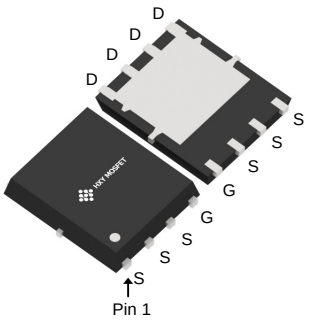
## General Description

The SIR846ADP-T1-RE3 use advanced SGT MOSFET technology to provide low RDS(ON), low gate charge, fast switching and excellent avalanche characteristics. This device is specially designed to get better ruggedness.

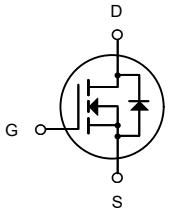



DFN5X6-8L
(Power(5x6))

## General Features

$V_{DS}$ = 100V $I_D$ = 75A

$R_{DS(ON)}$ < 7.5mΩ @ $V_{GS}$=10V




N-Channel MOSFET

## Applications

Consumer electronic power supply Motor control

Synchronous-rectification Isolated DC

Synchronous-rectification applications

## Package Marking and Ordering Information

| Product ID | Pack | Brand | Qty(PCS) |
|---|---|---|---|
| SIR846ADP-T1-RE3 | DFN5X6-8L(Power(5x6)) | HXY MOSFET | 5000 |

## Absolute Maximum Ratings at $T_j$=25°C unless otherwise noted

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Drain source voltage | VDS | 100 | V |
| Gate source voltage | VGS | ±20 | V |
| Continuous drain current[1)] | ID | 75 | A |
| Pulsed drain current[2)] | ID, pulse | 300 | A |
| Power dissipation[3)] | $P_D$ | 97 | W |
| Single pulsed avalanche energy[5)] | EAS | 90 | mJ |
| Operation and storage temperature | Tstg,Tj | -55 to 150 | °C |
| Thermal resistance, junction-case | RθJC | 1.3 | °C/W |

## Electrical Characteristics ($T_J$=25°C unless otherwise specified)

| Symbol | Parameter | Test Condition | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| **Off Characteristic** | | | | | | |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V, $I_D$=250μA | 100 | - | - | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$=100V, $V_{GS}$=0V, | - | - | 1.0 | μA |
| $I_{GSS}$ | Gate to Body Leakage Current | $V_{DS}$=0V, $V_{GS}$= ±20V | - | - | ±100 | nA |
| **On Characteristics** | | | | | | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$, $I_D$=250μA | 1.0 | 1.6 | 2.5 | V |
| $R_{DS(on)}$ | Static Drain-Source on-Resistance note3 | $V_{GS}$=10V, $I_D$=20A | - | 6.4 | 7.5 | mΩ |
| | | $V_{GS}$=4.5V, $I_D$=8A | - | 9.2 | 11.4 | mΩ |
| **Dynamic Characteristics** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=50V, $V_{GS}$=0V, f=1.0MHz | - | 2944 | - | pF |
| $C_{oss}$ | Output Capacitance | | - | 736 | - | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | | - | 2.04 | - | pF |
| $Q_g$ | Total Gate Charge | $V_{DS}$=50V, $I_D$=30A, $V_{GS}$=10V | - | 39.4 | - | nc |
| $Q_{gs}$ | Gate-Source Charge | | - | 5.6 | - | nc |
| $Q_{gd}$ | Gate-Drain(“Miller”) Charge | | - | 7.6 | - | nc |
| **Switching Characteristics** | | | | | | |
| $t_{d(on)}$ | Turn-on Delay Time | $V_{DD}$=50V, $I_D$=25A, $R_G$=6Ω, $V_{GS}$=10V | - | 13 | - | nc |
| $t_r$ | Turn-on Rise Time | | - | 27.5 | - | nc |
| $t_{d(off)}$ | Turn-off Delay Time | | - | 45.5 | - | nc |
| $t_f$ | Turn-off Fall Time | | - | 41.5 | - | nc |
| **Drain-Source Diode Characteristics and Maximum Ratings** | | | | | | |
| $I_S$ | Maximum Continuous Drain to Source Diode Forward Current | | - | - | 75 | 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 | V |
| $t_{rr}$ | Body Diode Reverse Recovery Time | $T_J$=25°C, $I_F$=12A,dI/dt=100A/μs | - | 177 | - | ns |
| $Q_{rr}$ | Body Diode Reverse Recovery Charge | | - | 1291 | - | nc |

