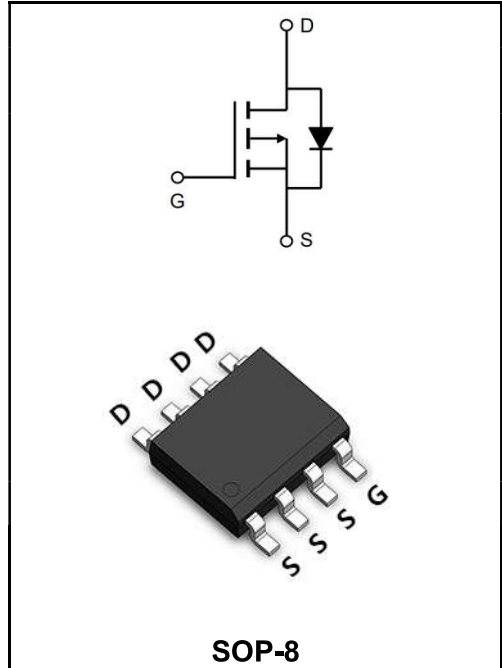


**-40V P-CHANNEL ENHANCEMENT MODE MOSFET**

**MAIN CHARACTERISTICS**

|   |                              |
|---|------------------------------|
| <b>I<sub>D</sub></b>                                | -12A                         |
| <b>V<sub>DSS</sub></b>                              | -40V                         |
| <b>R<sub>DS(on)-typ(@V<sub>GS</sub>=-10V)</sub></b> | < 18mΩ ( <b>Type:14 mΩ</b> ) |



**Application**

- ◆ Battery protection
- ◆ Load switch
- ◆ Uninterruptible power supply

**Maximum Ratings at T<sub>c</sub>=25°C unless otherwise specified**

| Characteristics   | Symbols          | Value       | Units |
|---|------------------|-------------|-------|
| Drain-Source Voltage  | V <sub>DS</sub>  | -40         | V     |
| Gate - Source Voltage   | V <sub>GS</sub>  | ±20         | V     |
| Continuous Drain Current, V <sub>GS</sub> @ -10V <sup>1</sup> @T <sub>C</sub> =25°C | I <sub>D</sub>   | -12         | A     |
| Continuous Drain Current, V <sub>GS</sub> @ -10V <sup>1</sup> @T <sub>C</sub> =75°C | I <sub>D</sub>   | -8.9        | A     |
| Pulsed Drain Current <sup>2</sup>   | I <sub>DM</sub>  | -36         | A     |
| Single Pulse Avalanche Energy <sup>3</sup>  | E <sub>AS</sub>  | 125         | mJ    |
| Total Power Dissipation <sup>4</sup> @T <sub>C</sub> =25°C                          | P <sub>D</sub>   | 3.5         | W     |
| Total Power Dissipation <sup>4</sup> @T <sub>A</sub> =25°C                          | P <sub>D</sub>   | 1.9         | W     |
| Storage Temperature Range   | T <sub>STG</sub> | -55 to +150 | °C    |
| Operating Junction Temperature Range  | T <sub>J</sub>   | -55 to +150 | °C    |
| Thermal Resistance Junction-Ambient <sup>1</sup>                                    | R <sub>θJA</sub> | 85          | °C/W  |
| Thermal Resistance Junction to Case <sup>1</sup>                                    | R <sub>θJC</sub> | 5           | °C/W  |

