

### General Description

The MDWC24D031ERH 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.

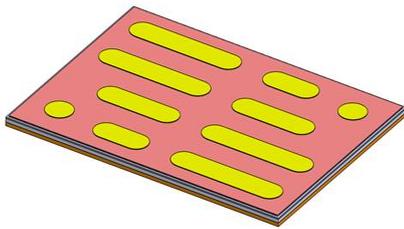
### Features

- $V_{SS} = 24V$
- Source-Source ON Resistance;
  - $R_{SS(ON)} < 2.8m\Omega @ V_{GS} = 4.5V$
  - $R_{SS(ON)} < 3.1m\Omega @ V_{GS} = 3.8V$
  - $R_{SS(ON)} < 3.6m\Omega @ V_{GS} = 3.1V$
  - $R_{SS(ON)} < 4.6m\Omega @ V_{GS} = 2.5V$

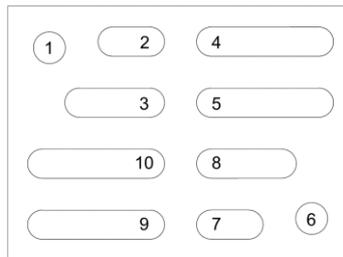
### Applications

- Portable Battery Protection

### Bottom View

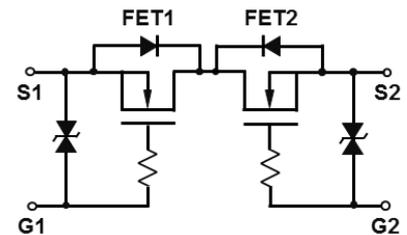


2.7mm x 2.0mm WLCSP



1. Gate1 (FET1)  
6. Gate2 (FET2)

2, 3, 4, 5. Source1 (FET1)  
7, 8, 9, 10. Source2 (FET2)



### 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>	$I_S$	15.7	A
	Pulse	$I_{SP}$	62.8	A
Total Power Dissipation	DC <sup>1</sup>	$P_D$	1.22	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	$R_{\theta JA}$	102.5	°C/W

## Ordering Information

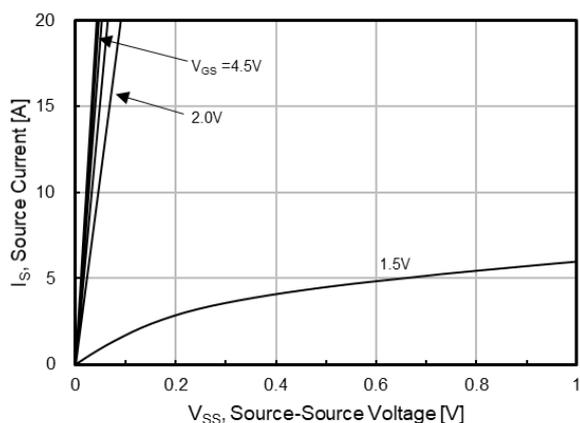
Part Number	Temp. Range	Package	Packing	RoHS Status
MDWC24D031ERH	-55~150 °C	WLCSP	Tape and Reel	Halogen Free

