



## Description

The SIR802DP-T1-GE3 uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

## General Features

$V_{DS} = 20V$   $I_D = 60A$

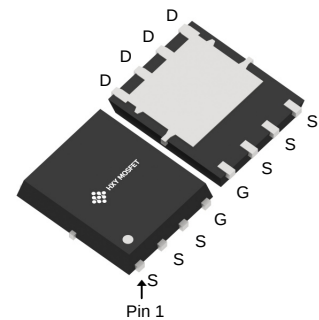
$R_{DS(ON)} < 5\text{ m}\Omega$   $V_{GS}=4.5V$

## Application

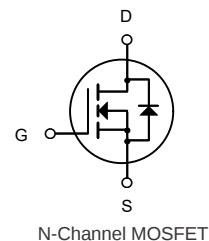
Battery protection

Load switch

Uninterruptible power supply



DFN5X6-8L



N-Channel MOSFET

## Package Marking and Ordering Information

| Product ID      | Pack      | Brand      | Qty(PCS) |
|-----------------|-----------|------------|----------|
| SIR802DP-T1-GE3 | DFN5X6-8L | HXY MOSFET | 5000     |

## Absolute Maximum Ratings ( $T_C=25^\circ\text{C}$ unless otherwise noted)

| Symbol                     | Parameter                                     | Rating     | Units              |
|----------------------------|-----------------------------------------------|------------|--------------------|
| $V_{DS}$                   | Drain-Source Voltage                          | 20         | V                  |
| $V_{GS}$                   | Gate-Source Voltage                           | $\pm 12$   | V                  |
| $I_D@T_C=25^\circ\text{C}$ | Continuous Drain Current, $V_{GS} @ 10V^1$    | 60         | A                  |
| $I_D@T_C=70^\circ\text{C}$ | Continuous Drain Current, $V_{GS} @ 10V^1$    | 43         | A                  |
| $I_{DM}$                   | Pulsed Drain Current <sup>2</sup>             | 200        | A                  |
| EAS                        | Single Pulse Avalanche Energy <sup>3</sup>    | 58         | mJ                 |
| $I_{AS}$                   | Avalanche Current                             | 41         | A                  |
| $P_D@T_C=25^\circ\text{C}$ | Total Power Dissipation <sup>4</sup>          | 58         | W                  |
| $T_{STG}$                  | Storage Temperature Range                     | -55 to 150 | $^\circ\text{C}$   |
| $T_J$                      | Operating Junction Temperature Range          | -55 to 150 | $^\circ\text{C}$   |
| $R_{\theta JC}$            | Thermal Resistance Junction-Case <sup>1</sup> | 2.6        | $^\circ\text{C/W}$ |



