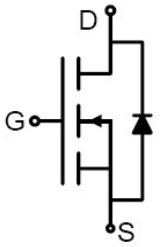
## Feature

- 20V,2.8A
  $R_{DS(ON)}$ <55mΩ @$V_{GS}$=4.5V
  $R_{DS(ON)}$ <80mΩ @$V_{GS}$=2.5V
- Advanced Trench Technology
- Lead free product is acquired




**Schematic Diagram**

## Application

- Interfacing Switching
- Load Switching
- Power management


**SOT-323 top view**

## Package Marking and Ordering Information

| Device Marking | Device | Device Package | Reel Size | Tape width | Quantity (PCS) |
|---|---|---|---|---|---|
| 55N20 | AP55N20N3 | Sot-323 | 7 inch | - | 3000 |

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

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 20 | V |
| Gate-Source Voltage | $V_{GS}$ | ±10 | V |
| Continuous Drain Current ($T_a$ =25℃) | $I_D$ | 2.8 | A |
| Continuous Drain Current ($T_a$ =70℃) | $I_D$ | 2 | A |
| Pulsed Drain Current | $I_{DM}$ | 12 | A |
| Power Dissipation | $P_D$ | 0.25 | W |
| Thermal Resistance from Junction to Ambient(4) | $R_{\theta JA}$ | `500 | ℃/W |
| Junction Temperature | $T_J$ | 150 | ℃ |
| Storage Temperature | $T_{STG}$ | -55~ +150 | ℃ |

## MOSFET ELECTRICAL CHARACTERISTICS($T_a$=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 | 20 | - | - | V |
| Zero gate voltage drain current | $I_{DSS}$ | $V_{DS}$ =20V, $V_{GS}$ = 0V | - | - | 1 | μA |
| Gate-body leakage current | $I_{GSS}$ | $V_{GS}$ =±10V,$V_{DS}$ = 0V | - | - | ±100 | nA |
| Gate threshold voltage(3) | $V_{GS(th)}$ | $V_{DS}$ =$V_{GS}$, $I_D$ =250μA | 0.3 | 0.7 | 1.0 | V |
| Drain-source on-resistance(3) | $R_{DS(on)}$ | $V_{GS}$ =4.5V, $I_D$ =2.8A | - | 48 | 55 | mΩ |
| | | $V_{GS}$ =2.5V, $I_D$ =2A | - | 64 | 80 | |
| **Dynamic characteristics** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$ =10V, $V_{GS}$ =0V, f =1MHz | - | 184 | - | pF |
| Output Capacitance | $C_{oss}$ | | - | 38 | - | |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 28 | - | |
| **Switching characteristics** | | | | | | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD}$=10V, $I_D$=2.8A, $V_{GS}$=4.5V, $R_G$=10Ω | - | 2.3 | - | ns |
| Turn-on rise time | $t_r$ | | - | 3.1 | - | |
| Turn-off delay time | $t_{d(off)}$ | | - | 9.2 | - | |
| Turn-off fall time | $t_f$ | | - | 2.5 | - | |
| Total Gate Charge | Qg | VDS=10V, ID=2.8A, VGS=4.5V | - | 2.7 | - | nC |
| Gate-Source Charge | Qgs | | - | 0.4 | - | |
| Gate-Drain Charge | Qgd | | - | 0.5 | - | |
| **Source-Drain Diode characteristics** | | | | | | |
| Diode Forward voltage(3) | $V_{DS}$ | $V_{GS}$ =0V, $I_S$=2.8A | - | - | 1.2 | V |
| Diode Forward current(4) | $I_S$ | | - | - | 2.8 | A |

**Notes:**

1. Repetitive Rating: pulse width limited by maximum junction temperature
2. Pulse Test: pulse width≤300μs, duty cycle≤2%
3. Surface Mounted on FR4 Board,t≤10 sec

