

AP5N10S

N-Channel Power MOSFET

Description

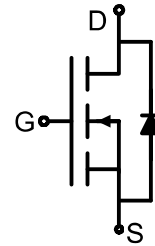
The AP5N10S uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications. It is ESD protected.

General Features

- | | | |
|-----------|-----------------------------|-------|
| V_{DSS} | $R_{DS(ON)}$ @ 10V (typ) | I_D |
| 100V | 115mΩ | 5A |
- High density cell design for ultra low R_{Dson}
- Fully characterized avalanche voltage and current
- Excellent package for good heat dissipation

Application

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply
- Motor control



Schematic diagram



SOT23-3L

Absolute Maximum Ratings ($T_A=25^{\circ}C$ unless otherwise noted)

| Parameter | Symbol | Limit | Unit |
|--|----------------|------------|------|
| Drain-Source Voltage | V_{DS} | 100 | V |
| Gate-Source Voltage | V_{GS} | ±20 | V |
| Drain Current-Continuous | I_D | 5 | A |
| Drain Current-Pulsed ^(Note 1) | I_{DM} | 21 | A |
| Maximum Power Dissipation | P_D | 5 | W |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | -55 To 150 | °C |

Thermal Characteristic

| | | | |
|---|-----------------|------|------|
| Thermal Resistance, Junction-to-Ambient ^(Note 2) | $R_{\theta JA}$ | 41.7 | °C/W |
|---|-----------------|------|------|

Electrical Characteristics ($T_A=25^{\circ}C$ unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---------------------------------|------------|---------------------------|-----|-----|-----|------|
| Off Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS}=0V, I_D=250\mu A$ | 100 | 110 | - | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=80V, V_{GS}=0V$ | - | - | 800 | nA |

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| | | | | | | |
|---|--------------|---|---|-----|-----------|------------|
| Gate-Body Leakage Current | I_{GSS} | $V_{GS}=\pm 20V, V_{DS}=0V$ | - | - | ± 100 | nA |
| On Characteristics (Note 3) | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$ | 1 | 1.8 | 3 | V |
| Drain-Source On-State Resistance | $R_{DS(ON)}$ | $V_{GS}=10V, I_D=3A$ | | 115 | 145 | m Ω |
| Forward Transconductance | g_{FS} | $V_{DS}=5V, I_D=2.9A$ | - | 8 | - | S |
| Dynamic Characteristics (Note 4) | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS}=25V, V_{GS}=0V,$ $F=1.0MHz$ | - | 210 | - | PF |
| Output Capacitance | C_{oss} | | - | 30 | - | PF |
| Reverse Transfer Capacitance | C_{rss} | | - | 14 | - | PF |
| Switching Characteristics (Note 4) | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}=50V, I_D=5A, R_L=15\Omega$ $V_{GS}=10V, R_G=2.5\Omega$ | - | 15 | - | nS |
| Turn-on Rise Time | t_r | | - | 3.4 | - | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 21 | - | nS |
| Turn-Off Fall Time | t_f | | - | 3.1 | - | nS |
| Total Gate Charge | Q_g | $V_{DS}=50V, I_D=5A,$ $V_{GS}=10V$ | | 4.5 | | nC |
| Gate-Source Charge | Q_{gs} | | - | 1.5 | - | nC |
| Gate-Drain Charge | Q_{gd} | | - | 1.2 | - | nC |
| Drain-Source Diode Characteristics | | | | | | |
| Diode Forward Voltage (Note 3) | V_{SD} | $V_{GS}=0V, I_S=6A$ | - | - | 1.2 | V |
| Diode Forward Current (Note 2) | I_S | | - | - | 5 | A |

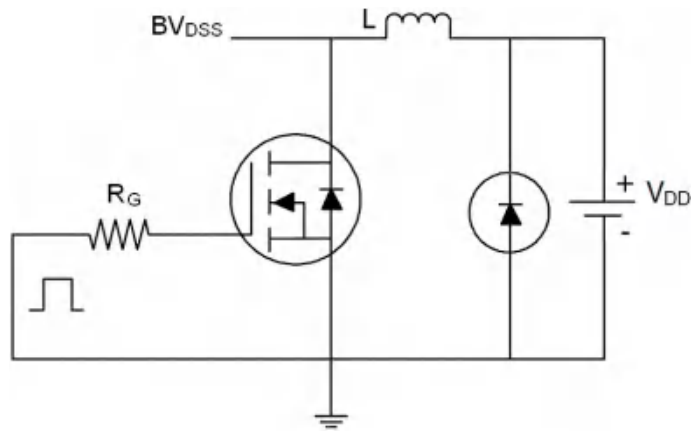
Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

