



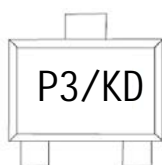
## FEATURE

- Lead Free Product is Acquired
- Surface Mount Package
- P-Channel Switch with Low  $R_{DS(on)}$
- Operated at Low Logic Level Gate Drive

## P-Channel MOSFET

| $V_{(VR)DSS}$ | $R_{DS(on)Typ}$ | $I_D$  |
|---------------|-----------------|--------|
| -20V          | 520mΩ@-4.5V     | -0.66A |
|               | 700mΩ@-2.5V     |        |

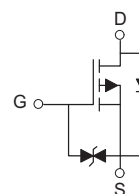
## MARKING



## APPLICATION

- Load/Power Switching
- Interfacing, Logic Switching
- Battery Management for Ultra Small Portable Electronics

## Equivalent Circuit



## Maximum ratings( $T_a=25^{\circ}C$ unless otherwise noted)

| Parameter  | Symbol          | Value    | Unit          |
|--|-----------------|----------|---------------|
| Drain-Source Voltage   | $V_{DS}$        | -20      | V             |
| Typical Gate-Source Voltage                                      | $V_{GS}$        | ±8       | V             |
| Continuous Drain Current (note 1)                                | $I_D$           | -0.66    | A             |
| Pulsed Drain Current ( $t_p=10\mu s$ )                           | $I_{DM}$        | -1.2     | A             |
| Power Dissipation (note 1)                                       | $P_D$           | 150      | mW            |
| Thermal Resistance from Junction to Ambient (note 1)             | $R_{\theta JA}$ | 833      | $^{\circ}C/W$ |
| Operation Junction and Storage Temperature Range                 | $T_J, T_{STG}$  | -55~+150 | $^{\circ}C$   |
| Lead Temperature for Soldering Purposes(1/8" from case for 10 s) | $T_L$           | 260      | $^{\circ}C$   |



**MOSFET ELECTRICAL CHARACTERISTICS  $T_a=25^\circ\text{C}$  unless otherwise specified**

| Parameter                                | Symbol        | Test Condition   | Min   | Typ   | Max      | Unit      |
|--|---------------|--|-------|-------|----------|-----------|
| <b>STATIC CHARACTERISTICS</b>            |               |  |       |       |          |           |
| Drain-source breakdown voltage           | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = -250\mu A$   | -20   |       |          | V         |
| Zero gate voltage drain current          | $I_{DSS}$     | $V_{DS} = -20V, V_{GS} = 0V$   |       |       | -1       | $\mu A$   |
| Gate-body leakage current                | $I_{GSS}$     | $V_{GS} = \pm 10V, V_{DS} = 0V$  |       |       | $\pm 20$ | $\mu A$   |
| Gate threshold voltage (note 2)          | $V_{GS(th)}$  | $V_{DS} = V_{GS}, I_D = -250\mu A$                                     | -0.35 | -0.45 | -1.1     | V         |
| Drain-source on-resistance (note 2)      | $R_{DS(on)}$  | $V_{GS} = -4.5V, I_D = -0.5A$  |       | 520   | 650      | $m\Omega$ |
|  |               | $V_{GS} = -2.5V, I_D = -0.5A$  |       | 700   | 850      | $m\Omega$ |
|  |               | $V_{GS} = -1.8V, I_D = -0.5A$  |       | 950   |          | $m\Omega$ |
| Forward transconductance (note 2)        | $g_{FS}$      | $V_{DS} = -10V, I_D = -0.54A$  |       | 1.2   |          | S         |
| Diode forward voltage                    | $V_{SD}$      | $I_S = -0.5A, V_{GS} = 0V$   |       |       | -1.2     | V         |
| <b>DYNAMIC CHARACTERISTICS(note 4)</b>   |               |  |       |       |          |           |
| Input capacitance                        | $C_{iss}$     | $V_{DS} = -16V, V_{GS} = 0V, f = 1MHz$                                 |       | 113   | 170      | pF        |
| Output capacitance                       | $C_{oss}$     |  |       | 15    | 25       | pF        |
| Reverse transfer capacitance             | $C_{rss}$     |  |       | 9     | 15       | pF        |
| <b>SWITCHING CHARACTERISTICS(note 4)</b> |               |  |       |       |          |           |
| Turn-on delay time (note 3)              | $t_{d(on)}$   | $V_{GS} = -4.5V, V_{DS} = -10V,$<br>$I_D = -200mA, R_{GEN} = 10\Omega$ |       | 9     |          | ns        |
| Turn-on rise time (note 3)               | $t_r$         |  |       | 5.8   |          | ns        |
| Turn-off delay time (note 3)             | $t_{d(off)}$  |  |       | 32.7  |          | ns        |
| Turn-off fall time (note 3)              | $t_f$         |  |       | 20.3  |          | ns        |

