

### General Description

The MDWC24D042ERH 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.

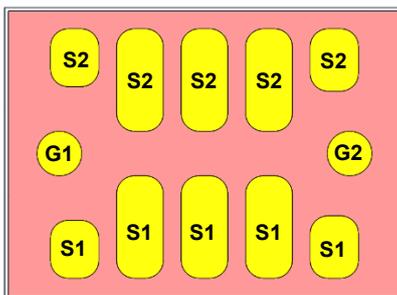
### Features

- $V_{SS} = 24V$
- Source-Source ON Resistance;
  - $R_{SS(ON)} < 4.5m\Omega @ V_{GS} = 3.9V$
  - $R_{SS(ON)} < 5.9m\Omega @ V_{GS} = 3.1V$

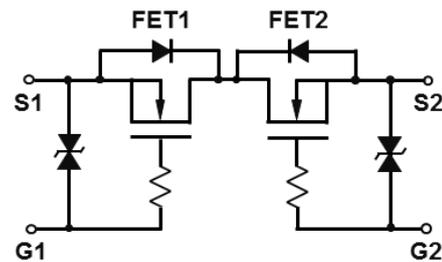
### Applications

- Portable Battery Protection

### Bottom View



2.23mm x 1.64mm WLCSP



### Absolute Maximum Ratings

Characteristics		Symbol	Rating	Units
Source-Source Voltage		$V_{SSS}$	24	V
Gate-Source Voltage		$V_{GSS}$	$\pm 12$	V
Source Current	DC <sup>1</sup>	$I_S$	12.93	A
	Pulse	$I_{SP}$	51.71	A
Total Power Dissipation	DC <sup>1</sup>	$P_D$	1.2	W
Channel Temperature		$T_{ch}$	-55~150	°C
Junction and Storage Temperature Range		$T_J, T_{stg}$	-55~150	°C

### Thermal Characteristics

Characteristics	Symbol	Rating	Unit
Thermal Resistance	$R_{\theta JA}$	103.9	°C/W

## Ordering Information

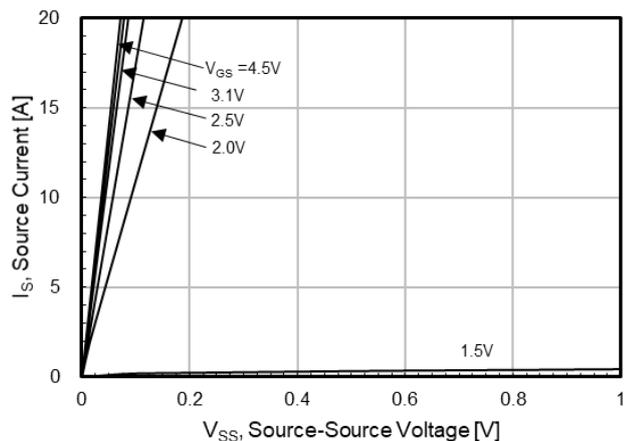
Part Number	Temp. Range	Package	Packing	RoHS Status
MDWC24D042ERH	-55~150 °C	WLCSP	Tape and Reel	Halogen Free

