RoHS Compliant

Magnachip

# MDWC0150ERH

## Common-Drain Dual N-Channel Trench MOSFET 12V, 19A, 2.75 mΩ



## General Description

The MDWC0150ERH uses advanced Magnachip's MOSFET Technology, which provides high performance in on-state resistance and excellent reliability. Excellent low $R_{SS(ON)}$, low gate charge operation and operation for Battery Application.

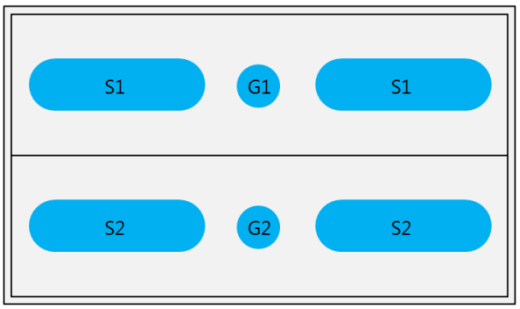
## Features

- $V_{SS}$ = 12V
- Source-Source ON Resistance;
  $R_{SS(ON)\ typ.}$ 2.1mΩ @ $V_{GS}$ = 4.5V
  $R_{SS(ON)\ typ.}$ 2.2mΩ @ $V_{GS}$ = 3.8V
  $R_{SS(ON)\ typ.}$ 2.4mΩ @ $V_{GS}$ = 3.1V
  $R_{SS(ON)\ typ.}$ 3.1mΩ @ $V_{GS}$ = 2.5V

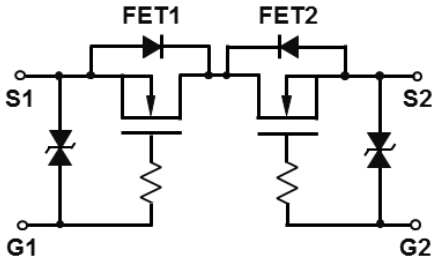
## Applications

- Portable Battery Protection

**Bottom View**




3.05mm*1.77mm WLCSP




## Absolute Maximum Ratings ($T_A$ = 25°C unless otherwise noted)

| Characteristics | | Symbol | Rating | Units |
|---|---|---|---|---|
| Source-Source Voltage | | $V_{SSS}$ | 12 | V |
| Gate-Source Voltage | | $V_{GSS}$ | ±8 | V |
| Source Current | DC*1 | $I_S$ | 19 | A |
| | Pulse | $I_{SP}$ | 76 | A |
| Total Power Dissipation | DC*1 | $P_D$ | 1.63 | W |
| Channel Temperature | | $T_{ch}$ | 150 | °C |
| Junction and Storage Temperature Range | | $T_J$, $T_{stg}$ | -55~150 | °C |

## Thermal Characteristics

| Characteristics | Symbol | Rating | Unit |
|---|---|---|---|
| Thermal Resistance | $R_{\theta JA}$ | 76.7 | °C/W |

## Ordering Information

| Part Number | Temp. Range | Package | Packing | RoHS Status |
|---|---|---|---|---|
| MDWC0150ERH | -55~150°C | WLCSP | Tape and Reel | Halogen Free |

## Electrical Characteristics ($T_A$ =25°C unless otherwise noted)

| Characteristics | Symbol | Test Condition | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| **Static Characteristics** | | | | | | |
| Source-Source Breakdown Voltage | $BV_{SSS}$ | $I_S$ = 1mA, $V_{GS}$ = 0V | 12 | - | - | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{SS}$ = $V_{GS}$, $I_S$ = 1.41mA | 0.35 | 1.1 | 1.4 | |
| Cut-Off Current | $I_{SSS}$ | $V_{SS}$ = 12V, $V_{GS}$ = 0V | - | - | 1.0 | μA |
| Gate Leakage Current | $I_{GSS}$ | $V_{GS}$ = ±8V, $V_{SS}$ = 0V | - | - | 10 | μA |
| Source-Source Resistance | $R_{SS(ON)}$ | $V_{GS}$ = 4.5V, $I_S$ = 6.0A | - | 2.1 | 2.75 | mΩ |
| | | $V_{GS}$ = 3.8V, $I_S$ = 6.0A | - | 2.2 | 2.85 | |
| | | $V_{GS}$ = 3.1V, $I_S$ = 6.0A | - | 2.4 | 3.95 | |
| | | $V_{GS}$ = 2.5V, $I_S$ = 6.0A | - | 3.1 | 6.1 | |
| **Dynamic Characteristics** | | | | | | |
| Total Gate Charge | $Q_g$ | $V_{DD}$ = 8V, $I_S$ = 6.0A, $V_{GS}$ = 4V | - | 51 | - | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 7.8 | - | |
| Gate-Drain Charge | $Q_{gd}$ | | - | 20.8 | - | |
| Input Capacitance | $C_{iss}$ | $V_{SS}$ = 10V, $V_{GS}$ = 0V, f = 1KHz | - | 6,725 | - | pF |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 1,880 | - | |
| Output Capacitance | $C_{oss}$ | | - | 1,970 | - | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{GS}$ = 4V, $V_{DD}$ = 8V, $I_S$ = 6.0A, $R_{GEN}$ = 3Ω | - | 0.1 | - | μS |
| Rise Time | $t_r$ | | - | 0.6 | - | |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 4.3 | - | |
| Fall Time | $t_f$ | | - | 17 | - | |
| **Drain-Source Body Diode Characteristics** | | | | | | |
| Source-Source Diode Forward Voltage | $VF_{(S-S)}$ | $I_F$ = 6.0A, $V_{GS}$ = 0V | - | 0.8 | 1.2 | V |

