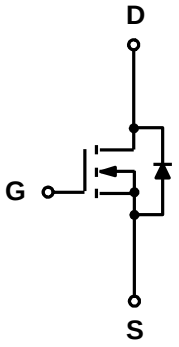
## Feature

- 100V,210A
  $R_{DS(ON)}$ <2.8mΩ @$V_{GS}$=10V (TYP:2.2mΩ)
- Split Gate Trench Technology
- Lead free product is acquired
- Excellent $R_{DS(ON)}$ and Low Gate Charge




## Application

- PWM applications
- Load Switch
- Power management




**Marking and pin assignment**

## Package Marking and Ordering Information

| Device Marking | Device | Device Package | Reel Size | Tape width | Quantity (PCS) |
|---|---|---|---|---|---|
| G028N10 | APG028N10 | TO-220 | - | - | 1000 |

## ABSOLUTE MAXIMUM RATINGS ($T_J$=25℃ unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 100 | V |
| Gate-Source Voltage | $V_{GS}$ | ±20 | V |
| Continuous Drain Current (Tc =25℃) | $I_D$ | 210 | A |
| Continuous Drain Current (Tc =100℃) | $I_D$ | 132 | A |
| Pulsed Drain Current (1) | $I_{DM}$ | 840 | A |
| Single Pulsed Avalanche Energy (2) | $E_{AS}$ | 418 | mJ |
| Power Dissipation | $P_D$ | 272 | W |
| Thermal Resistance from Junction to Case | $R_{\theta JC}$ | 0.46 | ℃/W |
| Thermal Resistance from Junction to Ambient | $R_{\theta JA}$ | 62.5 | ℃/W |
| Junction Temperature | $T_J$ | 150 | ℃ |
| Storage Temperature | $T_{STG}$ | -55~ +150 | ℃ |

## MOSFET ELECTRICAL CHARACTERISTICS($T_J$=25℃ unless otherwise noted)

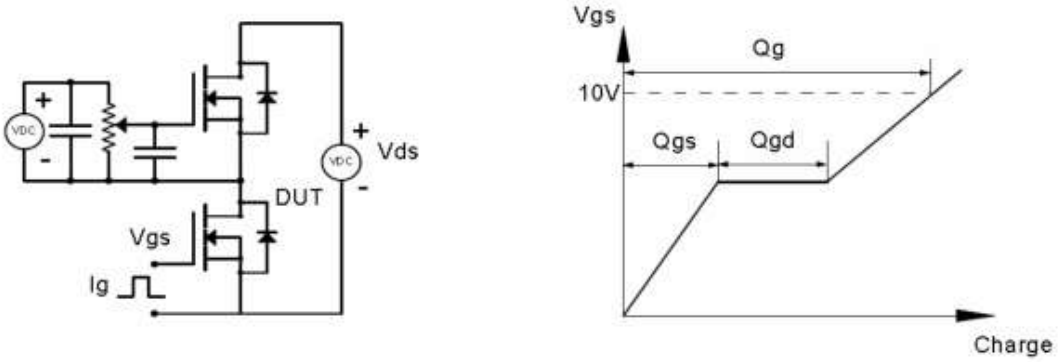
| Parameter | Symbol | Test Condition | Min | Type | Max | Unit |
|---|---|---|---|---|---|---|
| **Static Characteristics** | | | | | | |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | $V_{GS}$ = 0V, $I_D$ =250μA | 100 | - | - | V |
| Zero gate voltage drain current | $I_{DSS}$ | $V_{DS}$ =100V, $V_{GS}$ = 0V | - | - | 1 | μA |
| Gate-body leakage current | $I_{GSS}$ | $V_{GS}$ =±20V, $V_{DS}$ = 0V | - | - | ±100 | nA |
| Gate threshold voltage(3) | $V_{GS(th)}$ | $V_{DS}$ =$V_{GS}$, $I_D$ =250μA | 2 | 3 | 4 | V |
| Drain-source on-resistance(3) | $R_{DS(on)}$ | $V_{GS}$ =10V, $I_D$ =20A | - | 2.2 | 2.8 | mΩ |
| Gate Resistance | $R_g$ | $V_{DS}$ =$V_{GS}$ =0V, f =1MHz | - | 2.7 | - | Ω |
| **Dynamic characteristics** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$ =50V, $V_{GS}$ =0V, f =1MHz | - | 8390 | - | pF |
| Output Capacitance | $C_{oss}$ | | - | 2780 | - | |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 127 | - | |
| **Switching characteristics** | | | | | | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD}$=50V, $I_D$=50A, $V_{GS}$=10V, $R_G$=3Ω | - | 33 | - | ns |
| Turn-on rise time | $t_r$ | | - | 28 | - | |
| Turn-off delay time | $t_{d(off)}$ | | - | 102 | - | |
| Turn-off fall time | $t_f$ | | - | 36 | - | |
| Total Gate Charge | Qg | VDS=50V, ID=50A, VGS=10V | - | 112 | - | nC |
| Gate-Source Charge | Qgs | | - | 31 | - | |
| Gate-Drain Charge | Qgd | | - | 26 | - | |
| Reverse Recovery Chrage | Qrr | $I_F$=20A,di/dt=100A/us | | 178 | | nC |
| Reverse Recovery Time | Trr | $I_F$=20A,di/dt=100A/us | | 89 | | ns |
| **Source-Drain Diode characteristics** | | | | | | |
| Diode Forward voltage(3) | $V_{DS}$ | $V_{GS}$ =0V, $I_S$=40A | - | 0.8 | 1.2 | V |
| Diode Forward current(4) | $I_S$ | | - | - | 210 | A |

