

### General Description

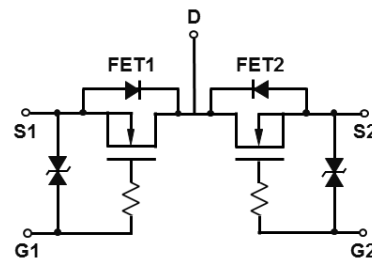
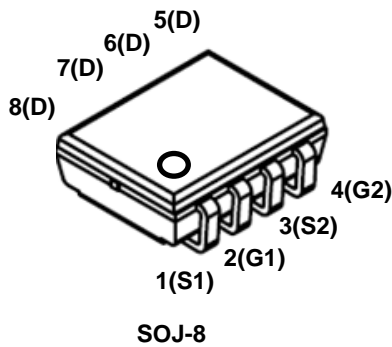
The MDCA0338E uses advanced MagnaChip's MOSFET Technology, which provides high performance in on-state resistance, fast switching performance and excellent quality.

### Features

- $V_{DS} = 24\text{ V}$
- $I_D = 10\text{ A}$
- Drain-Source ON Resistance;
  - $R_{DS(ON)} < 11.6\text{m}\Omega @ V_{GS} = 4.5\text{V}$
  - $R_{DS(ON)} < 12.6\text{m}\Omega @ V_{GS} = 4.0\text{V}$
  - $R_{DS(ON)} < 15.0\text{m}\Omega @ V_{GS} = 3.5\text{V}$
  - $R_{DS(ON)} < 17.5\text{m}\Omega @ V_{GS} = 3.1\text{V}$

### Applications

- Portable Battery Protection Module



### Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$ unless otherwise noted) <sup>Note 1</sup>

Characteristics	Symbol	Rating	Units
Drain-Source Voltage	$V_{DSS}$	24	V
Gate-Source Voltage	$V_{GSS}$	$\pm 12$	V
Continuous Drain Current <sup>Note 1</sup>	$I_D$	$T_A = 25^\circ\text{C}$	10
		$T_A = 70^\circ\text{C}$	8
Pulse Drain Current <sup>Note 2</sup>	$I_{DM}$	60	A
Power Dissipation for Single Operation <sup>Note 1</sup>	$P_{DSM}$	$T_A = 25^\circ\text{C}$	1.7
		$T_A = 70^\circ\text{C}$	1.0
Junction and Storage Temperature Range	$T_J, T_{stg}$	-55~150	$^\circ\text{C}$

### Thermal Characteristics

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

## Ordering Information

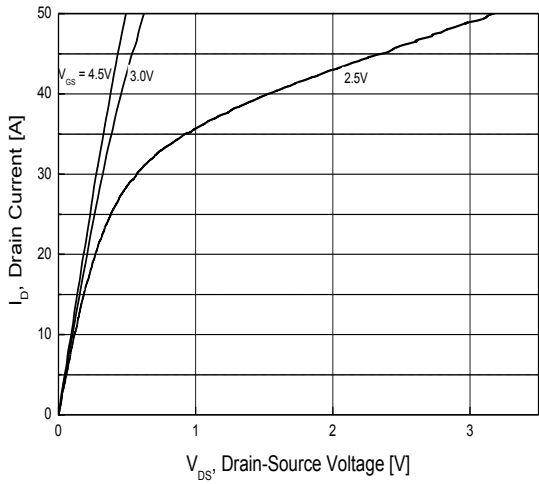
Part Number	Temp. Range	Package	Packing	RoHS Status
MDCA0338EURH	-55~150°C	SOJ-8L	Tape and Reel	Halogen Free

