



PJA3415A

20V P-Channel Enhancement Mode MOSFET

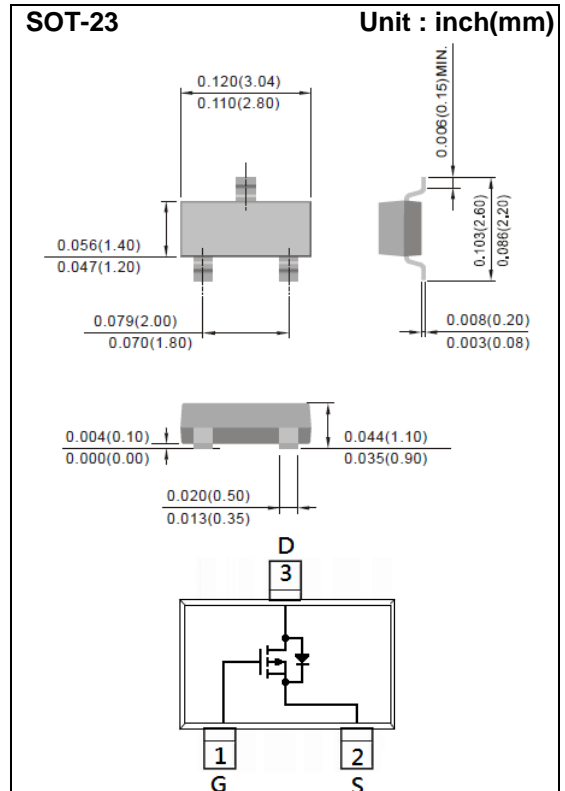
Voltage **-20 V** **Current** **-4.5A**

Features

- $R_{DS(ON)}$, $V_{GS}@-4.5V$, $I_D@-4.5A < 46m\Omega$
- $R_{DS(ON)}$, $V_{GS}@-2.5V$, $I_D@-3.0A < 56m\Omega$
- $R_{DS(ON)}$, $V_{GS}@-1.8V$, $I_D@-1.5A < 88m\Omega$
- Advanced Trench Process Technology
- Specially Designed for Switch Load, PWM Application, etc
- 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: A5A



Maximum Ratings and Thermal Characteristics ($T_A=25^\circ C$ unless otherwise noted)

| PARAMETER | SYMBOL | LIMIT | UNITS |
|--|-----------------|---------------------------|--------------|
| Drain-Source Voltage | V_{DS} | -20 | V |
| Gate-Source Voltage | V_{GS} | ± 12 | V |
| Continuous Drain Current | I_D | -4.5 | A |
| Pulsed Drain Current | I_{DM} | -18 | A |
| Power Dissipation | P_D | $T_a=25^\circ C$ | 1.25 |
| | | Derate above $25^\circ C$ | 10 |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | -55~150 | $^\circ C$ |
| Typical Thermal resistance | $R_{\theta JA}$ | 100 | $^\circ C/W$ |
| - 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 | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=-250\mu A$ | -0.5 | -0.74 | -1.3 | V |
| Drain-Source On-State Resistance | $R_{DS(on)}$ | $V_{GS}=-4.5V, I_D=-4.5A$ | - | 38 | 46 | mΩ |
| | | $V_{GS}=-2.5V, I_D=-3.0A$ | - | 47 | 56 | |
| | | $V_{GS}=-1.8V, I_D=-1.5A$ | - | 68 | 88 | |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=-16V, V_{GS}=0V$ | - | -0.01 | -1 | μA |
| Gate-Source Leakage Current | I_{GSS} | $V_{GS}=\pm 12V, V_{DS}=0V$ | - | ± 10 | ± 100 | nA |
| Dynamic | | | | | | |
| Total Gate Charge | Q_g | $V_{DS}=-10V, I_D=-4.5A,$ $V_{GS}=-4.5V$ (Note 1,2) | - | 10 | - | nC |
| Gate-Source Charge | Q_{gs} | | - | 1.7 | - | |
| Gate-Drain Charge | Q_{gd} | | - | 2.4 | - | |
| Input Capacitance | C_{iss} | $V_{DS}=-10V, V_{GS}=0V,$ $f=1.0MHz$ | - | 980 | - | pF |
| Output Capacitance | C_{oss} | | - | 100 | - | |
| Reverse Transfer Capacitance | C_{rss} | | - | 81 | - | |
| Switching | | | | | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD}=-10V, I_D=-4.5A,$ $V_{GS}=-4.5V,$ $R_G=6\Omega$ (Note 1,2) | - | 9.8 | - | ns |
| Turn-On Rise Time | t_r | | - | 54 | - | |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 44 | - | |
| Turn-Off Fall Time | t_f | | - | 31 | - | |
| Drain-Source Diode | | | | | | |
| Maximum Continuous Drain-Source Diode Forward Current | I_S | --- | - | - | -1.5 | A |
| Diode Forward Voltage | V_{SD} | $I_S=-1.0A, V_{GS}=0V$ | - | -0.78 | -1.2 | 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

