

## General Description

The MDWC0337E 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.

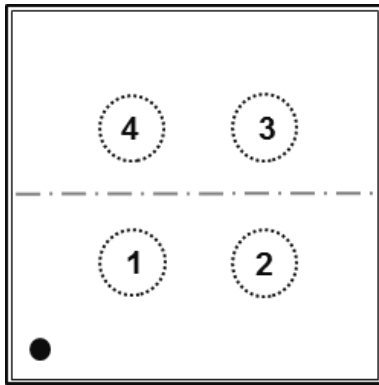
## Features

- $V_{SS} = 20V$
- Source-Source ON Resistance;
  - $R_{SS(ON)}$  typ. 8.3mΩ @  $V_{GS} = 4.5V$
  - $R_{SS(ON)}$  typ. 8.8mΩ @  $V_{GS} = 3.8V$
  - $R_{SS(ON)}$  typ. 9.9mΩ @  $V_{GS} = 3.1V$
  - $R_{SS(ON)}$  typ. 12.1mΩ @  $V_{GS} = 2.5V$

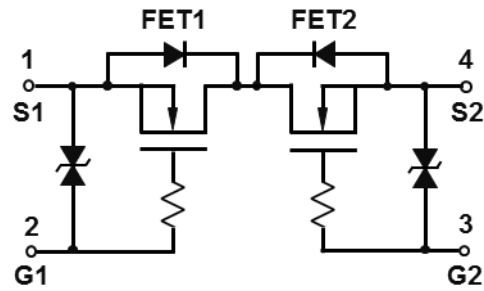
## Applications

- Portable Battery Protection Module

### Top View



1.88mm\*1.88mm WLCSP



- |                  |                 |
|------------------|-----------------|
| 1. Source (FET1) | 3. Gate(FET2)   |
| 2. Gate(FET1)    | 4. Source(FET2) |

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

Characteristics		Symbol	Rating	Units
Source-Source Voltage		$V_{SSS}$	20	V
Gate-Source Voltage		$V_{GSS}$	±8	V
Source Current	DC <sup>*1</sup>	IS	6.4	A
	Pulse <sup>*2</sup>	ISp	63	A
Total Power Dissipation	DC <sup>*1</sup>	PD	0.8	W
Channel Temperature		Tch	150	°C
Junction and Storage Temperature Range		T <sub>J</sub> , T <sub>stg</sub>	-55~150	°C

## Thermal Characteristics

Characteristics		Symbol	Rating	Unit
Thermal Resistance	DC <sup>*1</sup>	R <sub>θJA</sub>	121	°C/W
			157	°C/W

## Ordering Information

Part Number	Temp. Range	Package	Packing	RoHS Status
MDWC0337ERH	-55~150°C	WLCSP	Tape and Reel	Halogen Free

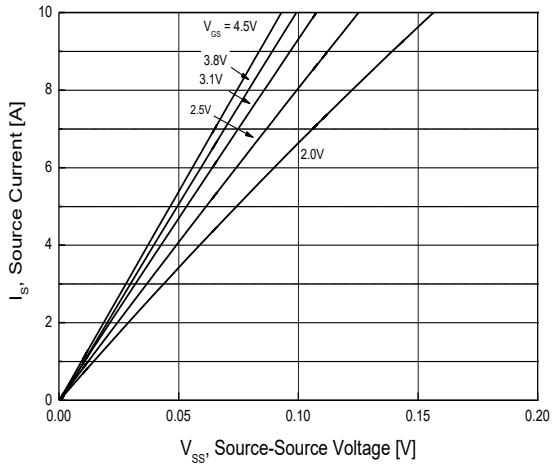
## Electrical Characteristics (Ta =25°C unless otherwise noted)

