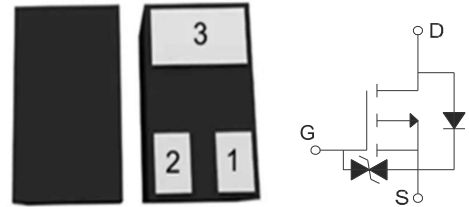


**P-Channel Plastic-Encapsulate MOSFET****PRIMARY CHARACTERISTICS**

| BV <sub>DSS</sub> | R <sub>DS(on)</sub> MAX      | I <sub>D</sub> |
|-------------------|------------------------------|----------------|
| -20V              | 520mΩ@V <sub>GS</sub> =-4.5V | -0.66A         |
|                   | 780mΩ@V <sub>GS</sub> =-2.5V |                |

**SCHEMATIC DIAGRAM  
DFN1006-3L PACKAGE**

1.Gate 2.Source 3.Drain

Bottom view

**FEATURES**

- P-Channel Switch with Low RDS(ON)
- Surface Mount Package
- Lead free product is acquired

**Absolute Maximum Ratings** (*T<sub>Ambient</sub>*=25°C unless noted otherwise)

| Symbol           | Description                 | Limit       | Unit |
|------------------|-----------------------------|-------------|------|
| V <sub>DS</sub>  | Drain-Source Voltage        | -20         | Volt |
| V <sub>GS</sub>  | Gate-Source Voltage         | ±10         | Volt |
| I <sub>D</sub>   | Drain Current-Continuous    | -0.66       | Amp  |
| I <sub>DM</sub>  | Drain Current-Pulsed        | -1.2        | Amp  |
| P <sub>D</sub>   | Maximum Power Dissipation   | 0.275       | Watt |
| T <sub>J</sub>   | Operating Temperature Range | -55 to +150 | °C   |
| T <sub>STG</sub> | Storage Temperature Range   | -55 to +150 | °C   |

**Thermal Characteristic**

| Symbol           | Description                             | Limit | Unit |
|------------------|-----------------------------------------|-------|------|
| R <sub>θJA</sub> | Thermal Resistance, Junction to Ambient | 455   | °C/W |



## P-Channel Plastic-Encapsulate MOSFET

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

| Symbol                             | Parameters                       | Conditions                                                                                    | Min.  | Typ.  | Max. | Unit |
|------------------------------------|----------------------------------|-----------------------------------------------------------------------------------------------|-------|-------|------|------|
| Off Characteristics                |                                  |                                                                                               |       |       |      |      |
| BV <sub>DSS</sub>                  | Drain-Source Breakdown Voltage   | V <sub>GS</sub> =-0V, I <sub>D</sub> =-250μA                                                  | -20   |       |      | Volt |
| I <sub>DSS</sub>                   | Zero Gate Voltage Drain Current  | V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V                                                    |       |       | -1   | μA   |
| I <sub>GSS</sub>                   | Gate-Body Leakage Current        | V <sub>GS</sub> =±10V, V <sub>DS</sub> =0V                                                    |       |       | ±10  | μA   |
| On Characteristics                 |                                  |                                                                                               |       |       |      |      |
| V <sub>GS(th)</sub>                | Gate Threshold Voltage           | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA                                     | -0.35 | -0.65 | -1.1 | Volt |
| R <sub>DS(ON)</sub>                | Drain-Source On-State Resistance | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-1.0A                                                 |       | 380   | 520  | mΩ   |
|                                    |                                  | V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-0.8A                                                 |       | 630   | 780  | mΩ   |
| Dynamic Characteristics            |                                  |                                                                                               |       |       |      |      |
| C <sub>iss</sub>                   | Input Capacitance                | V <sub>DD</sub> =-16V, V <sub>GS</sub> =0V ,<br>F=1MHz                                        |       | 113   |      | pF   |
| C <sub>oss</sub>                   | Output Capacitance               |                                                                                               |       | 15    |      | pF   |
| C <sub>rss</sub>                   | Reverse Transfer Capacitance     |                                                                                               |       | 9     |      | pF   |
| Switching Characteristics          |                                  |                                                                                               |       |       |      |      |
| td(on)                             | Turn-on Delay Time               | V <sub>DD</sub> =-10V, I <sub>D</sub> =-0.2A<br>V <sub>GS</sub> =-4.5V, R <sub>GEN</sub> =10Ω |       | 9     |      | nS   |
| tr                                 | Turn-on Rise Time                |                                                                                               |       | 5.5   |      | nS   |
| td(off)                            | Turn-Off Delay Time              |                                                                                               |       | 30.8  |      | nS   |
| tf                                 | Turn-Off Fall Time               |                                                                                               |       | 20    |      | nS   |
| Q <sub>g</sub>                     | Total Gate Charge                | V <sub>DS</sub> =-10V, I <sub>D</sub> =-0.5A,<br>V <sub>GS</sub> =-4.5V                       |       | 1.25  |      | nC   |
| Q <sub>gs</sub>                    | Gate-Source Charge               |                                                                                               |       | 0.35  |      | nC   |
| Q <sub>gd</sub>                    | Gate-Drain Charge                |                                                                                               |       | 0.29  |      | nC   |
| Drain-Source Diode Characteristics |                                  |                                                                                               |       |       |      |      |
| V <sub>SD</sub>                    | Diode Forward Voltage            | V <sub>GS</sub> =0V, I <sub>S</sub> =-0.66A                                                   |       |       | -1.2 | V    |