**Maximum Ratings at Tc=25°C unless otherwise specified**

| Characteristics                                | Test Condition  | Symbols                      | Min  | Typ    | Max  | Units |
|--|---|------------------------------|------|--------|------|-------|
| Drain-Source Breakdown Voltage                 | $V_{GS}=0V, I_D=-250\mu A$  | $BV_{DSS}$                   | -40  | -44    | -    | V     |
| BVDSS Temperature Coefficient                  | Reference to 25°C, $I_D=-1mA$   | $\Delta BV_{DSS}/\Delta T_J$ | -    | -0.023 | -    | V/°C  |
| Static Drain-Source On-Resistance <sup>2</sup> | $V_{GS}=-10V, I_D=-30A$   | $R_{DS(ON)}$                 | -    | 14     | 18   | mΩ    |
|  | $V_{GS}=-4.5V, I_D=-20A$  |                              | -    | 18     | 25   |       |
| Gate -Threshold Voltage                        | $V_{DS}=V_{GS}, I_D=-250\mu A$  | $V_{GS(th)}$                 | -1.0 | -1.6   | -2.5 | V     |
| $V_{GS(th)}$ Temperature Coefficient           |   | $\Delta V_{GS(th)}$          | -    | 4.74   | -    | mV/°C |
| Drain-Source Leakage Current                   | $V_{DS}=-40V, V_{GS}=0V, T_J=25^\circ C$  | $I_{DSS}$                    | -    | -      | 1    | μA    |
|  | $V_{DS}=-40V, V_{GS}=0V, T_J=55^\circ C$  |                              | -    | -      | 5    |       |
| Gate -Source Leakage Current                   | $V_{GS}=\pm 20V, V_{DS}=0V$   | $I_{GSS}$                    | -    | -      | ±100 | nA    |
| Total Gate Charge(-4.5V)                       | $V_{DS}=-20V$<br>$V_{GS}=-4.5V$<br>$I_D=-12A$                                   | $Q_g$                        | -    | 25     | -    | nC    |
| Gate-Source Charge                             |   | $Q_{GS}$                     | -    | 11     | -    |       |
| Gate-Drain Charge                              |   | $Q_{gd}$                     | -    | 9.5    | -    |       |
| Turn-on delay time                             | $V_{DD}=-15V$<br>$R_L=15\Omega$<br>$I_D=-1A$<br>$V_{GEN}=-10V$<br>$R_G=6\Omega$ | $t_{d(on)}$                  | -    | 48     | -    | ns    |
| Rise Time                                      |   | $T_r$                        | -    | 24     | -    |       |
| Turn-Off Delay Time                            |   | $t_{d(OFF)}$                 | -    | 88     | -    |       |
| Fall Time                                      |   | $t_f$                        | -    | 9.6    | -    |       |
| Input Capacitance                              | $V_{DS}=-20V$<br>$V_{GS}=0V$<br>$f=1MHz$  | $C_{iss}$                    | -    | 2760   | -    | pF    |
| Output Capacitance                             |   | $C_{oss}$                    | -    | 260    | -    |       |
| Reverse Transfer Capacitance                   |   | $C_{rss}$                    | -    | 85     | -    |       |
| Continuous Source Current <sup>1,5</sup>       | $V_G=V_D=0V, \text{Force Current}$  | $I_S$                        | -    | -      | -40  | A     |
| Pulsed Source Current <sup>2,5</sup>           |   | $I_{SM}$                     | -    | -      | -90  | A     |
| Diode Forward Voltage <sup>2</sup>             | $V_{GS}=0V, I_S=-1A, T_J=25^\circ C$  | $V_{SD}$                     | -    | -      | -1.3 | V     |

Note :

- 1、 The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper.
- 2、 The data tested by pulsed , pulse width  $\cong 300\mu s$  , duty cycle  $\cong 2\%$
- 3、 The power dissipation is limited by 150°C junction temperature
- 4、 The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

