RoHS Compliant

Magnachip

MDW1311E

Common-Drain Dual N-Channel Trench MOSFET 24V

General Description

The MDW1311E uses advanced Magnachip's MOSFET Technology, which provides high performance in on-state resistance, high switching performance and excellent reliability. Excellent low $R_{DS(ON)}$, low gate charge operation and operation for Battery Application.

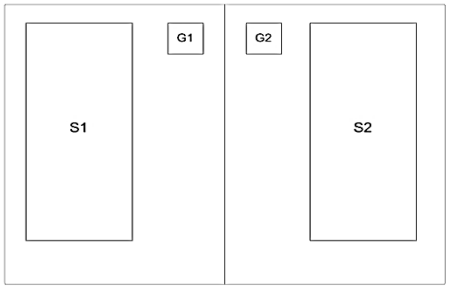
Features

- V_{DS} = 24V
- Drain-Source ON Resistance;
  $R_{DS(ON)}$ < 7.54mΩ @ V_{GS} = 3.0V
  $R_{DS(ON)}$ < 6.12mΩ @ V_{GS} = 3.9V

Applications

- Portable Battery Protection Module

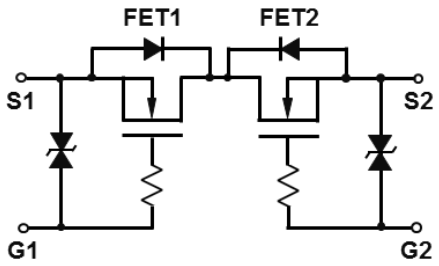
Bottom View



2,290um x 1,600um

Drain is the backside of the wafer level (TOP View)

Equivalent Circuit



G1: Gate1 G2: Gate2

S1: Source1 S2: Source2

Absolute Maximum Ratings

Characteristics	Symbol	Ratings	Units
Drain-Source Voltage	V_{DSS}	24	V
Gate-Source Voltage	V_{GSS}	±12	V
Junction and Storage Temperature Range	T_J, T_{stg}	-55~150	℃

Mechanical Data

Contents	Configuration
Wafer Thickness	145±5 ㎛
Front Metal Composition (Thickness)	Al-Cu
Back Metal Composition (Thickness)	NiV/Ag
Passivation Layer	Yes
Die Dimension (with S/L)	2,290×1,600 ㎛ ^{2}
Scribe lane width	60 ㎛
Gate Pad Open Size	180×180 ㎛ ^{2}

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

Characteristics	Symbol	Test Condition	Min	Typ	Max	Units
Static Characteristics Note 1						
Drain-Source Breakdown Voltage	BV_{DSS}	I_D = 250μA, V_{GS} = 0V	24	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	0.5	1.0	1.5	
Drain Cut-Off Current	I_{DSS}	V_{DS} = 20V, V_{GS} = 0V	-	-	1.0	μA
Gate Leakage Current	I_{GSS}	V_{GS} = ±10V, V_{DS} = 0V	-	-	10	μA
Drain-Source Resistance	$R_{DS(ON)}$	V_{GS} = 3.0V, I_D = 3.0A	-	6.3	7.54	mΩ
		V_{GS} = 3.9V, I_D = 3.0A	-	5.4	6.12	
Dynamic Characteristics Note 2						
Total Gate Charge	Q_g	V_{DS} = 12V, I_D = 8.0A, V_{GS} = 4.5V	-	23	-	nC
Gate-Source Charge	Q_{gs}		-	6.5	-	
Gate-Drain Charge	Q_{gd}		-	10.5	-	
Input Capacitance	C_{iss}	V_{DS} = 12V, V_{GS} = 0V, f = 1MHz	-	1900	-	pF
Reverse Transfer Capacitance	C_{rss}		-	430	-	
Output Capacitance	C_{oss}		-	490	-	
Turn-On Delay Time	$t_{d(on)}$	V_{GS} = 5.0V, V_{DS} = 15V, I_D = 8A, R_G = 6 Ω	-	20	-	us
Rise Time	t_r		-	22	-	
Turn-Off Delay Time	$t_{d(off)}$		-	1.8	-	
Fall Time	t_f		-	0.9	-	
Drain-Source Body Diode Characteristics Note 2						
Source-Drain Diode Forward Voltage	V_{SD}	I_S = 1.0A, V_{GS} = 0V	-	0.65	1.0	V