## P-Channel Plastic-Encapsulate MOSFET

### Typical Electrical and Thermal Characteristics

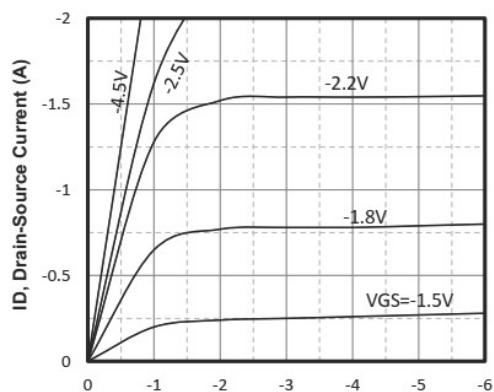


Fig1. Typical Output Characteristics

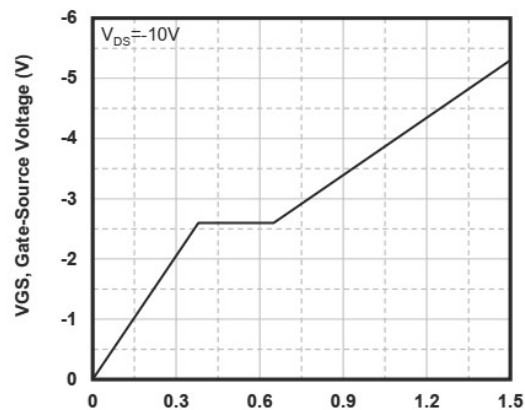


Fig2. Typical Gate Charge Vs. Gate-Source Voltage

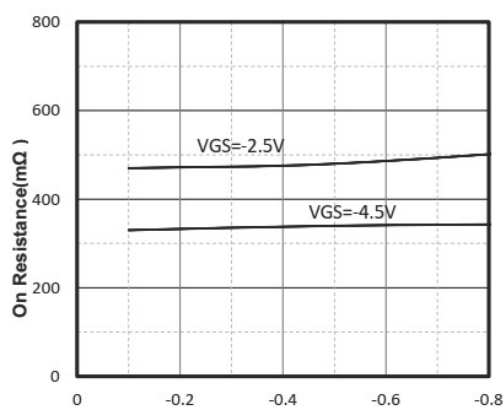


Fig3. Drain-Source on Resistance

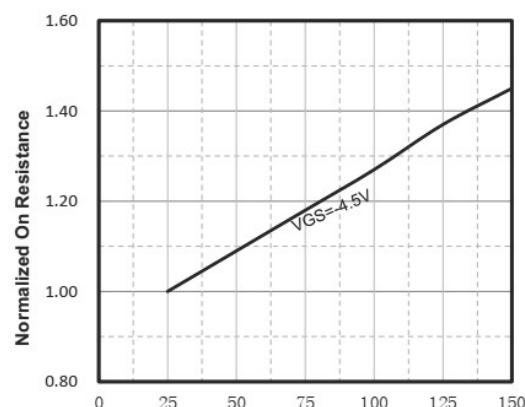


Fig4. Normalized On-Resistance Vs. Temperature

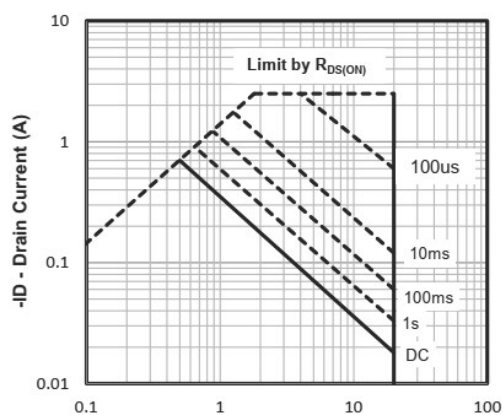


Fig5. Maximum Safe Operating Area

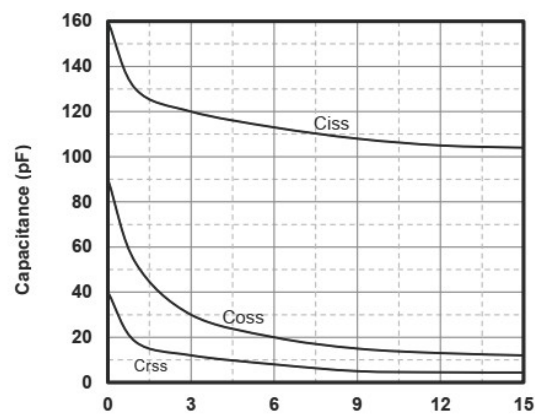
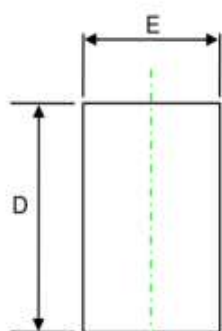


