RoHS Compliant

Magnachip

MDWC0340EB

Common-Drain Dual N-Channel Trench MOSFET 12V, 13.6A, 2.5 mΩ

General Description

The MDWC0340EB 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.

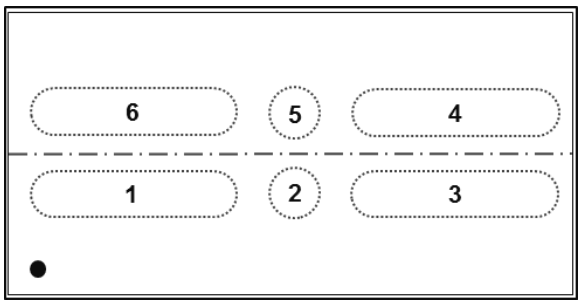
Features

- V_{SS} = 12V
- Source-Source ON Resistance;
  $R_{SS(ON)\ typ.}$ 2.5mΩ @ V_{GS} = 4.5V
  $R_{SS(ON)\ typ.}$ 2.7mΩ @ V_{GS} = 3.8V
  $R_{SS(ON)\ typ.}$ 3.2mΩ @ V_{GS} = 3.1V
  $R_{SS(ON)\ typ.}$ 4.1mΩ @ V_{GS} = 2.5V

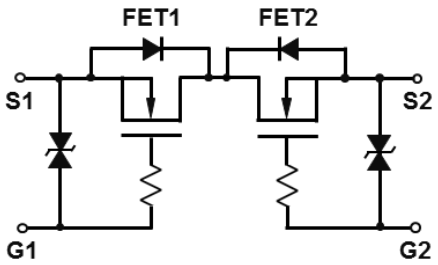
Applications

- Portable Battery Protection

Top View



3.54mm*1.77mm WLCSP



1. Source (FET1)
2. Gate (FET1)
3. Source (FET1)
4. Source (FET2)
5. Gate (FET2)
6. Source (FET2)

Absolute Maximum Ratings (Ta = 25°C unless otherwise noted)

Characteristics		Symbol	Rating	Units
Source-Source Voltage		V_{SSS}	12	V
Gate-Source Voltage		V_{GSS}	±8	V
Source Current	DC*1	IS	13.6	A
	Pulse*2	ISp	110	A
Total Power Dissipation	DC*1	PD	0.89	W
Channel Temperature		Tch	150	°C
Junction and Storage Temperature Range		T_J, T_{stg}	-55~150	°C

Thermal Characteristics

Characteristics	Symbol	Rating	Unit
Thermal Resistance	$R_{\theta JA}$	140	°C/W

Ordering Information

Part Number	Temp. Range	Package	Packing	RoHS Status
MDWC0340EBRH	-55~150°C	WLCSP	Tape and Reel	Halogen Free

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

Characteristics	Symbol	Test Condition	Min	Typ	Max	Units
Static Characteristics						
Source-Source Breakdown Voltage	BV_{SSS}	I_S = 500μA, V_{GS} = 0V	12	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{SS} = V_{GS}, I_S = 1mA	0.5	1.0	1.5	
Cut-Off Current	I_{SSS}	V_{SS} = 12V, V_{GS} = 0V	-	-	1.0	μA
Gate Leakage Current	I_{GSS}	V_{GS} = ±8V, V_{SS} = 0V	-	-	10	μA
Source-Source Resistance	$R_{SS(ON)}$	V_{GS} = 4.5V, I_S = 5.0A	1.9	2.5	3.3	mΩ
		V_{GS} = 3.8V, I_S = 5.0A	2.0	2.7	3.6	
		V_{GS} = 3.1V, I_S = 5.0A	2.1	3.2	4.8	
		V_{GS} = 2.5V, I_S = 5.0A	2.4	4.1	7.0	
Dynamic Characteristics						
Total Gate Charge	Q_g	V_{DS} = 10V, I_D = 2.5A, V_{GS} = 4.5V	-	95.5	-	nC
Gate-Source Charge	Q_{gs}		-	7.0	-	
Gate-Drain Charge	Q_{gd}		-	27	-	
Input Capacitance	C_{iss}	V_{DS} = 10V, V_{GS} = 0V, f = 1MHz	-	3340	-	pF
Reverse Transfer Capacitance	C_{rss}		-	866	-	
Output Capacitance	C_{oss}		-	1250	-	
Turn-On Delay Time	$t_{d(on)}$	V_{GS} = 4.5V, V_{DS} = 10V, I_D = 5A, R_{GEN} = 3Ω	-	156	-	ns
Rise Time	t_r		-	570	-	
Turn-Off Delay Time	$t_{d(off)}$		-	4750	-	
Fall Time	t_f		-	9000	-	
Body Diode Characteristics						
Source-Source Diode Forward Voltage	$VF_{(S-S)}$	I_S = 1.0A, V_{GS} = 0V	-	0.7	1.2	V

