

## General Description

The MDWC0340EB 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.

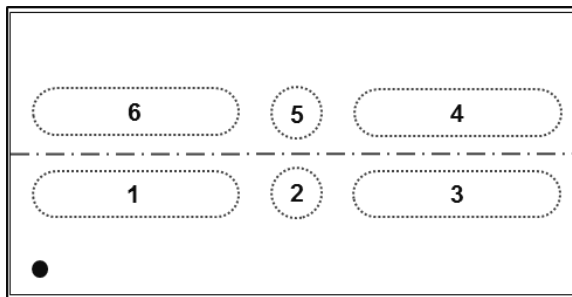
## Features

- $V_{SS} = 12V$
- Source-Source ON Resistance;
  - $R_{SS(ON)}$  typ. 2.5mΩ @  $V_{GS} = 4.5V$
  - $R_{SS(ON)}$  typ. 2.7mΩ @  $V_{GS} = 3.8V$
  - $R_{SS(ON)}$  typ. 3.2mΩ @  $V_{GS} = 3.1V$
  - $R_{SS(ON)}$  typ. 4.1mΩ @  $V_{GS} = 2.5V$

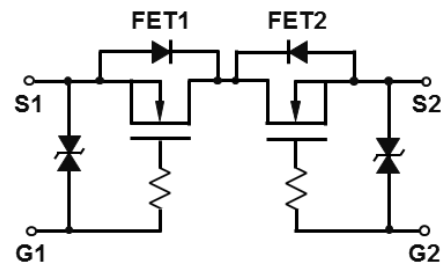
## Applications

- Portable Battery Protection

### Top View



3.54mm\*1.77mm 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 <sup>1</sup>	IS	13.6	A
	Pulse <sup>2</sup>	ISp	110	A
Total Power Dissipation	DC <sup>1</sup>	PD	0.89	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	$R_{\theta JA}$	140	°C/W

## Ordering Information

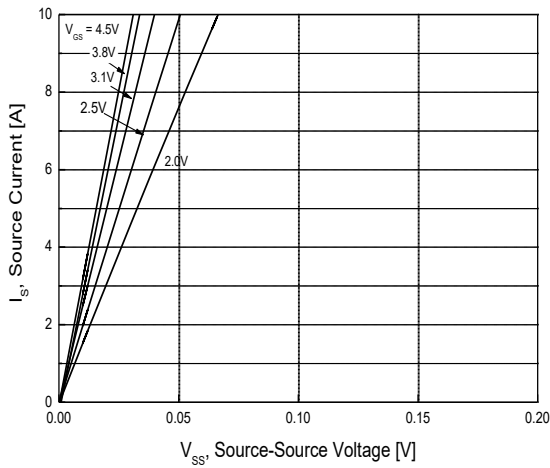
Part Number	Temp. Range	Package	Packing	RoHS Status
MDWC0340EBRH	-55~150°C	WLCSP	Tape and Reel	Halogen Free

