RoHS Compliant

Magnachip

MDWC12D012PERH

Common-Drain Dual N-Channel Trench MOSFET 12V, 1.2mΩ

General Description

The MDWC12D012PERH uses advanced Magnachip's SSCFET® II 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.

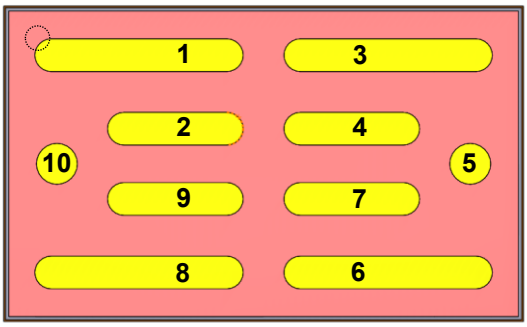
Features

- V_{SS} = 12V
- Source-Source ON Resistance;
  $R_{SS(ON)}$ < 1.15mΩ @ V_{GS} = 4.5V
  $R_{SS(ON)}$ < 1.20mΩ @ V_{GS} = 3.8V
  $R_{SS(ON)}$ < 1.70mΩ @ V_{GS} = 3.1V
  $R_{SS(ON)}$ < 3.00mΩ @ V_{GS} = 2.5V

Applications

- Portable Battery Protection

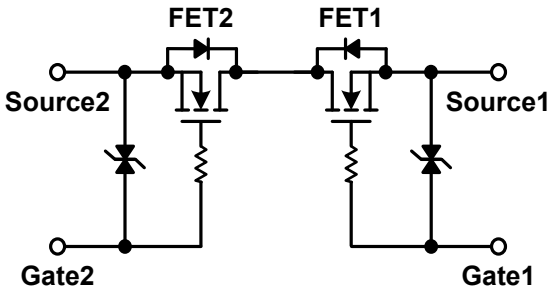
Bottom View



3.2mm x 1.95mm WLCSP

1, 2, 3, 4. Source1 (FET1) 5. Gate1 (FET1)
6, 7, 8, 9. Source2 (FET2) 10. Gate2 (FET2)

Equivalent Circuit



Absolute Maximum Ratings

Characteristics		Symbol	Rating	Units
Source-Source Voltage		V_{SSS}	12	V
Gate-Source Voltage		V_{GSS}	±8	V
Source Current	DC *1	I_S	35	A
	Pulse	I_{SP}	140	A
Total Power Dissipation	DC *1	P_D	2.4	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 *1	$R_{\theta JA}$	52.1	°C/W

Ordering Information

Part Number	Temp. Range	Package	Packing	RoHS Status
MDWC12D012PERH	-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 = 250μA, V_{GS} = 0V	12	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{SS} = V_{GS}, I_S = 250μA	0.4	0.9	1.4	
Cut-Off Current	I_{SSS}	V_{SS} = 12V, V_{GS} = 0V	-	-	1	μA
Gate Leakage Current	I_{GSS}1	V_{GS} = ±8V, V_{SS} = 0V	-	-	10	μA
	I_{GSS}2	V_{GS} = ±5V, V_{SS} = 0V	-	-	1	
Source-Source Resistance	$R_{SS(ON)}$	V_{GS} = 4.5V, I_S = 5.0A	-	0.85	1.15	mΩ
		V_{GS} = 3.8V, I_S = 5.0A	-	0.90	1.20	
		V_{GS} = 3.1V, I_S = 5.0A	-	1.15	1.70	
		V_{GS} = 2.5V, I_S = 5.0A	-	1.55	3.00	
Dynamic Characteristics[*1]						
Total Gate Charge	Q_g	V_{DD} = 6V, I_S = 5.0A, V_{GS} = 3.8V	-	66.8	-	nC
Gate-Source Charge	Q_{gs}		-	10.4	-	
Gate-Drain Charge	Q_{gd}		-	16.5	-	
Input Capacitance	C_{iss}	V_{SS} = 6V, V_{GS} = 0V, f = 50kHz	-	6390	-	pF
Reverse Transfer Capacitance	C_{rss}		-	860	-	
Output Capacitance	C_{oss}		-	945	-	
Turn-On Delay Time	$t_{d(on)}$	V_{GS} = 3.8V, V_{DD} = 6V, I_S = 5.0A, R_{GEN} = 3Ω	-	0.05	-	μS
Rise Time	t_r		-	0.27	-	
Turn-Off Delay Time	$t_{d(off)}$		-	12.6	-	
Fall Time	t_f		-	19.4	-	
Drain-Source Body Diode Characteristics						
Source-Source Diode Forward Voltage	$V_{F(S-S)}$	I_F = 5A, V_{GS} = 0V	-	0.7	1.2	V

