



# PJE8404

## 30V N-Channel Enhancement Mode MOSFET – ESD Protected

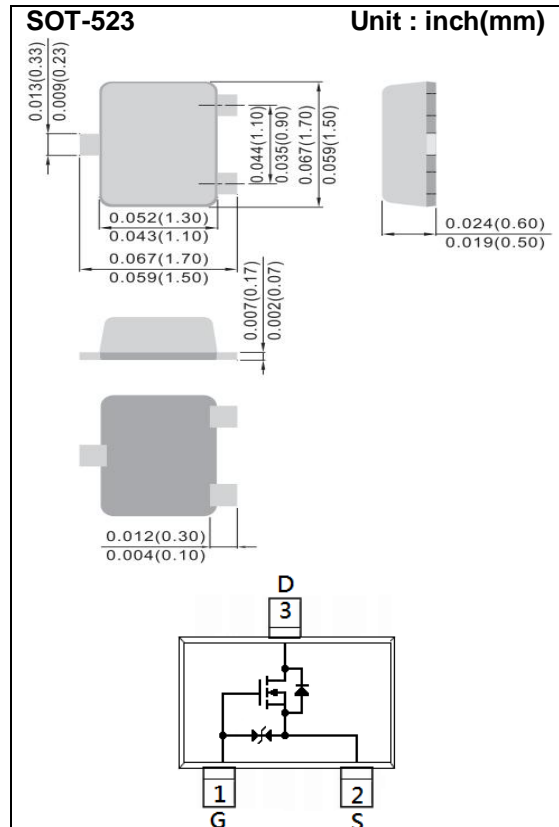
|                |             |                |             |
|----------------|-------------|----------------|-------------|
| <b>Voltage</b> | <b>30 V</b> | <b>Current</b> | <b>0.6A</b> |
|----------------|-------------|----------------|-------------|

### Features

- RDS(ON) , VGS@4.5V, ID@0.6A<220mΩ
- RDS(ON) , VGS@2.5V, ID@0.4A<290mΩ
- RDS(ON) , VGS@1.8V, ID@0.1A<600mΩ
- 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-523 Package
- Terminals : Solderable per MIL-STD-750, Method 2026
- Approx. Weight : 0.00007 ounces, 0.002 grams
- Marking : E04



### Maximum Ratings and Thermal Characteristics (T<sub>A</sub>=25°C unless otherwise noted)

| PARAMETER  | SYMBOL                            | LIMIT                | UNITS |       |
|--|-----------------------------------|----------------------|-------|-------|
| Drain-Source Voltage                             | V <sub>DS</sub>                   | 30                   | V     |       |
| Gate-Source Voltage                              | V <sub>GS</sub>                   | ±8                   | V     |       |
| Continuous Drain Current                         | I <sub>D</sub>                    | 0.6                  | A     |       |
| Pulsed Drain Current                             | I <sub>DM</sub>                   | 2.4                  | A     |       |
| Power Dissipation                                | P <sub>D</sub>                    | T <sub>a</sub> =25°C | 300   | mW    |
|  |                                   | Derate above 25°C    | 2.4   | mW/°C |
| Operating Junction and Storage Temperature Range | T <sub>J</sub> , T <sub>STG</sub> | -55~150              | °C    |       |
| Typical Thermal resistance                       | R <sub>θJA</sub>                  | 417                  | °C/W  |       |
| - Junction to Ambient <sup>(Note 3)</sup>        |                                   |                      |       |       |