**Electrical Characteristics** ( $T_J=25^{\circ}\text{C}$  unless otherwise specified)

| Symbol                | Parameter                                                | Test Condition                                                | Min. | Typ. | Max.      | Units      |
|-----------------------|----------------------------------------------------------|---------------------------------------------------------------|------|------|-----------|------------|
| $V_{(BR)DSS}$         | Drain-Source Breakdown Voltage                           | $V_{GS}=0V, I_D=250\mu A$                                     | 20   | -    | -         | V          |
| $I_{DSS}$             | Zero Gate Voltage Drain Current                          | $V_{DS}=20V, V_{GS}=0V,$                                      | -    | -    | 1.0       | $\mu A$    |
| $I_{GSS}$             | Gate to Body Leakage Current                             | $V_{DS}=0V, V_{GS}=\pm 12V$                                   | -    | -    | $\pm 100$ | nA         |
| $V_{GS(th)}$          | Gate Threshold Voltage                                   | $V_{DS}=V_{GS}, I_D=250\mu A$                                 | 0.4  | 0.7  | 1.1       | V          |
| $R_{DS(on)}$<br>note3 | Static Drain-Source on-Resistance                        | $V_{GS}=4.5V, I_D=30A$                                        | -    | 3.5  | 5         | m $\Omega$ |
|                       |                                                          | $V_{GS}=2.5V, I_D=20A$                                        | -    | 6.5  | 9         |            |
| $C_{iss}$             | Input Capacitance                                        | $V_{DS}=10V, V_{GS}=0V,$<br>$f = 1.0MHz$                      | -    | 2500 | -         | pF         |
| $C_{oss}$             | Output Capacitance                                       |                                                               | -    | 407  | -         | pF         |
| $C_{rss}$             | Reverse Transfer Capacitance                             |                                                               | -    | 386  | -         | pF         |
| $Q_g$                 | Total Gate Charge                                        | $V_{DS}=10V, I_D=30A,$<br>$V_{GS}=4.5V$                       | -    | 32   | -         | nC         |
| $Q_{gs}$              | Gate-Source Charge                                       |                                                               | -    | 3    | -         | nC         |
| $Q_{gd}$              | Gate-Drain("Miller") Charge                              |                                                               | -    | 11   | -         | nC         |
| $t_{d(on)}$           | Turn-on Delay Time                                       | $V_{DS}=10V,$<br>$I_D=30A, R_{GEN}=3\Omega,$<br>$V_{GS}=4.5V$ | -    | 17   | -         | ns         |
| $t_r$                 | Turn-on Rise Time                                        |                                                               | -    | 49   | -         | ns         |
| $t_{d(off)}$          | Turn-off Delay Time                                      |                                                               | -    | 74   | -         | ns         |
| $t_f$                 | Turn-off Fall Time                                       |                                                               | -    | 26   | -         | ns         |
| $I_S$                 | Maximum Continuous Drain to Source Diode Forward Current |                                                               | -    | -    | 60        | A          |
| $I_{SM}$              | Maximum Pulsed Drain to Source Diode Forward Current     |                                                               | -    | -    | 300       | A          |
| $V_{SD}$              | Drain to Source Diode Forward Voltage                    | $V_{GS} = 0V, I_S=30A$                                        | -    | -    | 1.2       | V          |

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

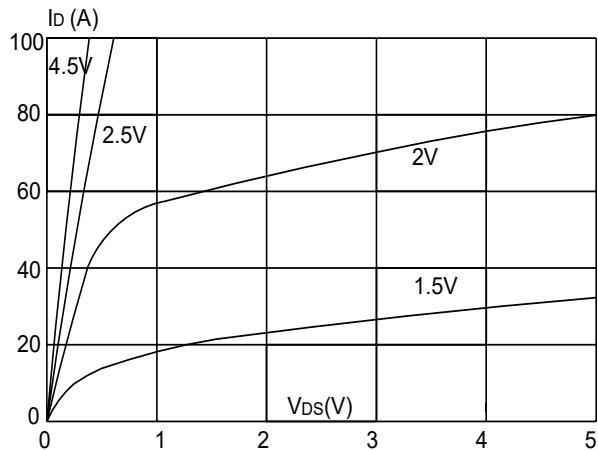
2. EAS condition:  $T_J=25^{\circ}\text{C}$ ,  $V_{DD}=10V$ ,  $V_G=4.5V$ ,  $L=0.5mH$ ,  $R_G=25\Omega$ ,  $I_{AS}=15A$

