

General Description

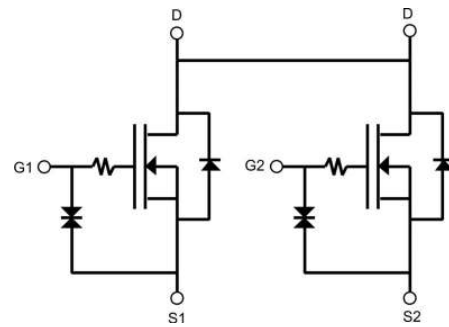
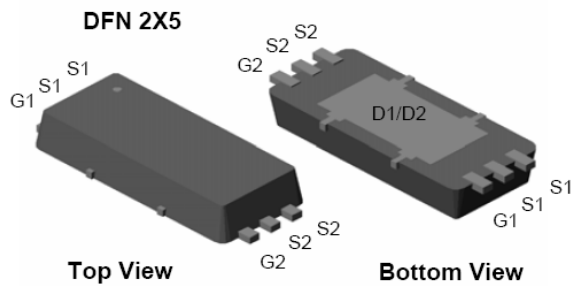
The MDA0531E uses advanced MagnaChip's MOSFET Technology, which provides low on-state resistance, high switching performance and excellent reliability. Low $R_{DS(ON)}$ and low gate charge operation with gate voltage as low as 2.5V.

Features

- $V_{DS} = 30V$
- $I_D = 8.0A$ @ $V_{GS} = 10V$
- $R_{DS(ON)}$
 - < 19mΩ @ $V_{GS} = 4.5V$
 - < 20mΩ @ $V_{GS} = 4.0V$
 - < 22mΩ @ $V_{GS} = 3.8V$
 - < 25mΩ @ $V_{GS} = 3.1V$
 - < 31mΩ @ $V_{GS} = 2.5V$

Applications

- Unidirectional or Bi-directional Load Switch
- Lithium-Ion Battery Packs
- Portable Battery Protection Module



Absolute Maximum Ratings ($T_A = 25^\circ C$)

Characteristics	Symbol	Rating	Units
Drain-Source Voltage	V_{DSS}	30	V
Gate-Source Voltage	V_{GSS}	± 12	V
Continuous Drain Current	I_D	$T_A = 25^\circ C$	8
		$T_A = 70^\circ C$	6.5
Pulse Drain Current	I_{DM}	65	A
Power Dissipation for Single Operation ⁽¹⁾	P_{DSM}	$T_A = 25^\circ C$	1.7
		$T_A = 70^\circ C$	1.0
Junction and Storage Temperature Range	T_J, T_{stg}	-55~150	$^\circ C$

Thermal Characteristics

Characteristics	Symbol	Rating	Unit
Thermal Resistance, Junction-to-Ambient(Steady-State) ⁽¹⁾	$R_{\theta JA}$	75	$^\circ C/W$
Thermal Resistance, Junction-to-Case ⁽²⁾	$R_{\theta JC}$	6	

Ordering Information

Part Number	Temp. Range	Package	Packing	RoHS Status
MDA0531EURH	-55~150°C	2x5 DFN	Tape and Reel	Halogen Free

Electrical Characteristics (Ta =25°C)

Characteristics	Symbol	Test Condition	Min	Typ	Max	Units
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D = 250\mu A, V_{GS} = 0V$	30	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	0.6	1.0	1.5	
Drain Cut-Off Current	I_{DSS}	$V_{DS} = 24V, V_{GS} = 0V$	-	-	1	μA
Gate Leakage Current	I_{GSS}	$V_{GS} = \pm 10V, V_{DS} = 0V$	-	-	10	
Drain-Source ON Resistance	$R_{DS(on)}$	$V_{GS} = 4.5V, I_D = 5A$	-	14	19	m Ω
		$V_{GS} = 4.0V, I_D = 3A$	-	15	20	
		$V_{GS} = 3.8V, I_D = 3A$	-	16	22	
		$V_{GS} = 3.1V, I_D = 3A$	-	17	25	
		$V_{GS} = 2.5V, I_D = 3A$	-	19	31	
Forward Transconductance	g_{FS}	$V_{GS} = 5V, I_D = 8A$	-	37		S
Dynamic Characteristics						
Total Gate Charge	Q_g	$V_{DS} = 15V, I_D = 5A, V_{GS} = 4.5V$	-	10.7		nC
Gate-Source Charge	Q_{gs}		-	2.1		
Gate-Drain Charge	Q_{gd}		-	4.3		
Input Capacitance	C_{iss}	$V_{DS} = 15V, V_{GS} = 0V, f = 1.0MHz$	-	870		pF
Reverse Transfer Capacitance	C_{riss}		-	105		
Output Capacitance	C_{oss}		-	115		
Gate resistance	R_g	$V_{GS}=0V, V_{DS}=0V, f=1MHz$	1.6	1.8	2.1	k Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = 10V, V_{DS} = 15V, R_L = 1.25\Omega, R_G = 3\Omega$	-	3.5		ns
Rise Time	t_r		-	11		
Turn-Off Delay Time	$t_{d(off)}$		-	27		
Fall Time	t_f		-	6.5		
Drain-Source Body Diode Characteristics						
Maximum Continuous Drain-Source Diode Forward Current	I_S				2.1	A
Source-Drain Diode Forward Voltage	V_{SD}	$I_S = 1A, V_{GS} = 0V$	0.5	0.76	0.9	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 11.6A, di/dt = 100A/\mu s$	-	24		ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	13		nC