Note *1. Mounted on PCB Board (25.4mm x 25.4mm ),

## Characteristic Graph

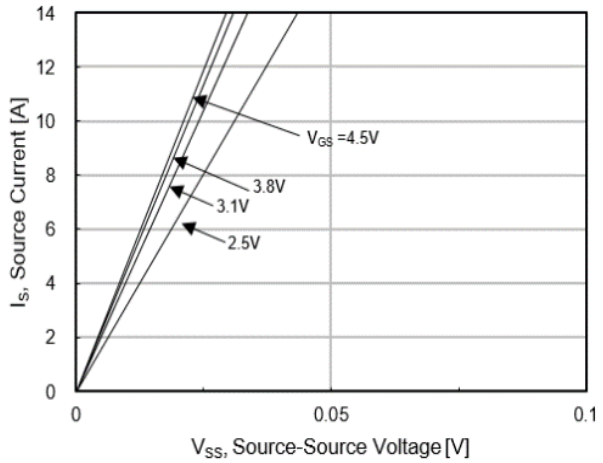



**Fig.1 On-Region Characteristics**

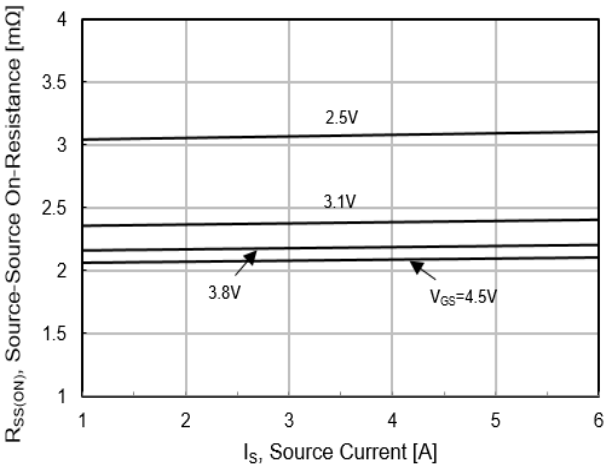



**Fig.2 On-Resistance Variation with Source Current and Gate Voltage**

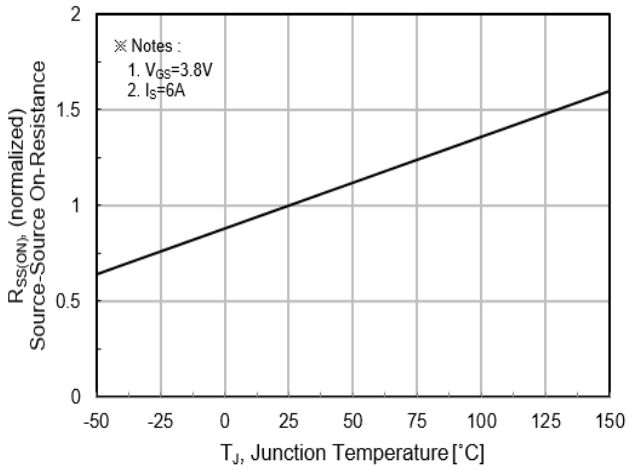



**Fig.3 On-Resistance Variation with Temperature**

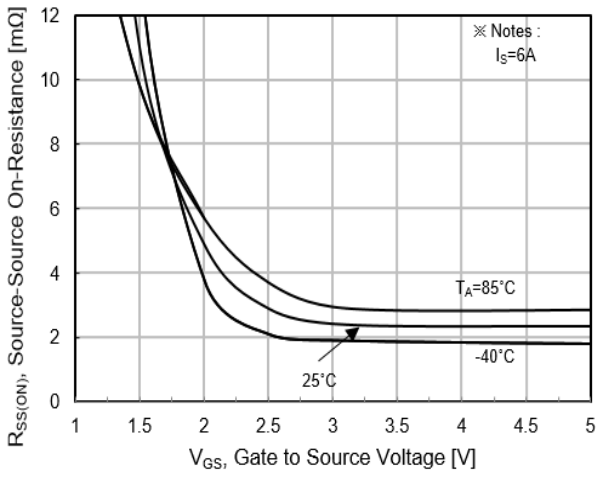



**Fig.4 On-Resistance Variation with Gate to Source Voltage**

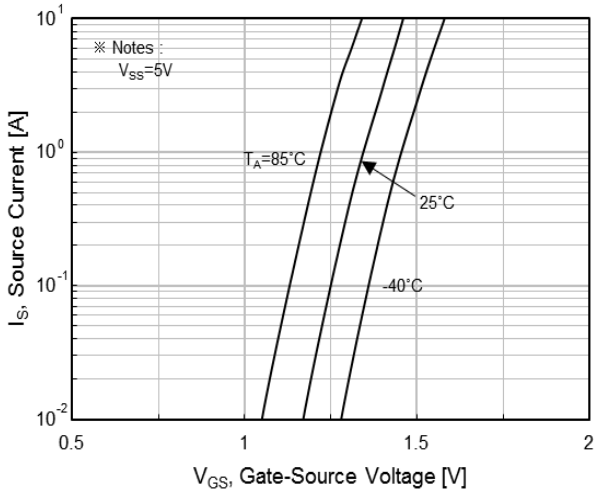



