MDA0336E

Common-Drain N-Channel Trench MOSFET 30V, 9A, 9.5mΩ

General Description

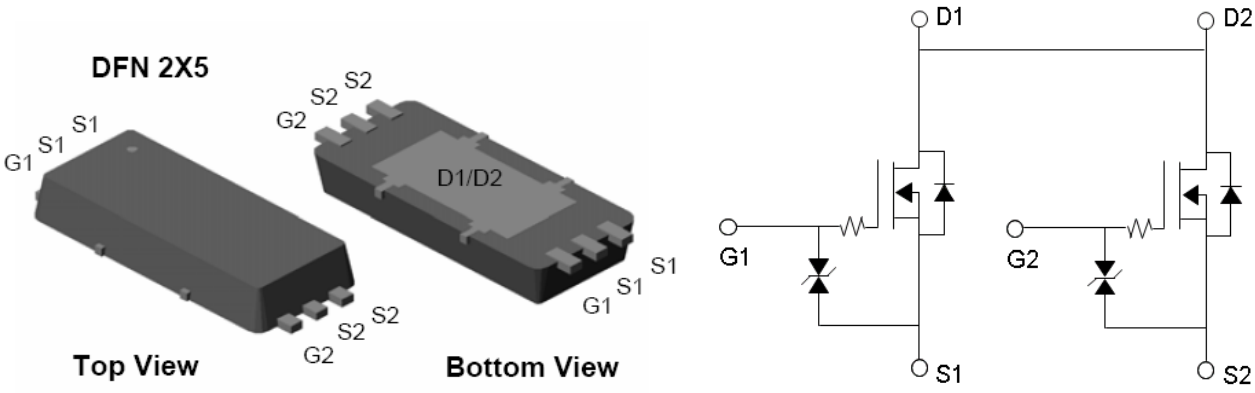
The MDA0336E uses advanced MagnaChip's MOSFET Technology, which provides high performance in on-state resistance, fast switching performance and excellent quality.

Features

- V_{DS} = 20 V
- I_D = 9 A
- Drain-Source ON Resistance;
  $R_{DS(ON)}$ < 9.5mΩ @ V_{GS} = 4.5V
  $R_{DS(ON)}$ < 10mΩ @ V_{GS} = 4.0V
  $R_{DS(ON)}$ < 10.5mΩ @ V_{GS} = 3.5V
  $R_{DS(ON)}$ < 11.5mΩ @ V_{GS} = 3.1V
- ESD Protection = HBM CLASS 2

Applications

- Portable Battery Protection Module



Absolute Maximum Ratings (Ta = 25°C unless otherwise noted) Note 1

Characteristics		Symbol	Rating	Units
Drain-Source Voltage		V_{DSS}	20	V
Gate-Source Voltage		V_{GSS}	±12	V
Continuous Drain Current	T_A=25°C	I_D	9	A
	T_A=70°C		7	A
Pulse Drain Current		I_{DM}	65	A
Power Dissipation for Single Operation	T_A=25°C	P_{DSM}	1.7	W
	T_A=70°C		1.0	
Junction and Storage Temperature Range		T_J, T_{stg}	-55~150	°C

Thermal Characteristics

Characteristics	Symbol	Rating	Unit
Thermal Resistance, Junction-to-Ambient(Steady-State)	$R_{\theta JA}$	75	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	6	

Ordering Information

Part Number	Temp. Range	Package	Packing	RoHS Status
MDA0336EURH	-55~150°C	2x5 DFN	Tape and Reel	Halogen Free

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

Characteristics	Symbol	Test Condition	Min	Typ	Max	Units
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	I_D = 250μA, V_{GS} = 0V	20	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 uA	0.60	1.10	1.60	
Drain Cut-Off Current	I_{DSS}	V_{DS} = 20V, V_{GS} = 0V	-	-	1	uA
Gate Leakage Current	I_{GSS}	V_{GS} = ±10V, V_{DS} = 0V	-10.0	-	10.0	μA
Drain-Source Resistance Note 2	$R_{DS(ON)}$	V_{GS} = 4.5V, I_D = 9A	-	7.3	9.5	mΩ
		V_{GS} = 4.0V, I_D = 9A	-	7.5	10	
		V_{GS} = 3.5V, I_D = 9A	-	7.9	10.5	
		V_{GS} = 3.1V, I_D = 9A	-	8.4	11.5	
Forward Trans conductance	g_{fs}	V_{DS} = 5V, I_D = 9A	-	40	-	S
Dynamic Characteristics						
Total Gate Charge	Q_g	V_{DS} = 10V, I_D = 9A, V_{GS} = 4.5V	-	22	-	nC
Gate-Source Charge	Q_{gs}		-	3.7	-	
Gate-Drain Charge	Q_{gd}		-	10	-	
Input Capacitance	C_{iss}	V_{DS} = 10V, V_{GS} = 0V, f = 1MHz	-	1330	-	pF
Reverse Transfer Capacitance	C_{rss}		-	449	-	
Output Capacitance	C_{oss}		-	475	-	
Gate resistance	R_g	V_{GS} = 0V, V_{DS} = 0V, f = 1MHz	-	0.2	-	kΩ
Turn-On Delay Time	$t_{d(on)}$	V_{GS} = 4.5V, V_{DS} = 10V, R_L = 1.0Ω, R_{GEN} = 3Ω	-	1.0	-	us
Rise Time	t_r		-	0.15	-	
Turn-Off Delay Time	$t_{d(off)}$		-	0.3	-	
Fall Time	t_f		-	2.0	-	
Drain-Source Body Diode Characteristics						
Source-Drain Diode Forward Voltage	V_{SD}	I_S = 1.0A, V_{GS} = 0V	-	0.65	1	V
Body Diode Reverse Recovery Time	t_{rr}	I_F = 9A, di/dt = 200A/μs	-	30	-	ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	25	-	nC