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

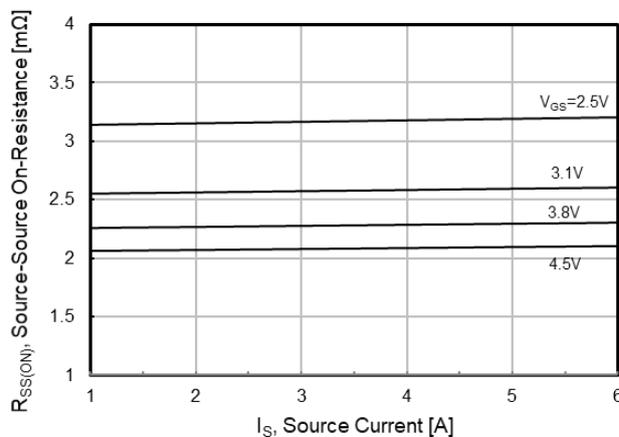
Characteristics	Symbol	Test Condition	Min	Typ	Max	Units
<b>Static Characteristics</b>						
Source-Source Breakdown Voltage	BV <sub>SSS</sub>	I <sub>S</sub> = 250uA, V <sub>GS</sub> = 0V	24	-	-	V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>SS</sub> = V <sub>GS</sub> , I <sub>S</sub> = 250uA	0.5	0.95	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> = 4.5V, I <sub>S</sub> = 5.0A	-	2.1	2.8	mΩ
		V <sub>GS</sub> = 3.8V, I <sub>S</sub> = 5.0A	-	2.3	3.1	
		V <sub>GS</sub> = 3.1V, I <sub>S</sub> = 5.0A	-	2.6	3.6	
		V <sub>GS</sub> = 2.5V, I <sub>S</sub> = 5.0A	-	3.2	4.6	
<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> = 3.8V	-	33.8	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	4.5	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	18.3	-	
Input Capacitance	C <sub>iss</sub>	V <sub>SS</sub> = 12V, V <sub>GS</sub> = 0V, f = 50kHz	-	3,666	-	pF
Reverse Transfer Capacitance	C <sub>riss</sub>		-	847	-	
Output Capacitance	C <sub>oss</sub>		-	931	-	
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>GS</sub> = 3.8V, V <sub>DD</sub> = 12V, I <sub>S</sub> = 5.0A, R <sub>GEN</sub> = 3Ω	-	0.03	-	μS
Rise Time	t <sub>r</sub>		-	0.33	-	
Turn-Off Delay Time	t <sub>d(off)</sub>		-	6.02	-	
Fall Time	t <sub>f</sub>		-	17.85	-	
<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)