**Notes:**

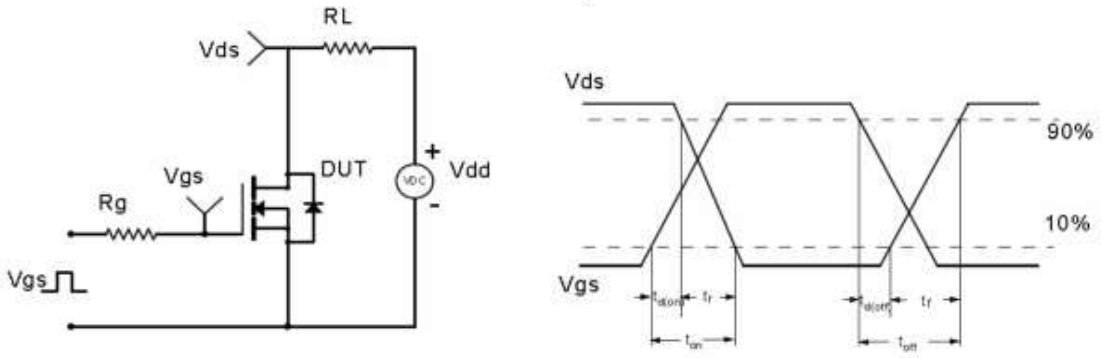
1. Repetitive Rating: pulse width limited by maximum junction temperature
2. EAS Condition:$T_J$=25℃,$V_{DD}$=50V,$R_G$=25Ω,L=0.5Mh
3. Pulse Test: pulse width≤300μs, duty cycle≤2%
4. Surface Mounted on FR4 Board,t≤10 sec