Notes :

1. The device current rating is derived from its thermal resistance and from the number and diameter of bonding wires. The testing current at wafer level is set only for ease of testing. Actual package current ratings can be much higher.

2. $R_{DS(ON)}$ is Single MOS.

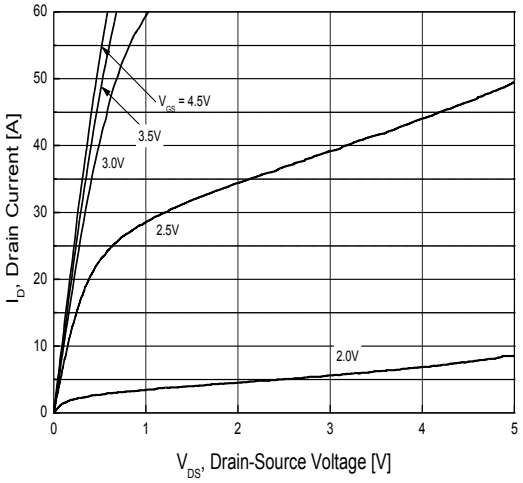


Fig.1 On-Region Characteristics

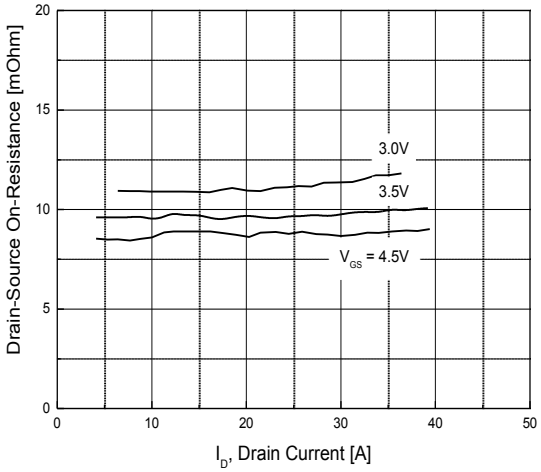


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

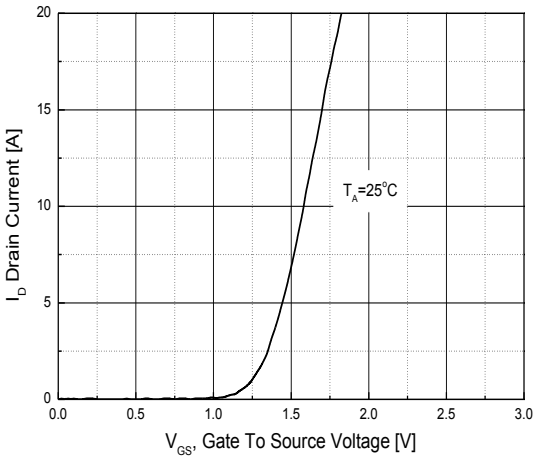


Fig.3 Transfer Characteristics

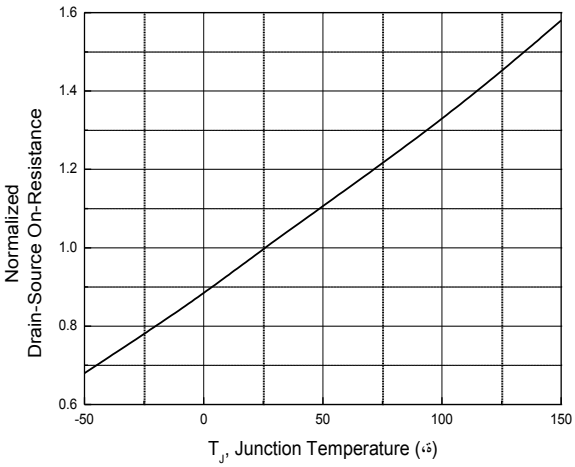


Fig.4 On-Resistance Variation with Temperature

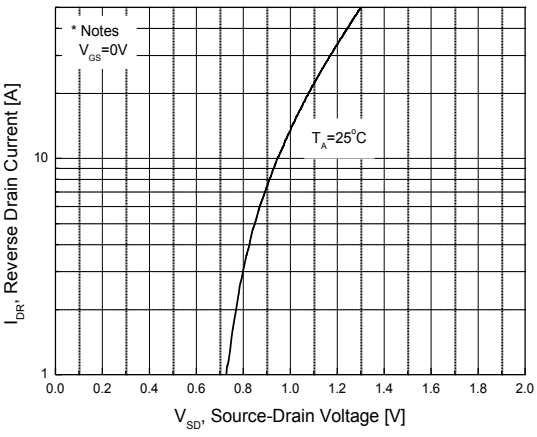