Note *1. Test on PCB board (60.0mm x 15.0mm x 1.0t)

Characteristic Graph*1

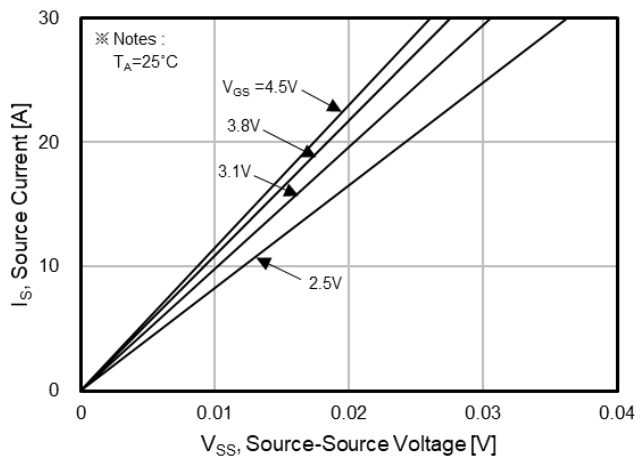


Fig.1 On-Region Characteristics

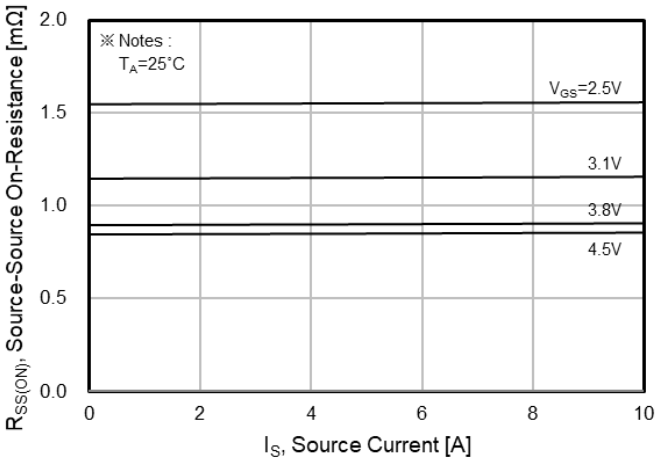


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

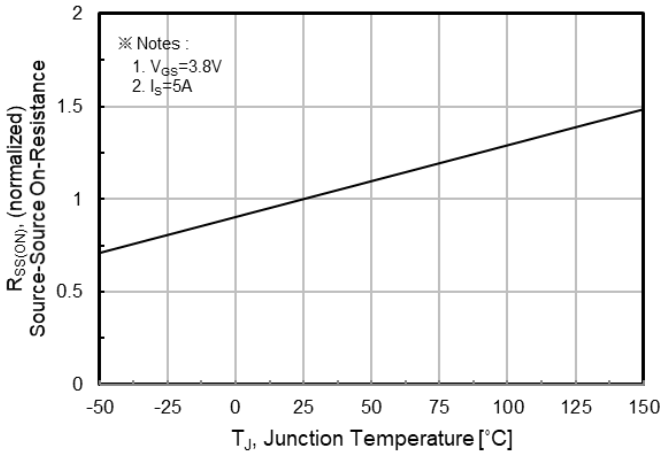


Fig.3 On-Resistance Variation with Temperature

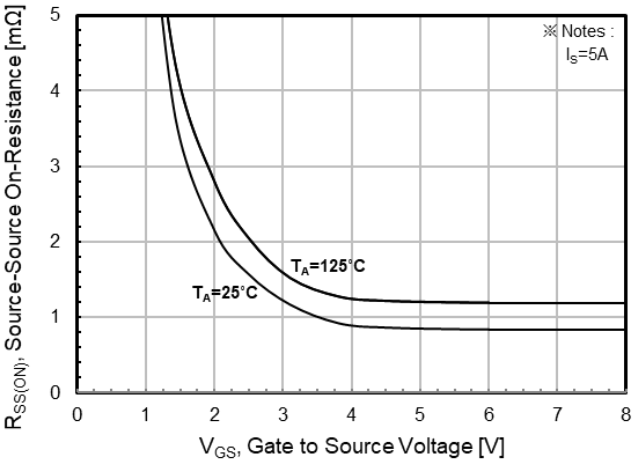


