



PJA3416AE

20V N-Channel Enhancement Mode MOSFET – ESD Protected

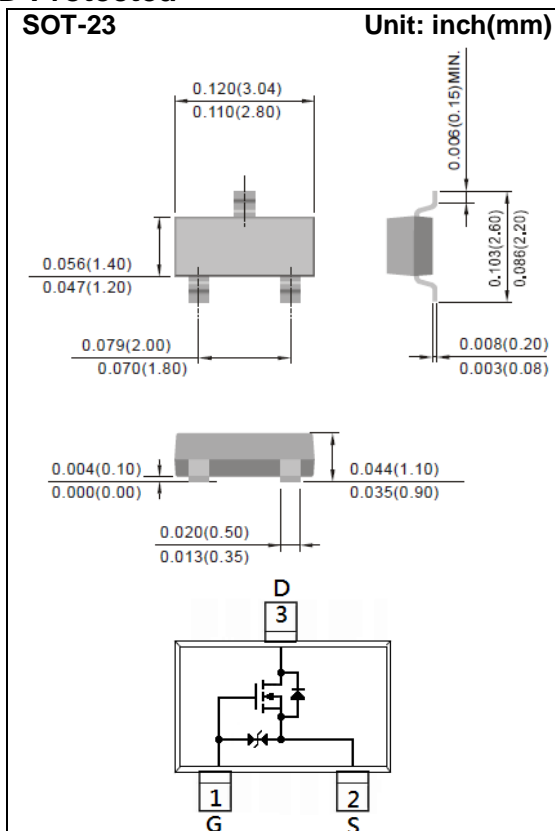
| | | | |
|----------------|-------------|----------------|-------------|
| Voltage | 20 V | Current | 6.5A |
|----------------|-------------|----------------|-------------|

Features

- RDS(ON) , VGS@4.5V, ID@6.5A<22mΩ
- RDS(ON) , VGS@2.5V, ID@5.5A<26mΩ
- RDS(ON) , VGS@1.8V, ID@5.0A<34mΩ
- Advanced Trench Process Technology
- Specially Designed for Switch Load, PWM Application, etc.
- ESD Protected 2KV HBM
- Lead free in compliance with EU RoHS 2011/65/EU directive
- Green molding compound as per IEC61249 Std.
(Halogen Free)

Mechanical Data

- Case: SOT-23 Package
- Terminals : Solderable per MIL-STD-750, Method 2026
- Approx. Weight: 0.0003 ounces, 0.0084 grams
- Marking: A6E



Maximum Ratings and Thermal Characteristics (T_A=25°C unless otherwise noted)

| PARAMETER | SYMBOL | LIMIT | UNITS |
|--|-----------------------------------|----------------------|-------|
| Drain-Source Voltage | V _{DS} | 20 | V |
| Gate-Source Voltage | V _{GS} | ±8 | V |
| Continuous Drain Current | I _D | 6.5 | A |
| Pulsed Drain Current ^(Note 4) | I _{DM} | 32 | A |
| Power Dissipation | P _D | T _a =25°C | 1.25 |
| | | Derate above 25°C | 10 |
| Operating Junction and Storage Temperature Range | T _J , T _{STG} | -55~150 | °C |
| Typical Thermal resistance | R _{θJA} | 100 | °C/W |
| - Junction to Ambient ^(Note 3) | | | |