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

| PARAMETER   | SYMBOL       | TEST CONDITION  | MIN. | TYP.      | MAX.     | UNITS      |
|---|--------------|---|------|-----------|----------|------------|
| <b>Static</b>   |              |   |      |           |          |            |
| Drain-Source Breakdown Voltage                        | $BV_{DSS}$   | $V_{GS}=0V, I_D=250\mu A$   | 30   | -         | -        | V          |
| Gate Threshold Voltage                                | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$   | 0.5  | 0.79      | 1.3      | V          |
| Drain-Source On-State Resistance                      | $R_{DS(on)}$ | $V_{GS}=4.5V, I_D=0.6A$   | -    | 177       | 220      | m $\Omega$ |
|   |              | $V_{GS}=2.5V, I_D=0.4A$   | -    | 223       | 290      |            |
|   |              | $V_{GS}=1.8V, I_D=0.1A$   | -    | 330       | 600      |            |
| Zero Gate Voltage Drain Current                       | $I_{DSS}$    | $V_{DS}=30V, V_{GS}=0V$   | -    | 0.01      | 1        | $\mu A$    |
| Gate-Source Leakage Current                           | $I_{GSS}$    | $V_{GS}=\pm 8V, V_{DS}=0V$  | -    | $\pm 1.5$ | $\pm 10$ | $\mu A$    |
| <b>Dynamic</b> (Note 5)                               |              |   |      |           |          |            |
| Total Gate Charge                                     | $Q_g$        | $V_{DS}=15V, I_D=0.6A,$<br>$V_{GS}=4.5V$ (Note 1,2)                   | -    | 1.5       | -        | nC         |
| Gate-Source Charge                                    | $Q_{gs}$     |   | -    | 0.3       | -        |            |
| Gate-Drain Charge                                     | $Q_{gd}$     |   | -    | 0.3       | -        |            |
| Input Capacitance                                     | $C_{iss}$    | $V_{DS}=15V, V_{GS}=0V,$<br>$f=1.0MHz$                                | -    | 93        | -        | pF         |
| Output Capacitance                                    | $C_{oss}$    |   | -    | 19        | -        |            |
| Reverse Transfer Capacitance                          | $C_{rss}$    |   | -    | 6         | -        |            |
| Turn-On Delay Time                                    | $t_{d(on)}$  | $V_{DD}=15V, I_D=0.6A,$<br>$V_{GS}=4.5V,$<br>$R_G=6\Omega$ (Note 1,2) | -    | 6         | -        | ns         |
| Turn-On Rise Time                                     | $t_r$        |   | -    | 33        | -        |            |
| Turn-Off Delay Time                                   | $t_{d(off)}$ |   | -    | 37        | -        |            |
| Turn-Off Fall Time                                    | $t_f$        |   | -    | 32        | -        |            |
| <b>Drain-Source Diode</b>                             |              |   |      |           |          |            |
| Maximum Continuous Drain-Source Diode Forward Current | $I_S$        | ---   | -    | -         | 0.4      | A          |
| Diode Forward Voltage                                 | $V_{SD}$     | $I_S=1A, V_{GS}=0V$   | -    | 0.81      | 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
5. Guaranteed by design, not subject to production testing.



