RoHS Compliant

Magnachip

MDWC24D031ERH

Common-Drain Dual N-Channel Trench MOSFET 24V, 3.1 mΩ

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.

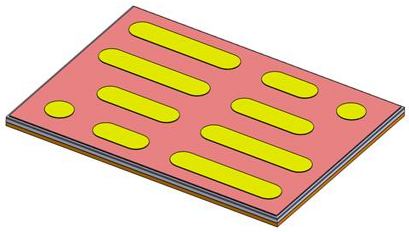
Features

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

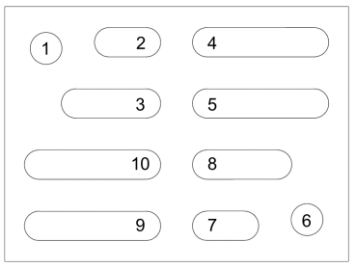
Applications

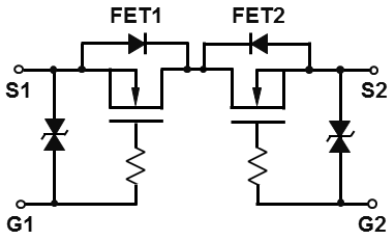
- Portable Battery Protection

Bottom View



2.7mm x 2.0mm WLCSP





1. Gate1 (FET1) **2, 3, 4, 5. Source1 (FET1)**
6. Gate2 (FET2) **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}	±12	V
Source Current	DC*1	I_S	15.7	A
	Pulse	I_{SP}	62.8	A
Total Power Dissipation	DC*1	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_A =25°C unless otherwise noted)

Characteristics	Symbol	Test Condition	Min	Typ	Max	Units
Static Characteristics						
Source-Source Breakdown Voltage	BV_{SSS}	I_S = 250uA, V_{GS} = 0V	24	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{SS} = V_{GS}, I_S = 250uA	0.5	0.95	1.5	
Cut-Off Current	I_{SSS}	V_{SS} = 20V, V_{GS} = 0V	-	-	1.0	μA
Gate Leakage Current	I_{GSS}	V_{GS} = ±12V, V_{SS} = 0V	-	-	10	μA
Source-Source Resistance	$R_{SS(ON)}$	V_{GS} = 4.5V, I_S = 5.0A	-	2.1	2.8	mΩ
		V_{GS} = 3.8V, I_S = 5.0A	-	2.3	3.1	
		V_{GS} = 3.1V, I_S = 5.0A	-	2.6	3.6	
		V_{GS} = 2.5V, I_S = 5.0A	-	3.2	4.6	
Dynamic Characteristics						
Total Gate Charge	Q_g	V_{DD} = 12V, I_S = 5.0A, V_{GS} = 3.8V	-	33.8	-	nC
Gate-Source Charge	Q_{gs}		-	4.5	-	
Gate-Drain Charge	Q_{gd}		-	18.3	-	
Input Capacitance	C_{iss}	V_{SS} = 12V, V_{GS} = 0V, f = 50kHz	-	3,666	-	pF
Reverse Transfer Capacitance	C_{rss}		-	847	-	
Output Capacitance	C_{oss}		-	931	-	
Turn-On Delay Time	$t_{d(on)}$	V_{GS} = 3.8V, V_{DD} = 12V, I_S = 5.0A, R_{GEN} = 3Ω	-	0.03	-	μS
Rise Time	t_r		-	0.33	-	
Turn-Off Delay Time	$t_{d(off)}$		-	6.02	-	
Fall Time	t_f		-	17.85	-	
Drain-Source Body Diode Characteristics						
Source-Source Diode Forward Voltage	$VF_{(S-S)}$	I_F = 5A, V_{GS} = 0V	-	0.75	1.0	V