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

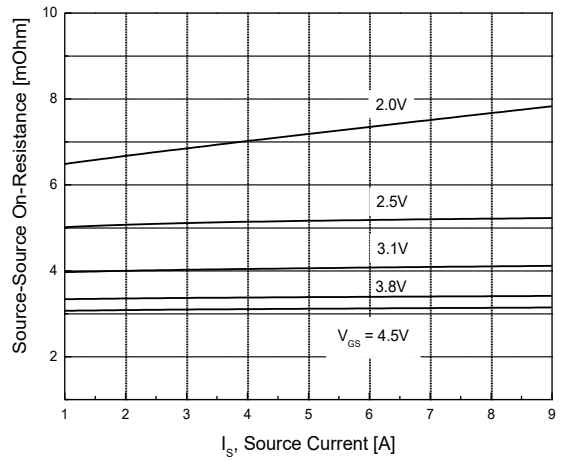
Characteristics	Symbol	Test Condition	Min	Typ	Max	Units
<b>Static Characteristics</b>						
Source-Source Breakdown Voltage	$BV_{SSS}$	$I_S = 500\mu A, V_{GS} = 0V$	12	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{SS} = V_{GS}, I_S = 1mA$	0.5	1.0	1.5	
Cut-Off Current	$I_{SSS}$	$V_{SS} = 12V, V_{GS} = 0V$	-	-	1.0	$\mu A$
Gate Leakage Current	$I_{GSS}$	$V_{GS} = \pm 8V, V_{SS} = 0V$	-	-	10	$\mu A$
Source-Source Resistance	$R_{SS(ON)}$	$V_{GS} = 4.5V, I_S = 5.0A$	1.9	2.5	3.3	m $\Omega$
		$V_{GS} = 3.8V, I_S = 5.0A$	2.0	2.7	3.6	
		$V_{GS} = 3.1V, I_S = 5.0A$	2.1	3.2	4.8	
		$V_{GS} = 2.5V, I_S = 5.0A$	2.4	4.1	7.0	
<b>Dynamic Characteristics</b>						
Total Gate Charge	$Q_g$	$V_{DS} = 10V, I_D = 2.5A, V_{GS} = 4.5V$	-	95.5	-	nC
Gate-Source Charge	$Q_{gs}$		-	7.0	-	
Gate-Drain Charge	$Q_{gd}$		-	27	-	
Input Capacitance	$C_{iss}$	$V_{DS} = 10V, V_{GS} = 0V, f = 1MHz$	-	3340	-	pF
Reverse Transfer Capacitance	$C_{riss}$		-	866	-	
Output Capacitance	$C_{oss}$		-	1250	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = 4.5V, V_{DS} = 10V, I_D = 5A, R_{GEN} = 3\Omega$	-	156	-	ns
Rise Time	$t_r$		-	570	-	
Turn-Off Delay Time	$t_{d(off)}$		-	4750	-	
Fall Time	$t_f$		-	9000	-	
<b>Body Diode Characteristics</b>						
Source-Source Diode Forward Voltage	$V_{F(S-S)}$	$I_S = 1.0A, V_{GS} = 0V$	-	0.7	1.2	V

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

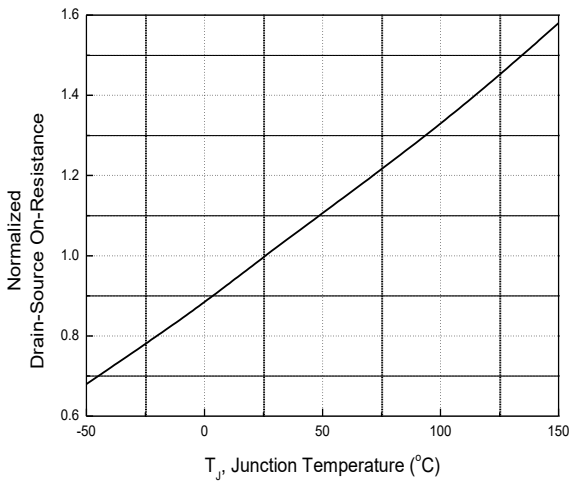
\*2.  $t_r = 10\mu s$ , Duty Cycle  $\leq 1\%$



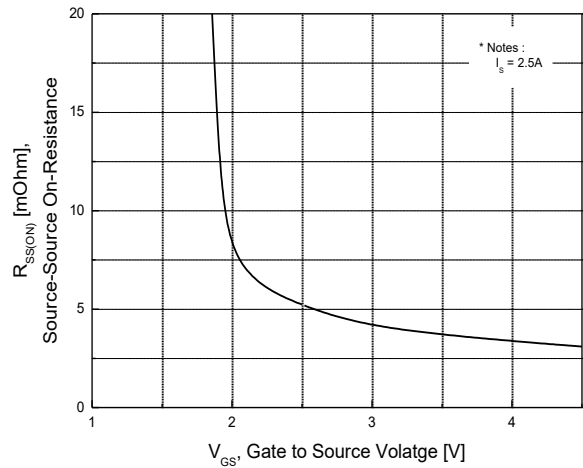
**Fig.1 On-Region Characteristics**



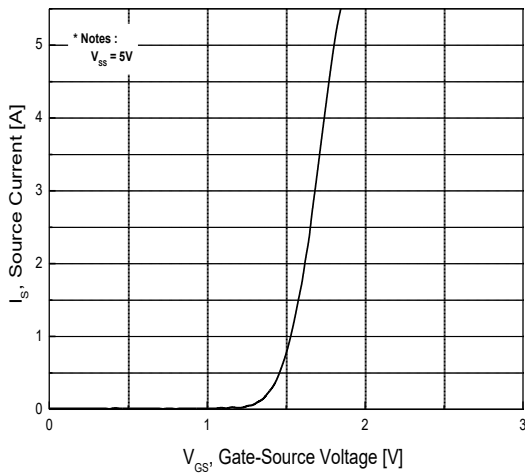
**Fig.2 On-Resistance Variation with Source Current and Gate Voltage**