Ratings and Characteristic Curves

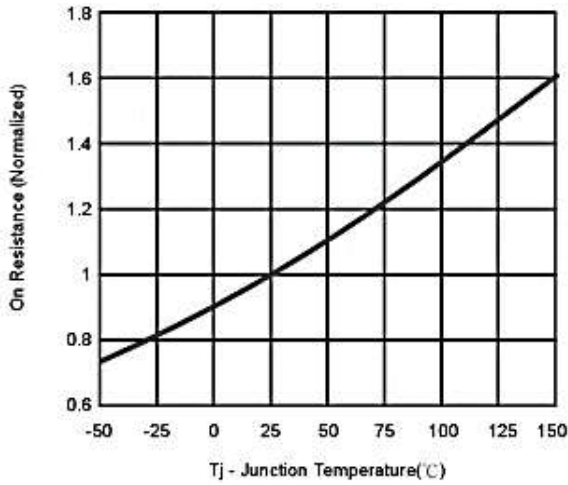


Fig.1 On Resistance Vs Junction Temperature

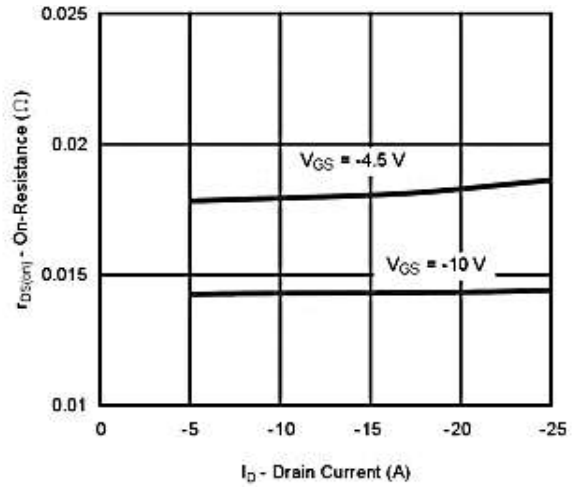


Fig.2 On-Resistance Vs. Drain Current

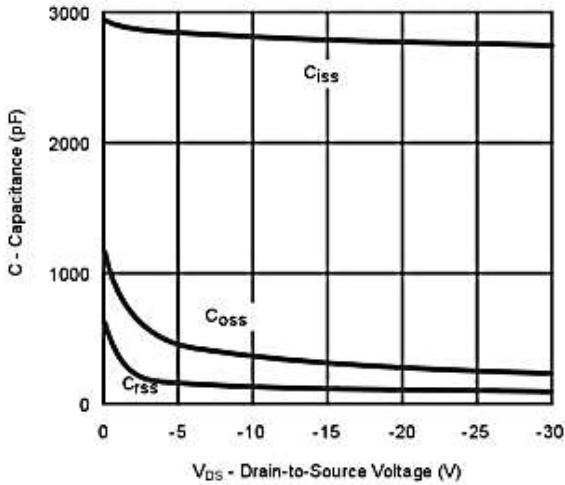


Fig.3 Capacitance

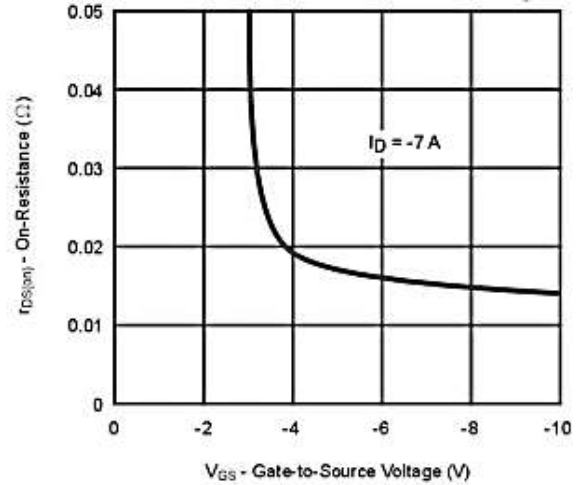


Fig.4 On-Resistance Vs. Gate-to-Source Voltage

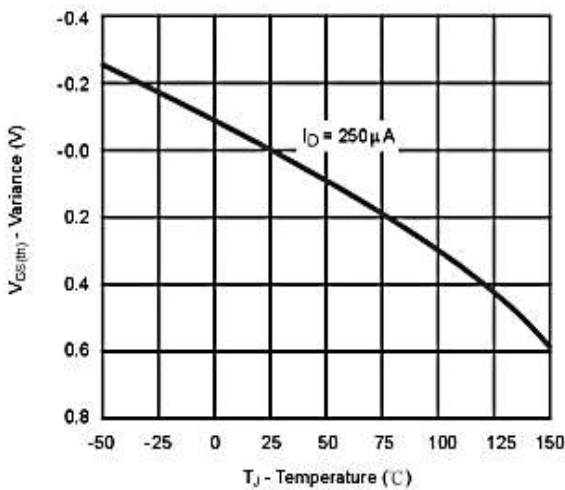


Fig.5 Threshold Voltage

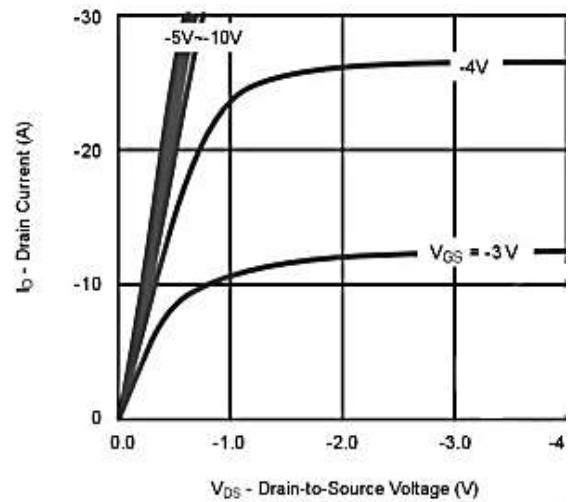


Fig.6 On-Region Characteristics

Ratings and Characteristic Curves

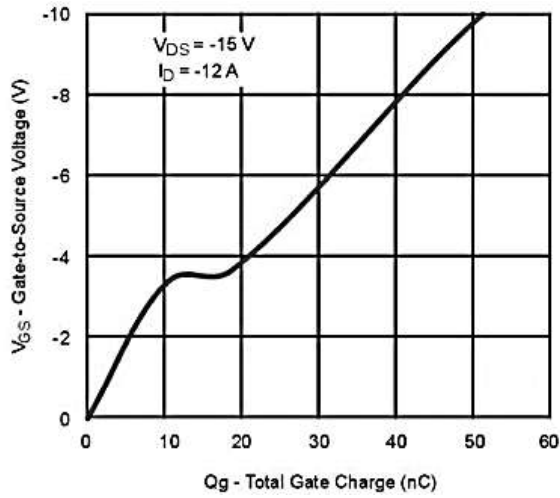


Fig.7 Gate Charge

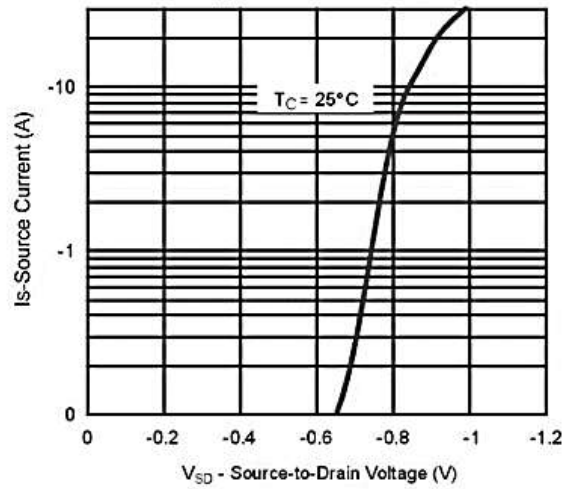


Fig.8 Body-diode Characteristic

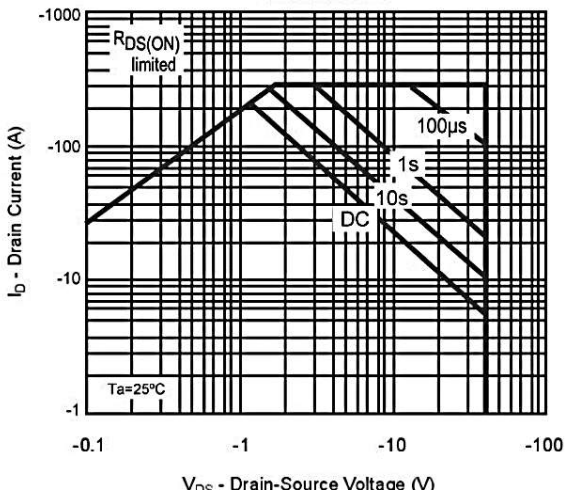