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

Characteristic Graph

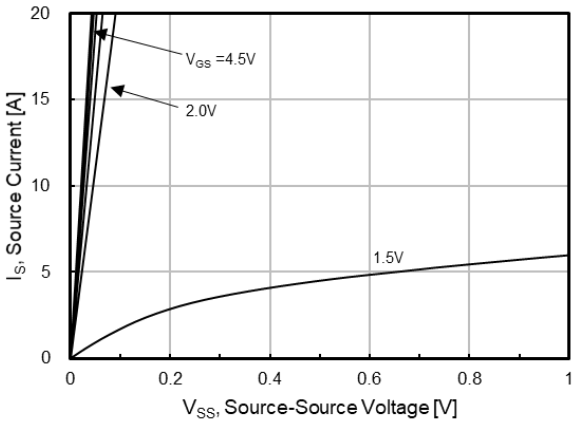


Fig.1 On-Region Characteristics

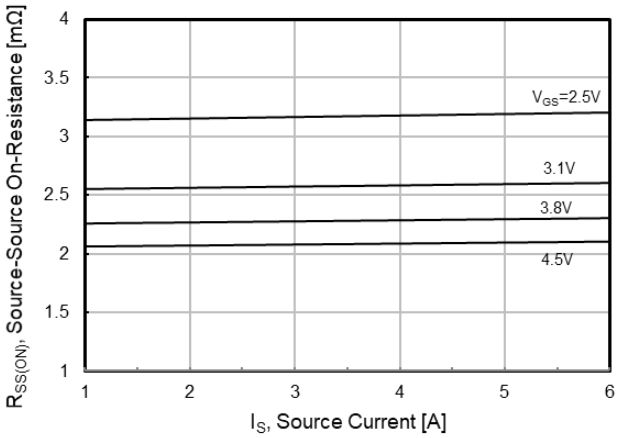


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

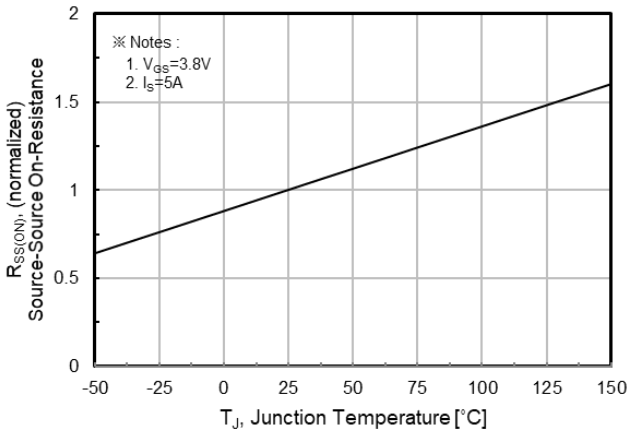


Fig.3 On-Resistance Variation with Temperature

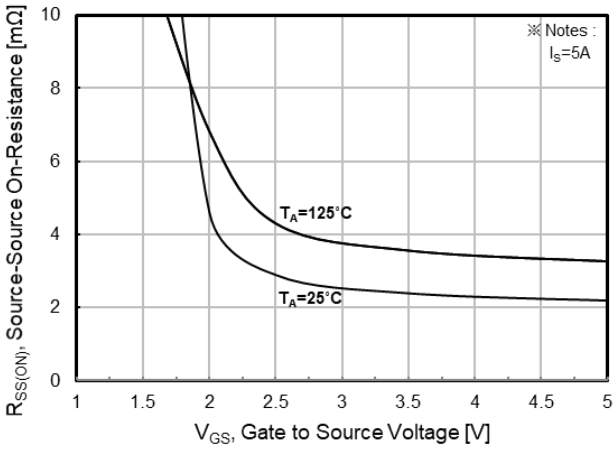


Fig.4 On-Resistance Variation with Gate to Source Voltage

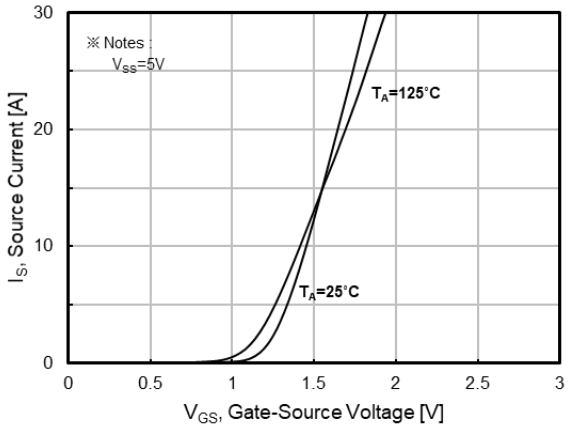


Fig.5 Transfer Characteristics

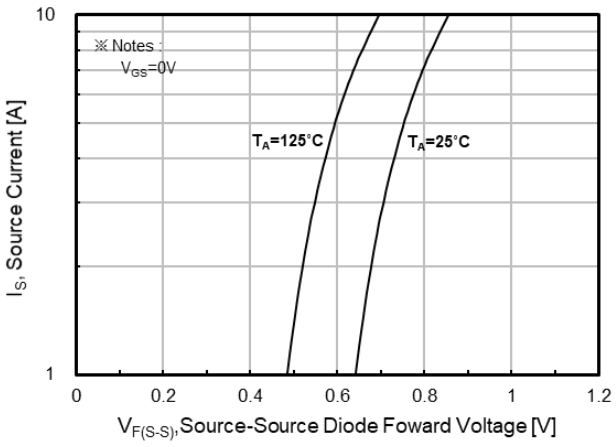


Fig.6 Forward Source to Source Characteristics

Characteristic Graph