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

2. EAS condition: $T_J$=25°C, $V_{DD}$=50V, $V_G$=10V, $R_G$=25Ω, L=0.5mH, $I_{AS}$=19A

3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

## Typical Performance Characteristics

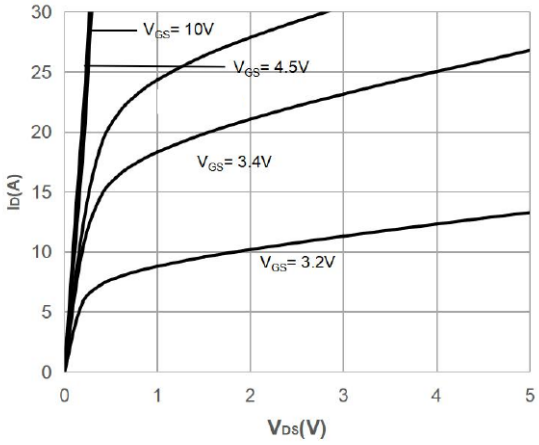



Figure 1: Output Characteristics

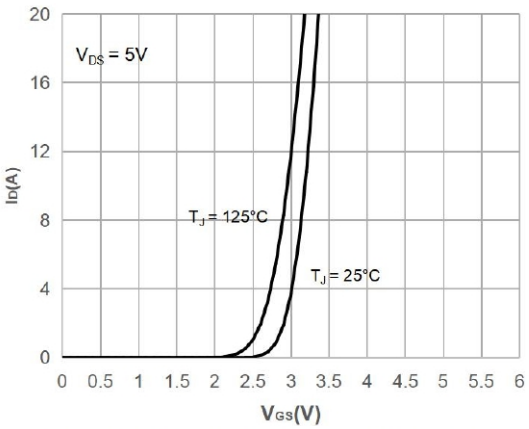



Figure 2: Typical Transfer Characteristics

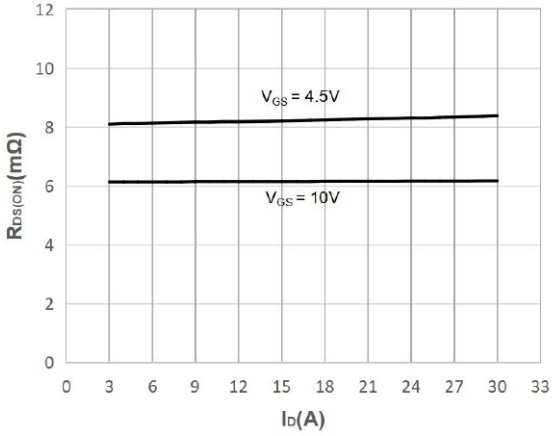



Figure 3: On-resistance vs. Drain Current

