RoHS Compliant

Magnachip

MDW0157E

Common-Drain Dual N-Channel Trench MOSFET 24V

General Description

The MDW0157E 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.

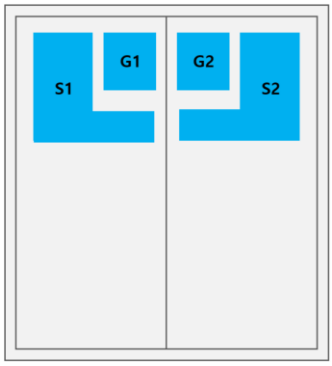
Features

- V_{DS} = 24V
- Drain-Source ON Resistance;
  $R_{DS(ON)}$ < 25.4mΩ @ V_{GS} = 3.5V
  $R_{DS\ (ON)}$ < 23.4mΩ @ V_{GS} = 4.5V

Applications

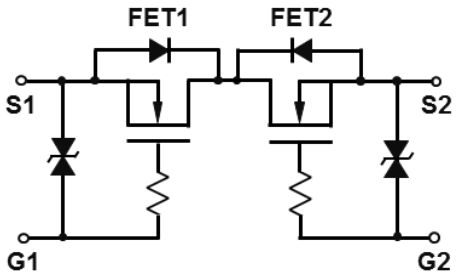
- Portable Battery Protection Module
- Wearable Device Protection Module

Bottom View



1,000um x 1,100um

Drain is the backside of the wafer (TOP View)



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
Passivation	TEOS (3,000 Å) - Nitride (6,000 Å)
Back Metal Composition (Thickness)	NiV (3,000 Å) – Ag (1,500 Å)
Front Metal Composition (Thickness)	Al (45,000 Å)
Die Dimension (with S/L)	1,000 um x 1,100 um
Gate Pad Dimension	155 um x 180 um
Wafer Diameter	200 mm, with 100 flat
Wafer Thickness	145 um
Scribe lane width	60 um

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

Characteristics	Symbol	Test Condition	Min	Typ	Max	Units
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	I_D = 500μA, V_{GS} = 0V	24	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 1mA	0.5	0.9	1.5	
Drain Cut-Off Current	I_{DSS}	V_{DS} = 20V, V_{GS} = 0V	-	-	1.0	uA
Gate Leakage Current	I_{GSS}	V_{GS} = ±12V, V_{DS} = 0V	-	-	10	uA
Drain-Source Resistance Note 1	$R_{DS(ON)}$	V_{GS} = 4.5V, I_S = 5.0A	-	12.2	23.4	mΩ
		V_{GS} = 3.5V, I_S = 5.0A	-	13.6	25.4	
		V_{GS} = 3.0V, I_S = 5.0A	-	14.8	32.0	
		V_{GS} = 2.5V, I_S = 5.0A	-	17.2	36.0	
Dynamic Characteristics Note 2						
Total Gate Charge	Q_g	V_{DD} = 12V, I_D = 5.0A, V_{GS} = 3.5V	-	7.5	-	nC
Gate-Source Charge	Q_{gs}		-	2.3	-	
Gate-Drain Charge	Q_{gd}		-	3.4	-	
Input Capacitance	C_{iss}	V_{DS} = 12V, V_{GS} = 0V, f = 50kHz	-	643	-	pF
Reverse Transfer Capacitance	C_{rss}		-	206	-	
Output Capacitance	C_{oss}		-	223	-	
Turn-On Delay Time	$t_{d(on)}$	V_{GS} = 3.5V, V_{DD} = 12V, I_D = 5.0A, R_G = 3 Ω	-	0.04	-	us
Rise Time	t_r		-	0.16	-	
Turn-Off Delay Time	$t_{d(off)}$		-	1.01	-	
Fall Time	t_f		-	3.08	-	
Drain-Source Body Diode Characteristics						
Source-Drain Diode Forward Voltage	V_{SD}	I_S = 5.0A, V_{GS} = 0V	-	0.75	1.0	V

Notes :

1. $R_{DS(ON)}$ is the value for Single MOS.
2. Dynamic Characteristics are tested on SOIC-8L Package.