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

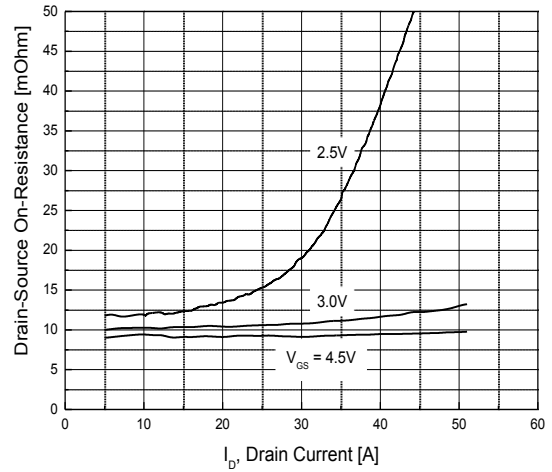
Characteristics	Symbol	Test Condition	Min	Typ	Max	Units
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$I_D = 500\mu A, V_{GS} = 0V$	24	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 1 mA$	0.50	1.00	1.50	
Drain Cut-Off Current	$I_{DSS}$	$V_{DS} = 20V, V_{GS} = 0V$	-	-	1.0	$\mu A$
Gate Leakage Current	$I_{GSS}$	$V_{GS} = \pm 8V, V_{DS} = 0V$	-	-	$\pm 1.0$	$\mu A$
Drain-Source Resistance <sup>Note 3</sup>	$R_{DS(ON)}$	$V_{GS} = 4.5V, I_D = 5A$	7.4	9.0	11.6	m $\Omega$
		$V_{GS} = 4.0V, I_D = 5A$	7.7	9.3	12.6	
		$V_{GS} = 3.1V, I_D = 5A$	8.5	10.2	15.0	
		$V_{GS} = 2.5V, I_D = 5A$	10.0	11.8	17.5	
Forward Trans conductance	$g_{fs}$	$V_{DS} = 5V, I_D = 10A$	-	33	-	S
<b>Dynamic Characteristics</b>						
Total Gate Charge	$Q_g$	$V_{DS} = 10V, I_D = 10A, V_{GS} = 4.5V$	-	18	-	nC
Gate-Source Charge	$Q_{gs}$		-	3.7	-	
Gate-Drain Charge	$Q_{gd}$		-	8.2	-	
Input Capacitance	$C_{iss}$	$V_{DS} = 12V, V_{GS} = 0V, f = 1MHz$	-	1440	-	pF
Reverse Transfer Capacitance	$C_{rss}$		-	340	-	
Output Capacitance	$C_{oss}$		-	790	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = 4.5V, V_{DS} = 10V, I_D = 5A, R_{GEN} = 3\Omega$	-	50	-	ns
Rise Time	$t_r$		-	200	-	
Turn-Off Delay Time	$t_{d(off)}$		-	1800	-	
Fall Time	$t_f$		-	2500	-	
<b>Drain-Source Body Diode Characteristics</b>						
Source-Drain Diode Forward Voltage	$V_{SD}$	$I_S = 1.0A, V_{GS} = 0V$	0.5	0.65	0.9	V

Notes :

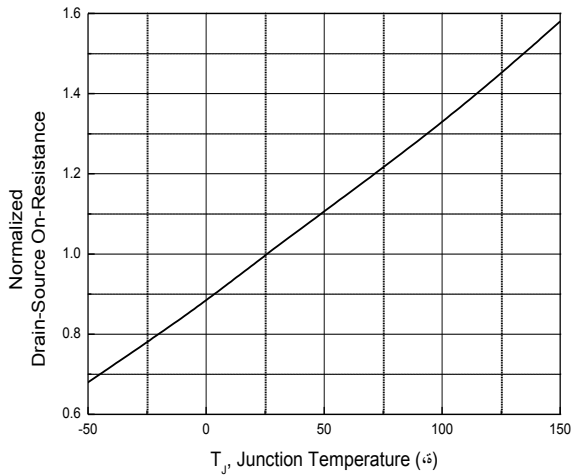
1. Surface mounted FR-4 board by JEDEC (jesd51-7)
2.  $t = 10 \mu s$ , Duty cycle  $\leq 1\%$
3.  $R_{DS(ON)}$  is Single MOS.