Characteristics	Symbol	Test Condition	Min	Typ	Max	Units
<b>Static Characteristics</b>						
Source-Source Breakdown Voltage	$BV_{SSS}$	$I_S = 500\mu A, V_{GS} = 0V$	20	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{SS} = V_{GS}, I_S = 1mA$	0.5	1.0	1.5	
Cut-Off Current	$I_{SSS}$	$V_{SS} = 20V, V_{GS} = 0V$	-	-	1.0	$\mu A$
Gate Leakage Current	$I_{GSS}$	$V_{GS} = \pm 8V, V_{SS} = 0V$	-	-	10	$\mu A$
Source-Source Resistance	$R_{SS(OH)}^{*3}$	$V_{GS} = 4.5V, I_S = 2.5A$	5.8	8.3	11.9	m $\Omega$
		$V_{GS} = 3.8V, I_S = 2.5A$	6.0	8.8	12.9	
		$V_{GS} = 3.1V, I_S = 2.5A$	6.2	9.9	15.8	
		$V_{GS} = 2.5V, I_S = 2.5A$	6.5	12.1	22.6	
<b>Dynamic Characteristics</b>						
Total Gate Charge	$Q_g$	$V_{DS} = 10V, I_D = 2.5A, V_{GS} = 4.5V$	-	28.0	-	nC
Gate-Source Charge	$Q_{gs}$		-	3.5	-	
Gate-Drain Charge	$Q_{gd}$		-	13.0	-	
Input Capacitance	$C_{iss}$	$V_{DS} = 10V, V_{GS} = 0V, f = 1MHz$	-	1924	-	pF
Reverse Transfer Capacitance	$C_{rss}$		-	524	-	
Output Capacitance	$C_{oss}$		-	620	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = 4.5V, V_{DS} = 10V, I_D = 5A, R_{GEN} = 3\Omega$	-	85	-	ns
Rise Time	$t_r$		-	280	-	
Turn-Off Delay Time	$t_{d(off)}$		-	2600	-	
Fall Time	$t_f$		-	5850	-	
<b>Drain-Source Body Diode Characteristics</b>						
Source-Source Diode Forward Voltage	$V_{F(S-S)}$	$I_S = 1.0A, V_{GS} = 0V$	0.40	0.65	1.0	V

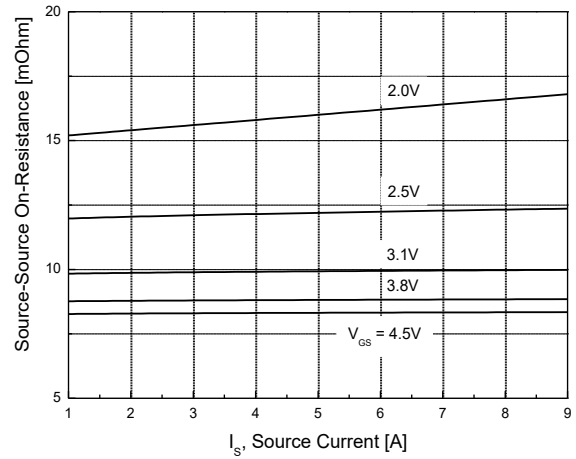
Note \*1. Mounted on FR4 board "jesd51-7" (76.2mm x 114.3mm x t1.6mm),

\*2.  $t_r = 10\mu s$ , Duty Cycle  $\leq 1\%$

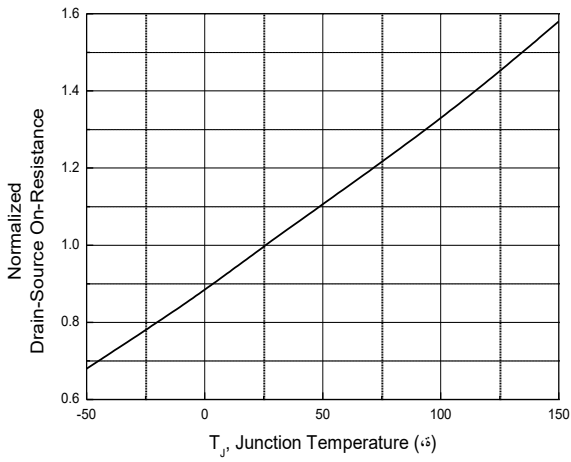
\*3.  $R_{SS(OH)}$  is guaranteed by design, not subject to production testing.