Characteristic Graph

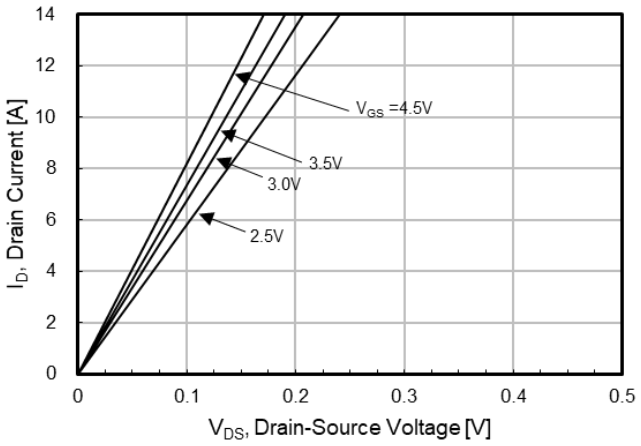


Fig.1 On-Region Characteristics

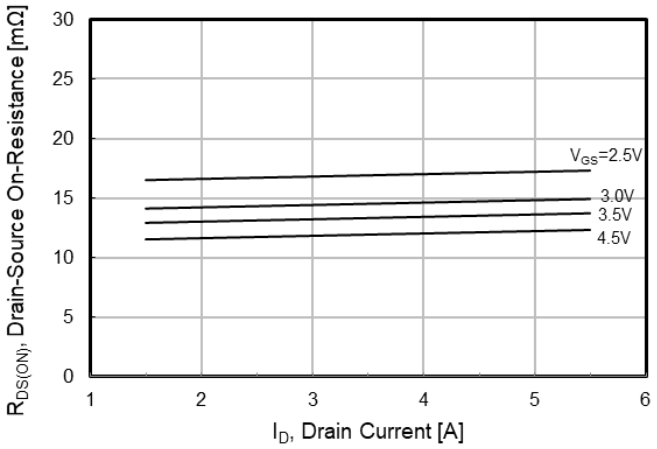


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

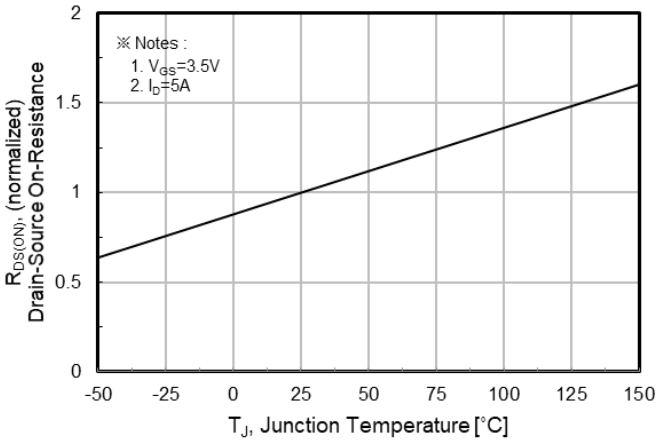


Fig.3 On-Resistance Variation with Temperature

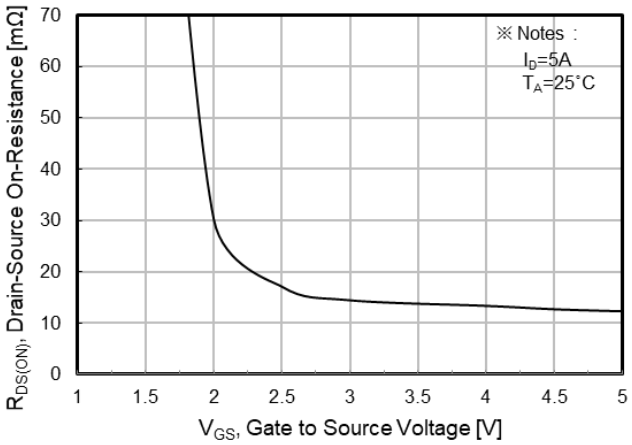


Fig.4 On-Resistance Variation with Gate to Source Voltage

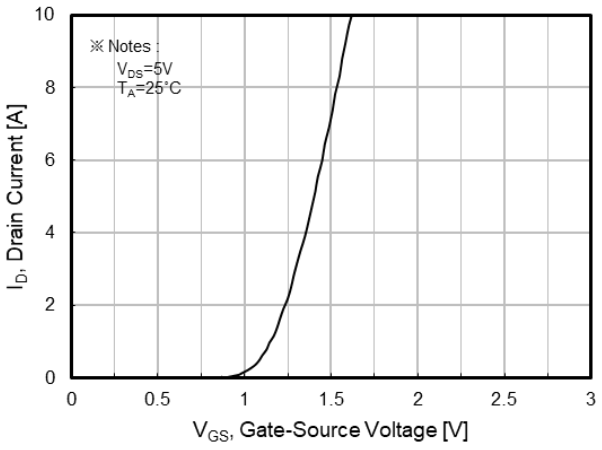


Fig.5 Transfer Characteristics