Fig.4 On-Resistance Variation with Gate to Source Voltage

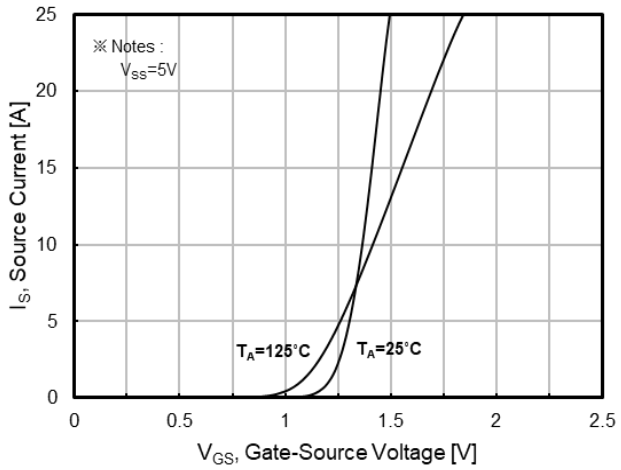


Fig.5 Transfer Characteristics

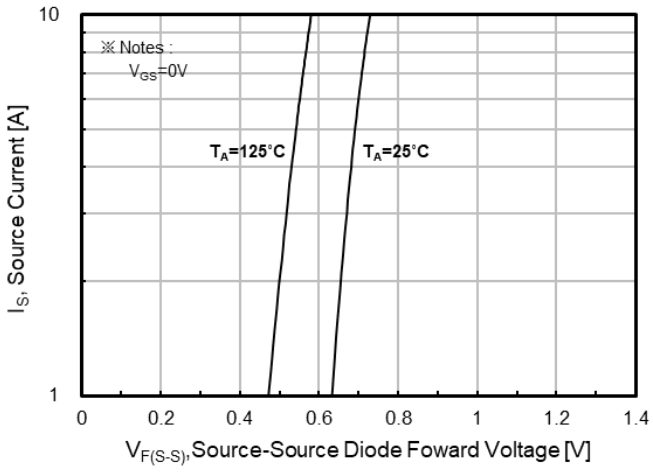


Fig.6 Forward Source to Source Characteristics

Characteristic Graph*1

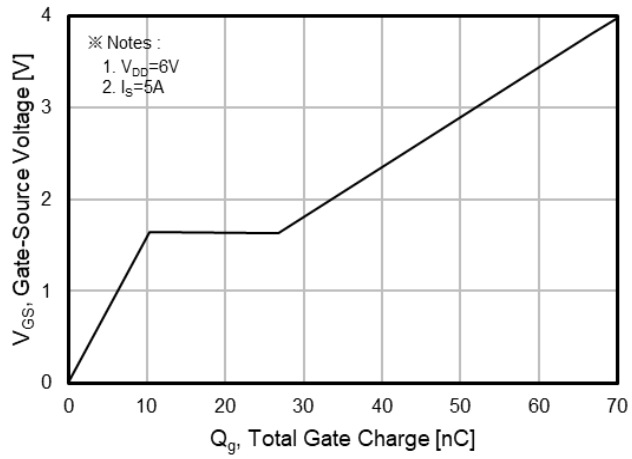


Fig.7 Gate Charge Characteristics

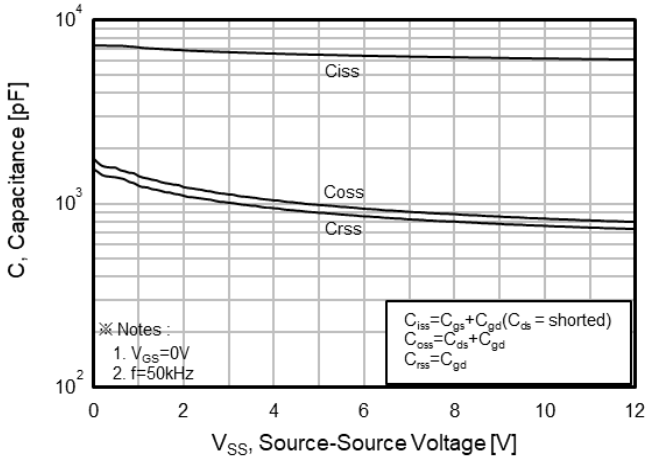


Fig.8 Capacitance Characteristics