## Test Circuit & Waveform

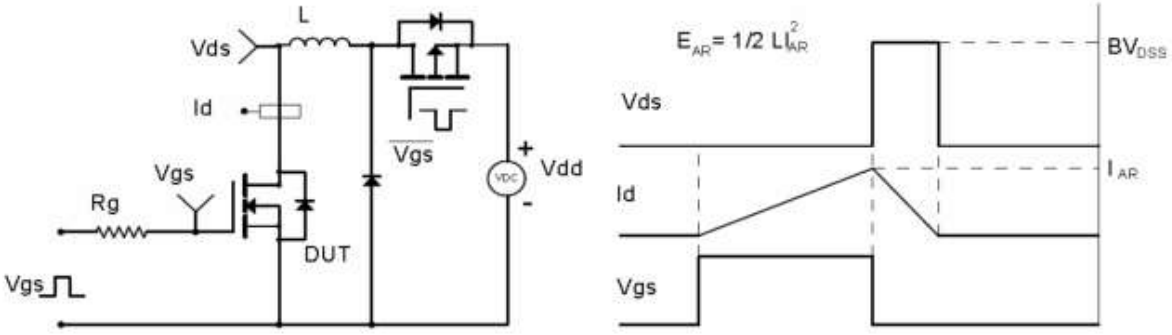
Gate Charge Test Circuit & Waveform



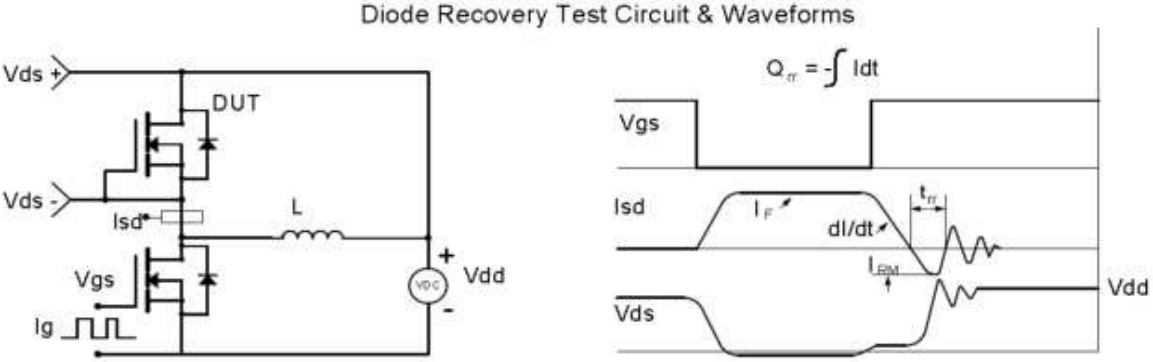

Resistive Switching Test Circuit & Waveforms




Unclamped Inductive Switching (UIS) Test Circuit & Waveforms




Diode Recovery Test Circuit & Waveforms



## Typical Performance Characteristics

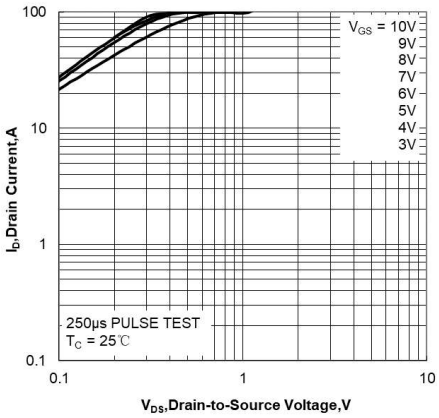



**Figure 1. Output Characteristics**

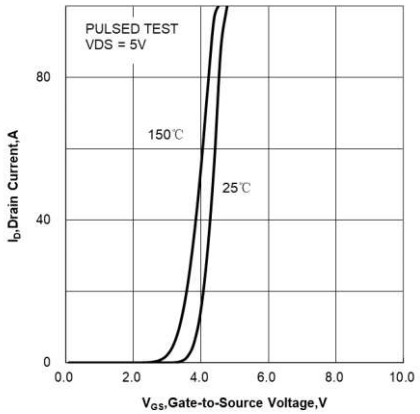



**Figure 2. Transfer Characteristics**

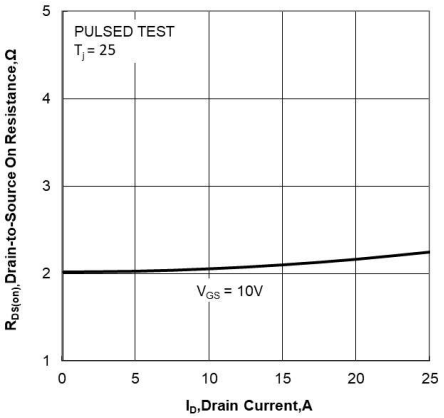