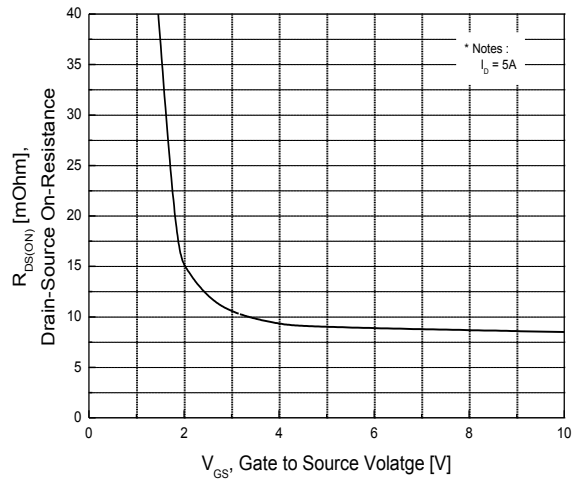
**Fig.1 On-Region Characteristics**



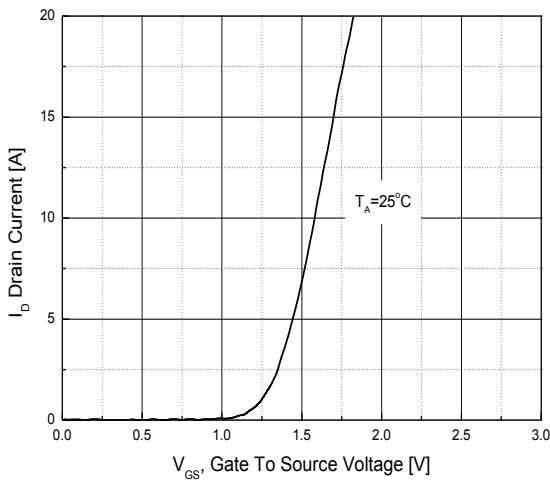
**Fig.2 On-Resistance Variation with Drain Current and Gate Voltage**



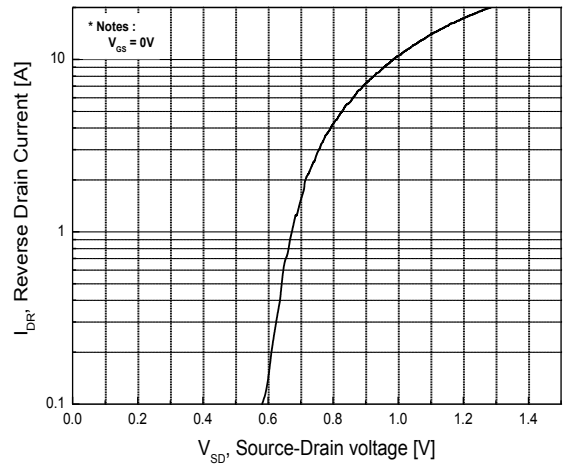
**Fig.3 On-Resistance Variation with Temperature**



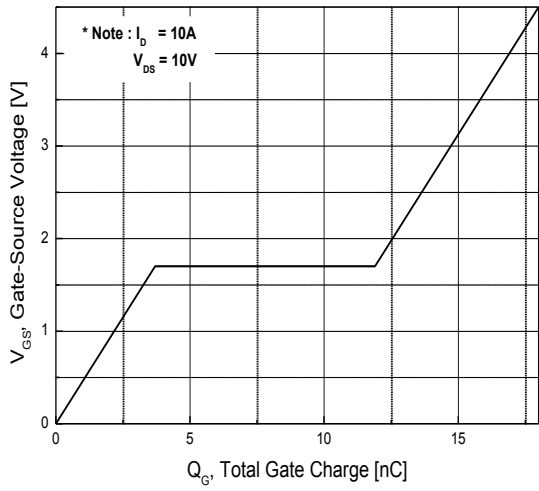
**Fig.4 On-Resistance Variation with Gate to Source Voltage**