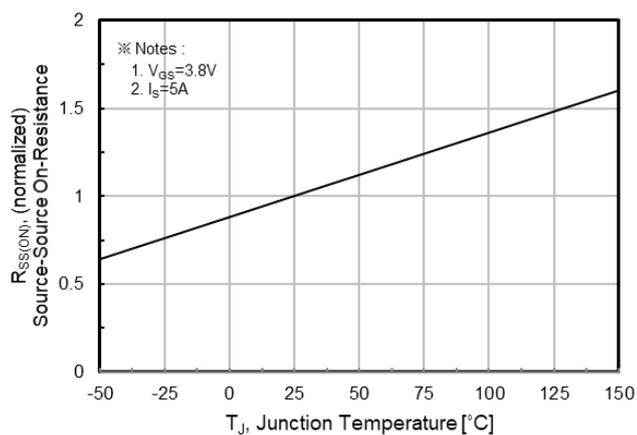
### Characteristic Graph



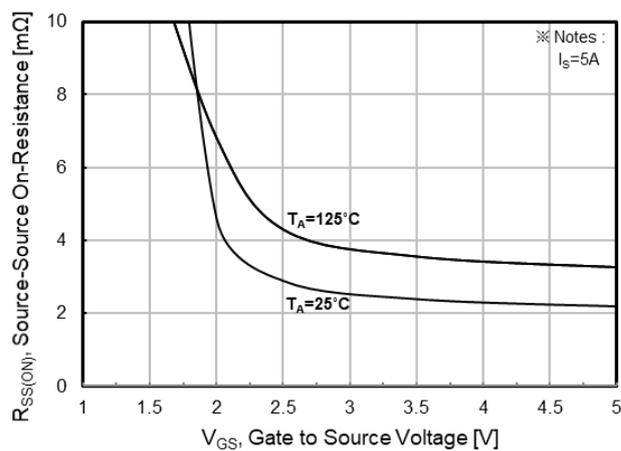
**Fig.1 On-Region Characteristics**



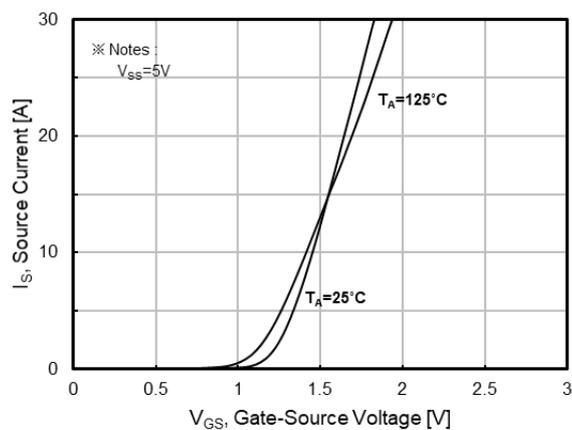
**Fig.2 On-Resistance Variation with Drain Current and Gate Voltage**



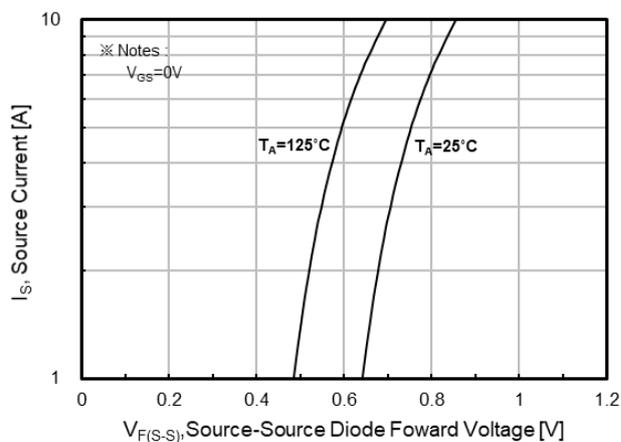
**Fig.3 On-Resistance Variation with Temperature**