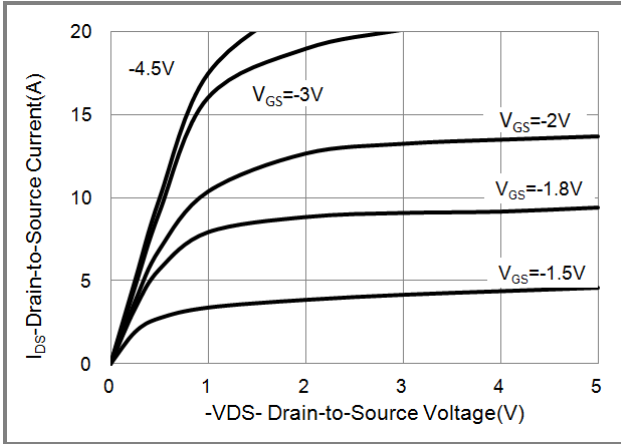


Fig.1 On-Region Characteristics

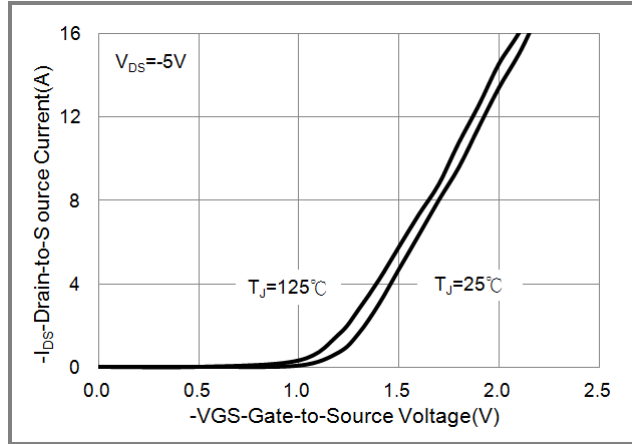


Fig.2 Transfer Characteristics

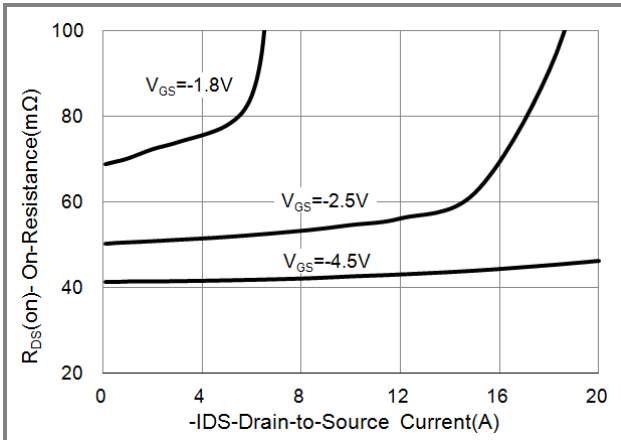


Fig.3 On-Resistance vs. Drain Current

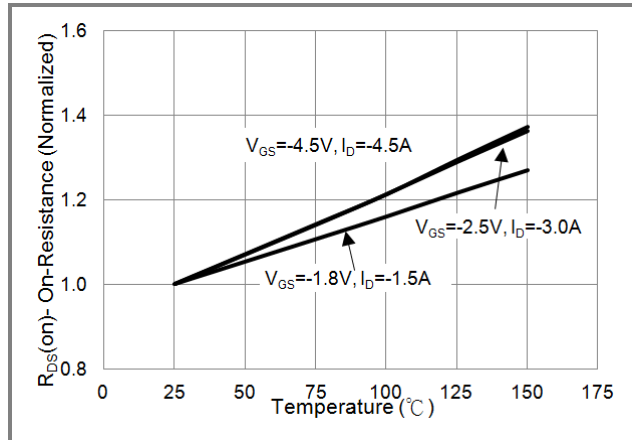