**Figure 3. Drain-to-Source On Resistance vs Drain Current**

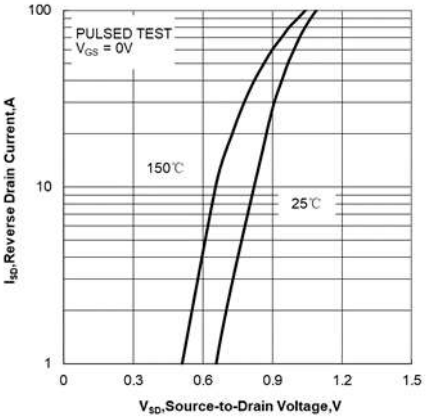



**Figure 4. Body Diode Forward Voltage vs Source Current and Temperature**

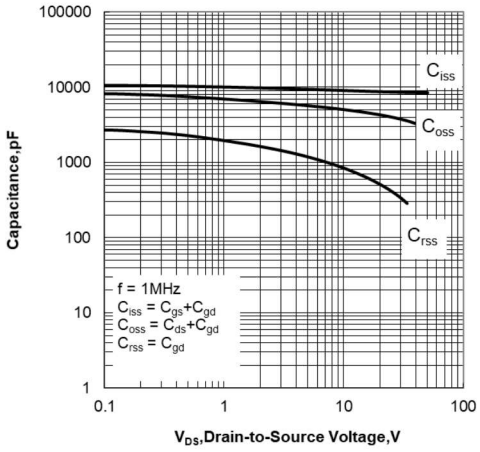



**Figure 5. Capacitance Characteristics**

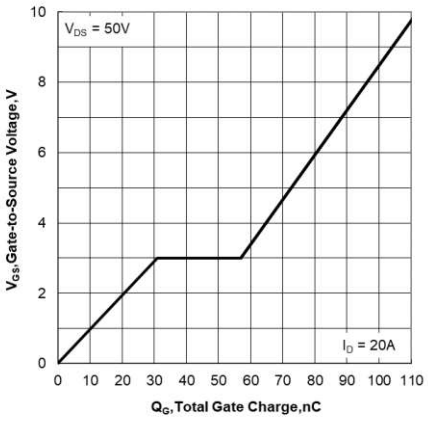



**Figure 6. Gate Charge Characteristics**

## Typical Performance Characteristics

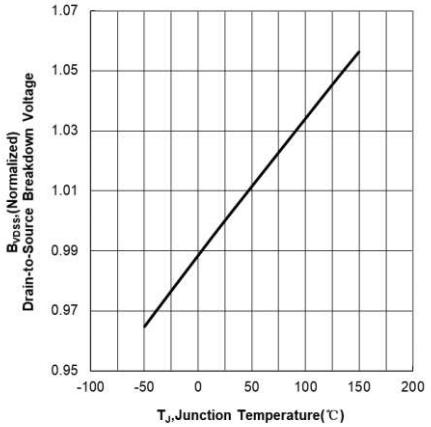



**Figure 7. Normalized Breakdown Voltage vs Junction Temperature**

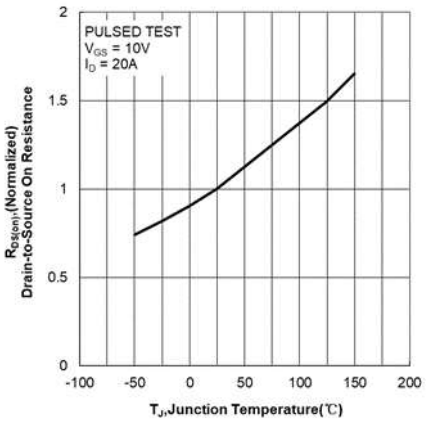