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

| PARAMETER | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNITS |
|---|--------------|---|------|------|----------|------------|
| Static | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS}=0V, I_D=250\mu A$ | 20 | - | - | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$ | 0.4 | 0.58 | 1.0 | V |
| Drain-Source On-State Resistance | $R_{DS(on)}$ | $V_{GS}=4.5V, I_D=6.5A$ | - | 18.4 | 22 | m Ω |
| | | $V_{GS}=2.5V, I_D=5.5A$ | - | 21.5 | 26 | |
| | | $V_{GS}=1.8V, I_D=5.0A$ | - | 26.4 | 34 | |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=20V, V_{GS}=0V$ | - | - | 1 | μA |
| Gate-Source Leakage Current | I_{GSS} | $V_{GS}=\pm 8V, V_{DS}=0V$ | - | - | ± 10 | μA |
| Dynamic | | | | | | |
| Total Gate Charge | Q_g | $V_{DS}=10V, I_D=6.5A,$ $V_{GS}=4.5V$ (Note 1,2) | - | 8.6 | - | nC |
| Gate-Source Charge | Q_{gs} | | - | 1.06 | - | |
| Gate-Drain Charge | Q_{gd} | | - | 1.04 | - | |
| Input Capacitance | C_{iss} | $V_{DS}=10V, V_{GS}=0V,$ $f=1.0MHz$ | - | 836 | - | pF |
| Output Capacitance | C_{oss} | | - | 96 | - | |
| Reverse Transfer Capacitance | C_{rss} | | - | 80 | - | |
| Switching | | | | | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD}=10V, I_D=1A,$ $V_{GS}=4.5V,$ $R_G=3\Omega$ (Note 1,2) | - | 24 | - | ns |
| Turn-On Rise Time | t_r | | - | 46 | - | |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 0.22 | - | us |
| Turn-Off Fall Time | t_f | | - | 0.30 | - | |
| Drain-Source Diode | | | | | | |
| Maximum Continuous Drain-Source Diode Forward Current | I_S | --- | - | - | 1.5 | A |
| Diode Forward Voltage | V_{SD} | $I_S=1.0A, V_{GS}=0V$ | - | 0.74 | 1.0 | V |

NOTES :

1. Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$
2. Essentially independent of operating temperature typical characteristics.
3. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins mounted on a 1 inch FR-4 with 2oz. square pad of copper.
4. The maximum current rating is package limited.



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TYPICAL CHARACTERISTIC CURVES