Note *1. Mounted on FR4 board “jesd51-7” (76.2mm x 114.3mm x t1.6mm),
*2. t= 10us, Duty Cycle ≤ 1%

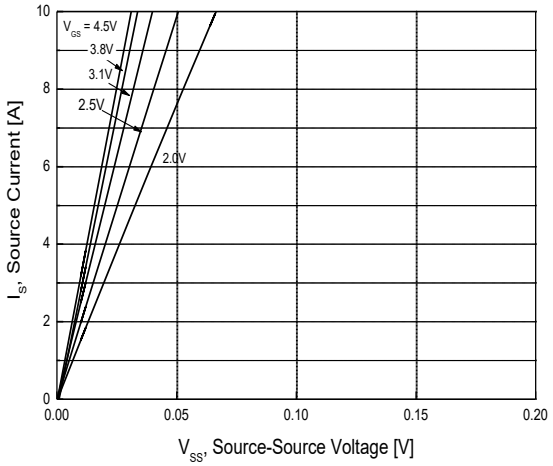


Fig.1 On-Region Characteristics

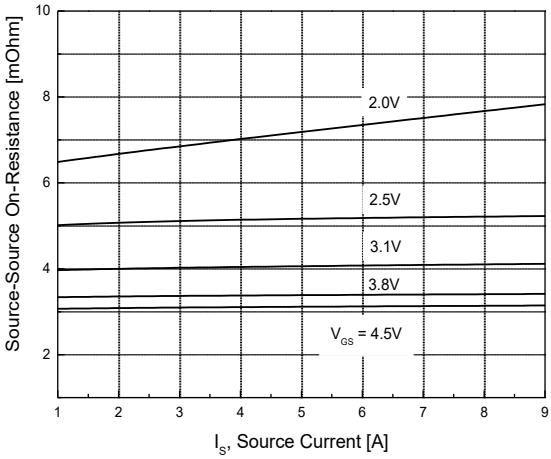


Fig.2 On-Resistance Variation with Source Current and Gate Voltage

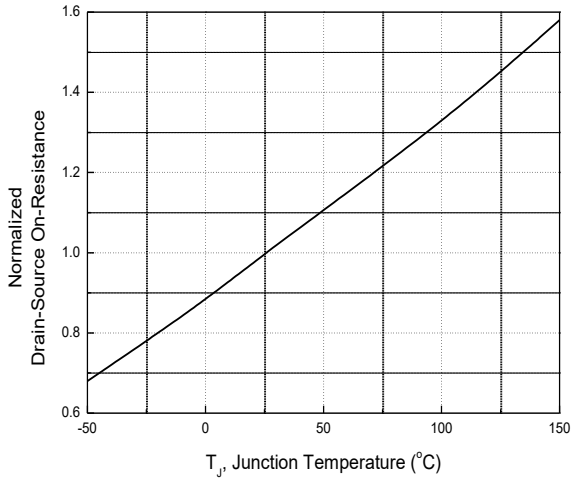


Fig.3 On-Resistance Variation with Temperature

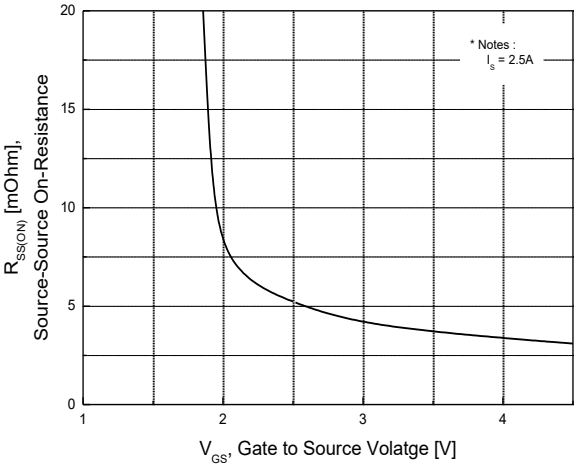


Fig.4 On-Resistance Variation with Gate to Source Voltage

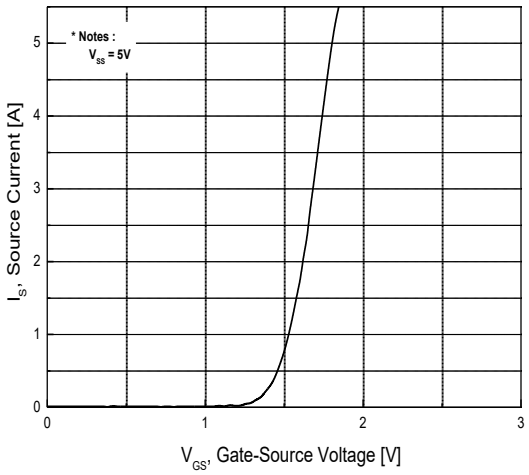


Fig.5 Transfer Characteristics

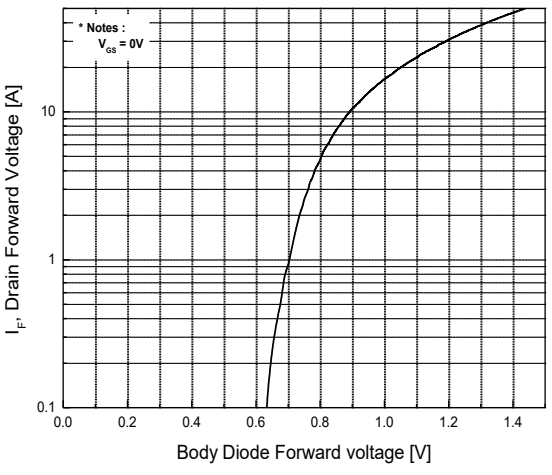