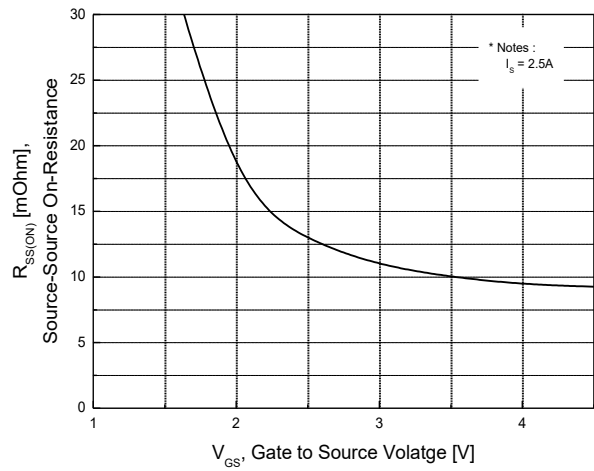
**Fig.1 On-Region Characteristics**



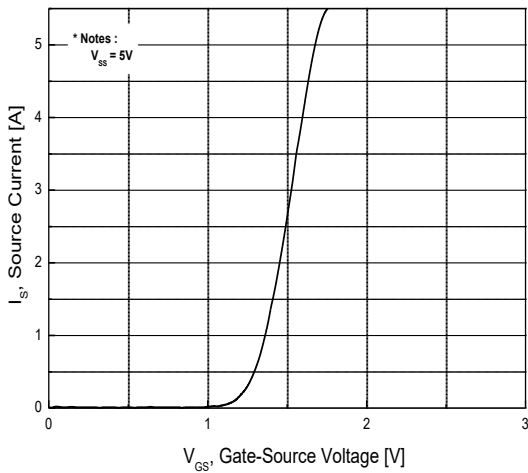
**Fig.2 On-Resistance Variation with Drain Current and Gate Voltage**



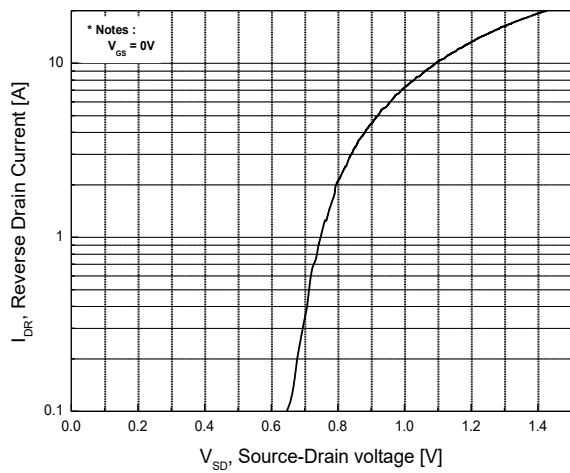
**Fig.3 On-Resistance Variation with Temperature**



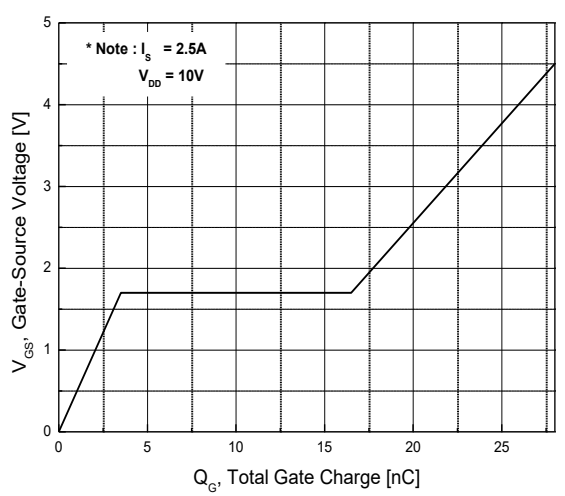
**Fig.4 On-Resistance Variation with Gate to Source Voltage**