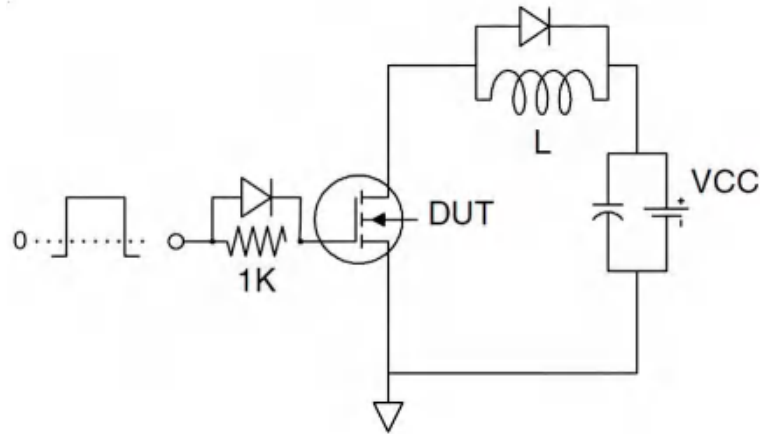
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Test Circuit

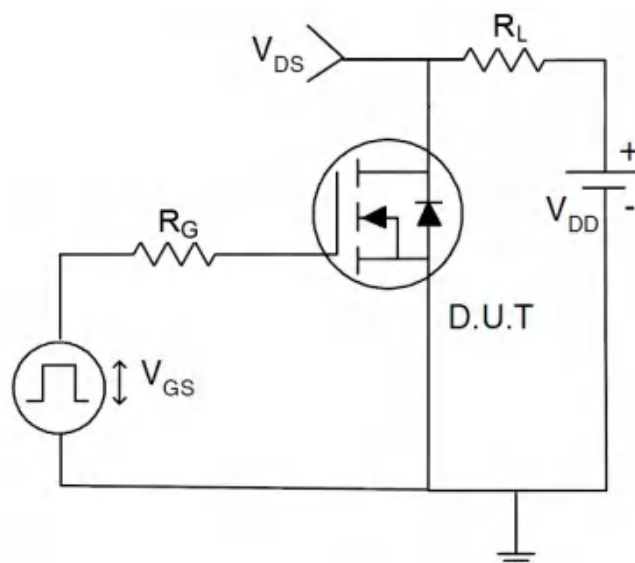
1) E_{AS} test circuit



2) Gate charge test circuit



3) Switch Time Test Circuit



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Typical Electrical and Thermal Characteristics (curves)