Note :

1. Surface mounted FR-4 board with 2oz. Copper.

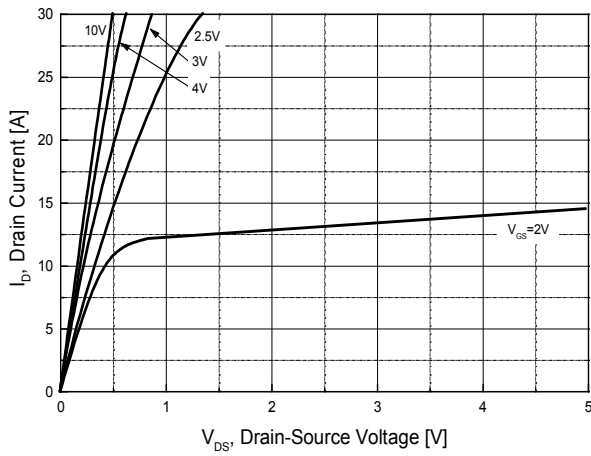


Fig.1 On-Region Characteristics

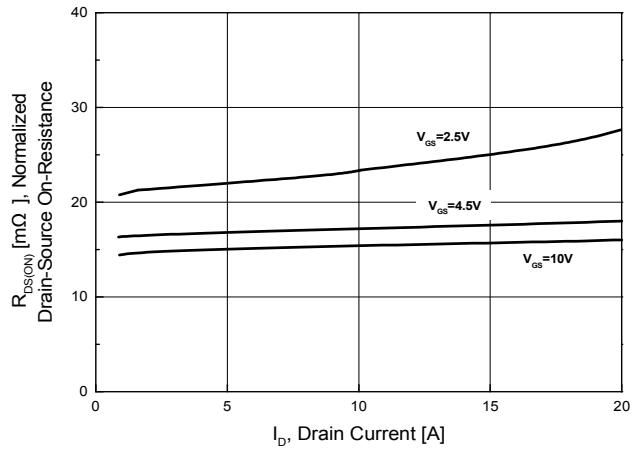


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

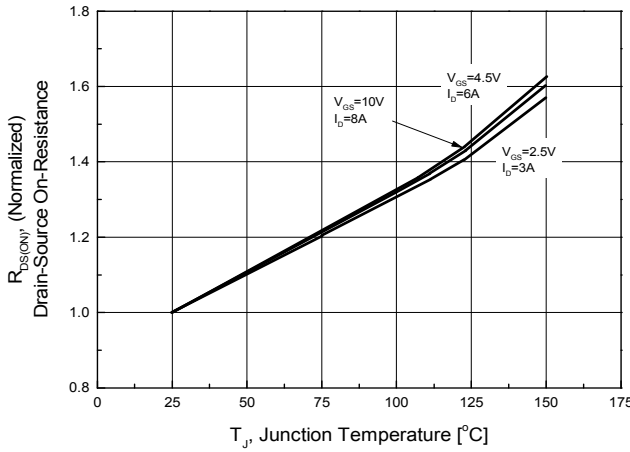


Fig.3 On-Resistance Variation with Temperature