**Fig.5 Transfer Characteristics**

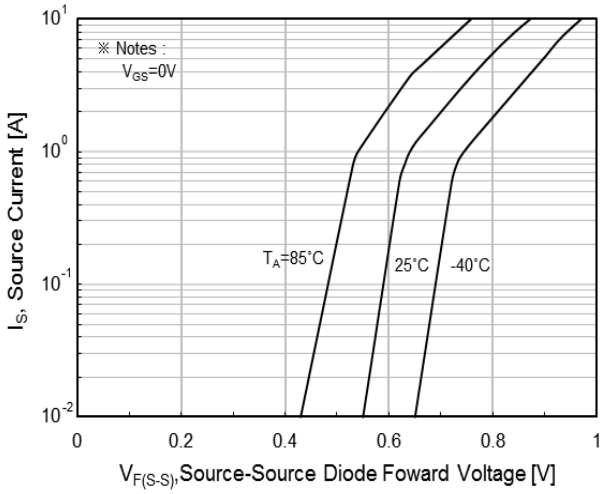



**Fig.6 Body Diode Forward Voltage**

## Characteristic Graph

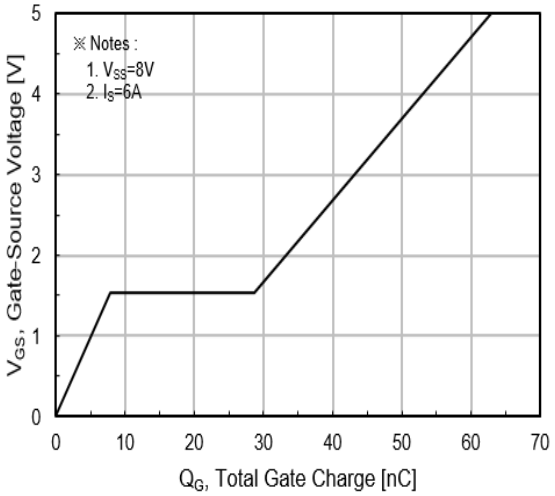



**Fig.7 Gate Charge Characteristics**

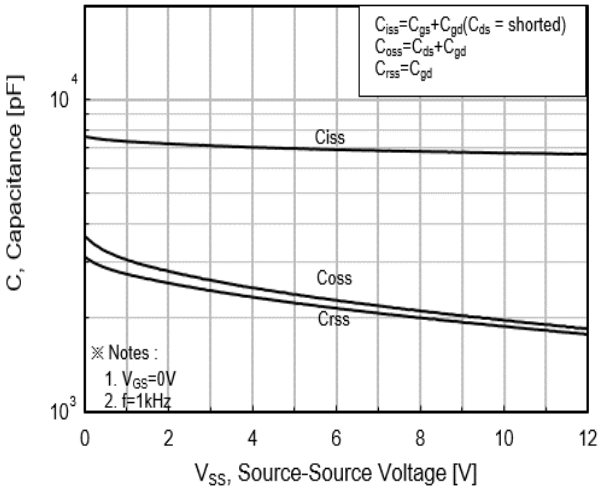



**Fig.8 Capacitance Characteristics**

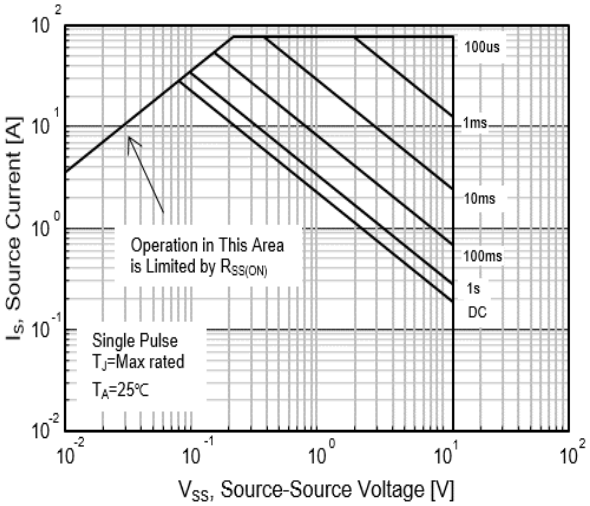



**Fig.9 Maximum Safe Operating Area**

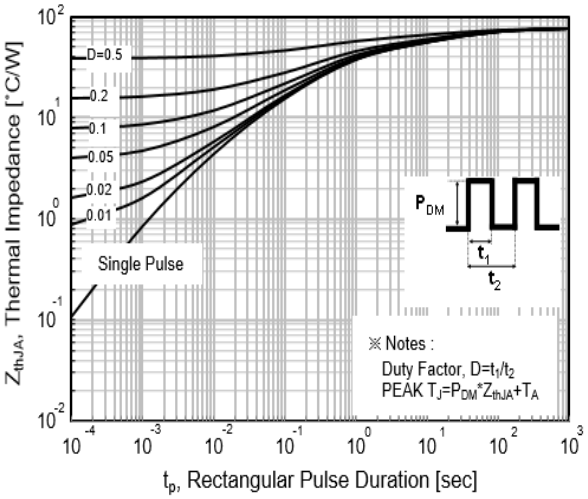
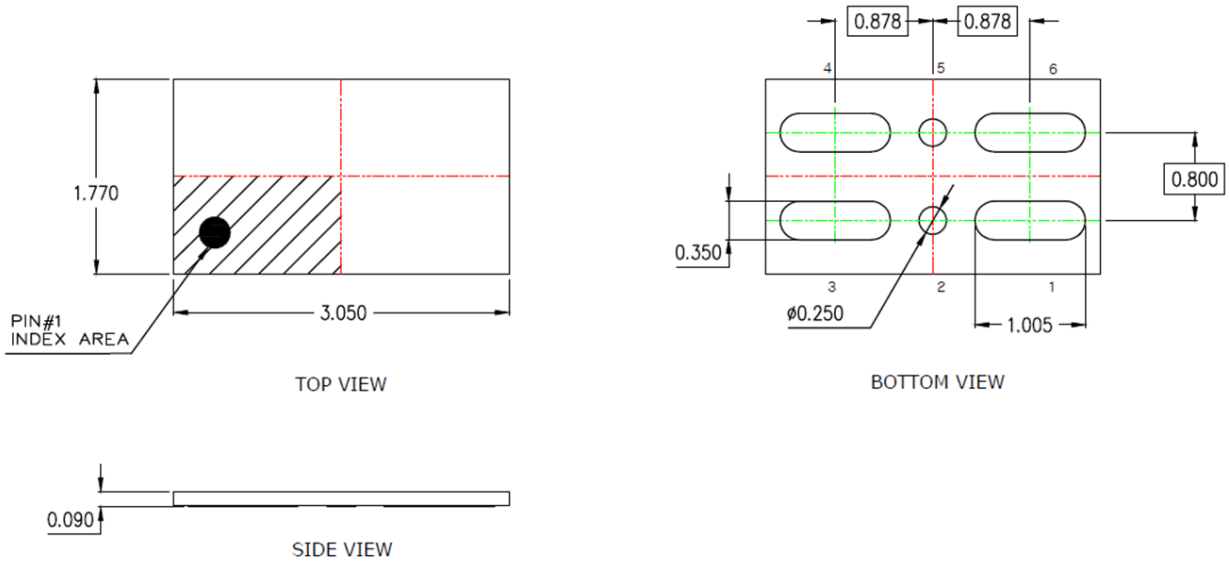



**Fig.10 Transient Thermal Impedance Curve**

## PACKAGE OUTLINE




NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. GENERAL TOLERANCE : ±0.03mm
3. PACKAGE BODY SIZES EXCLUDE FLASH & BURRS

**DISCLAIMER:**

The Products are not designed for use in hostile environments, including, without limitation, aircraft, nuclear power generation, medical appliances, and devices or systems in which malfunction of any Product can reasonably be expected to result in a personal injury. Seller's customers using or selling Seller's products for use in such applications do so at their own risk and agree to fully defend and indemnify Seller.