



PJT138K

50V N-Channel Enhancement Mode MOSFET – ESD Protected

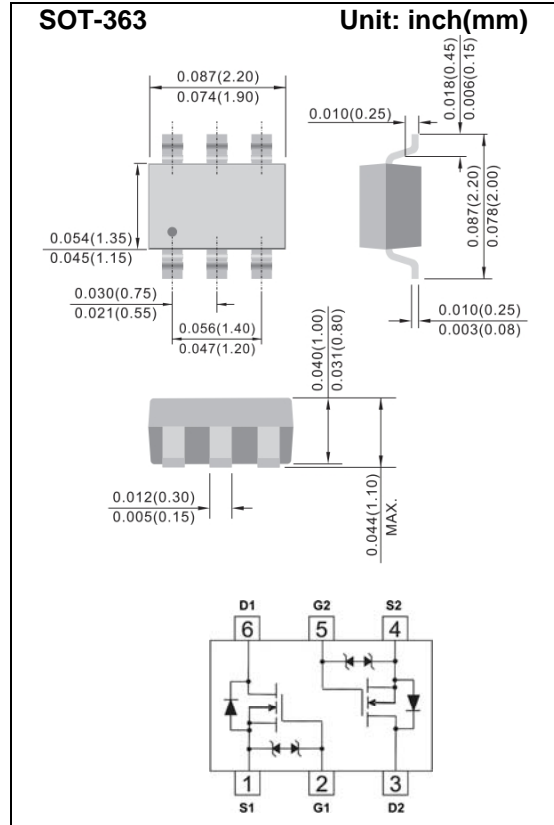
Voltage 50 V **Current** 360mA

Features

- $R_{DS(ON)}$, $V_{GS}@10V$, $I_D@500mA < 1.6\Omega$
- $R_{DS(ON)}$, $V_{GS}@4.5V$, $I_D@200mA < 2.5\Omega$
- $R_{DS(ON)}$, $V_{GS}@2.5V$, $I_D@100mA < 4.5\Omega$
- Advanced Trench Process Technology
- Specially Designed for Battery Operated Systems, Solid-State Relays Drivers: Relay, Displays, Memories, etc.
- ESD Protected 1.5KV HBM
- Lead free in comply with EU RoHS 2011/65/EU directives.
- Green molding compound as per IEC61249 Std. (Halogen Free)

Mechanical Data

- Case: SOT-363 Package
- Terminals : Solderable per MIL-STD-750, Method 2026
- Approx. Weight: 0.00021 ounces, 0.006 grams



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

| PARAMETER | SYMBOL | LIMIT | UNITS | |
|--|-----------------|---------------------------------|---------------------------|----------------------|
| Drain-Source Voltage | V_{DS} | 50 | V | |
| Gate-Source Voltage | V_{GS} | +20 | V | |
| Continuous Drain Current | I_D | 360 | mA | |
| Pulsed Drain Current | I_{DM} | 1200 | mA | |
| Power Dissipation | P_D | $T_A=25^\circ\text{C}$ | 236 | mW |
| | | Derate above 25°C | 1.89 | mW/ $^\circ\text{C}$ |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | -55~150 | $^\circ\text{C}$ | |
| Thermal resistance | $R_{\theta JA}$ | 530 | $^\circ\text{C}/\text{W}$ | |
| - 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} | $V_{GS}=0V, I_D=250\mu A$ | 50 | - | - | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$ | 0.8 | 1.0 | 1.5 | V |
| Drain-Source On-State Resistance | $R_{DS(on)}$ | $V_{GS}=10V, I_D=500mA$ | - | 0.96 | 1.6 | Ω |
| | | $V_{GS}=4.5V, I_D=200mA$ | - | 1.25 | 2.5 | |
| | | $V_{GS}=2.5V, I_D=100mA$ | - | 2.73 | 4.5 | |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=50V, V_{GS}=0V$ | - | 0.01 | 1 | μA |
| Gate-Source Leakage Current | I_{GSS} | $V_{GS}=\pm 20V, V_{DS}=0V$ | - | ± 3.0 | ± 10 | μA |
| Dynamic | | | | | | |
| Total Gate Charge | Q_g | $V_{DS}=25V, I_D=250mA,$ $V_{GS}=4.5V$ (Note 1,2) | - | 0.63 | 1 | nC |
| Gate-Source Charge | Q_{gs} | | - | 0.2 | - | |
| Gate-Drain Charge | Q_{gd} | | - | 0.23 | - | |
| Input Capacitance | C_{iss} | $V_{DS}=25V, V_{GS}=0V,$ $f=1.0MHz$ | - | 40.8 | 50 | μF |
| Output Capacitance | C_{oss} | | - | 2.8 | 10 | |
| Reverse Transfer Capacitance | C_{rss} | | - | 2.7 | 5 | |
| Switching | | | | | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD}=25V, I_D=500mA,$ $V_{GS}=10V,$ $R_G=6\Omega$ (Note 1,2) | - | 2.2 | 5 | ns |
| Turn-On Rise Time | t_r | | - | 19.2 | 38 | |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 6.2 | 12 | |
| Turn-Off Fall Time | t_f | | - | 23 | 50 | |
| Drain-Source Diode | | | | | | |
| Maximum Continuous Drain-Source Diode Forward Current | I_S | --- | - | - | 500 | mA |
| Diode Forward Voltage | V_{SD} | $I_S=500mA, V_{GS}=0V$ | | 0.86 | 1.5 | 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 square pad of copper