# PJE8404

## TYPICAL CHARACTERISTIC CURVES

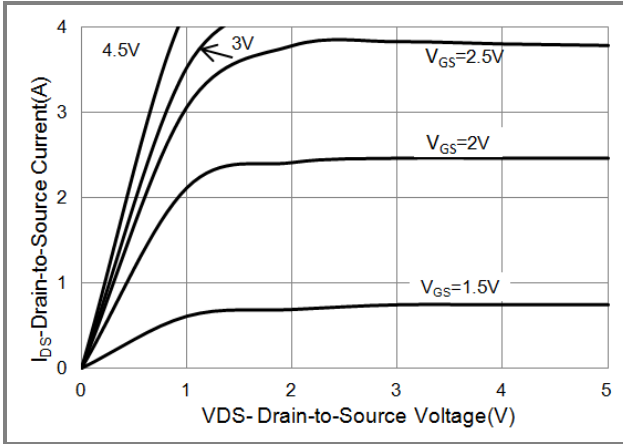


Fig.1 On-Region Characteristics

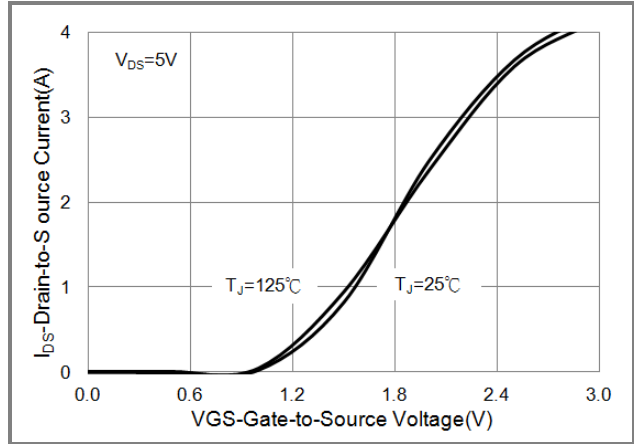


Fig.2 Transfer Characteristics

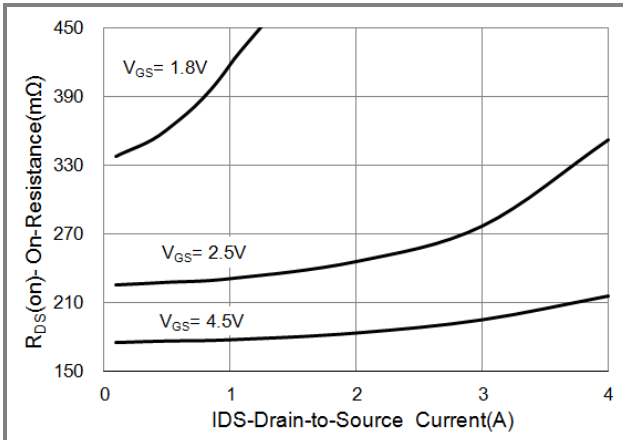


Fig.3 On-Resistance vs. Drain Current

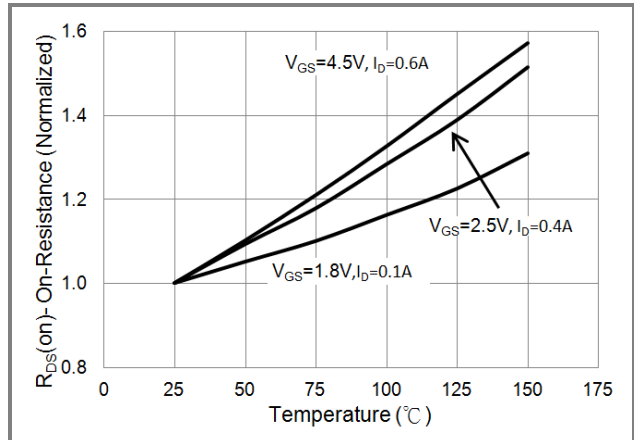


Fig.4 On-Resistance vs. Junction temperature

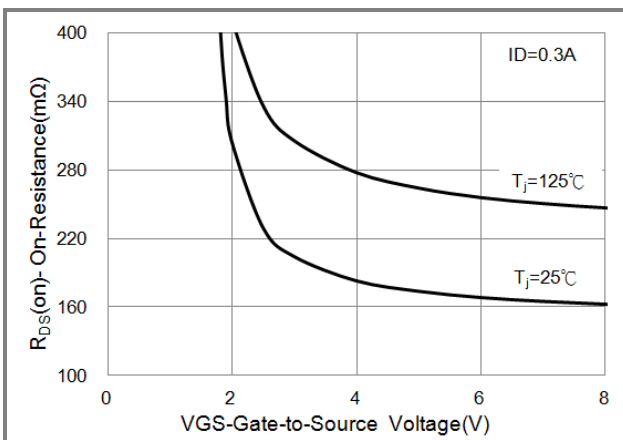


Fig.5 On-Resistance Variation with VGS.

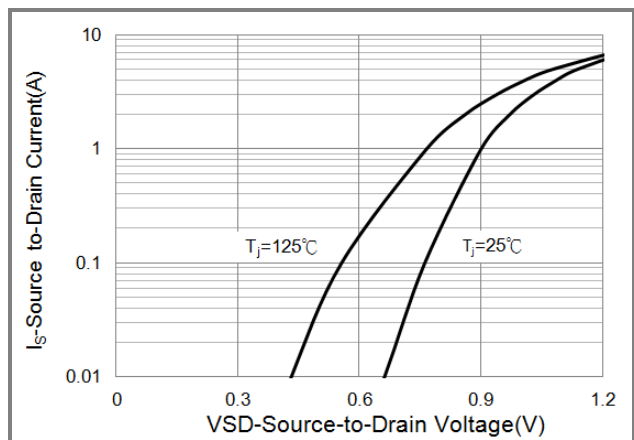


Fig.6 Body Diode Characteristics



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## TYPICAL CHARACTERISTIC CURVES