## Test Circuit

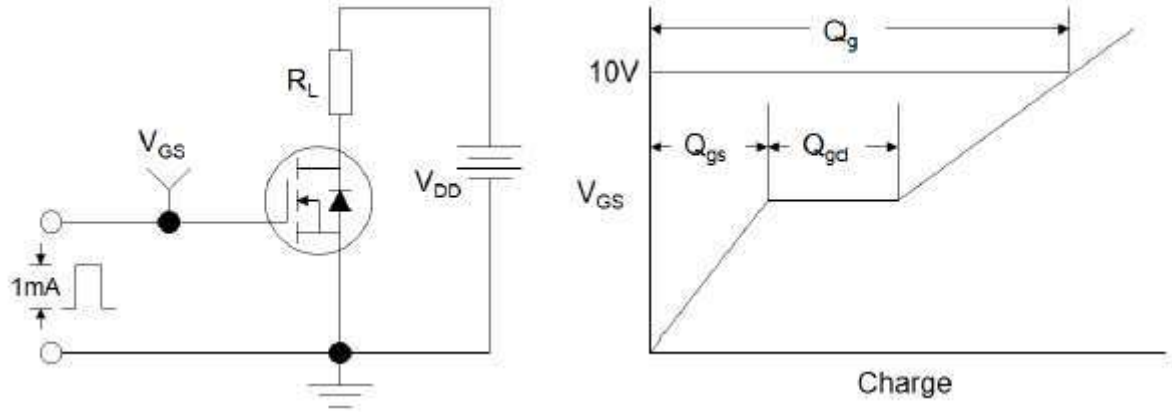



**Figure1:Gate Charge Test Circuit & Waveform**

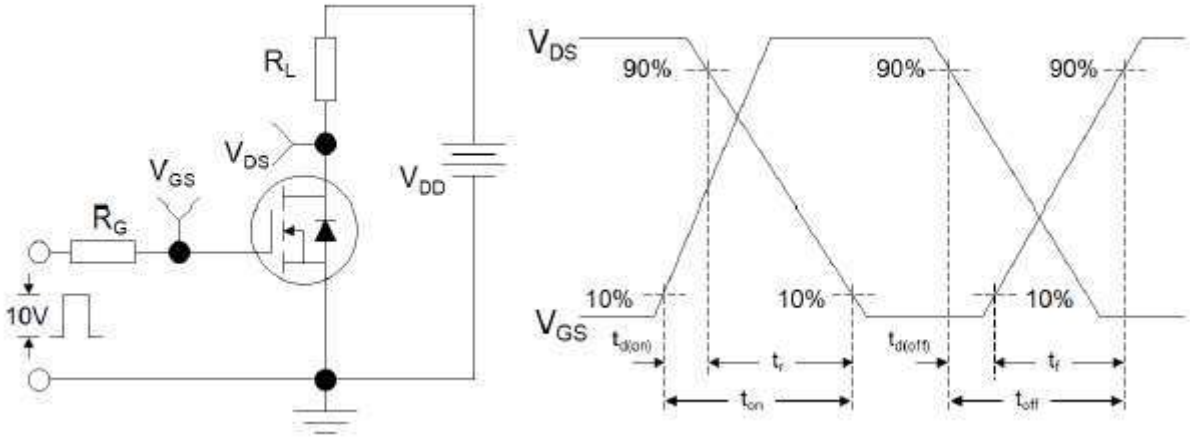



**Figure 2: Resistive Switching Test Circuit & Waveforms**

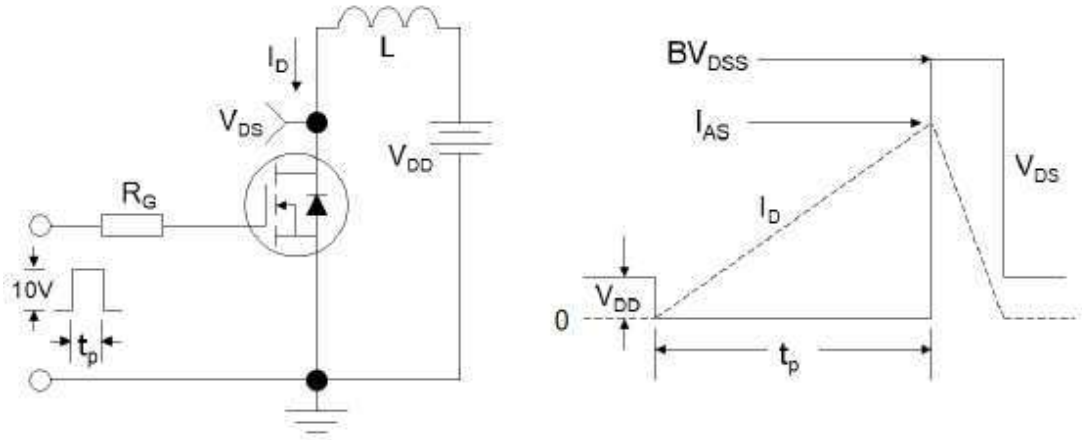



**Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms**

## Typical Performance Characteristics

**Figure1:** Output Characteristics

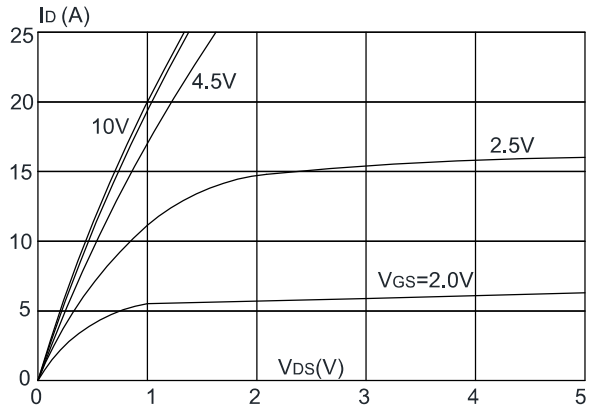



**Figure 2:** Typical Transfer Characteristics

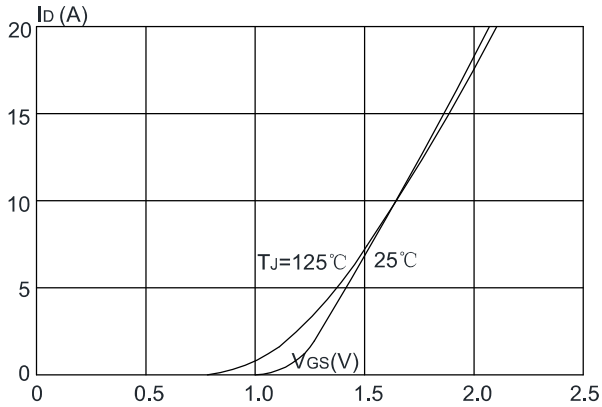



**Figure 3:**On-resistance vs. Drain Current

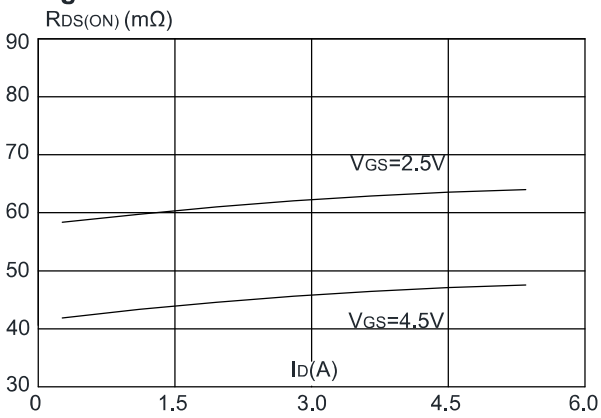