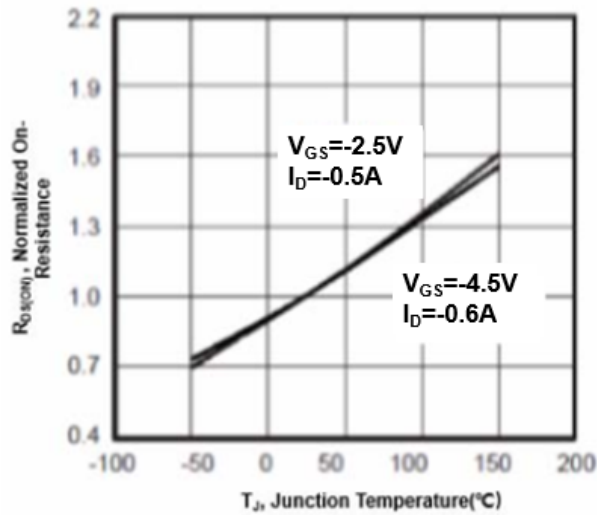
Notes:

1. Surface mounted on FR4 board using the minimum recommended pad size.
2. Pulse Test : Pulse Width=300 $\mu s$ , Duty Cycle=2%.
3. Switching characteristics are independent of operating junction temperatures.
4. Guaranteed by design, not subject to producing.

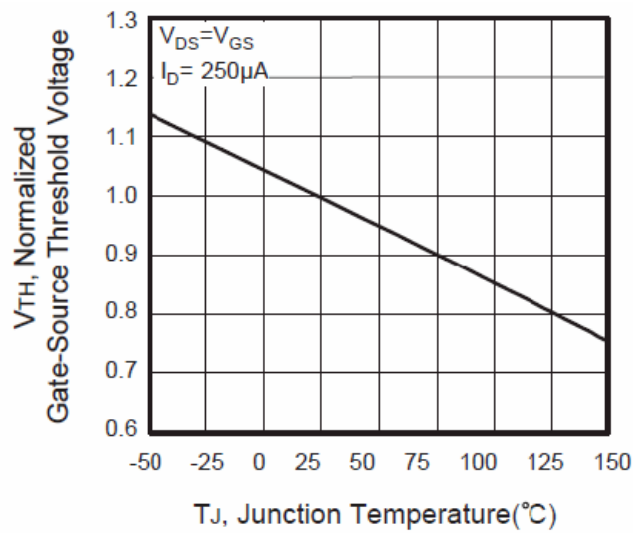
Typical Characteristics

IV. Temperature vs  $R_{DS(ON)} / V_{GS(th)}$

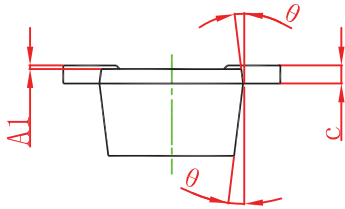
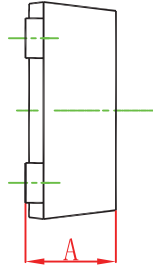
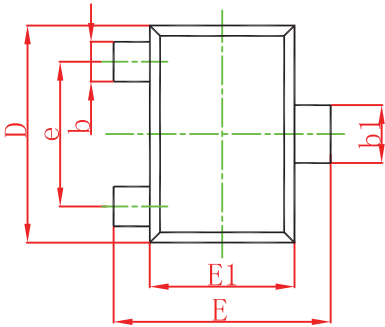
$R_{DS(ON)}$  vs Junction Temperature



$V_{GS(th)}$  vs Junction Temperature

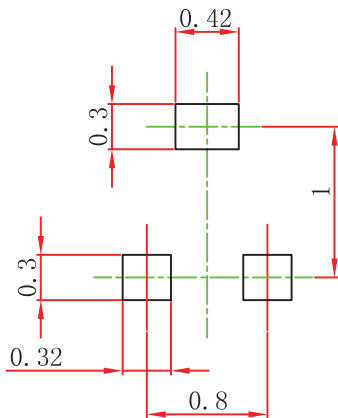


**SOT-723 Package Outline Dimensions**



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 0.430                     | 0.500 | 0.017                | 0.020 |
| A1     | 0.000                     | 0.050 | 0.000                | 0.002 |
| b      | 0.170                     | 0.270 | 0.007                | 0.011 |
| b1     | 0.270                     | 0.370 | 0.011                | 0.015 |
| c      | 0.080                     | 0.150 | 0.003                | 0.006 |
| D      | 1.150                     | 1.250 | 0.045                | 0.049 |
| E      | 1.150                     | 1.250 | 0.045                | 0.049 |
| E1     | 0.750                     | 0.850 | 0.030                | 0.033 |
| e      | 0.800TYP.                 |       | 0.031TYP.            |       |
| θ      | 7° REF.                   |       | 7° REF.              |       |

**SOT-723 Suggested Pad Layout**



Note:  
 1. Controlling dimension: in millimeters.  
 2. General tolerance: ± 0.05mm.  
 3. The pad layout is for reference purposes only.