**Figure 8. Normalized On Resistance vs Junction Temperature**

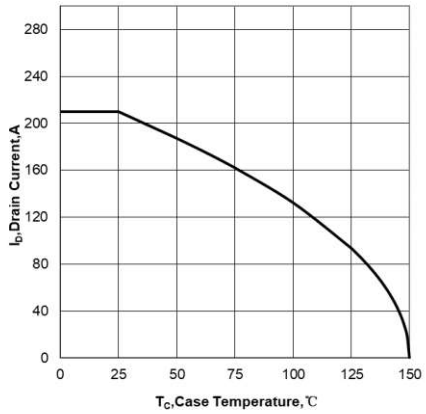



**Figure 9. Maximum Continuous Drain Current vs Case Temperature**

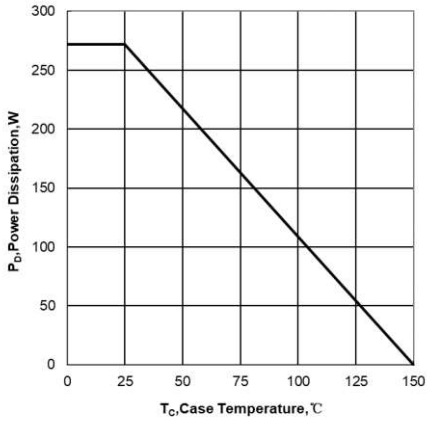



**Figure 10. Maximum Power Dissipation vs Case Temperature**

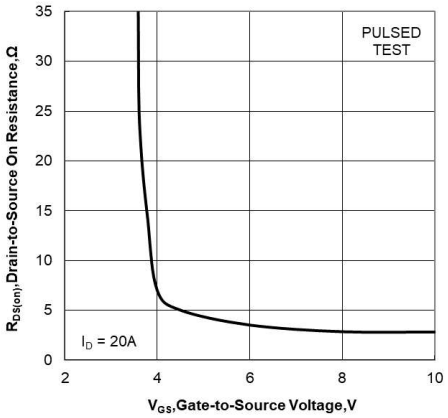



**Figure11. Drain-to-Source On Resistance vs Gate Voltage and Drain Current**

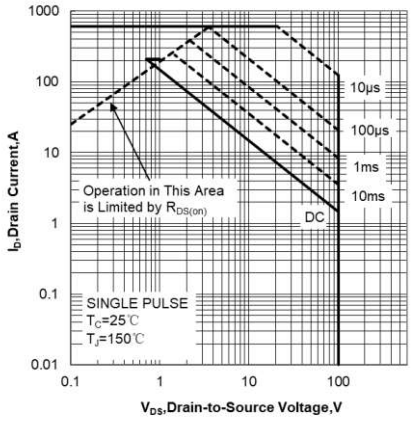



**Figure 12. Maximum Safe Operating Area**

## Typical Performance Characteristics

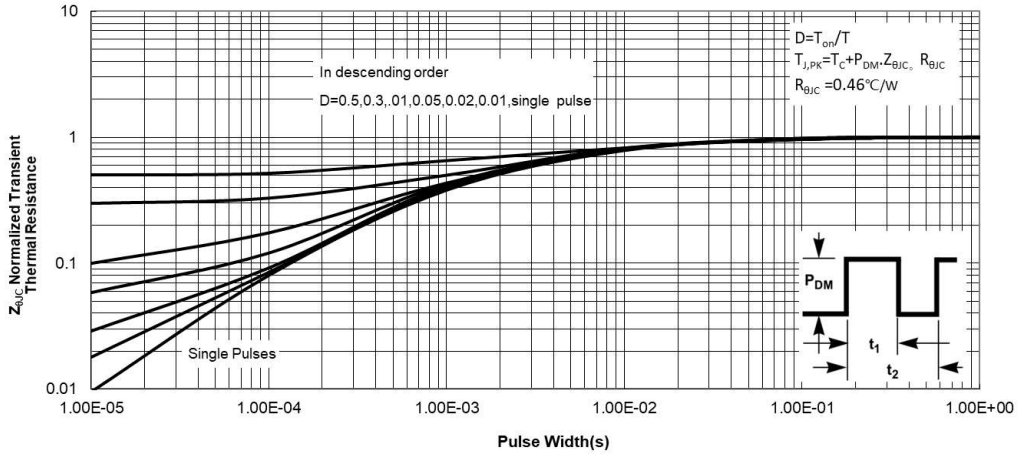
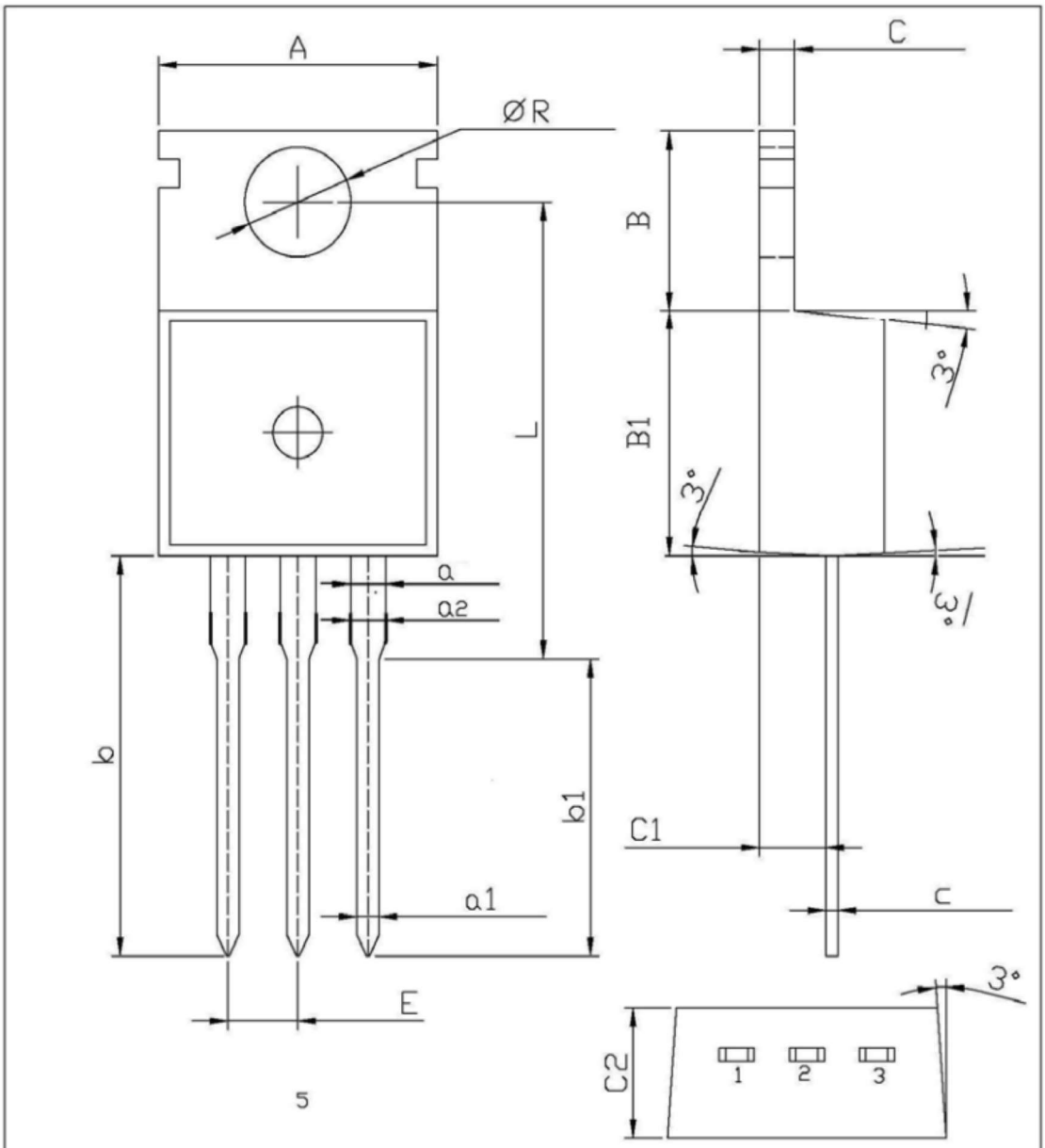