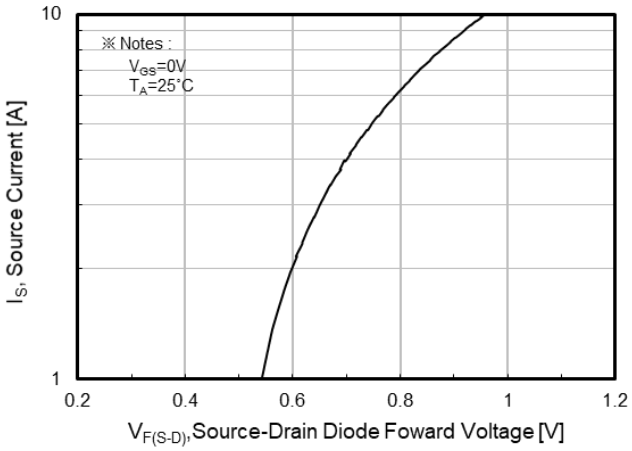


Fig.6 Body Diode Forward Voltage Variation with Source Current

Characteristic Graph

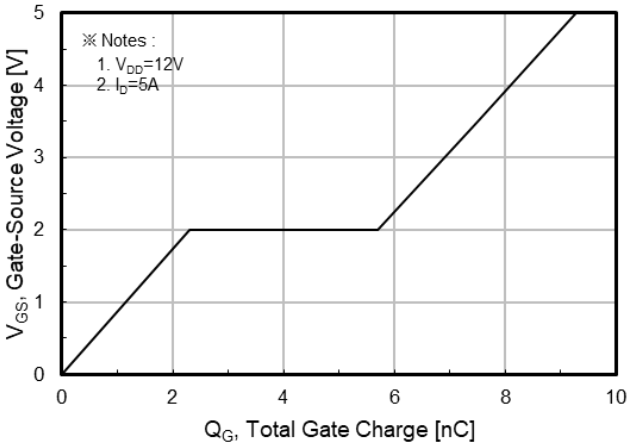


Fig.7 Gate Charge Characteristics

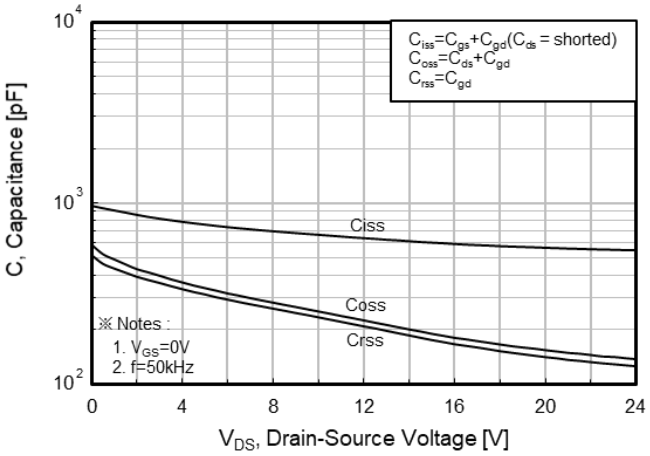
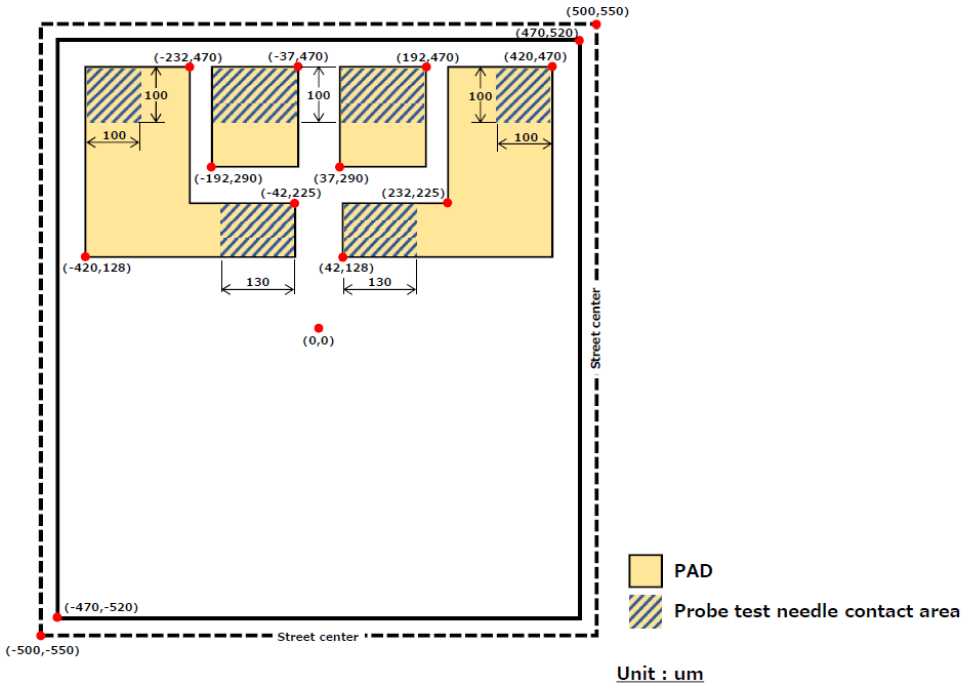


Fig.8 Capacitance Characteristics

Die Outline (Unit : um)



Chip size : 1,000 x 1,100 um2

DISCLAIMER:

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