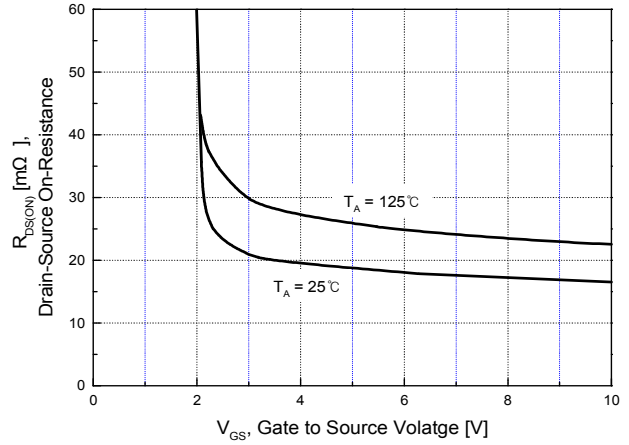


Fig.4 On-Resistance Variation with Gate to Source Voltage

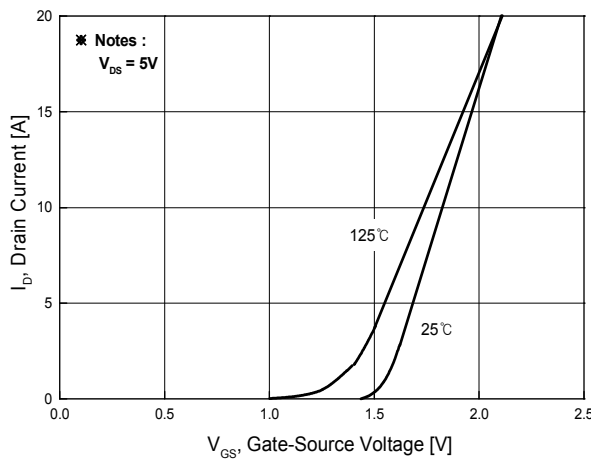


Fig.5 Transfer Characteristics

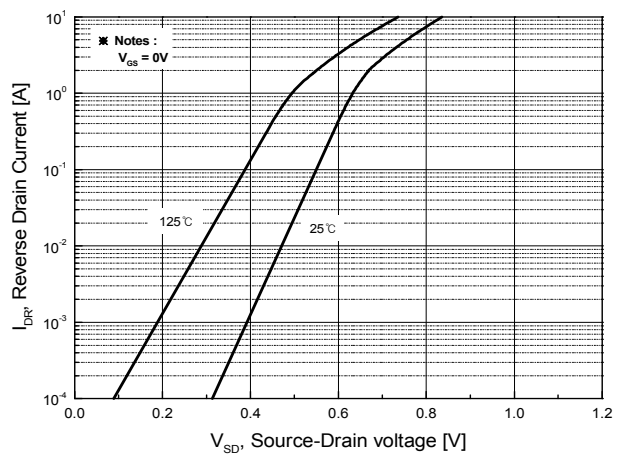


Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature