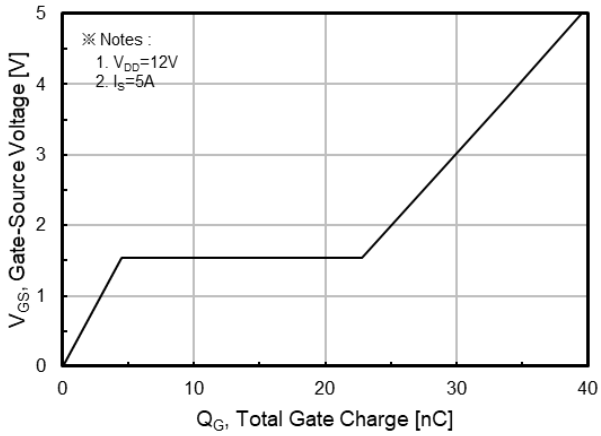


Fig.7 Gate Charge Characteristics

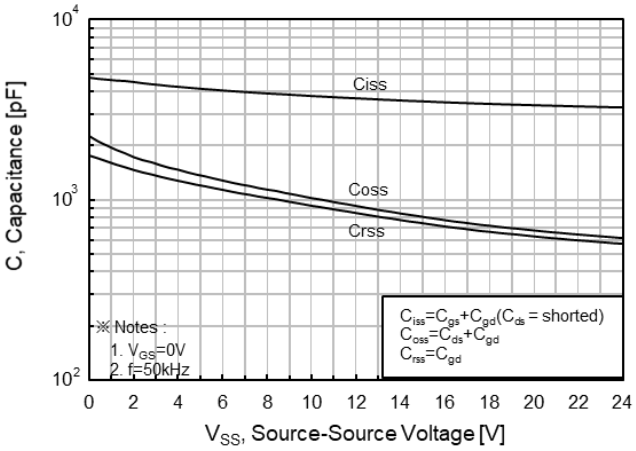


Fig.8 Capacitance Characteristics

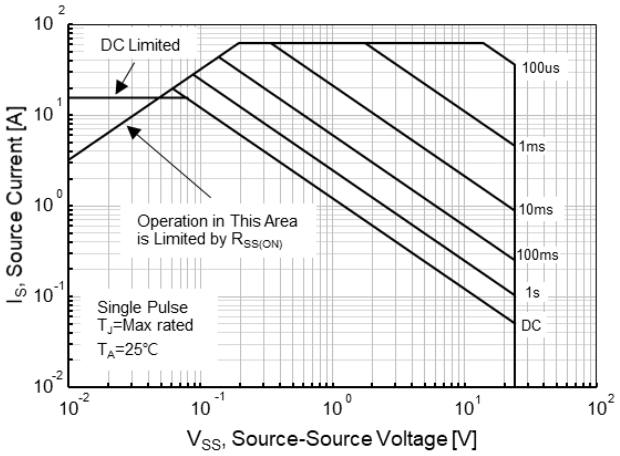


Fig.9 Maximum Safe Operating Area

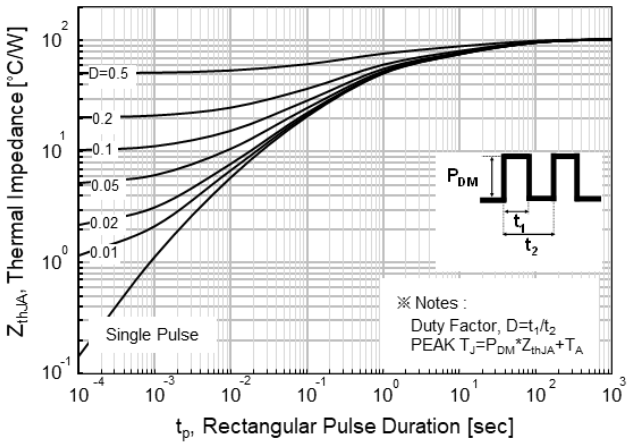
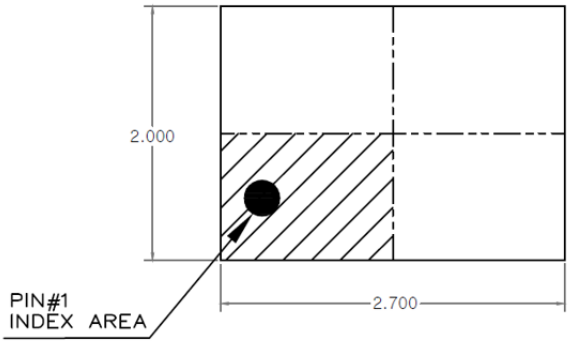
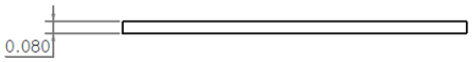


Fig.10 Transient Thermal Response Curve

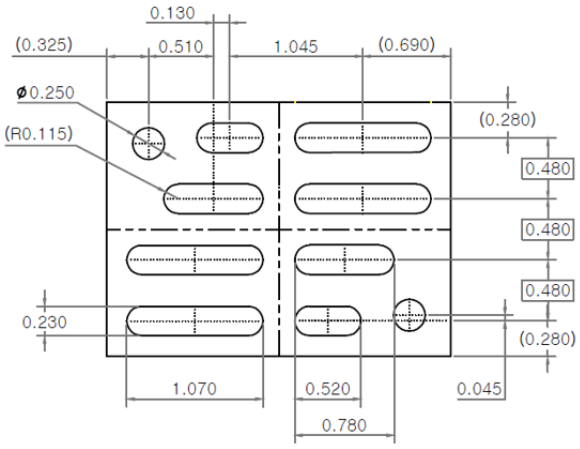
PACKAGE OUTLINE



TOP VIEW(Mark Side)



SIDE VIEW



BOTTOM VIEW

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. GENERAL TOLERANCE : ±0.03mm
3. PACKAGE BODY SIZES EXCLUDE FLASH & BURRS