Notes

1. Static characteristics are tested at the wafer level and $R_{DS(ON)}$ is the value for single MOS.
2. Dynamic and drain-source body diode characteristics are tested on package (SOP-8).

Typical Electrical Characteristics Graph

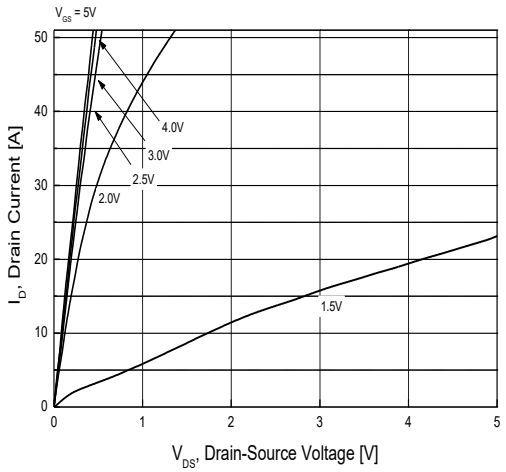


Fig.1 On-Region Characteristics

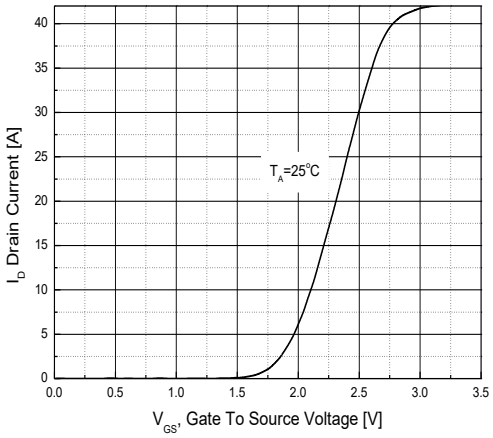


Fig.2 Transfer Characteristics