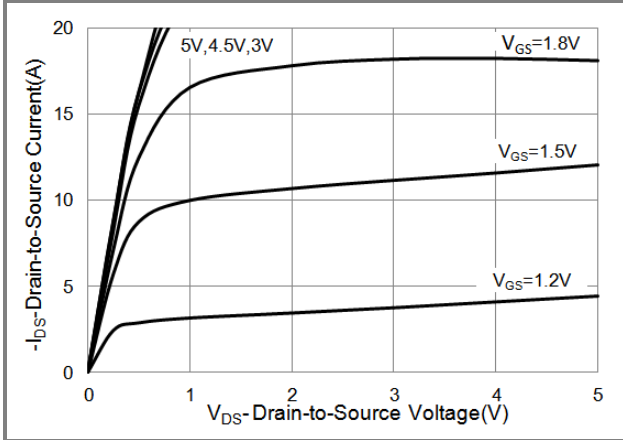


Fig.1 On-Region Characteristics

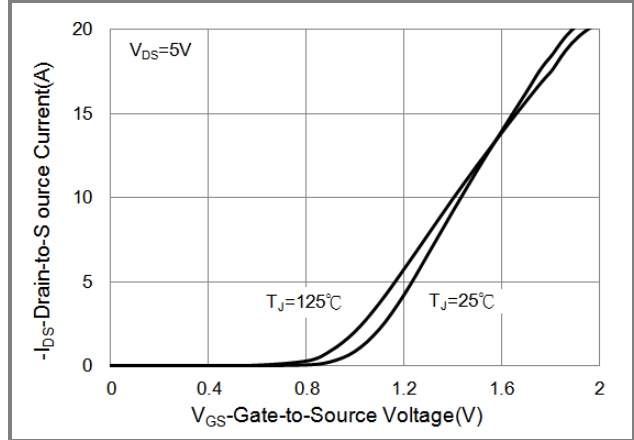


Fig.2 Transfer Characteristics

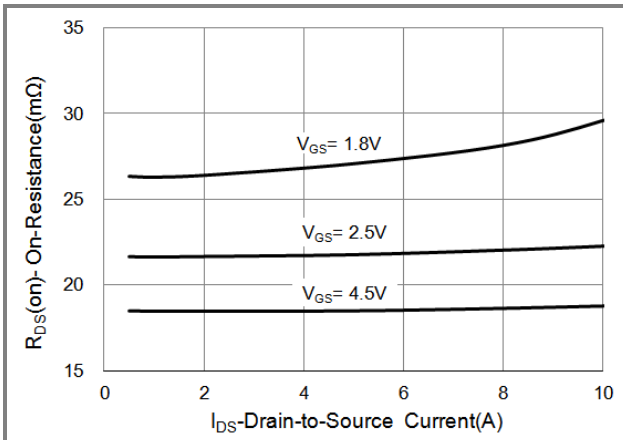


Fig.3 On-Resistance vs. Drain Current

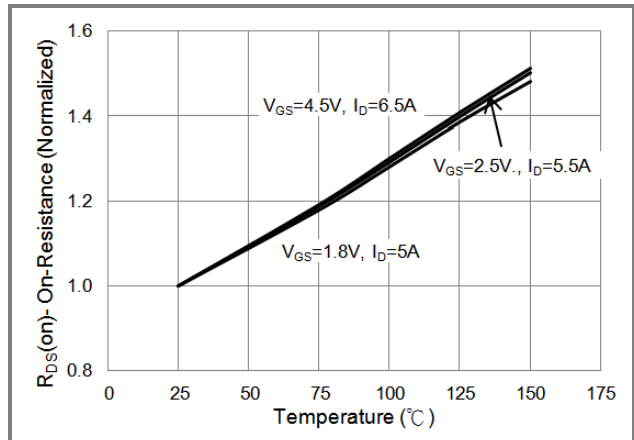


Fig.4 On-Resistance vs. Junction temperature

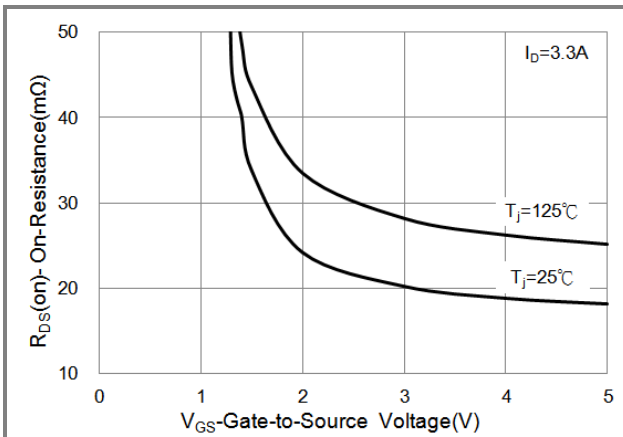


Fig.5 On-Resistance Variation with V_GS.

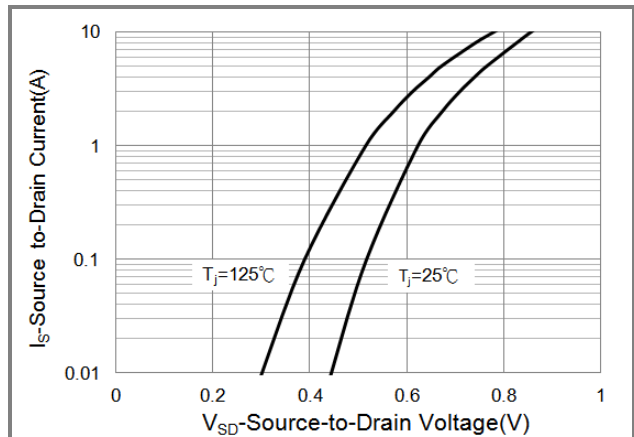


Fig.6 Body Diode Characteristics



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TYPICAL CHARACTERISTIC CURVES