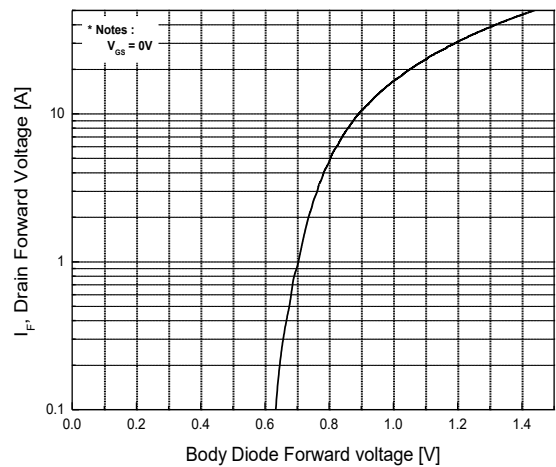
**Fig.3 On-Resistance Variation with Temperature**



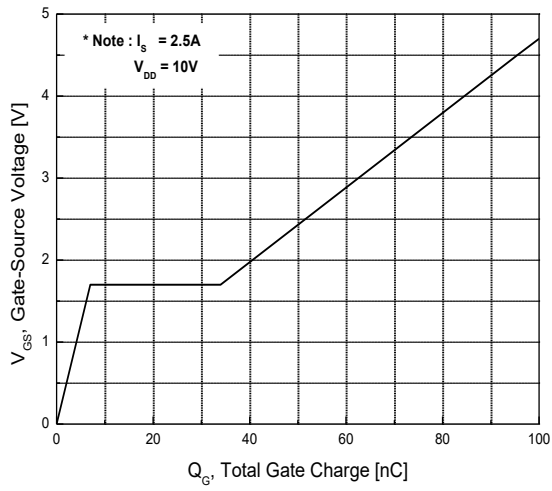
**Fig.4 On-Resistance Variation with Gate to Source Voltage**