3. Pulse Test: Pulse Width $\leq 300\mu s$ , Duty Cycle $\leq 0.5\%$

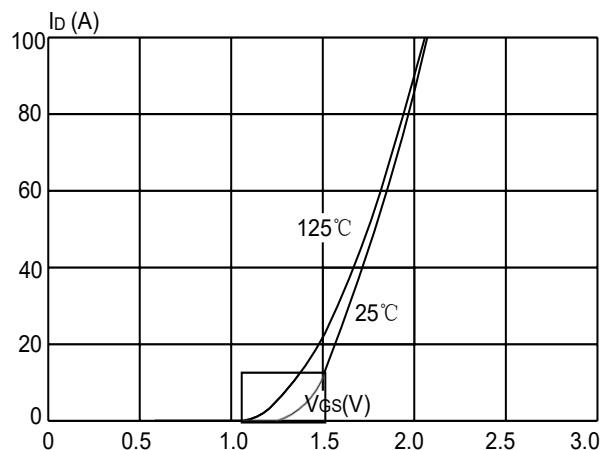


## Typical Performance Characteristics

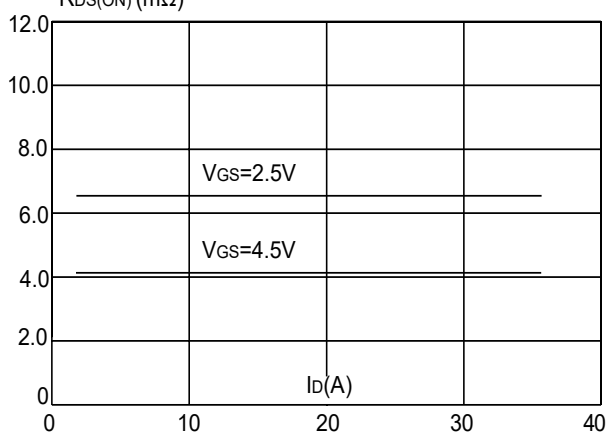
**Figure1:** Output Characteristics



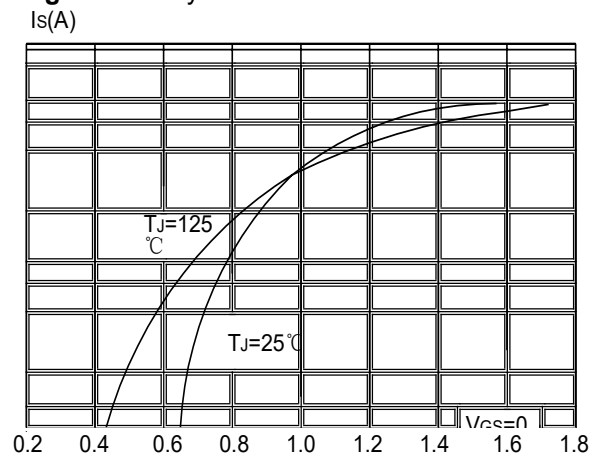
**Figure 2:** Typical Transfer Characteristics



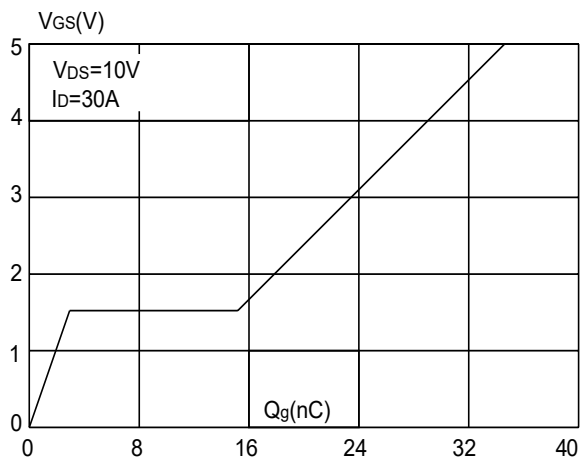
**Figure 3:** On-resistance vs. Drain Current



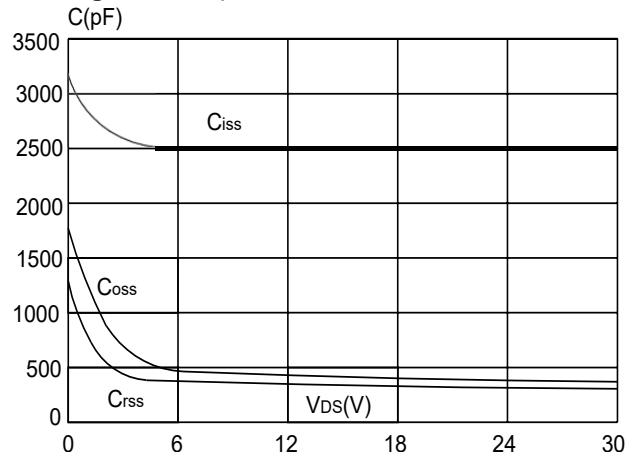
**Figure 4:** Body Diode Characteristics