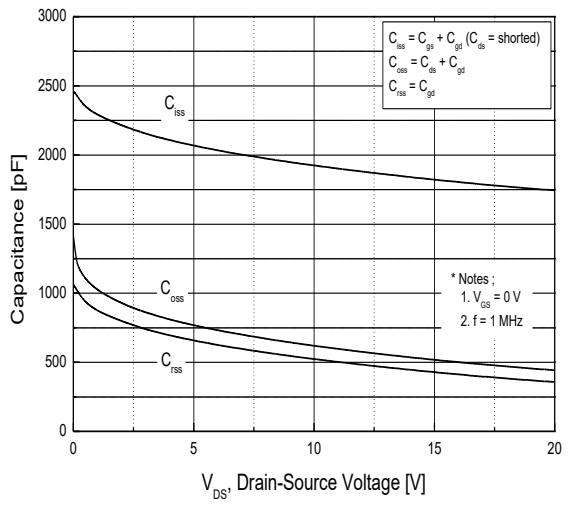
**Fig.5 Transfer Characteristics**



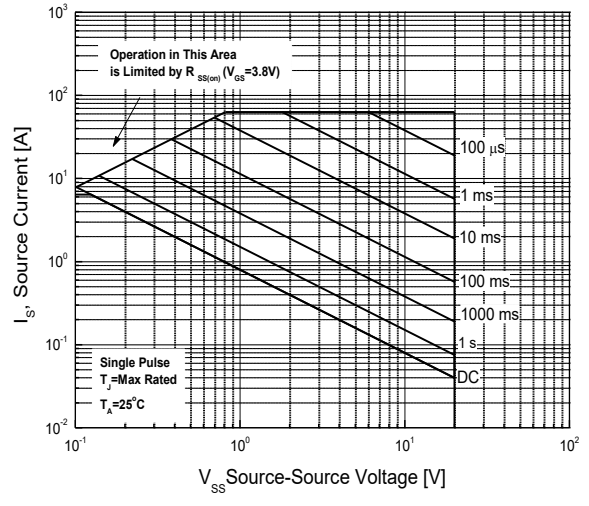
**Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature**



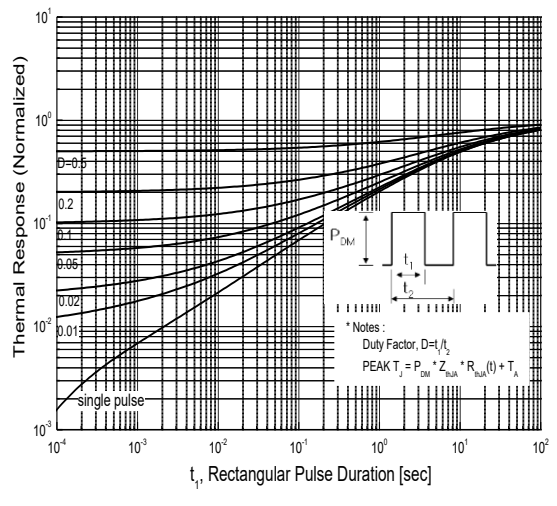
**Fig.7 Gate Charge Characteristics**



**Fig.8 Capacitance Characteristics**



**Fig.9 Maximum Safe Operating Area**

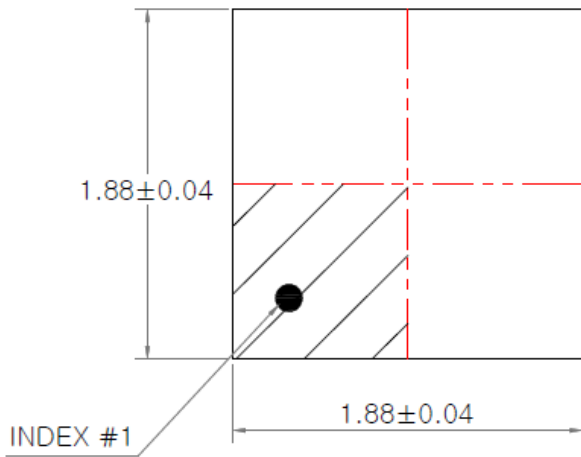


**Fig.10 Transient Thermal Response Curve**

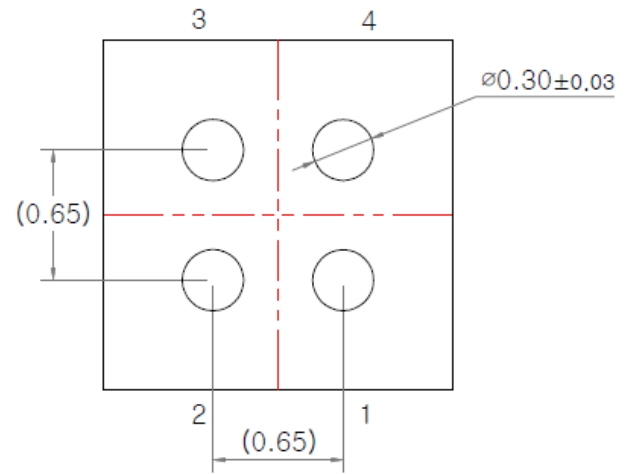
### Package Dimension

### WLCSP POD(Package Outline Dimension)

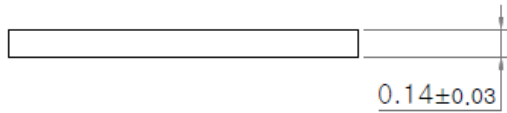
Unit: mm



TOP VIEW



BOTTOM VIEW




SIDE VIEW

Note

- \* PKG BODY SIZES EXCLUDE FLASH & BURRS
- \* THE DIRECTION OF VIEW

**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.

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