## Electrical Characteristics (T<sub>A</sub> =25°C unless otherwise noted)

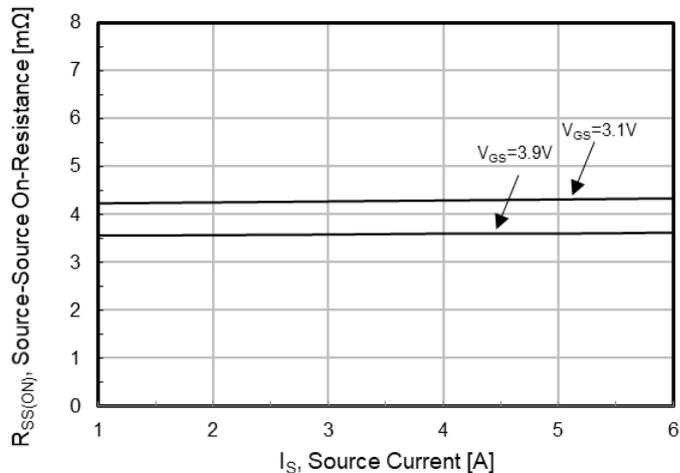
Characteristics	Symbol	Test Condition	Min	Typ	Max	Units
<b>Static Characteristics</b>						
Source-Source Breakdown Voltage	BV <sub>SSS</sub>	I <sub>S</sub> = 250uA, V <sub>GS</sub> = 0V	24	-	-	V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>SS</sub> = V <sub>GS</sub> , I <sub>S</sub> = 250uA	0.5	1.0	1.5	
Cut-Off Current	I <sub>SSS</sub>	V <sub>SS</sub> = 20V, V <sub>GS</sub> = 0V	-	-	1.0	μA
Gate Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±12V, V <sub>SS</sub> = 0V	-	-	10	μA
Source-Source Resistance	R <sub>SS(ON)</sub>	V <sub>GS</sub> = 3.9V, I <sub>S</sub> = 5.0A	-	3.6	4.5	mΩ
		V <sub>GS</sub> = 3.1V, I <sub>S</sub> = 5.0A	-	4.3	5.9	
<b>Dynamic Characteristics</b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DD</sub> = 12V, I <sub>S</sub> = 5.0A, V <sub>GS</sub> = 3.9V	-	24.5	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	4.6	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	12.1	-	
Input Capacitance	C <sub>iSS</sub>	V <sub>SS</sub> = 12V, V <sub>GS</sub> = 0V, f = 50kHz	-	2592	-	pF
Reverse Transfer Capacitance	C <sub>rSS</sub>		-	592	-	
Output Capacitance	C <sub>oss</sub>		-	639	-	
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>GS</sub> = 3.9V, V <sub>DD</sub> = 12V, I <sub>S</sub> = 5.0A, R <sub>GEN</sub> = 3Ω	-	0.07	-	μS
Rise Time	t <sub>r</sub>		-	0.29	-	
Turn-Off Delay Time	t <sub>d(off)</sub>		-	2.28	-	
Fall Time	t <sub>f</sub>		-	4.62	-	
<b>Drain-Source Body Diode Characteristics</b>						
Source-Source Diode Forward Voltage	V <sub>F(S-S)</sub>	I <sub>F</sub> = 5A, V <sub>GS</sub> = 0V	-	0.75	1.0	V

Note \*1. Mounted on PCB Board (14.9mm x 25.0mm x t1.6mm)

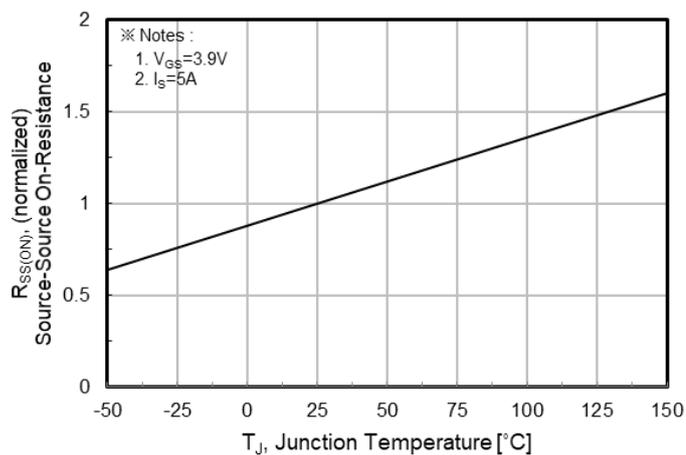
### Characteristic Graph



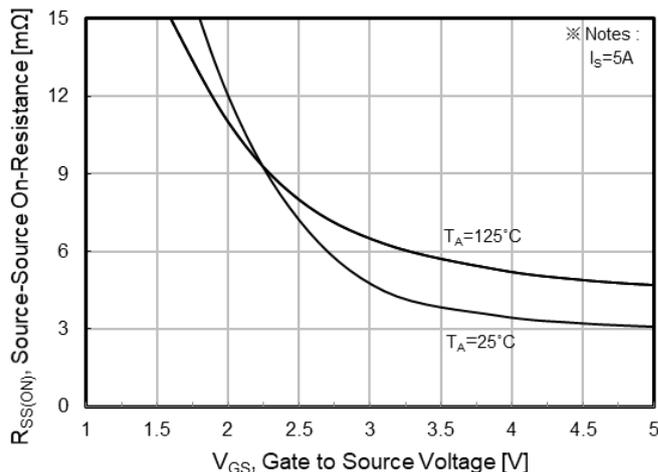
**Fig.1 On-Region Characteristics**



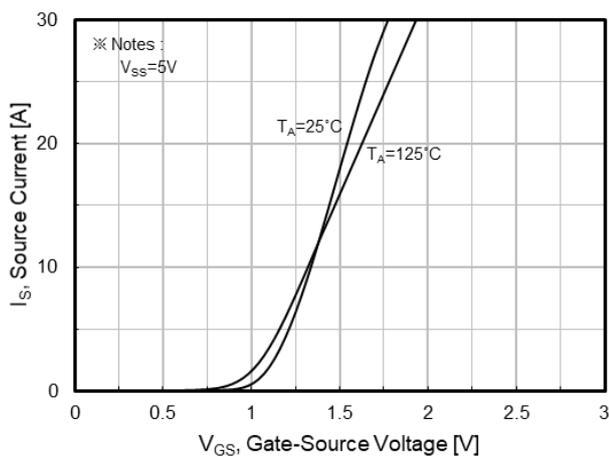
**Fig.2 On-Resistance Variation with Drain Current and Gate Voltage**