Fig.4 On-Resistance vs. Junction temperature

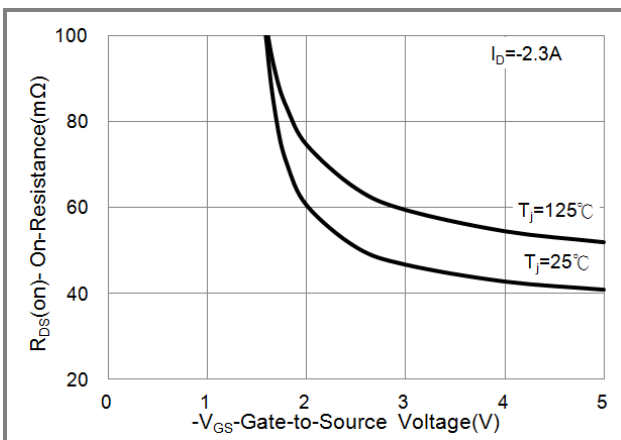


Fig.5 On-Resistance Variation with VGS.

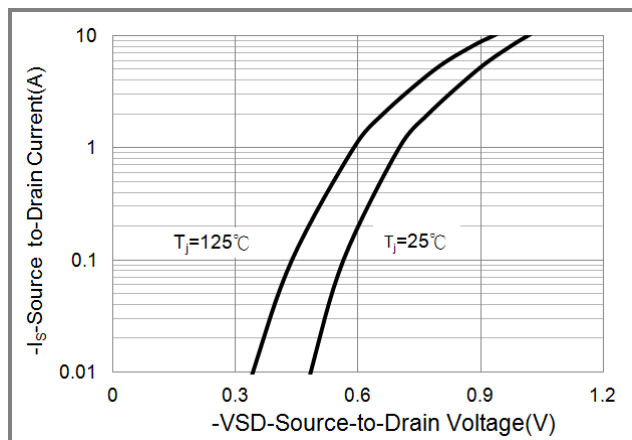


Fig.6 Body Diode Characteristics



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TYPICAL CHARACTERISTIC CURVES