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TYPICAL CHARACTERISTIC CURVES

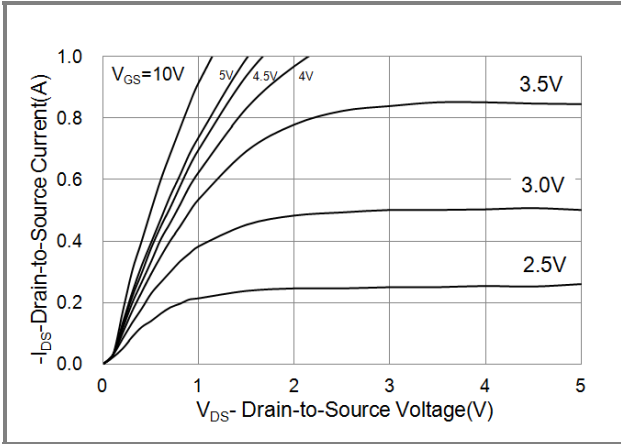


Fig.1 On-Region Characteristics

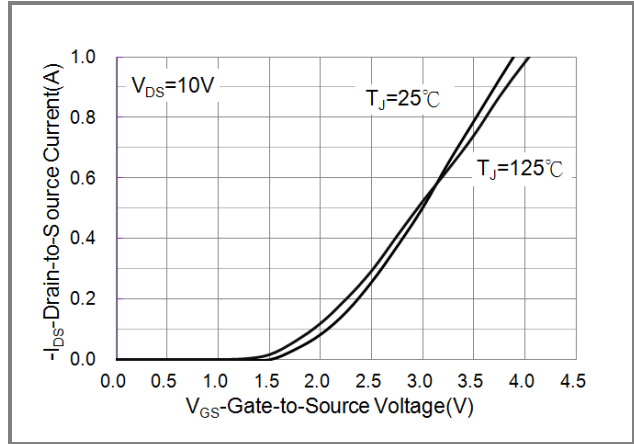


Fig.2 Transfer Characteristics

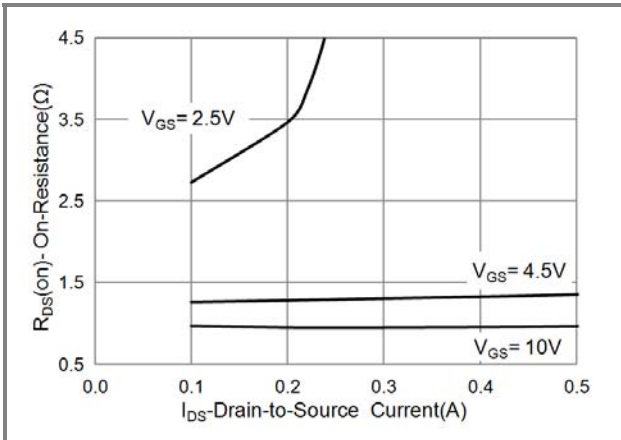


Fig.3 On-Resistance vs. Drain Current