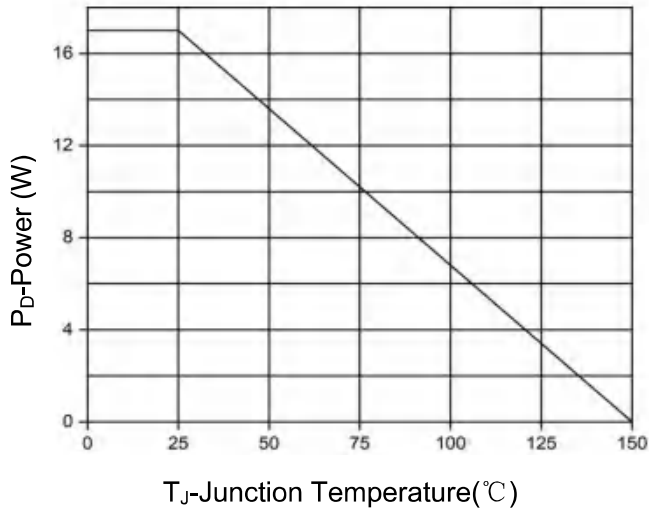


Figure 1. Power Dissipation

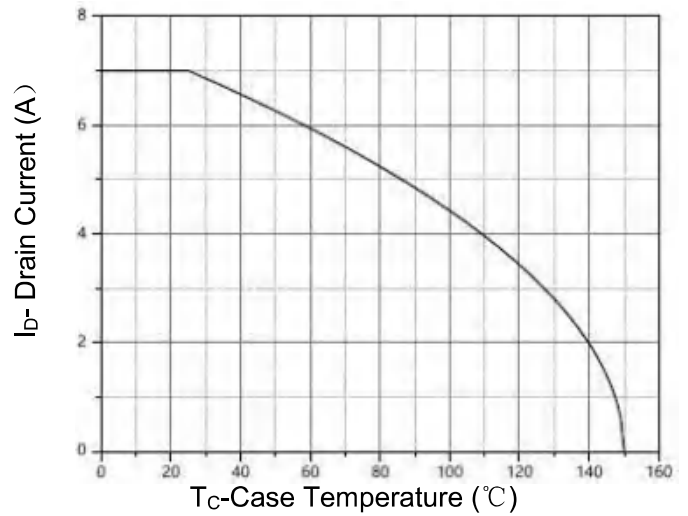


Figure 2. Drain Current

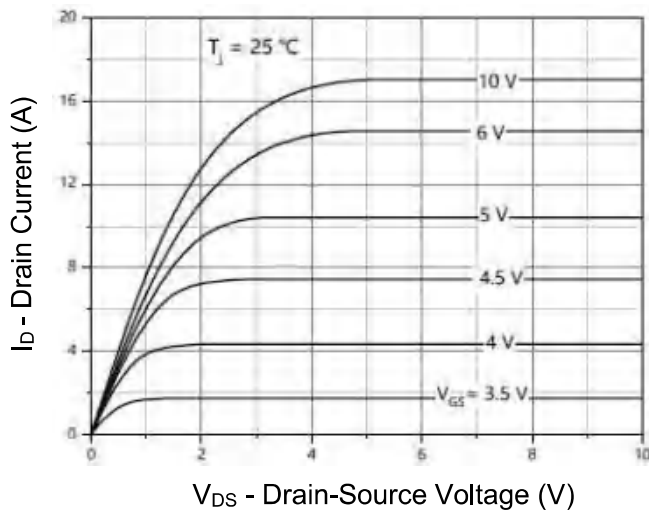


Figure 3. Output characteristics

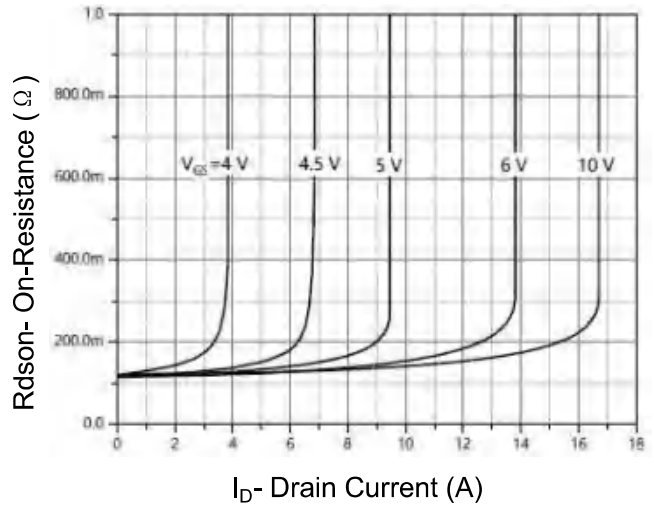


Figure 4. Drain-Source On-state resistance

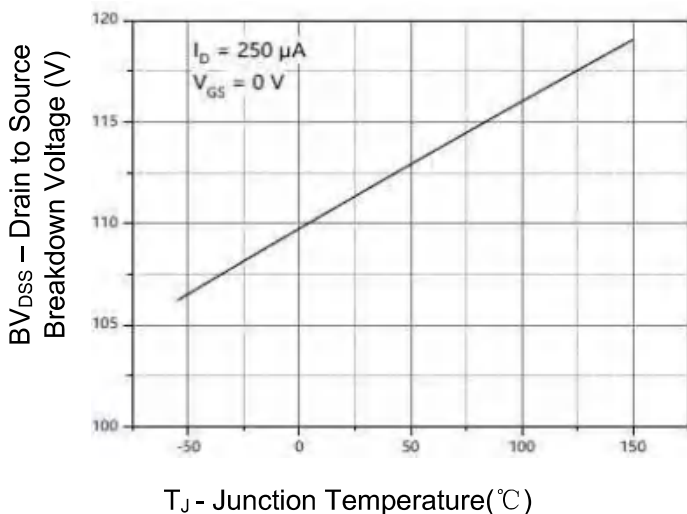


Figure 5. Drain-source breakdown voltage

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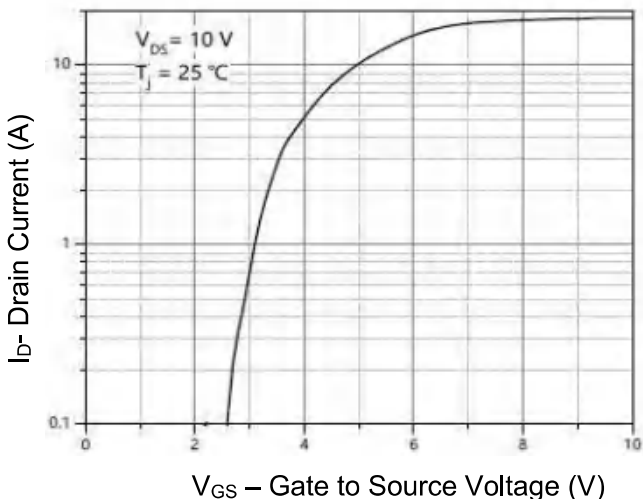


