RoHS Compliant

Magnachip

# MDWC0342E

## Common-Drain Dual N-Channel Trench MOSFET 12V



## General Description

The MDWC0342E 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.

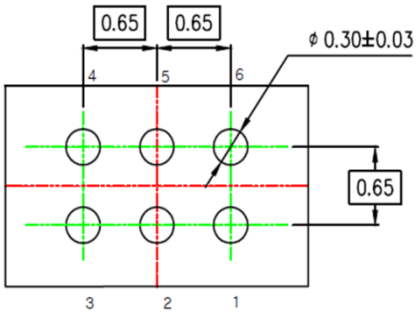
## Features

- $V_{SS}$ = 12V
- Source-Source ON Resistance;
  $R_{SS(ON)}$ < 5.7 mΩ @ $V_{GS}$ = 4.5V
  $R_{SS(ON)}$ < 5.75mΩ @ $V_{GS}$ = 3.8V
  $R_{SS(ON)}$ < 7.8 mΩ @ $V_{GS}$ = 3.1V
  $R_{SS(ON)}$ < 12.5mΩ @ $V_{GS}$ = 2.5V

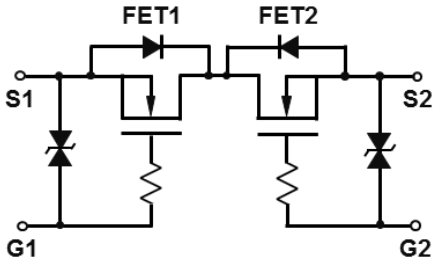
## Applications

- Portable Battery Protection

**Bottom View**




2.68mm*1.68mm WLCSP




1. Source (FET1)
2. Gate (FET1)
3. Source (FET1)
4. Source (FET2)
5. Gate (FET2)
6. Source (FET2)

## Absolute Maximum Ratings (Ta = 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 | | IS | 9.6 | A |
| | Pulse*2 | | ISp | 96 | A |
| Total Power Dissipation | DC*1 | | PD | 0.83 | W |
| Channel Temperature | | | Tch | 150 | °C |
| Thermal Resistance | DC*1 | Max. | Rthja | 150 | °C/W |
| Junction and Storage Temperature Range | | | $T_J$, $T_{stg}$ | -55~150 | °C |

## Ordering Information

| Part Number | Temp. Range | Package | Packing | RoHS Status |
|---|---|---|---|---|
| MDWC0342ERH | -55~150°C | WLCSP | Tape and Reel | Halogen Free |

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

| Characteristics | Symbol | Test Condition | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| **Static Characteristics** | | | | | | |
| Source-Source Breakdown Voltage | $BV_{SSS}$ | $I_S$ = 250μA, $V_{GS}$ = 0V | 12 | - | - | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{SS}$ = $V_{GS}$, $I_S$ = 250μA | 0.5 | 1.0 | 1.5 | |
| Cut-Off Current | $I_{SSS}$ | $V_{SS}$ = 10V, $V_{GS}$ = 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, $I_S$ = 3.0A | 3.0 | 4.5 | 5.7 | mΩ |
| | | $V_{GS}$ = 3.8V, $I_S$ = 3.0A | 3.2 | 4.9 | 5.75 | |
| | | $V_{GS}$ = 3.1V, $I_S$ = 3.0A | 3.6 | 5.5 | 7.8 | |
| | | $V_{GS}$ = 2.5V, $I_S$ = 3.0A | 4.2 | 6.5 | 12.5 | |
| **Dynamic Characteristics** | | | | | | |
| Total Gate Charge | $Q_g$ | $V_{DS}$ = 10V, $I_D$ = 2.5A, $V_{GS}$ = 4.5V | - | 38 | - | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 5.0 | - | |
| Gate-Drain Charge | $Q_{gd}$ | | - | 18 | - | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$ = 10V, $V_{GS}$ = 0V, f = 1MHz | - | 2,700 | - | pF |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 650 | - | |
| Output Capacitance | $C_{oss}$ | | - | 900 | - | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{GS}$ = 4.5V, $V_{DS}$ = 10V, $I_D$ = 5A, $R_{GEN}$ = 3Ω | - | 120 | - | ns |
| Rise Time | $t_r$ | | - | 400 | - | |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 3,300 | - | |
| Fall Time | $t_f$ | | - | 7,000 | - | |
| **Body Diode Characteristics** | | | | | | |
| Source-Source Diode Forward Voltage | $VF_{(S-S)}$ | $I_S$ = 1.0A, $V_{GS}$ = 0V | - | 0.70 | 1.2 | V |