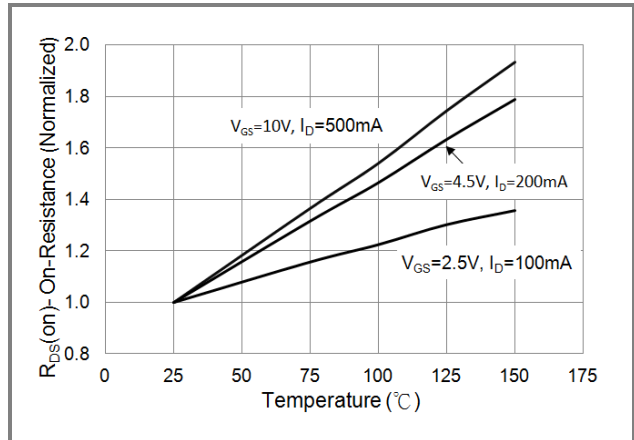


Fig.4 On-Resistance vs. Junction temperature

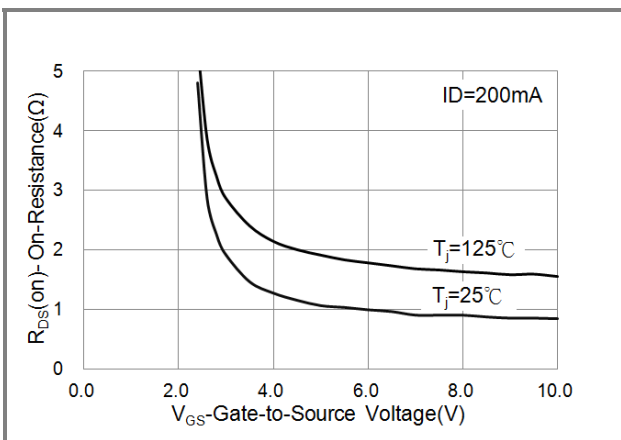


Fig.5 On-Resistance Variation with VGS.

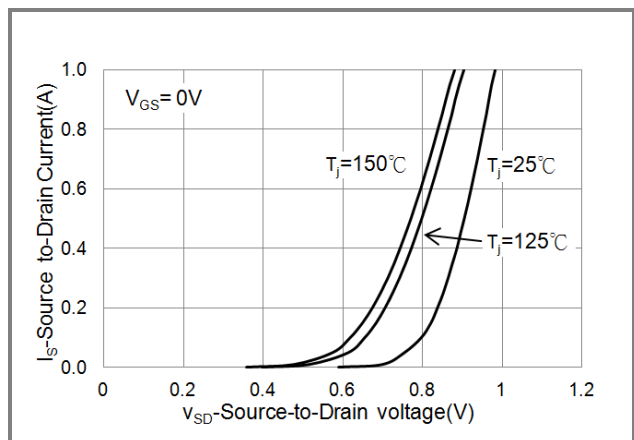


Fig.6 Body Diode Characteristics



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TYPICAL CHARACTERISTIC CURVES