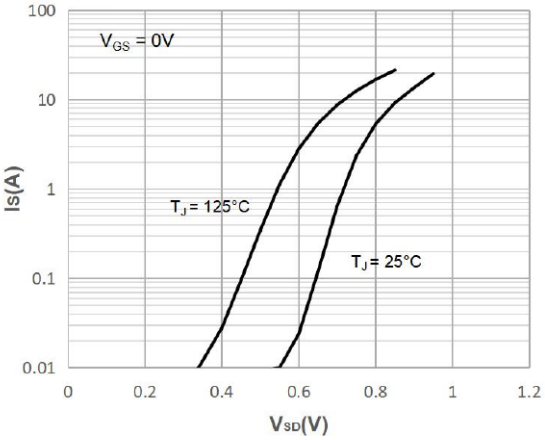



Figure 4: Body Diode Characteristics

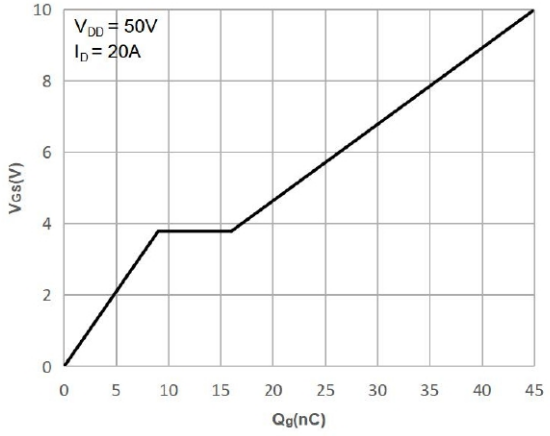



Figure 5: Gate Charge Characteristics

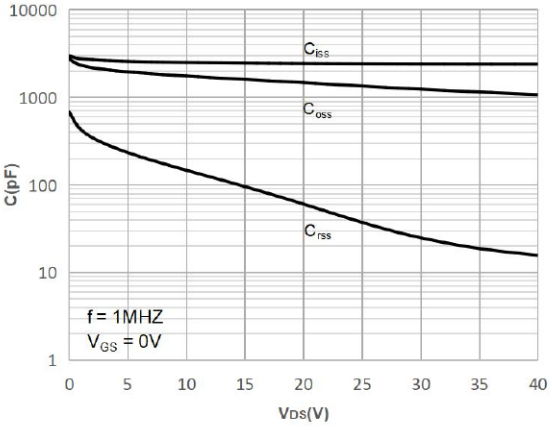



Figure 6: Capacitance Characteristics

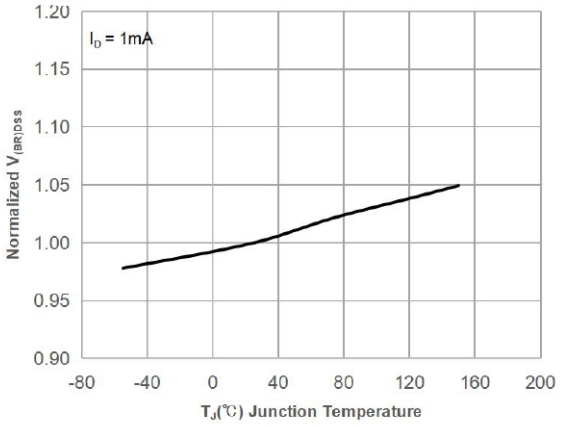



Figure 7: Normalized Breakdown voltage vs. Junction Temperature

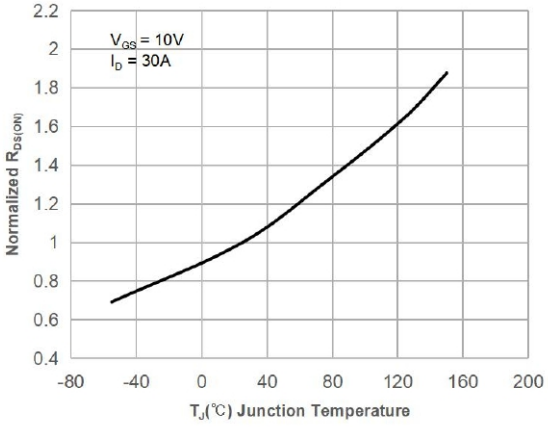



Figure 8: Normalized on Resistance vs. Junction Temperature

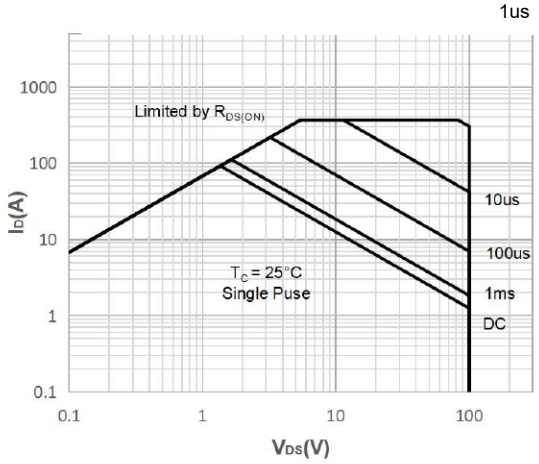