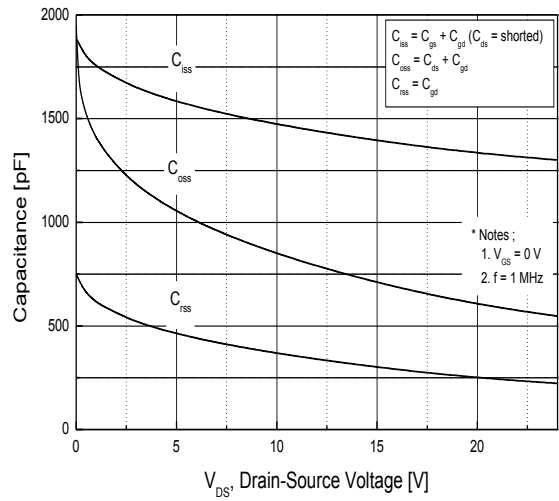
**Fig.5 Transfer Characteristics**



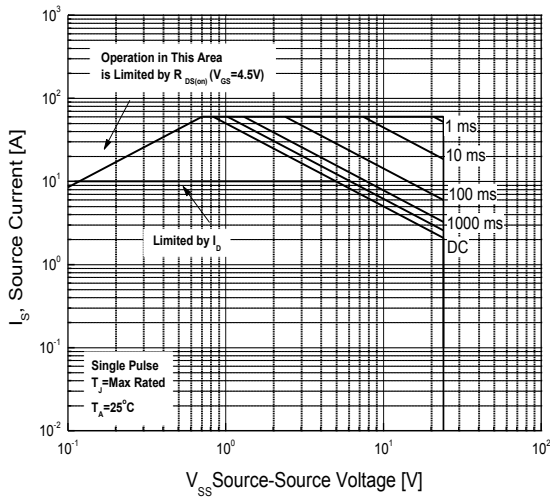
**Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature**



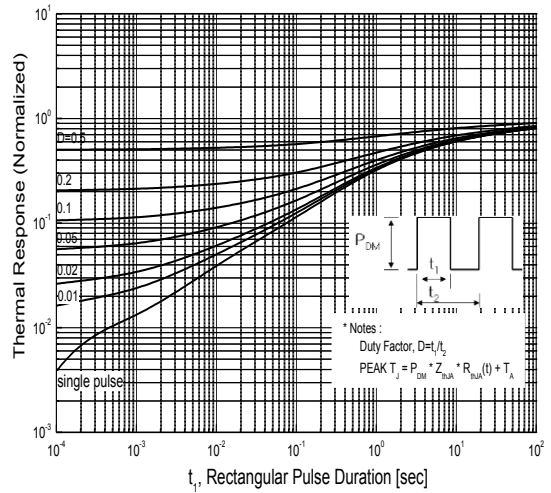
**Fig.7 Gate Charge Characteristics**



**Fig.8 Capacitance Characteristics**



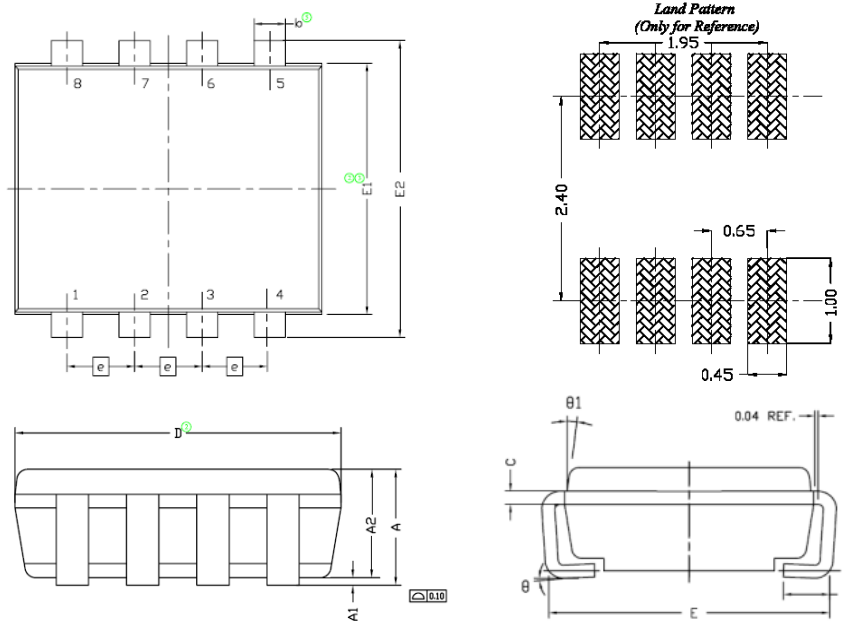
**Fig.9 Maximum Safe Operating Area**



**Fig.10 Transient Thermal Response Curve**

## Package Dimension

### SOJ, 8 Leads




Unit: mm

	Min	Nom	Max
<b>A</b>	-	1.00	-
<b>A1</b>	0.01	-	0.10
<b>A2</b>	0.925	-	1.00
<b>b</b>	0.25	0.32	0.40
<b>c</b>	0.10	0.15	0.20
<b>D</b>	2.95	3.05	3.10
<b>E</b>	2.50	-	3.00
<b>E1</b>	2.30	2.40	2.50
<b>E2</b>	2.65	2.85	3.05
<b>e</b>	0.65BSC		
<b>L</b>	0.30	0.45	0.60
<b>θ</b>	0°	4°	8°
<b>θ1</b>	7° NOM		

**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.

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