Note *1. Mounted on FR4 board “jesd51-7” (76.2mm x 114.3mm x t1.6mm),
*2. t= 10us, Duty Cycle ≤ 1%

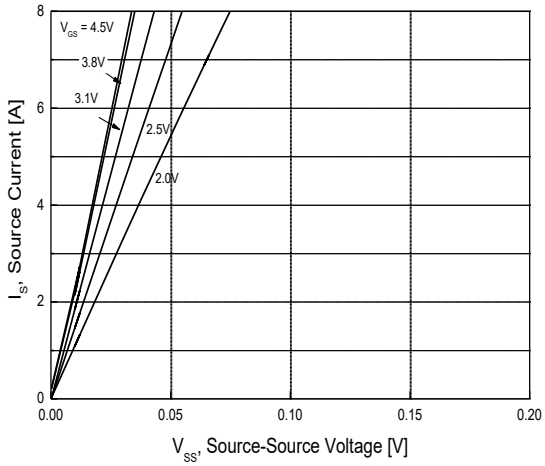



**Fig.1 On-Region Characteristics**

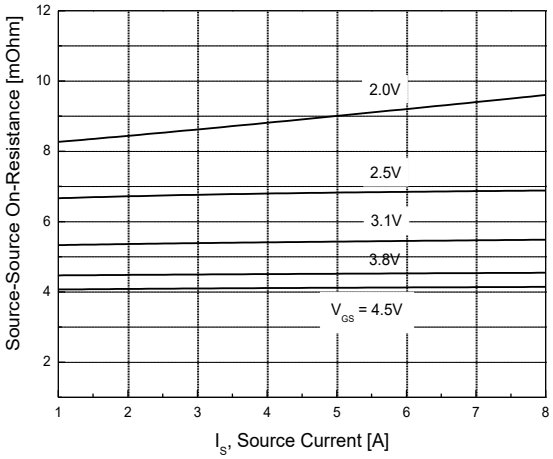



**Fig.2 On-Resistance Variation with Source Current and Gate Voltage**

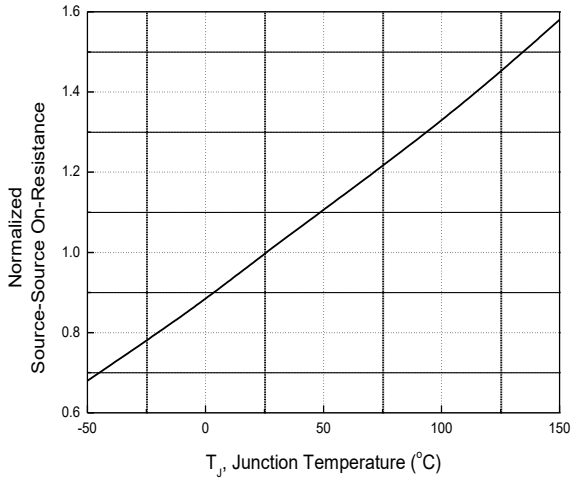



**Fig.3 On-Resistance Variation with Temperature**

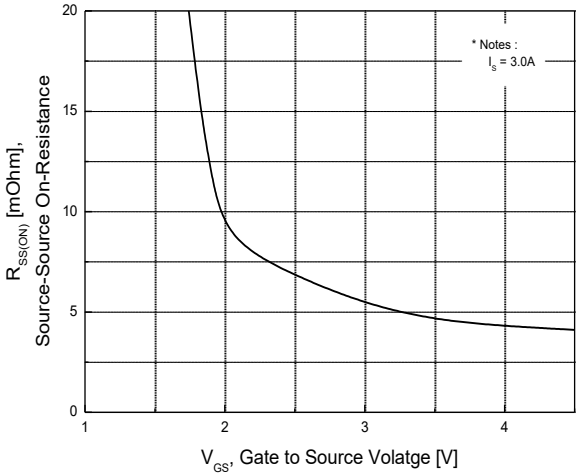



