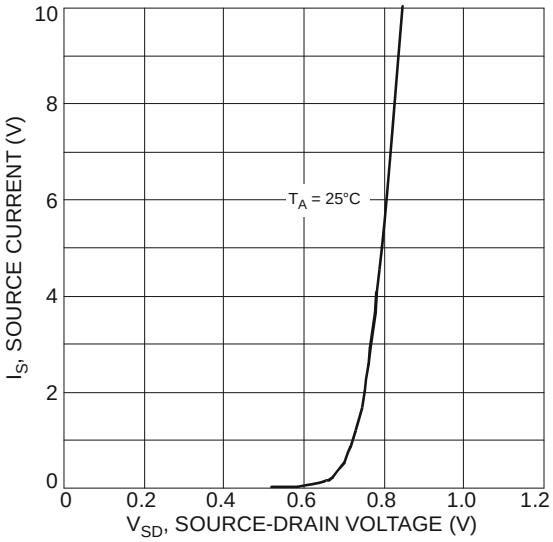
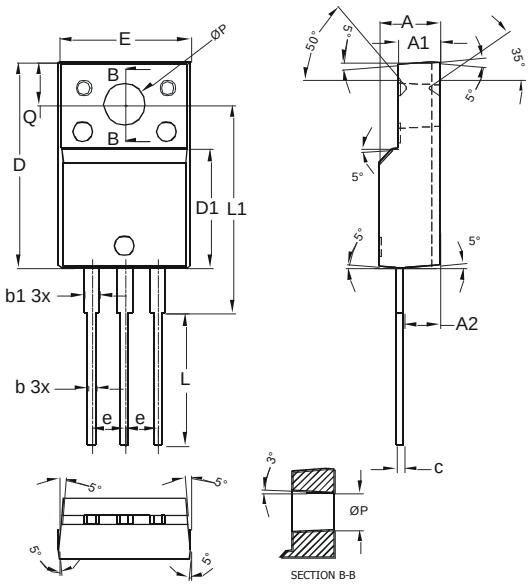



Fig. 8 Diode Forward Voltage vs. Current

## Package Outline Dimensions

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




| ITO-220AB | | | |
|---|---|---|---|
| **Dim** | **Min** | **Typ** | **Max** |
| **A** | 4.50 | 4.70 | 4.90 |
| **A1** | 3.04 | 3.24 | 3.44 |
| **A2** | 2.56 | 2.76 | 2.96 |
| **b** | 0.50 | 0.60 | 0.75 |
| **b1** | 1.10 | 1.20 | 1.35 |
| **c** | 0.50 | 0.60 | 0.70 |
| **D** | 15.67 | 15.87 | 16.07 |
| **D1** | 8.99 | 9.19 | 9.39 |
| **e** | | 2.54 | |
| **E** | 9.91 | 10.11 | 10.31 |
| **L** | 9.45 | 9.75 | 10.05 |
| **L1** | 15.80 | 16.00 | 16.20 |
| **P** | 2.98 | 3.18 | 3.38 |
| **Q** | 3.10 | 3.30 | 3.50 |
| **All Dimensions in mm** | | | |

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