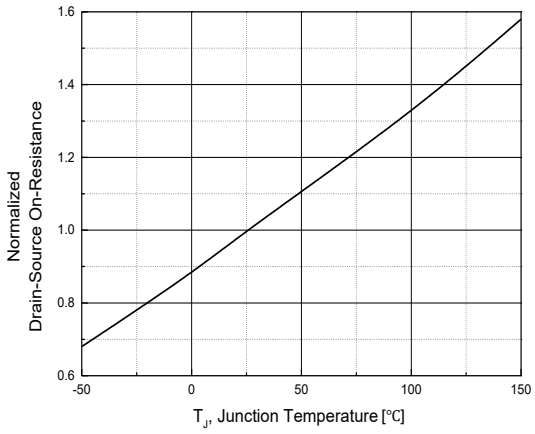


Fig.3 On-Resistance Variation with Temperature

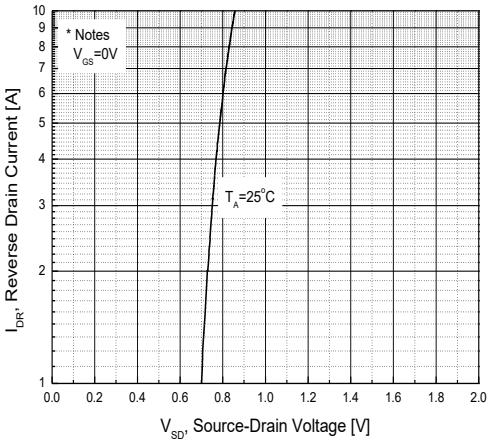


Fig.4 Body Diode Forward Voltage Variation with Source Current and Temperature

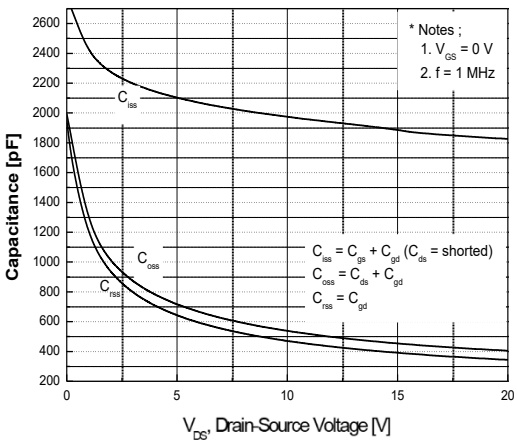
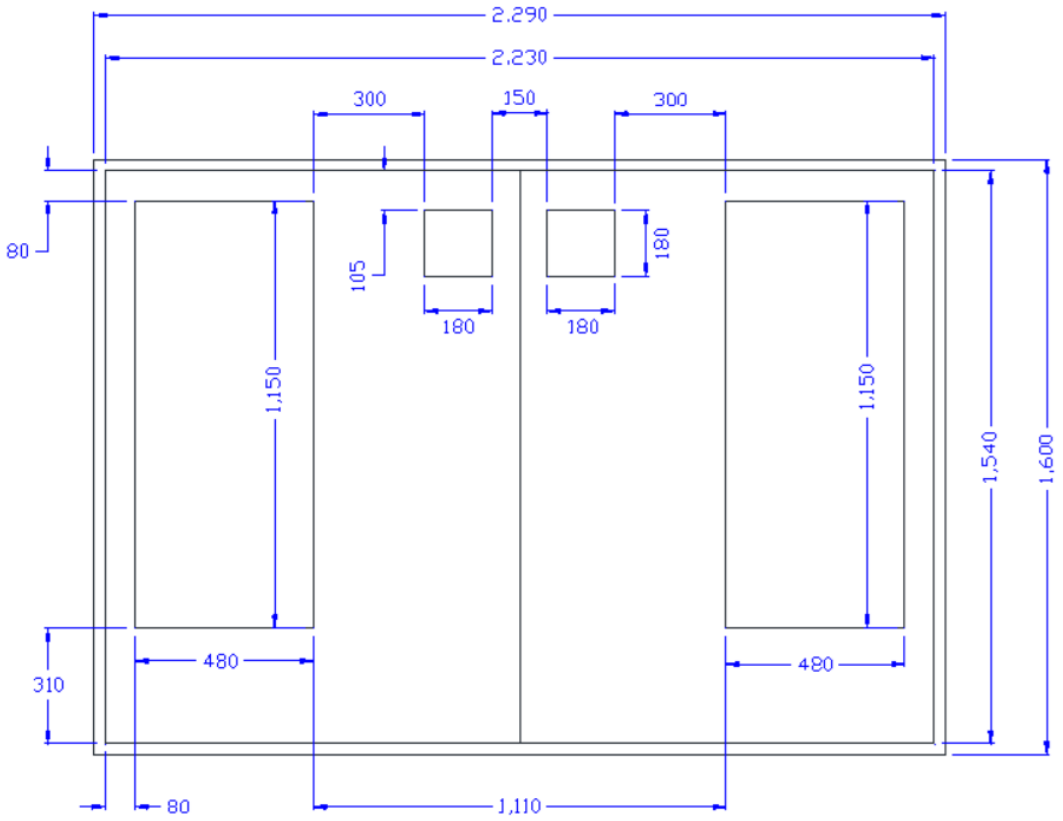


Fig.5 Capacitance Characteristics

Die Outline (Unit: μm)



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