**Fig.4 On-On-Resistance Variation with Gate to Source Voltage**

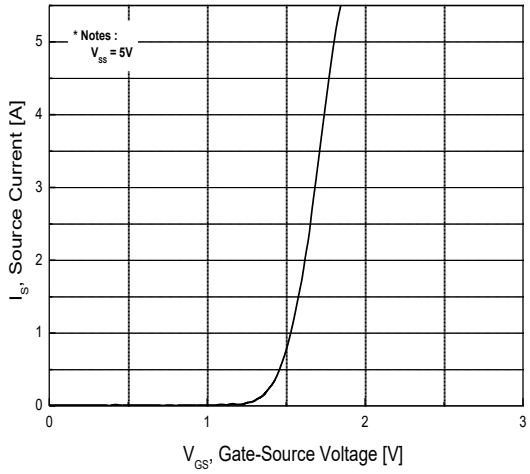



**Fig.5 Transfer Characteristics**

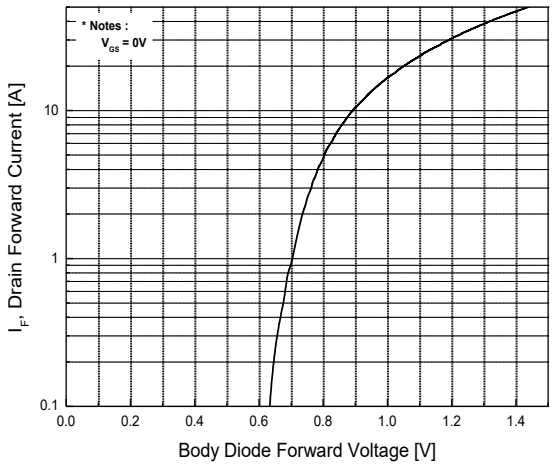



**Fig.6 Body Diode Characteristics**

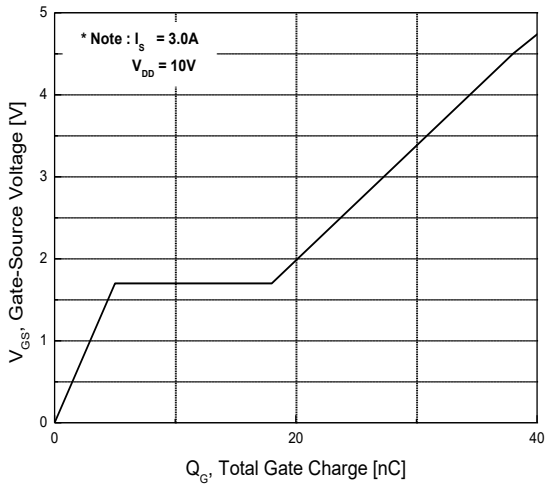



**Fig.7 Gate Charge Characteristics**

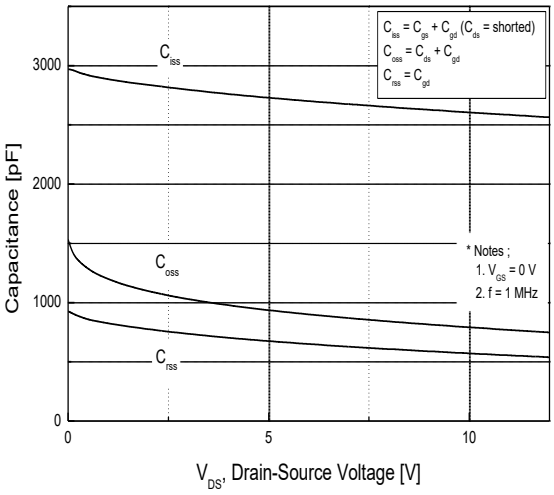



**Fig.8 Capacitance Characteristics**

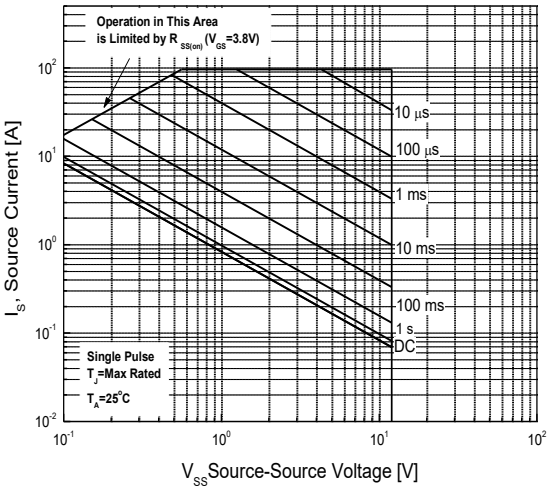