**Figure 4**: Body Diode Characteristics

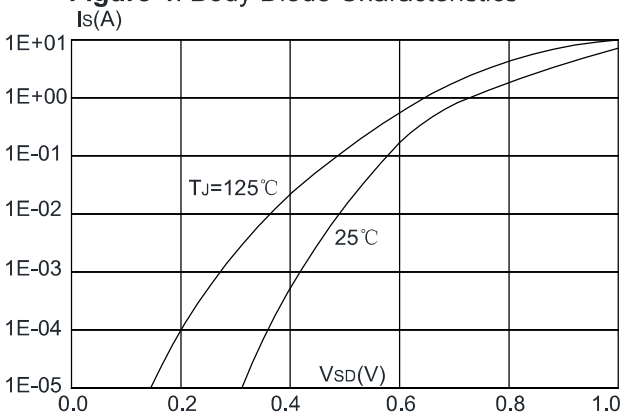



**Figure 5:** Gate Charge Characteristics

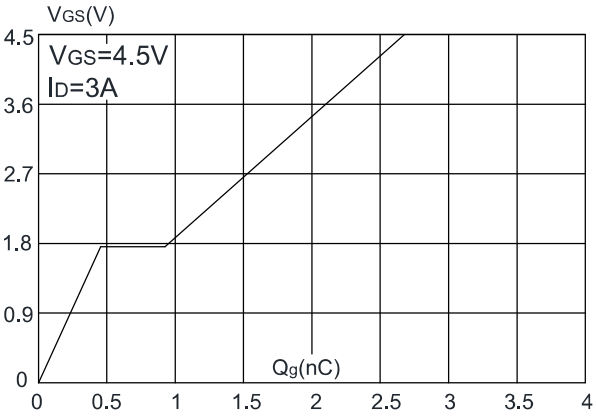



**Figure 6:** Capacitance Characteristics

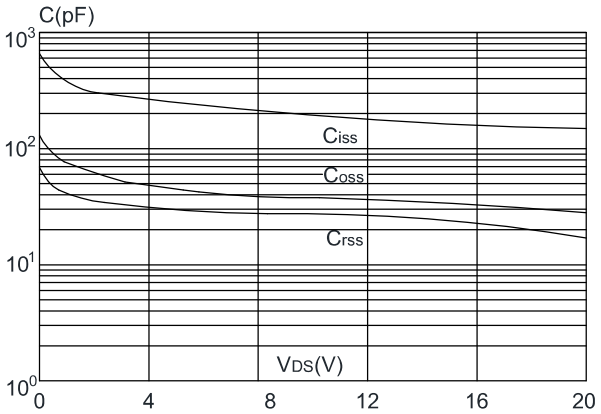


**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature

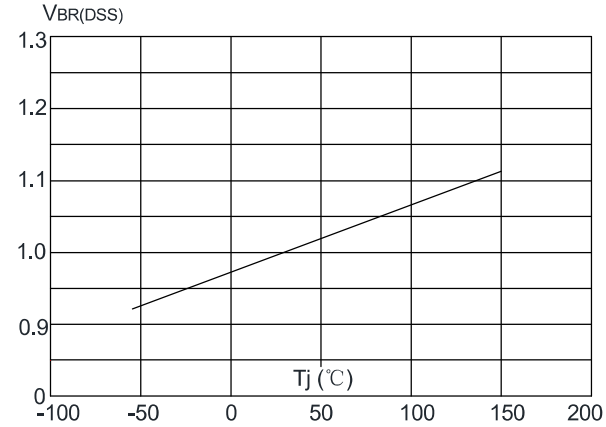



**Figure 8:** Normalized on Resistance vs. Junction Temperature

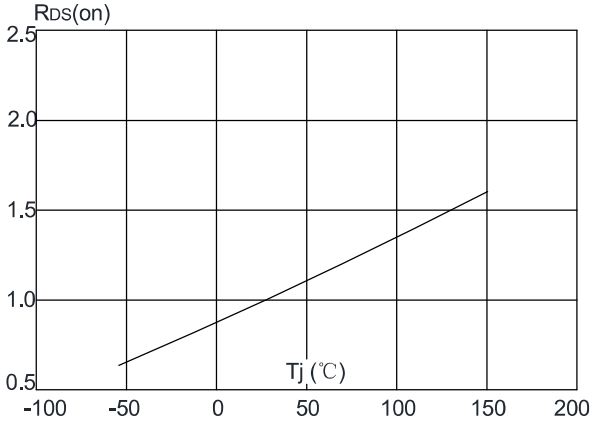



**Figure 9:** Maximum Safe Operating Area

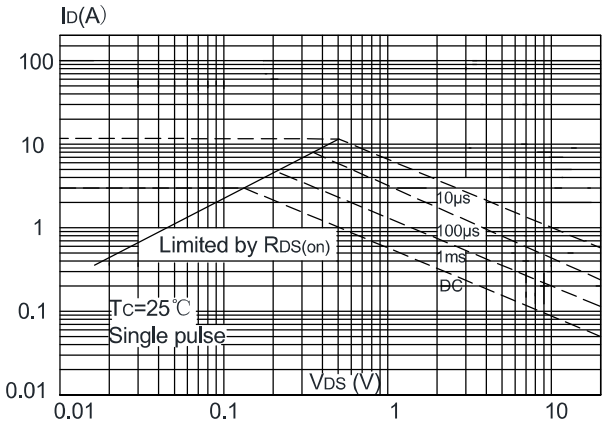



**Figure 10:** Maximum Continuous Drain Current vs. Ambient Temperature

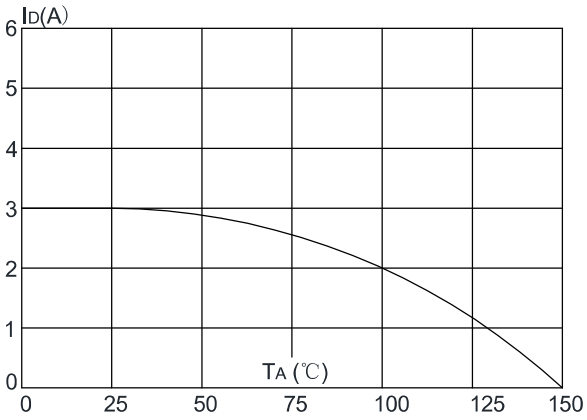