Fig.5 Body Diode Forward Voltage Variation with Source Current and Temperature

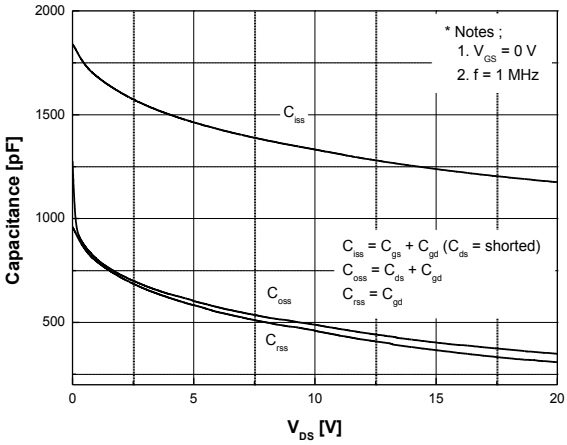


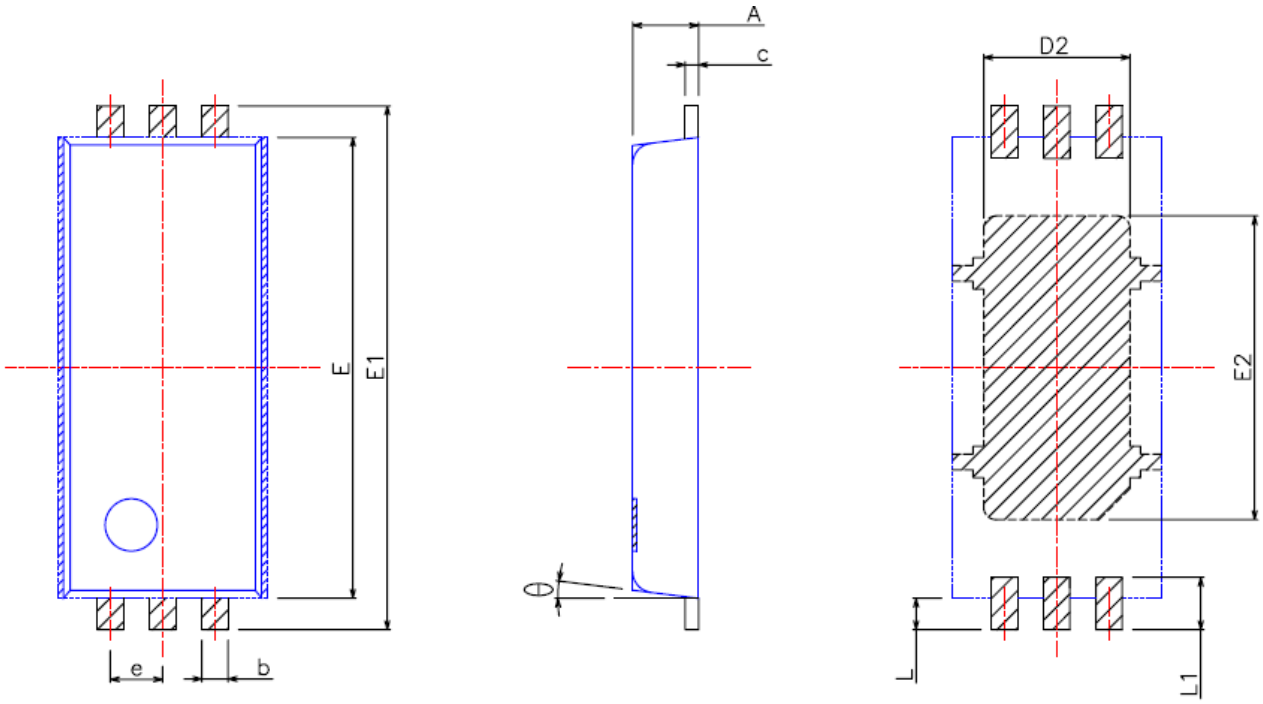
Fig.6 Capacitance Characteristics

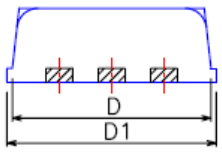
Die Layout and Construction

Physical Dimensions

2x5mm, 6 Leads, DFN

Dimensions are in millimeters, unless otherwise specified





SYMBOL	MILLIMETERS			NOTE
	MINIMUM	NOMINAL	MAXIMUM	
A	0.63	0.65	0.67	
b	0.20	0.25	0.35	
c	0.10	0.13	0.20	
D	1.80	1.90	2.00	
D1	1.90	2.00	2.10	
D2	1.40 TYP			
E	4.30	4.40	4.50	
E1	4.90	5.00	5.10	
E2	2.90 TYP			
e	0.50 TYP			
L	0.20	0.30	0.40	
L1	0.35	0.50	0.65	
θ	2°	–	12°	

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.