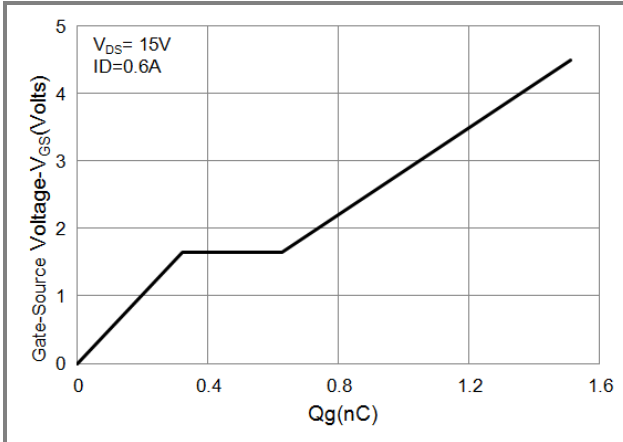


Fig.7 Gate-Charge Characteristics

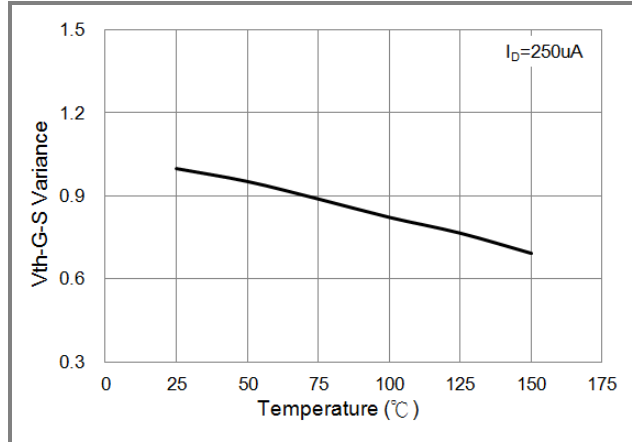


Fig.8 Threshold Voltage Variation with Temperature.

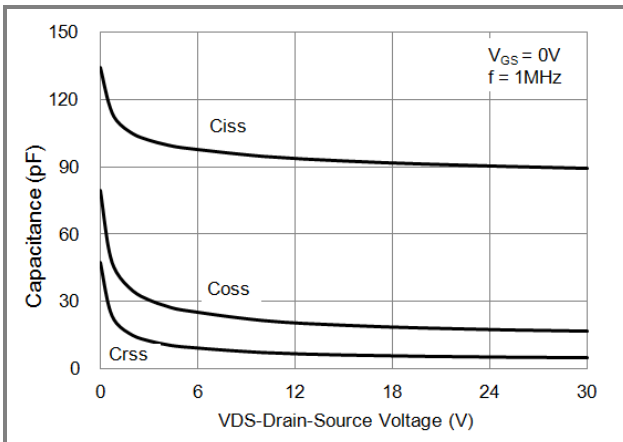


Fig.9 Capacitance vs. Drain-Source Voltage.

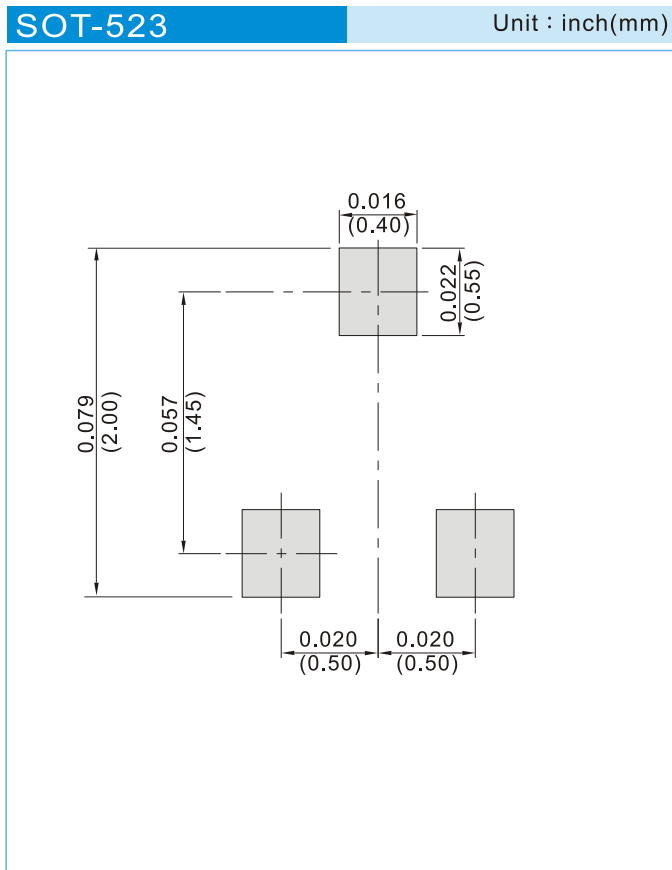


# PJE8404

## PART NO PACKING CODE VERSION

| Part No Packing Code | Package Type | Packing type     | Marking | Version      |
|----------------------|--------------|------------------|---------|--------------|
| PJE8404_R1_00001     | SOT-523      | 4K pcs / 7" reel | E04     | Halogen free |

## MOUNTING PAD LAYOUT





## PJE8404

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