**Figure 5:** Gate Charge Characteristics

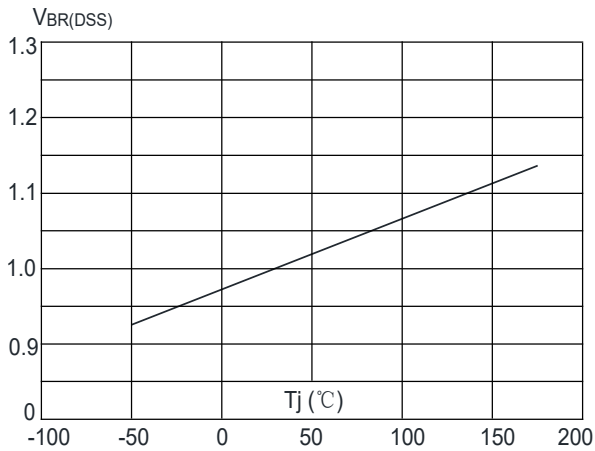


**Figure 6:** Capacitance Characteristics

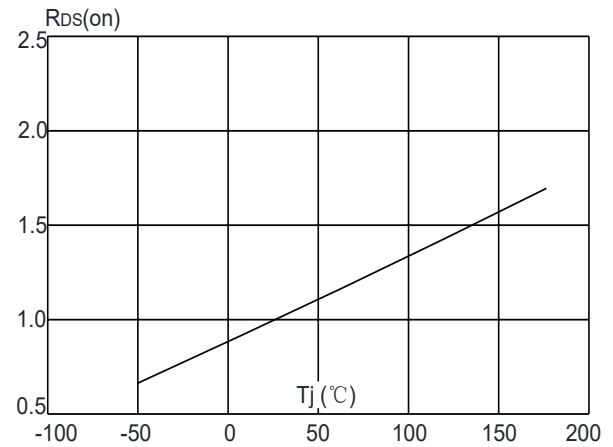




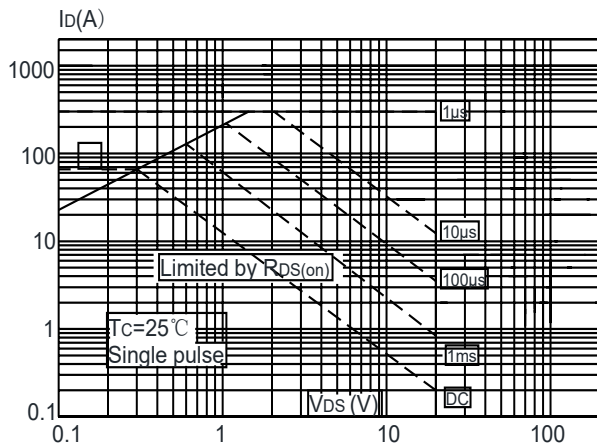
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



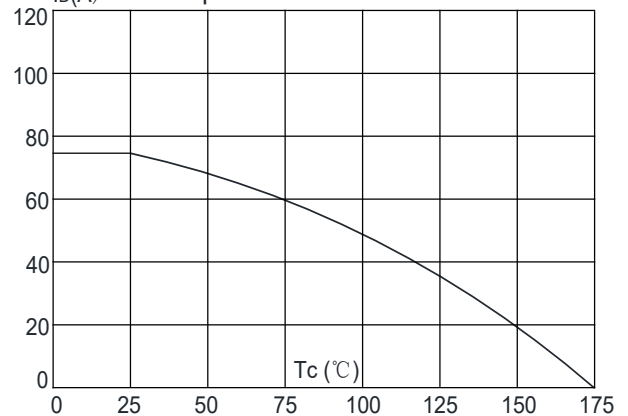
**Figure 8:** Normalized on Resistance vs. Junction Temperature



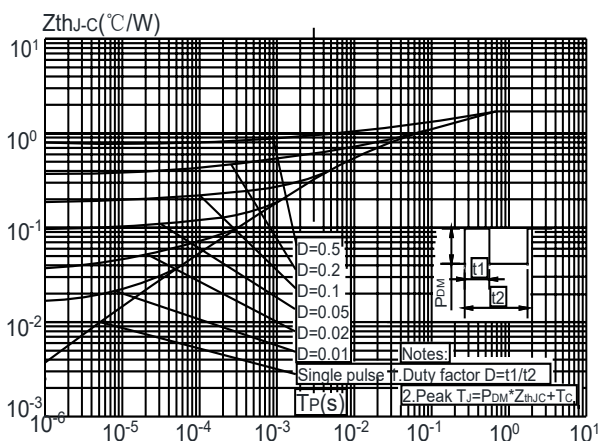
**Figure 9:** Maximum Safe Operating Area