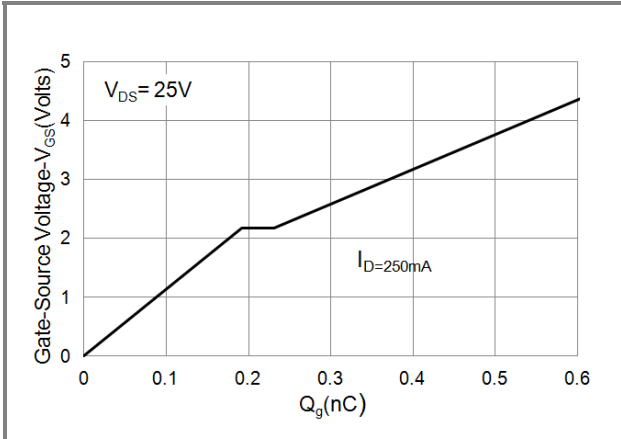


Fig.7 Gate-Charge Characteristics

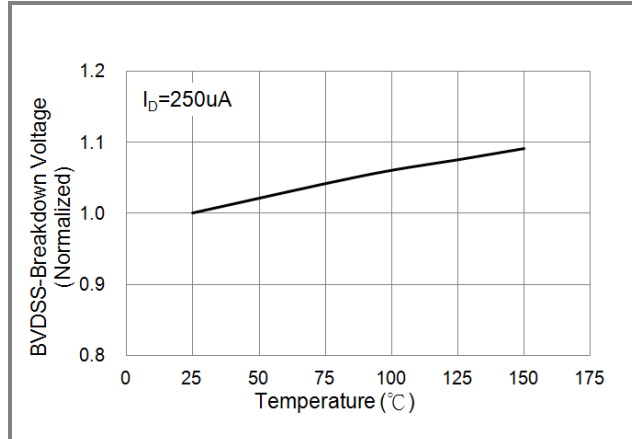


Fig.8 Breakdown Voltage Variation vs. Temperature

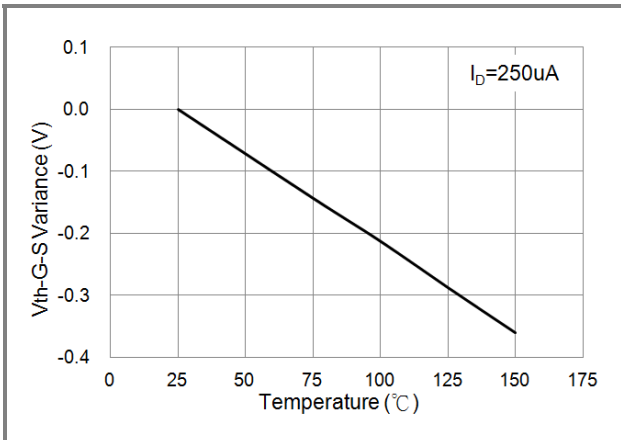


Fig.9 Threshold Voltage Variation with Temperature.

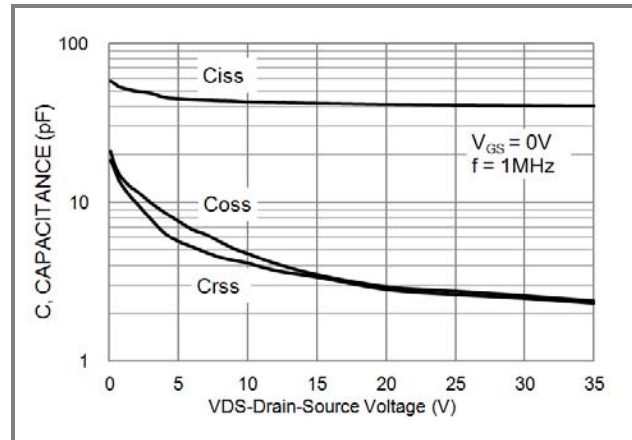


Fig.10 Capacitance vs. Drain-Source Voltage.

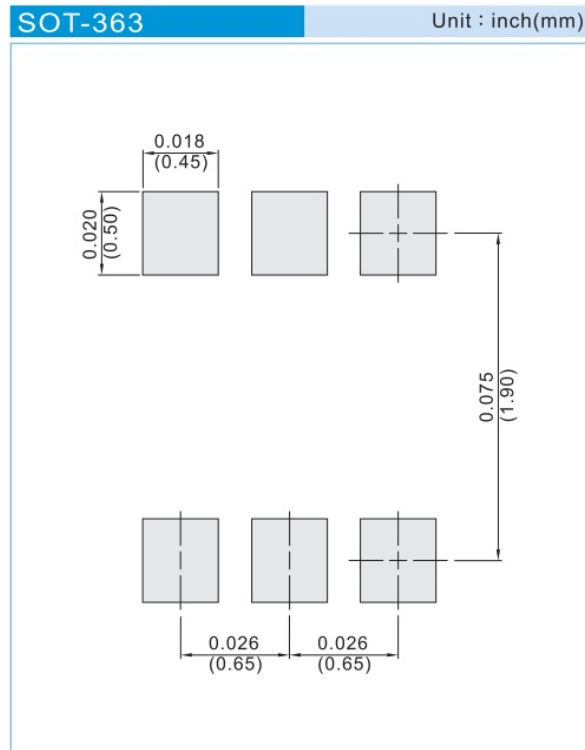


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PART NO PACKING CODE VERSION

| PART NO PACKING CODE VERSION | Package Type | Packing type | Marking | Version |
|---------------------------------|--------------|--------------------|---------|--------------|
| PJT138K_R1_00001 | SOT-363 | 3K pcs / 7" reel | 8KD | Halogen free |
| PJT138K_R2_00001 | SOT-363 | 10K pcs / 13" reel | 8KD | Halogen free |

MOUNTING PAD LAYOUT





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