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

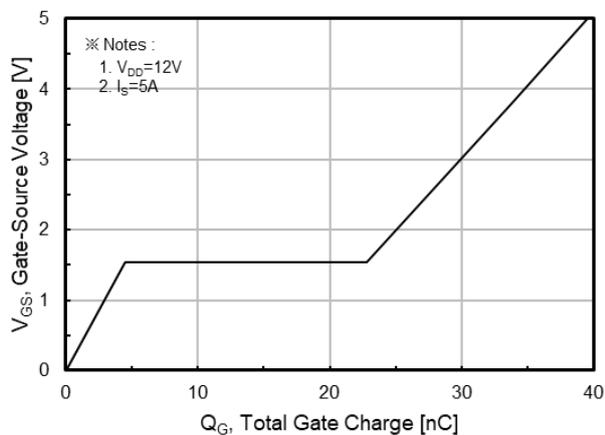


**Fig.5 Transfer Characteristics**

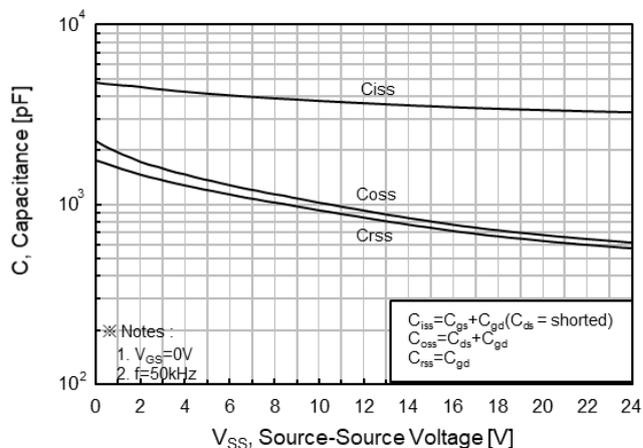


**Fig.6 Forward Source to Source Characteristics**

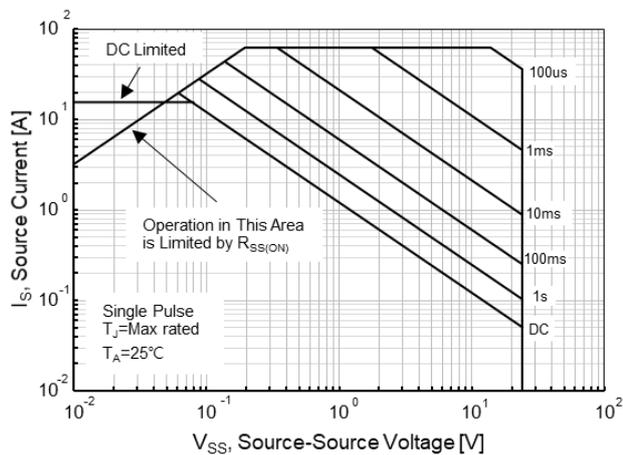
### Characteristic Graph



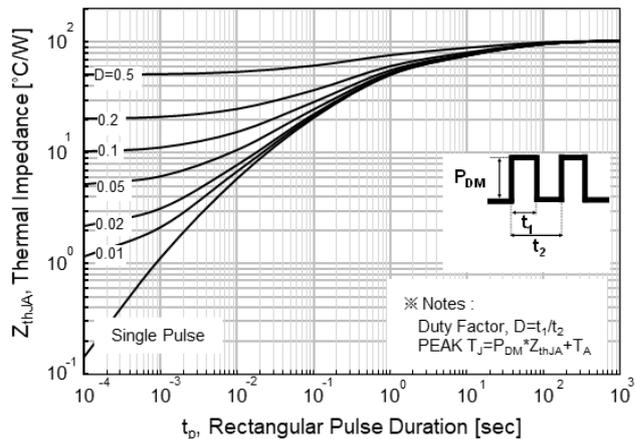
**Fig.7 Gate Charge Characteristics**



**Fig.8 Capacitance Characteristics**

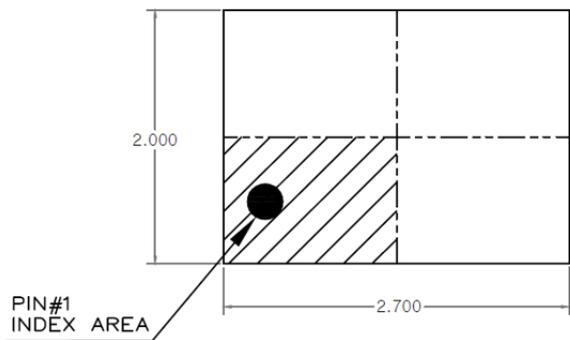


**Fig.9 Maximum Safe Operating Area**

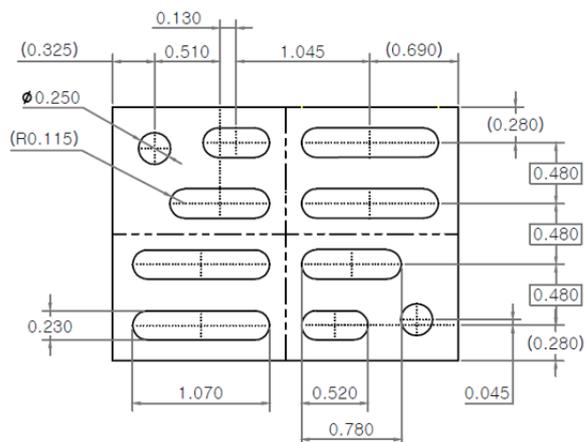


**Fig.10 Transient Thermal Response Curve**

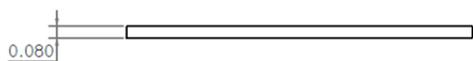
## PACKAGE OUTLINE



TOP VIEW(Mark Side)



BOTTOM VIEW



SIDE VIEW

### NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. GENERAL TOLERANCE :  $\pm 0.03\text{mm}$
3. PACKAGE BODY SIZES EXCLUDE FLASH & BURRS

### DISCLAIMER:

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