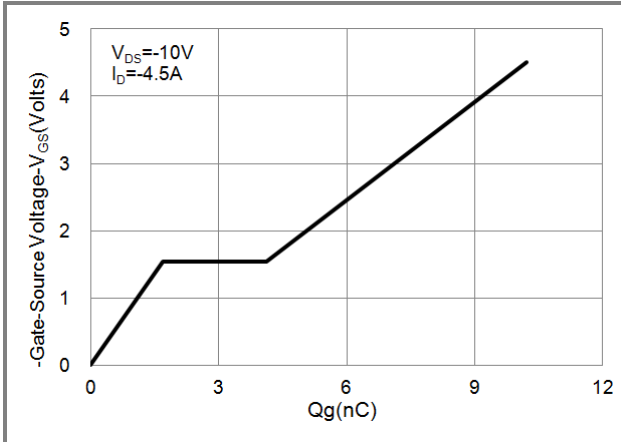


Fig.7 Gate-Charge Characteristics

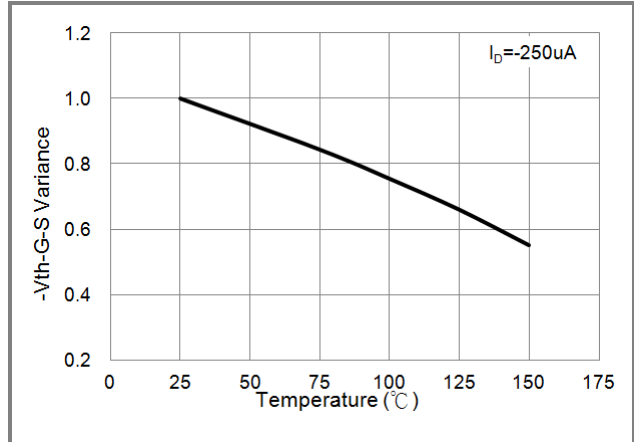


Fig.8 Threshold Voltage Variation with Temperature.

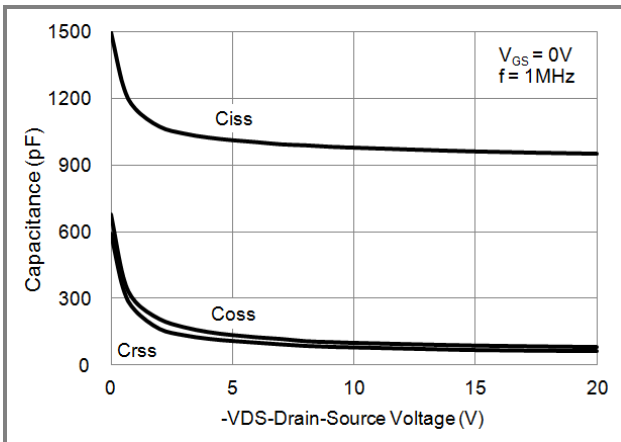


Fig.9 Capacitance vs. Drain-Source Voltage.

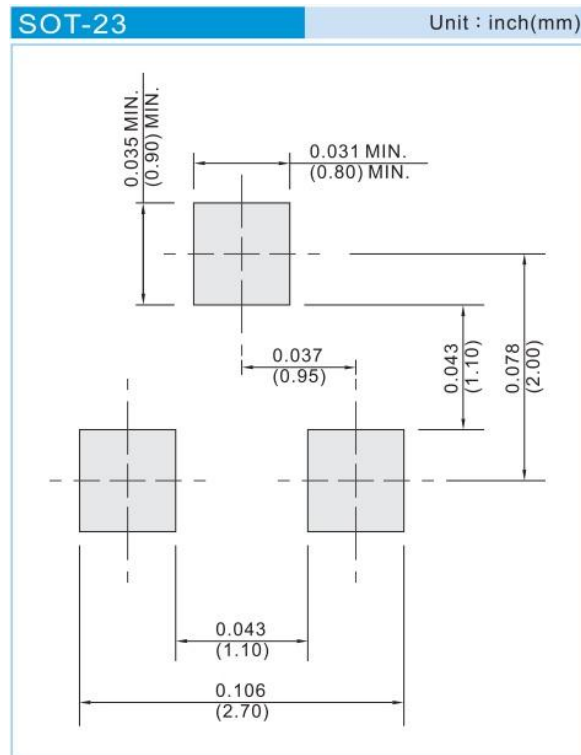


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PART NO PACKING CODE VERSION

| Part No Packing Code | Package Type | Packing type | Marking | Version |
|----------------------|--------------|--------------------|---------|--------------|
| PJA3415A_R1_00001 | SOT-23 | 3K pcs / 7" reel | A5A | Halogen free |
| PJA3415A_R2_00001 | SOT-23 | 12K pcs / 13" reel | A5A | Halogen free |

MOUNTING PAD LAYOUT





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