Fig.9 Safe Operating Area

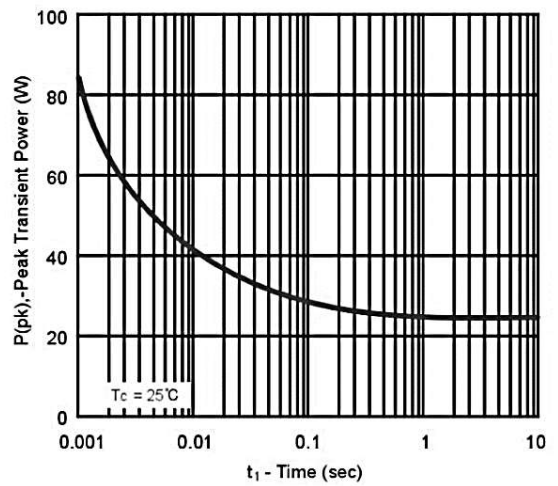


Fig.10 Single Pulse Maximum Power Dissipation

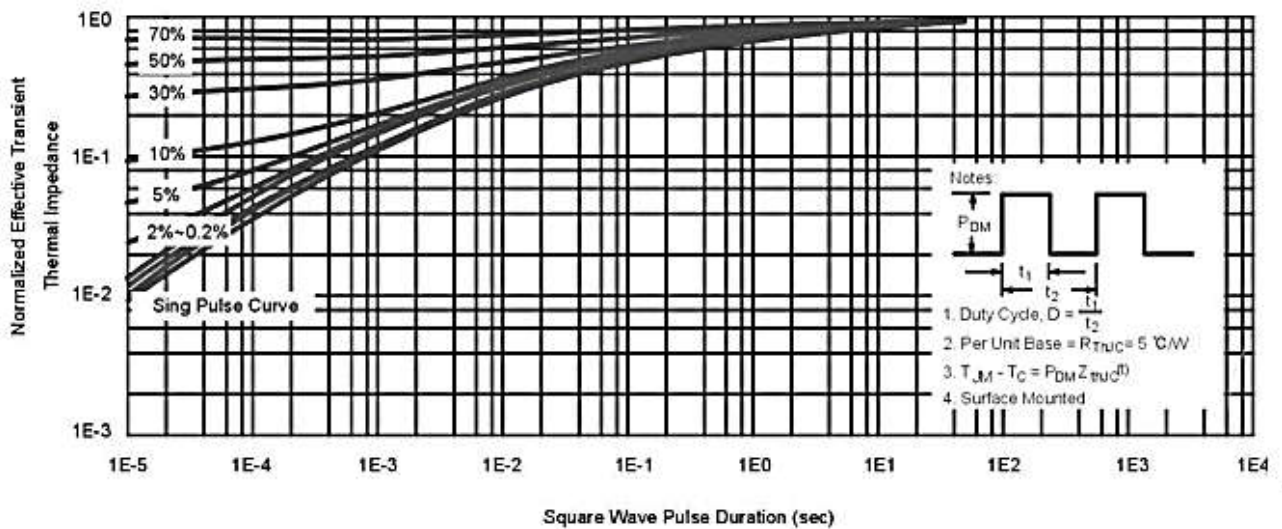
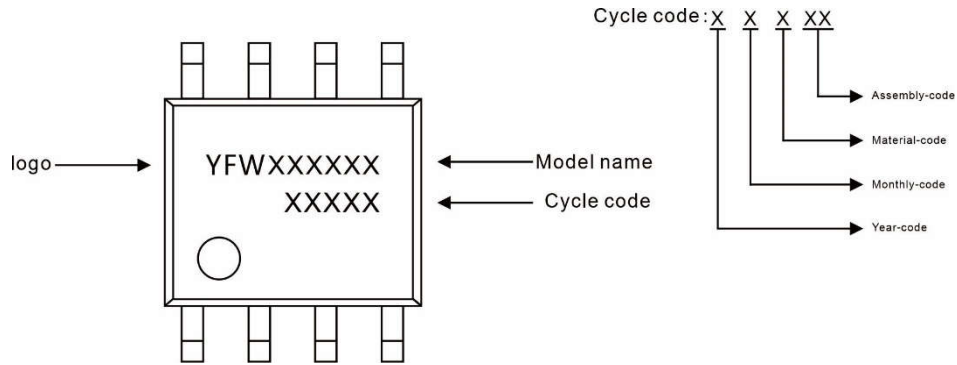


Fig.11 Normalized Maximum Transient Thermal Impedance

**Marking Diagram**



**Ordering information**

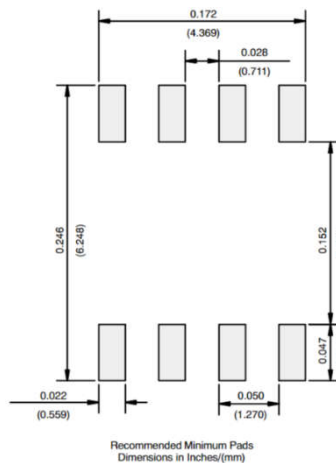
| Package | Packing Description | Packing Quantity             |
|---------|---------------------|------------------------------|
| SOP-8   | Tape/Reel, 13" reel | 3000PCS/Reel 30000PCS/Carton |

**Package Dimensions**

**SOP-8**

| Dim | Millimeter |      | Inches      |       |
|-----|------------|------|-------------|-------|
|     | Min.       | Max. | Min.        | Max.  |
| A   | 1.35       | 1.75 | 0.053       | 0.069 |
| A1  | 0.10       | 0.25 | 0.004       | 0.010 |
| A2  | 1.35       | 1.50 | 0.053       | 0.059 |
| b   | 0.35       | 0.55 | 0.014       | 0.022 |
| c   | 0.15       | 0.25 | 0.006       | 0.010 |
| D   | 4.80       | 5.00 | 0.189       | 0.197 |
| D1  | 3.10       | 3.50 | 0.122       | 0.138 |
| E   | 5.80       | 6.20 | 0.228       | 0.244 |
| E1  | 3.80       | 4.00 | 0.150       | 0.157 |
| E2  | 2.20       | 2.60 | 0.087       | 0.102 |
| e   | 1.27 (BSC) |      | 0.050 (BSC) |       |
| L   | 0.40       | 1.27 | 0.016       | 0.050 |
| θ   | 0°         | 8°   | 0°          | 8°    |

**The recommended mounting pad size**



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