Figure 6. Transfer Characteristics

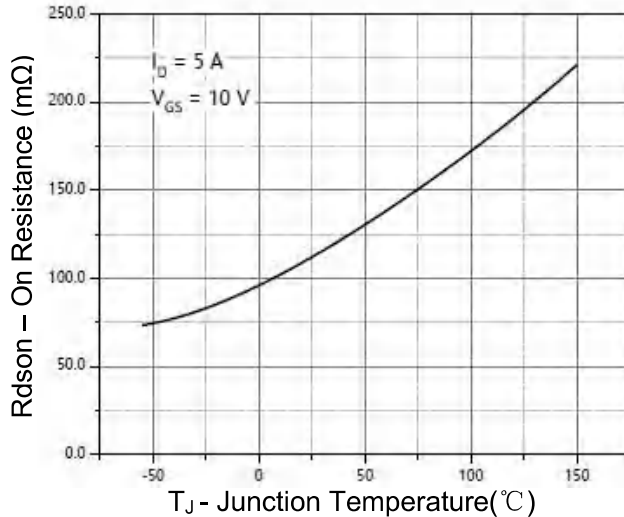


Figure 7. Drain-Source On-State Resistance

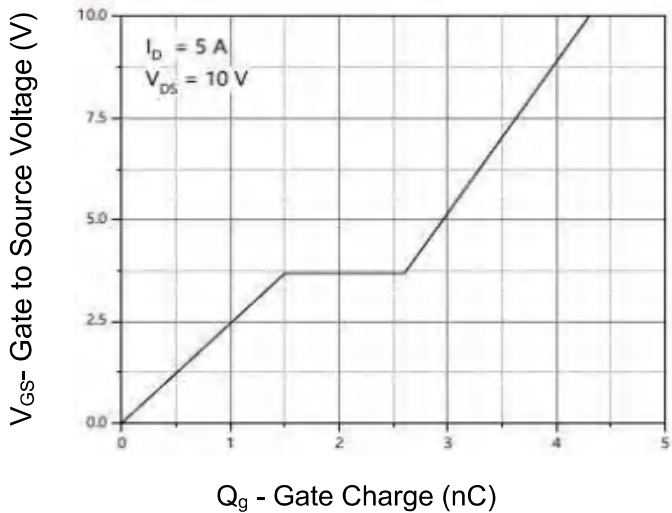


Figure 8. Gate Charge

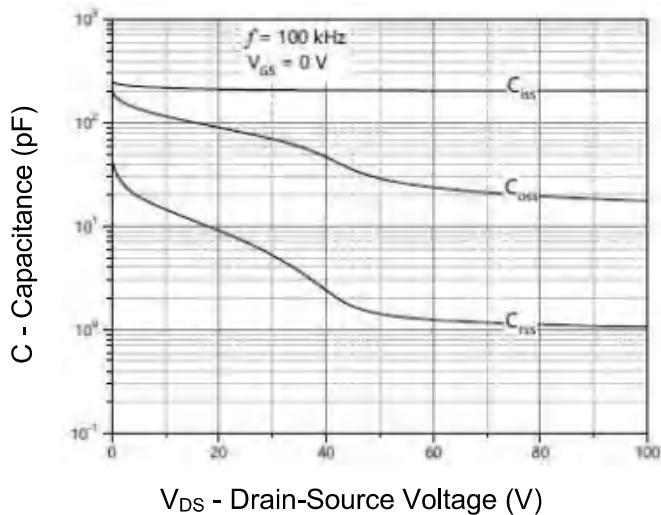


Figure 9 . Capacitance vs Vds

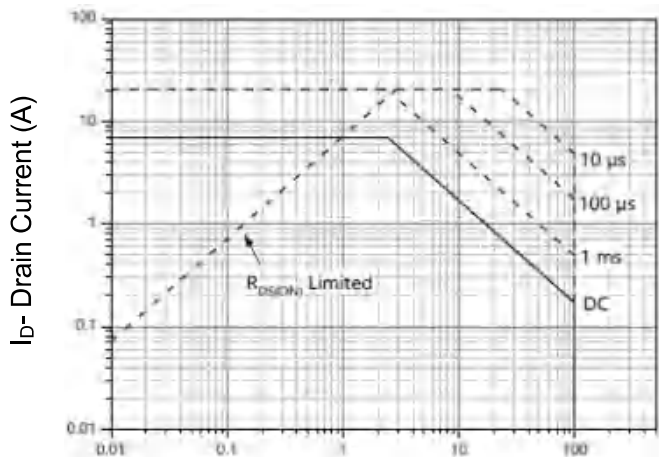


Figure 10. Safe Operation Area

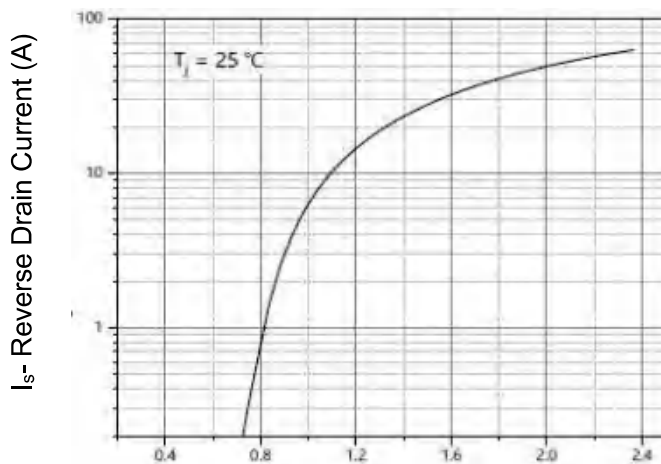
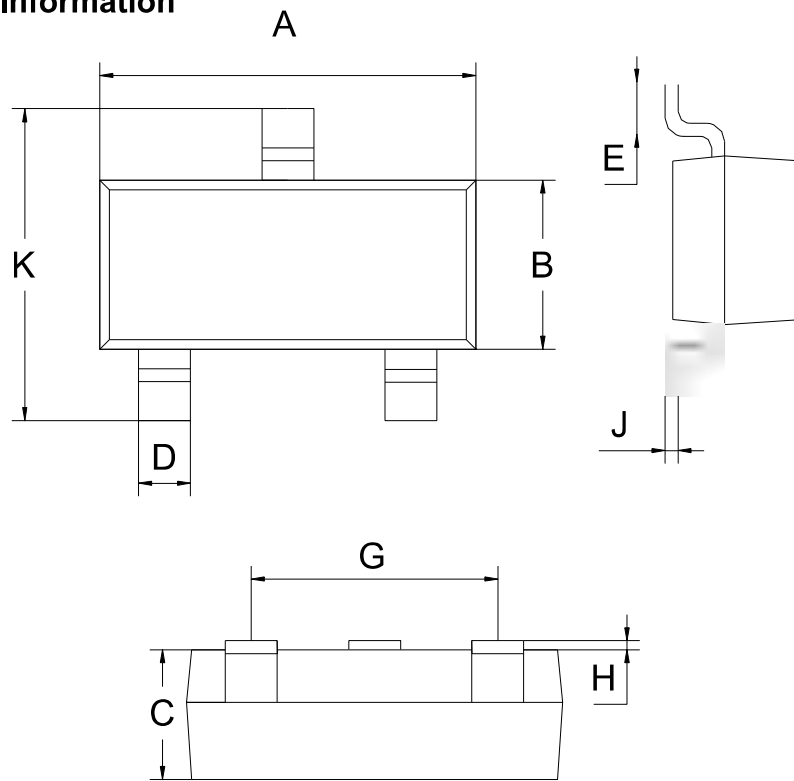


Figure 11. Source- Drain Diode Forward

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SOT-23-3L Package Information



| SOT-23-3L | | | |
|----------------------|-------|-------|-------|
| Dim | MIN | NOM | MAX |
| A | 2.80 | 2.90 | 3.00 |
| B | 1.50 | 1.60 | 1.70 |
| C | 1.00 | 1.10 | 1.20 |
| D | 0.30 | 0.40 | 0.50 |
| E | 0.25 | 0.40 | 0.55 |
| G | 1.90 | | |
| H | 0.00 | - | 0.10 |
| J | 0.047 | 0.127 | 0.207 |
| K | 2.60 | 2.80 | 3.00 |
| All Dimensions in mm | | | |