Figure 9: Maximum Safe Operating Area

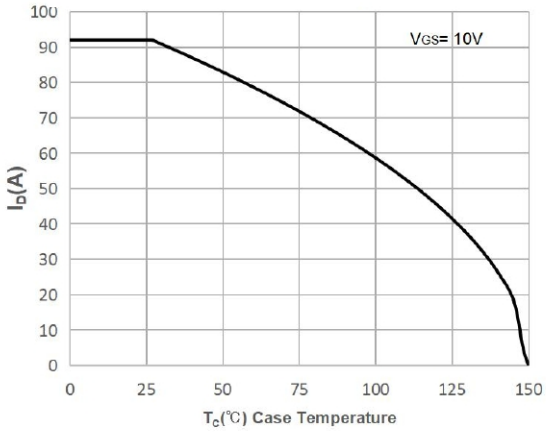



Figure 10: Maximum Continuous Drian Current vs. Case Temperature

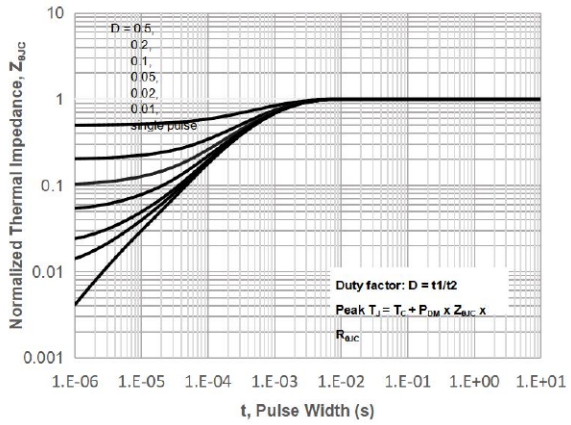



Figure 11: Normalized Maximum Transient Thermal Impedance

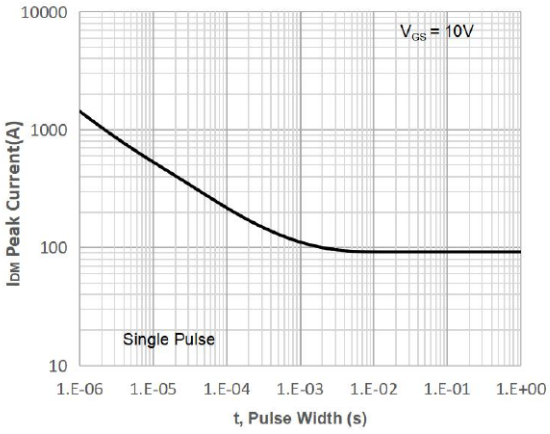
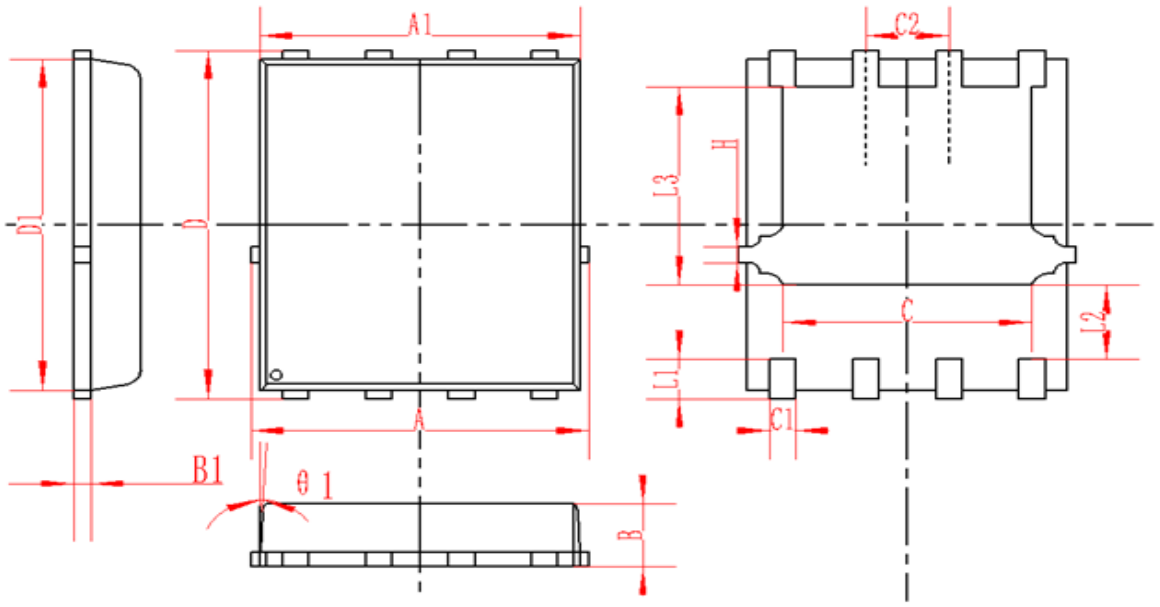



Figure 12: Peak Current Capacity

## DFN5X6-8L(Power(5x6)) 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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