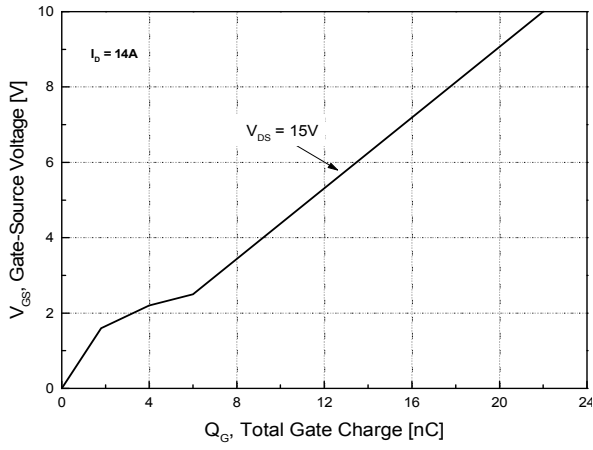


Fig.7 Gate Charge Characteristics

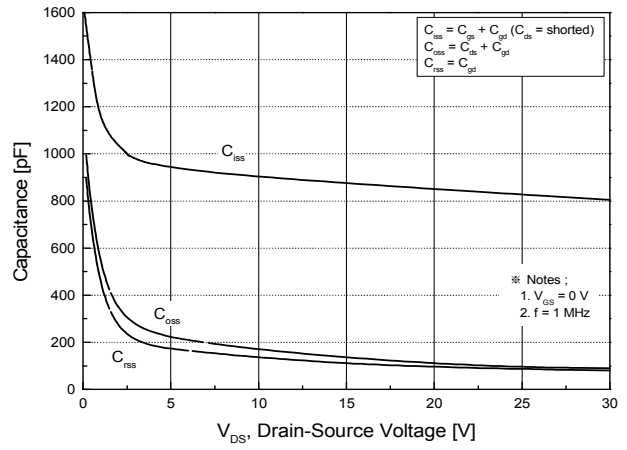
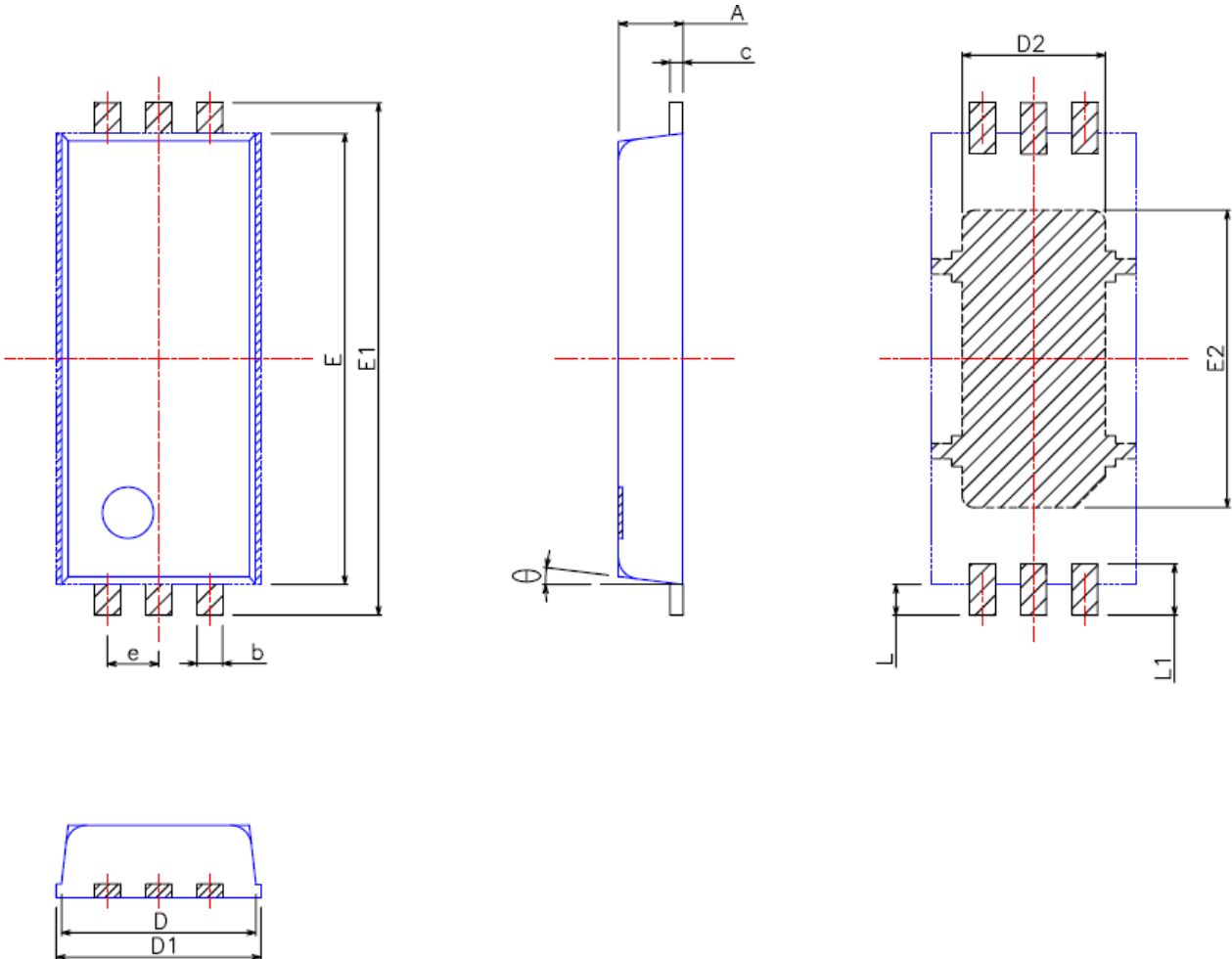


Fig.8 Capacitance Characteristics

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°	

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