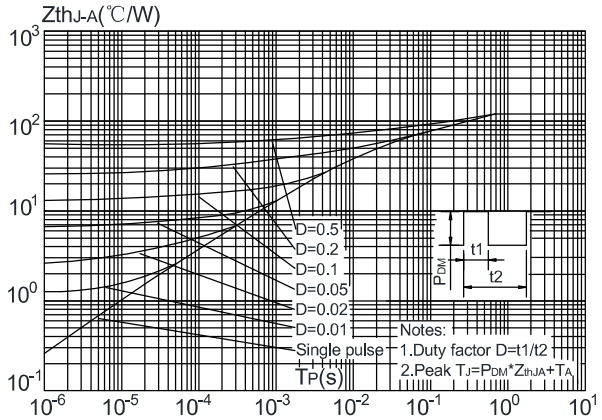
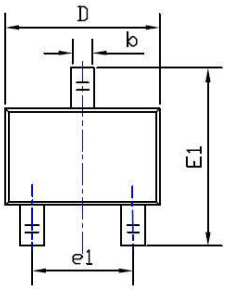


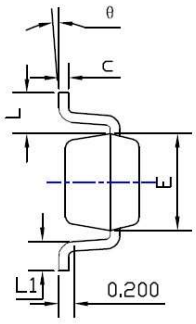

**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



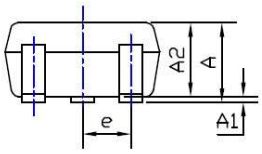
## SOT-323 Package Information



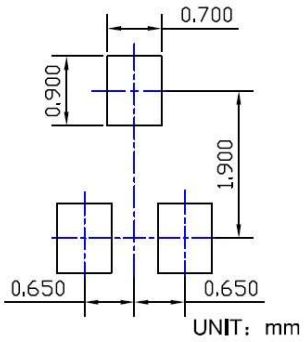

TOP VIEW




SIDE VIEW




SIDE VIEW




SUGGESTED SOLDER PAD LAYOUT

| SYMBOL | DIMENSIONS | | | | | |
|---|---|---|---|---|---|---|
| | INCHES | | | Millmeter | | |
| | MIN. | NOM. | MAX. | MIN. | NOM. | MAX. |
| A | 0.035 | --- | 0.043 | 0.900 | --- | 1.100 |
| A1 | 0.000 | --- | 0.004 | 0.000 | --- | 0.100 |
| A2 | 0.035 | 0.037 | 0.039 | 0.900 | 0.950 | 1.000 |
| b | 0.006 | 0.012 | 0.016 | 0.150 | 0.300 | 0.400 |
| c | 0.004 | --- | 0.010 | 0.100 | --- | 0.250 |
| D | 0.071 | 0.079 | 0.087 | 1.800 | 2.000 | 2.200 |
| E | 0.045 | 0.049 | 0.053 | 1.150 | 1.250 | 1.350 |
| E1 | 0.085 | 0.091 | 0.096 | 2.150 | 2.300 | 2.450 |
| e | 0.026TYP | | | 0.650TYP | | |
| e1 | 0.047 | 0.051 | 0.055 | 1.200 | 1.300 | 1.400 |
| L | 0.021REF | | | 0.525REF | | |
| L1 | 0.010 | 0.014 | 0.018 | 0.260 | 0.360 | 0.460 |
| θ | 0° | --- | 8° | 0° | --- | 8° |

NOTE:
1.PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
2.TOLERANCE 0.1mm UNLESS OTHERWISE SPECIFIED.
3.THE PAD LAYOUT IS FOR REFERENCE PURPOSES ONLY.