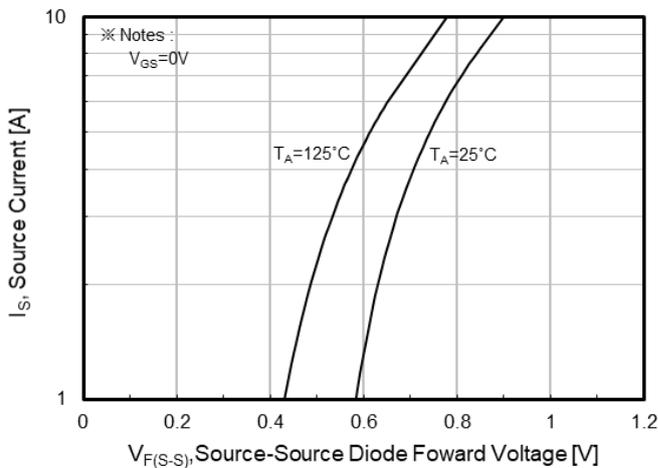
**Fig.3 On-Resistance Variation with Temperature**



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

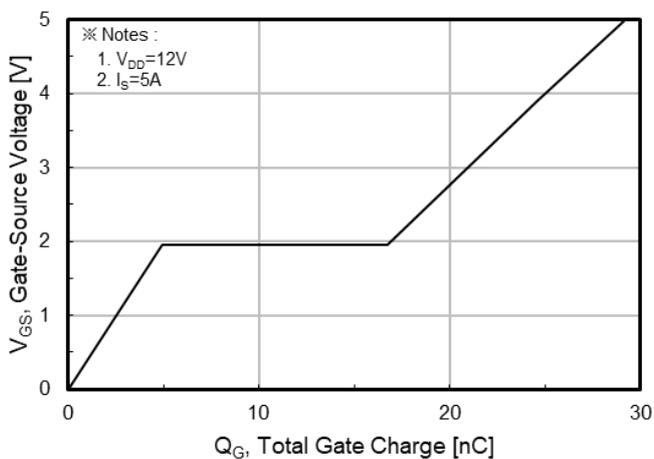


**Fig.5 Transfer Characteristics**

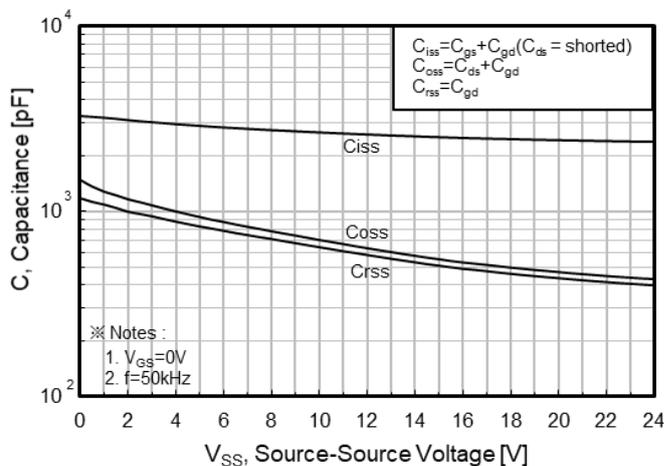


**Fig.6 Forward Source to Source Characteristics**

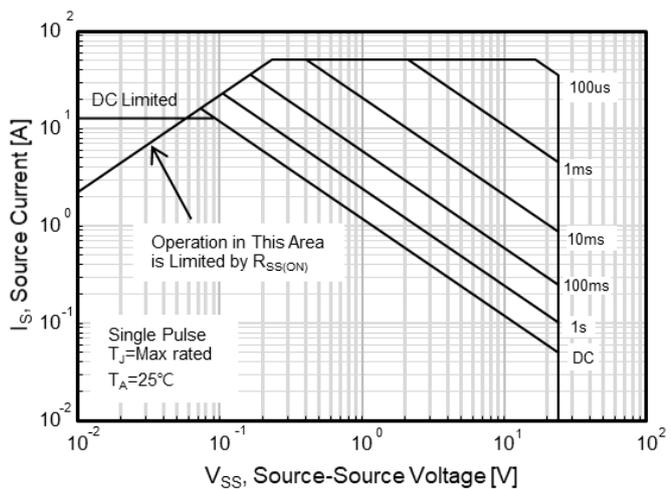
### Characteristic Graph



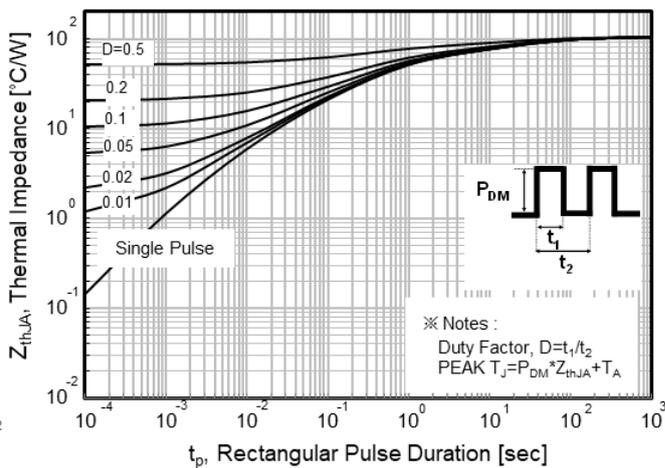
**Fig.7 Gate Charge Characteristics**



**Fig.8 Capacitance Characteristics**

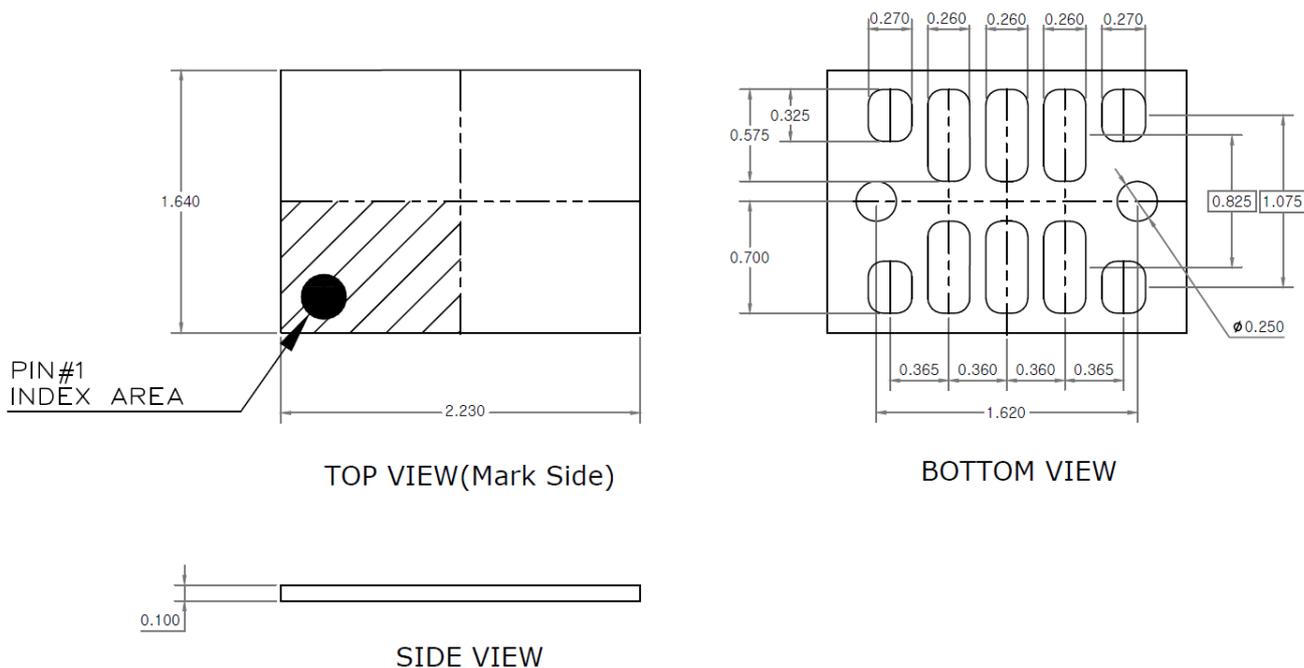


**Fig.9 Maximum Safe Operating Area**



**Fig.10 Transient Thermal Response Curve**

## PACKAGE OUTLINE



### NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. GENERAL TOLERANCE :  $\pm 0.03\text{mm}$
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.

Magnachip reserves the right to change the specifications and circuitry without notice at any time. Magnachip does not consider responsibility for use of any circuitry other than circuitry entirely included in a Magnachip product.  Magnachip is a registered trademark of Magnachip Semiconductor Ltd.