**Fig.9 Maximum Safe Operating Area**

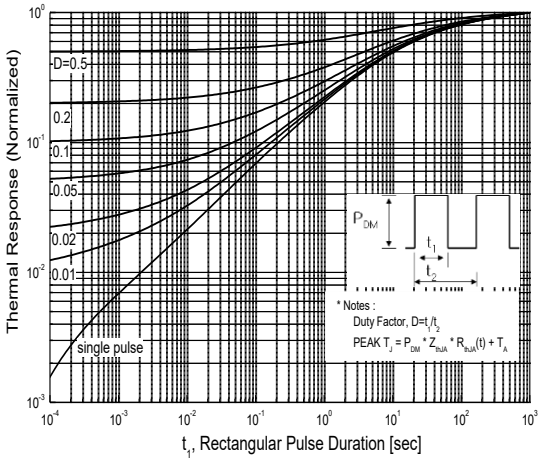
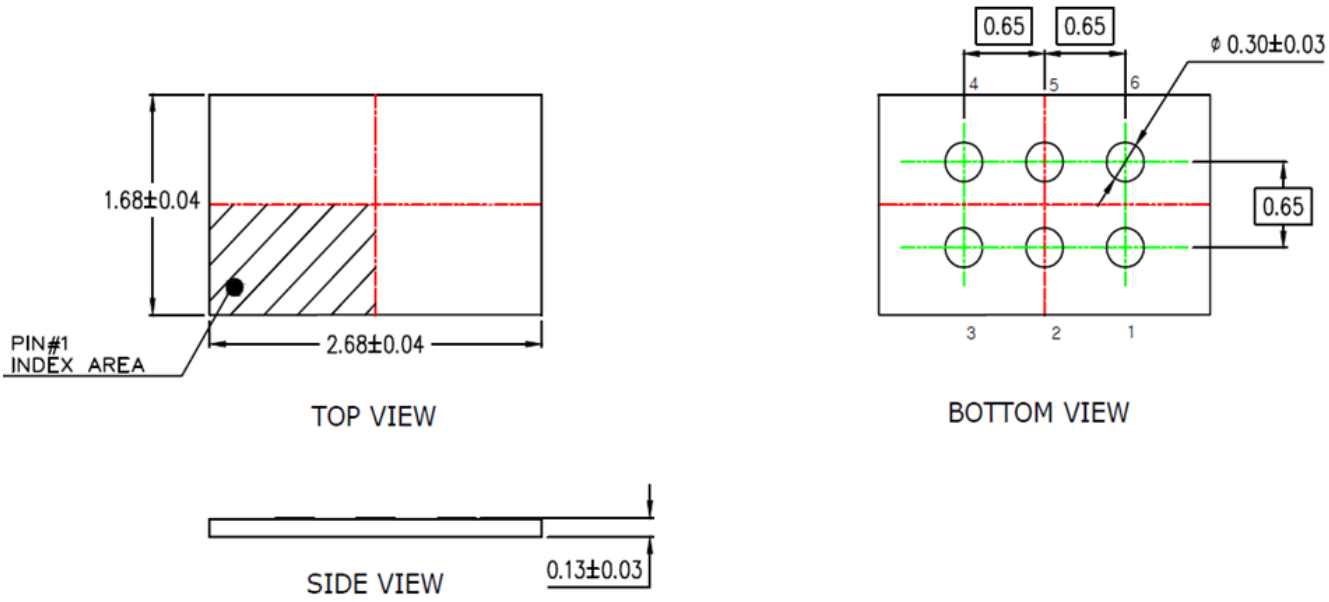



**Fig.10 Transient Thermal Response Curve**

## Package Dimension

### WLCSP POD (Package Outline Dimension)

**Unit: mm**




Note
* GENERAL TOLERANCE : ±0.03mm
* PKG BODY SIZES EXCLUDE FLASH & BURRS
* THE DIRECTION OF VIEW

**DISCLAIMER**:

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