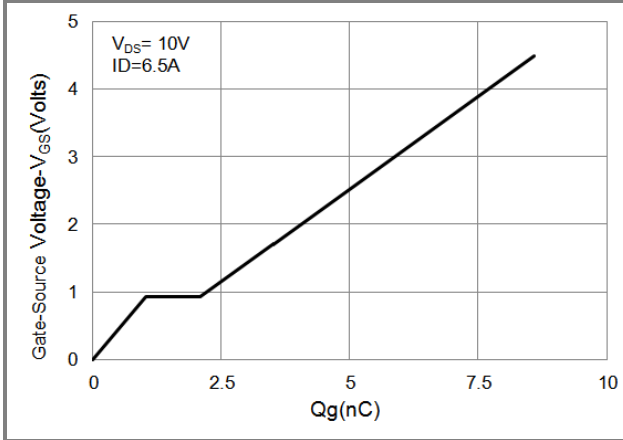


Fig.7 Gate-Charge Characteristics

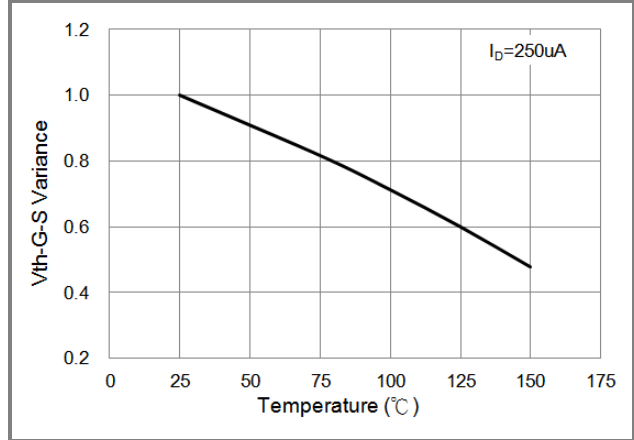


Fig.8 Threshold Voltage Variation with Temperature.

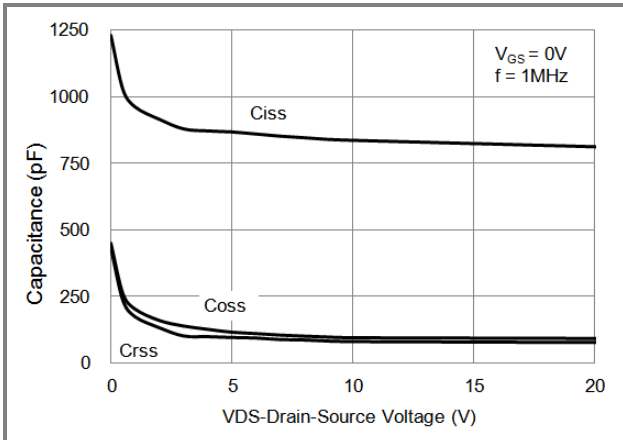


Fig.9 Capacitance vs. Drain-Source Voltage.

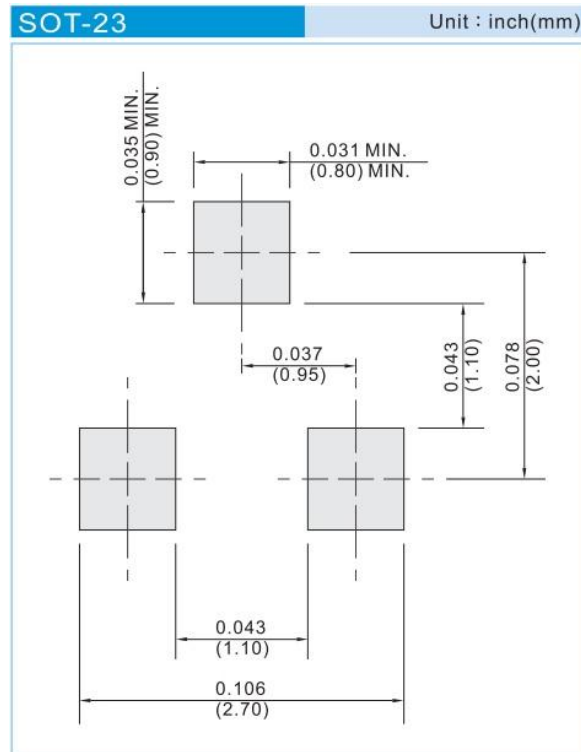


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PART NO PACKING CODE VERSION

| PART NO PACKING CODE | Package Type | Packing type | Marking | Version |
|----------------------|--------------|--------------------|---------|--------------|
| PJA3416AE_R1_00001 | SOT-23 | 3K pcs / 7" reel | A6E | Halogen free |
| PJA3416AE_R2_00001 | SOT-23 | 12K pcs / 13" reel | A6E | Halogen free |

MOUNTING PAD LAYOUT





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