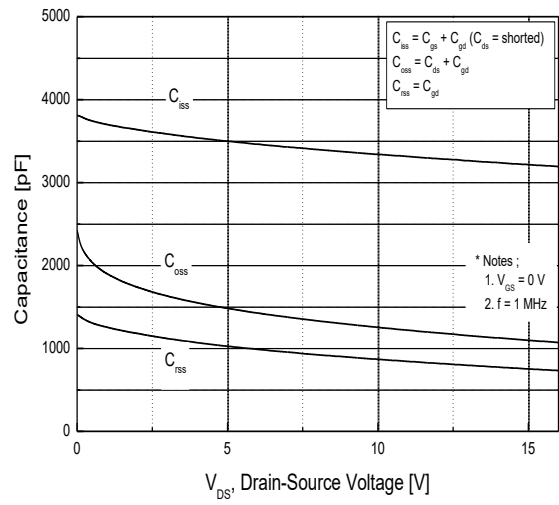
**Fig.5 Transfer Characteristics**



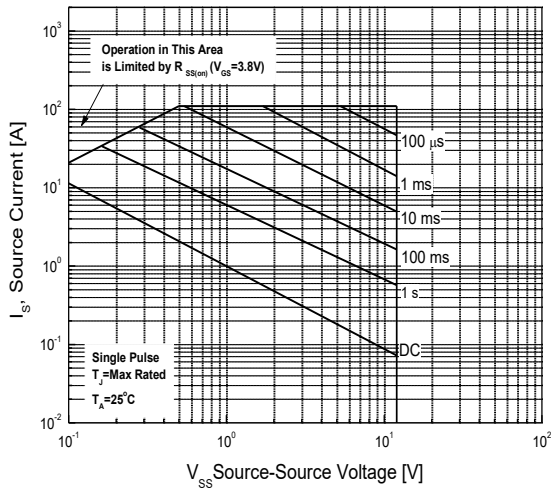
**Fig.6 Body Diode Characteristics**



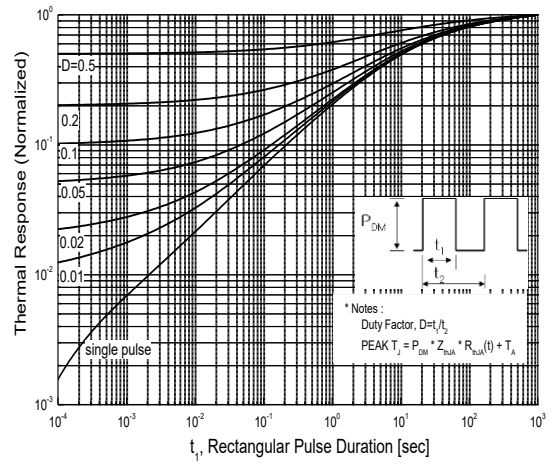
**Fig.7 Gate Charge Characteristics**



**Fig.8 Capacitance Characteristics**



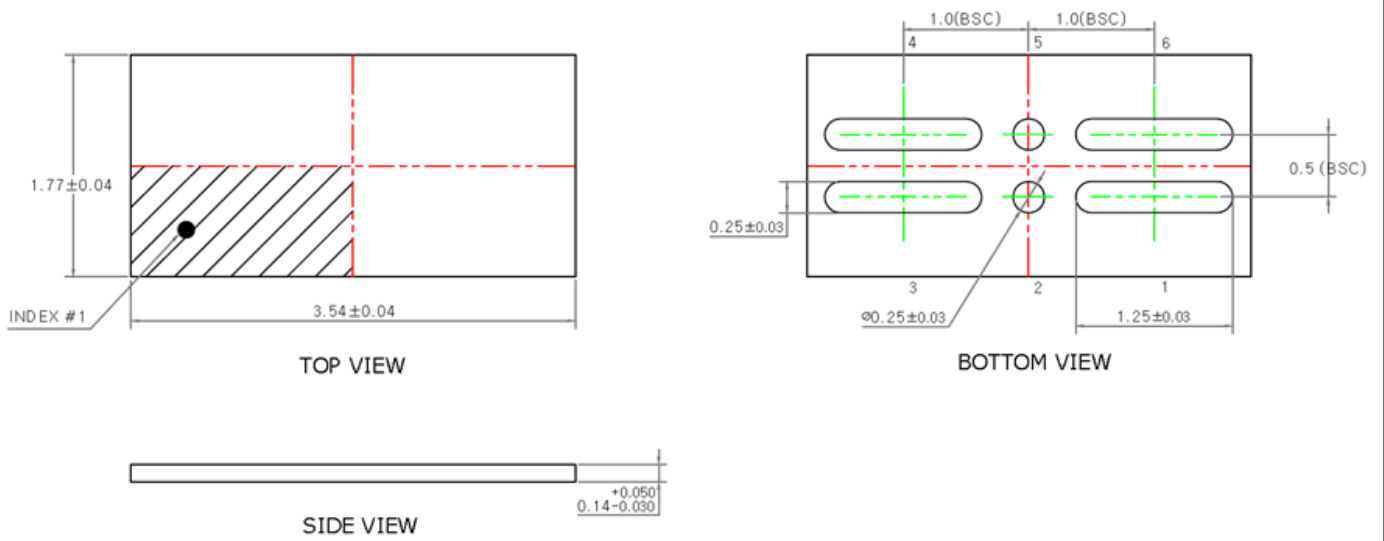
**Fig.9 Maximum Safe Operating Area**



**Fig.10 Transient Thermal Response Curve**

**Package Dimension**


**MDWC0340EB WLCSP POD(Package Outline Dimension)**



Contents	Value
Chip Thickness (Min. / Typ. / Max.)	110 / 140 / 190 $\mu\text{m}$
Metal (Gate PAD)	Al-Cu-Si
Metal (Source PAD)	Cu/Ni/Au
Passivation Layer	Yes
Chip Size	$3,540 \pm 40 \times 1,770 \pm 40 \mu\text{m}^2$
Gate Pad Open Size	$\varnothing 250 \mu\text{m}$
Packaging	5,000 pcs / 1 reel

**DISCLAIMER:**

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