**Figure 13. Maximum Effective Transient Thermal Impedance, Junction-to-Case**

## TO-220 Package Dimensions




| Symbol | Dimensions In Millimeters | | Symbol | Dimensions In Millimeters | |
|---|---|---|---|---|---|
| | Min | Max | | Min | Max |
| A | 9.8 | 10.2 | C | 1.2 | 1.4 |
| R | 3.56 | 3.64 | B | 6.3 | 6.7 |
| L | 15.7 | 16.1 | B1 | 9.0 | 9.4 |
| b | 12.6 | 13.6 | C1 | 2.2 | 2.6 |
| b1 | 9.6 | 10.6 | a1 | 0.7 | 0.9 |
| a | 1.22 | 1.32 | c | 0.4 | 0.6 |
| E | 2.34 | 2.74 | C2 | 4.3 | 4.7 |
| a2 | 1.25 | 1.45 | | | |

## Revision History

| Revision | Release | Remark |
|---|---|---|
| V1.0 | 2023/11/28 | Initial Release |

## Disclaimer

**The information given in this document describes the independent performance of the product,but similar performance is not guaranteed under other working conditions,and cannot be guaranteed when installed with other products or equipment.To achieve the required performance of the product in actual scenarios,the customer should conduct a complete application test to assess the functionality of the product.**

**Allpower assumes no responsibility for equipment failures result from using products at values that exceed the ratings,operating conditions,or other parameters listed in the product specifications.**

**The product described in this specification is not applicable for aerospace or other applications which requires high reliability.Customers using or selling these products for use in medical,life-saving,or life-sustaining applications do so at their own risk and agree to fully indemnify.**

**Due to product or technical improvements,the information described or contained herein may be changed without prior notice.**