Fig.6 Body Diode Characteristics

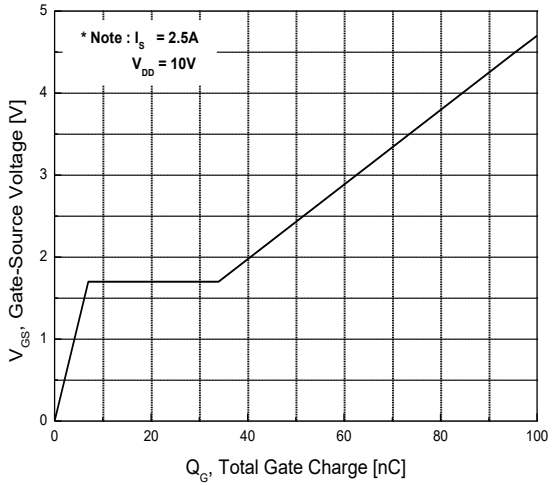


Fig.7 Gate Charge Characteristics

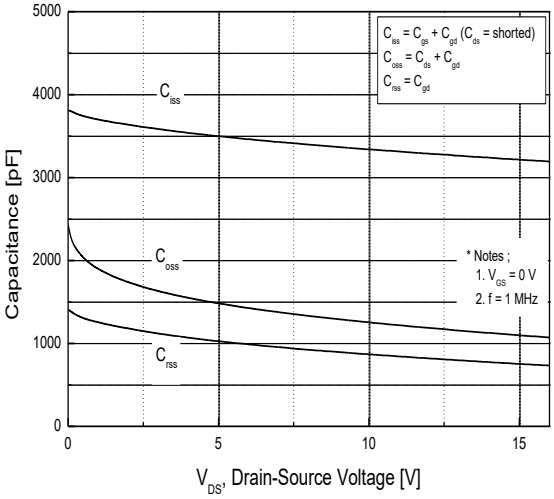


Fig.8 Capacitance Characteristics

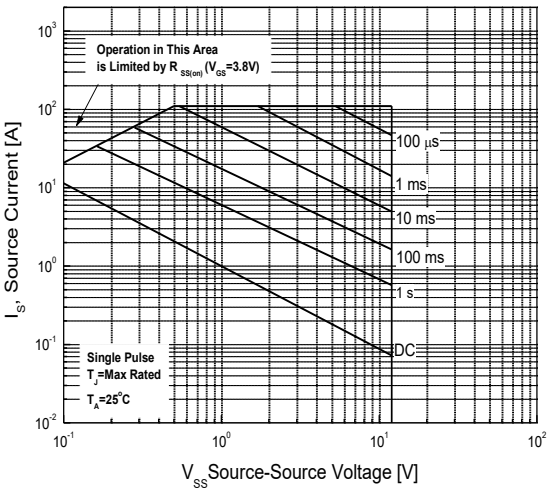


Fig.9 Maximum Safe Operating Area

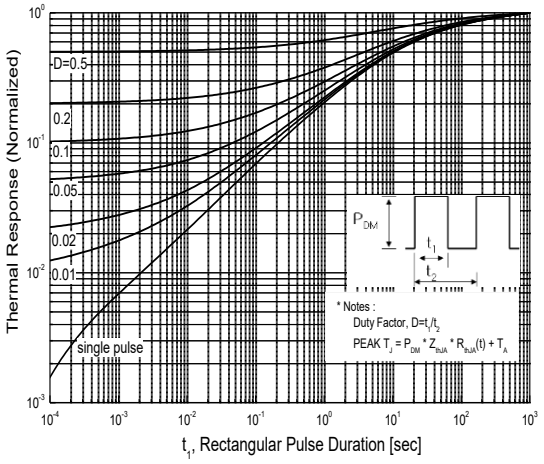
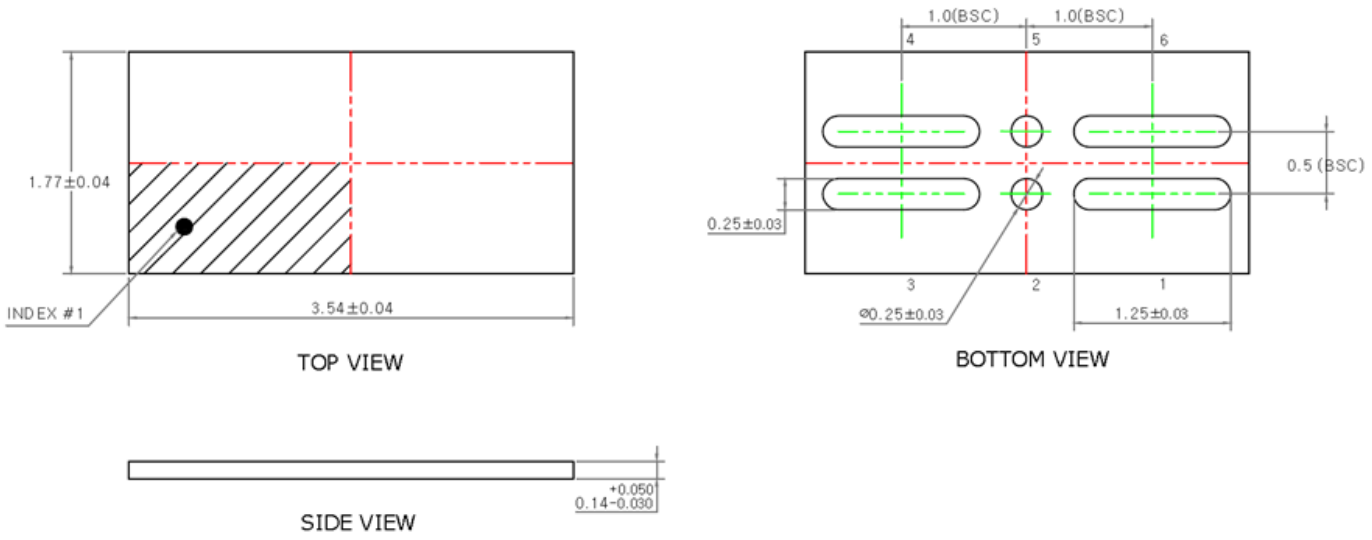


Fig.10 Transient Thermal Response Curve

Package Dimension

MDWC0340EB WLCSP POD(Package Outline Dimension)



Contents	Value
Chip Thickness (Min. / Typ. / Max.)	110 / 140 / 190 ㎛
Metal (Gate PAD)	Al-Cu-Si
Metal (Source PAD)	Cu/Ni/Au
Passivation Layer	Yes
Chip Size	3,540±40 ×1,770±40 ㎛ ^{2}
Gate Pad Open Size	Ø250 ㎛
Packaging	5,000 pcs / 1 reel

DISCLAIMER:

The Products are not designed for use in hostile environments, including, without limitation, aircraft, nuclear power generation, medical appliances, and devices or systems in which malfunction of any Product can reasonably be expected to result in a personal injury. Seller's customers using or selling Seller's products for use in such applications do so at their own risk and agree to fully defend and indemnify Seller.