**Figure 10:** Maximum Continuous Drain Current vs. Case Temperature

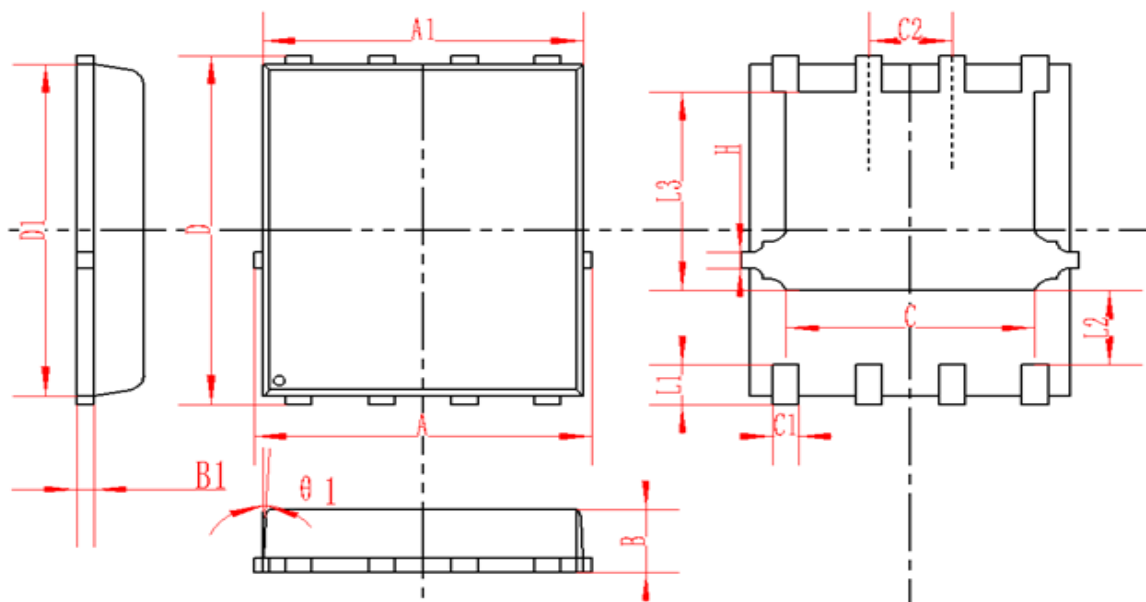


**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Case





## DFN5X6-8L Package Information



| SYMBOL | MM       |      |       | INCH     |       |       |
|--------|----------|------|-------|----------|-------|-------|
|        | MIN      | NOM  | MAX   | MIN      | NOM   | MAX   |
| A      | 4.95     | 5    | 5.05  | 0.195    | 0.197 | 0.199 |
| A1     | 4.82     | 4.9  | 4.98  | 0.190    | 0.193 | 0.196 |
| D      | 5.98     | 6    | 6.02  | 0.235    | 0.236 | 0.237 |
| D1     | 5.67     | 5.75 | 5.83  | 0.223    | 0.226 | 0.230 |
| B      | 0.9      | 0.95 | 1     | 0.035    | 0.037 | 0.039 |
| B1     | 0.254REF |      |       | 0.010REF |       |       |
| C      | 3.95     | 4    | 4.05  | 0.156    | 0.157 | 0.159 |
| C1     | 0.35     | 0.4  | 0.45  | 0.014    | 0.016 | 0.018 |
| C2     | 1.27TYP  |      |       | 0.5TYP   |       |       |
| θ1     | 8°       | 10°  | 12°   | 8°       | 10°   | 12°   |
| L1     | 0.63     | 0.64 | 0.65  | 0.025    | 0.025 | 0.026 |
| L2     | 1.2      | 1.3  | 1.4   | 0.047    | 0.051 | 0.055 |
| L3     | 3.415    | 3.42 | 3.425 | 0.134    | 0.135 | 0.135 |
| H      | 0.24     | 0.25 | 0.26  | 0.009    | 0.010 | 0.010 |



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