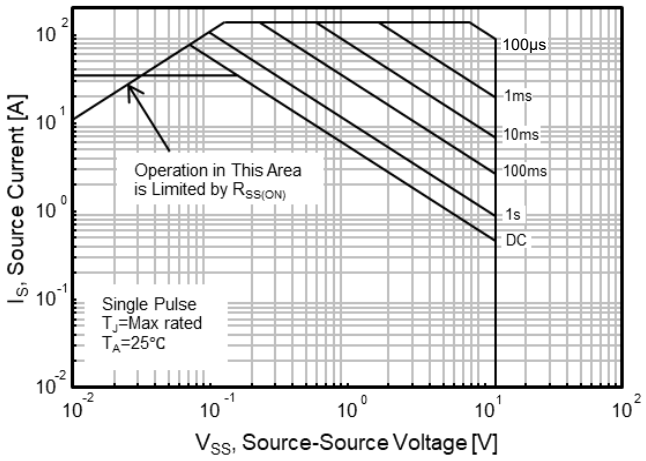


Fig.9 Maximum Safe Operating Area

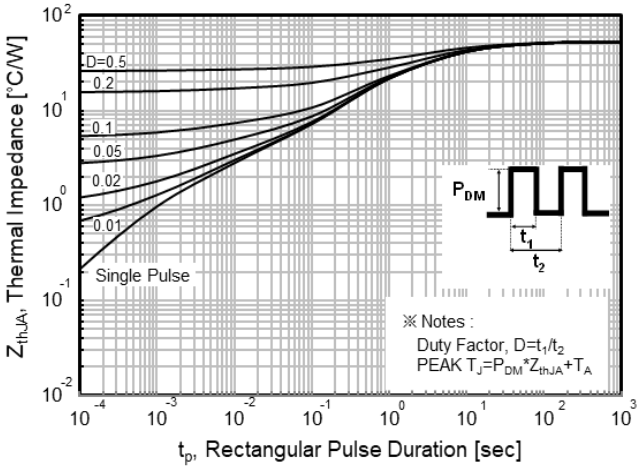
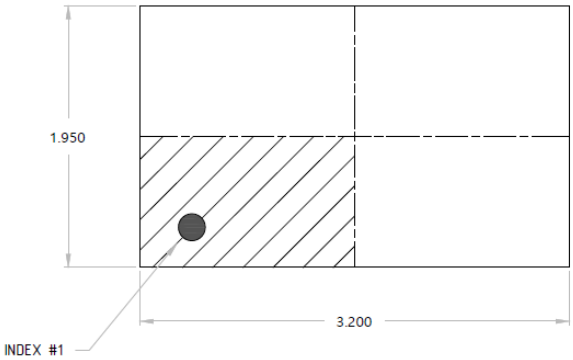
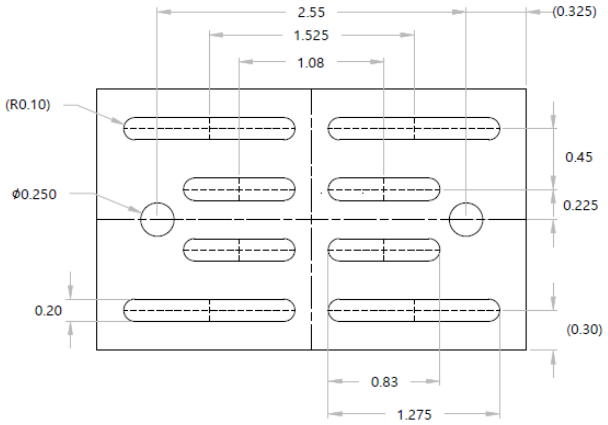


Fig.10 Transient Thermal Response Curve

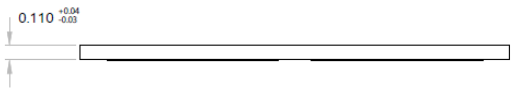
Package Outline



TOP VIEW



BOTTOM VIEW



SIDE VIEW

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