Fig6. Typical Capacitance Vs. Drain-Source Voltage

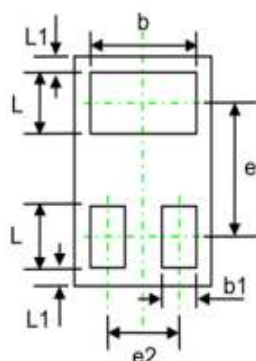


## Outline Drawing

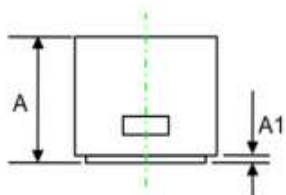
DFN1006-3L(Z)



TOP VIEW



BOTTOM VIEW



SIDE VIEW

## SIDE VIEW

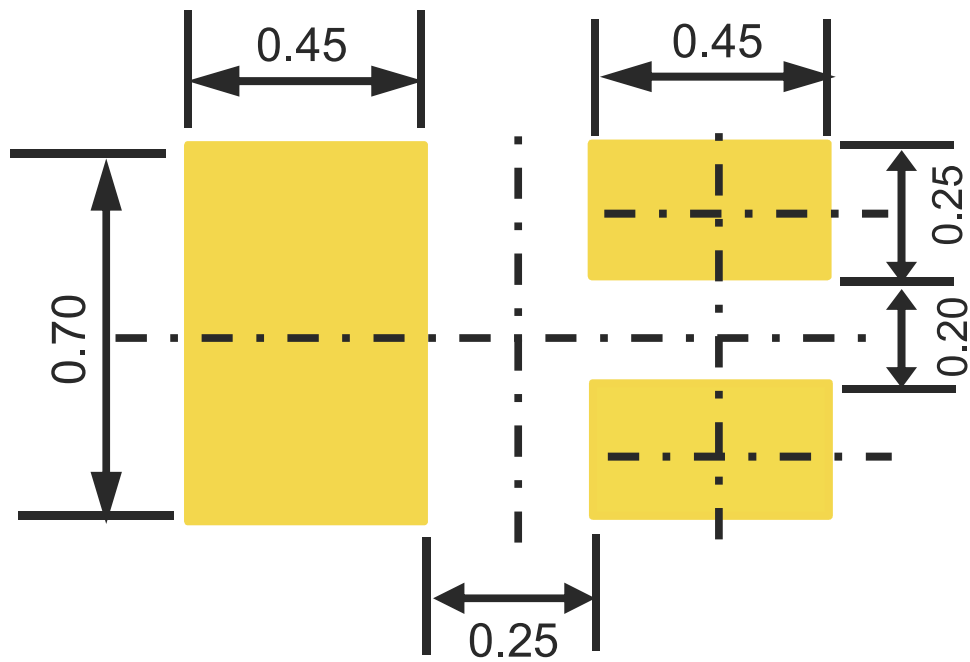
| Symbol | Dimensions in Millimeters(mm) |       |
|--------|-------------------------------|-------|
|        | Min                           | Max   |
| A      | 0.450                         | 0.550 |
| A1     | 0.000                         | 0.030 |
| D      | 0.950                         | 1.050 |
| E      | 0.550                         | 0.650 |
| b      | 0.470                         | 0.550 |
| e      | 0.65TYP                       |       |
| e2     | 0.35TYP                       |       |
| L1     | 0.05TYP                       |       |
| L      | 0.220                         | 0.300 |
| b1     | 0.110                         | 0.190 |

Rev.C



## Suggested Soldering Pad Layout

DFN1006-3L



Dimensions in inches and (millimeters)

RevC

**P-Channel Plastic-Encapsulate MOSFET****Ordering Information:**

| Device PN                                                       | Marking <sup>(4)</sup> | Packing                 |
|-----------------------------------------------------------------|------------------------|-------------------------|
| SE20P08ED -T <sup>(1)</sup> H <sup>(2)</sup> -WS <sup>(3)</sup> | 39K                    | Tape&Reel: 10 Kpcs/Reel |

Note: (1) Packing code, Tape & Reel Packing

(2) Packing code suffix "G" for RoHS product ; Packing code Suffix "H" for halogen free product.  
All materials and products supplied comply with the U.S. Toxic Substances Control Act statement, PBT Chemicals.

(3) Willas brand abbreviation, Label Type does not display

(4) There may be additional marking, which relates to the lot trace code information (data code and vendor code), the logo or the environmental category on the device

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