RoHS Compliant

MagnaChip

MDCA0338E

Common-Drain N-Channel Trench MOSFET 24V, 10A, 11.6mΩ

General Description

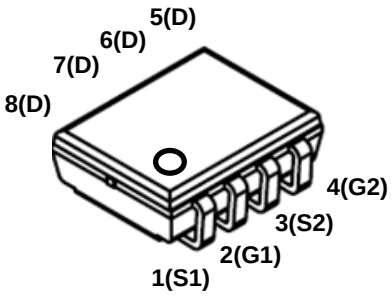
The MDCA0338E uses advanced MagnaChip's MOSFET Technology, which provides high performance in on-state resistance, fast switching performance and excellent quality.

Features

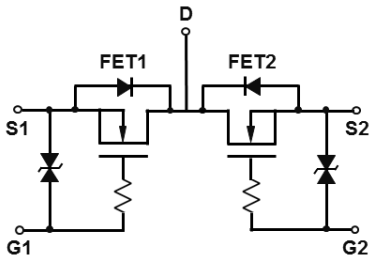
- V_{DS} = 24 V
- I_D =10 A
- Drain-Source ON Resistance;
  $R_{DS(ON)}$ < 11.6mΩ @ V_{GS} = 4.5V
  $R_{DS(ON)}$ < 12.6mΩ @ V_{GS} = 4.0V
  $R_{DS(ON)}$ < 15.0mΩ @ V_{GS} = 3.5V
  $R_{DS(ON)}$ < 17.5mΩ @ V_{GS} = 3.1V

Applications

- Portable Battery Protection Module



SOJ-8



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

Characteristics		Symbol	Rating	Units
Drain-Source Voltage		V_{DSS}	24	V
Gate-Source Voltage		V_{GSS}	±12	V
Continuous Drain Current Note 1	T_A=25°C	I_D	10	A
	T_A=70°C		8	A
Pulse Drain Current Note 2		I_{DM}	60	A
Power Dissipation for Single Operation Note 1	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
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
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 = 1 mA	0.50	1.00	1.50	
Drain Cut-Off Current	I_{DSS}	V_{DS} = 20V, V_{GS} = 0V	-	-	1.0	μA
Gate Leakage Current	I_{GSS}	V_{GS} = ±8V, V_{DS} = 0V	-	-	±1.0	μA
Drain-Source Resistance Note 3	$R_{DS(ON)}$	V_{GS} = 4.5V, I_D = 5A	7.4	9.0	11.6	mΩ
		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
Dynamic Characteristics						
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} = 3Ω	-	50	-	ns
Rise Time	t_r		-	200	-	
Turn-Off Delay Time	$t_{d(off)}$		-	1800	-	
Fall Time	t_f		-	2500	-	
Drain-Source Body Diode Characteristics						
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 μs, Duty cycle ≤1%
3. $R_{DS(ON)}$ is Single MOS.

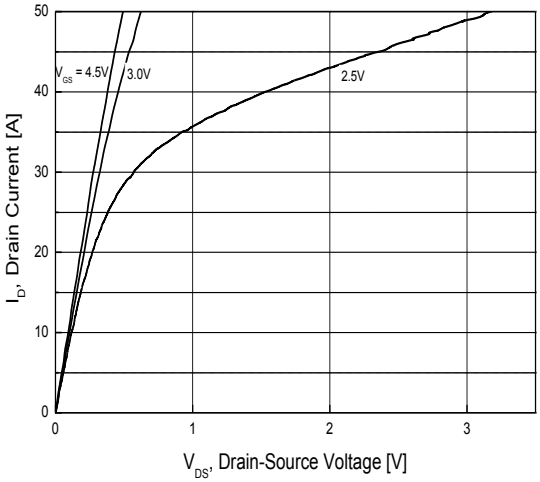


Fig.1 On-Region Characteristics

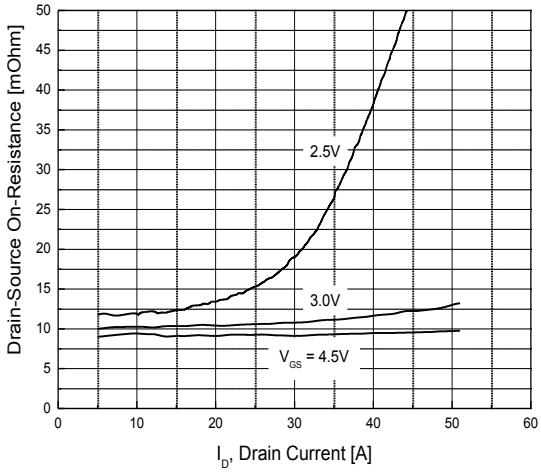


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

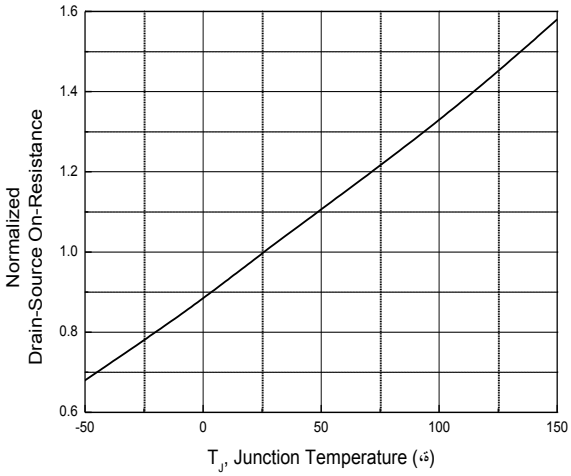


Fig.3 On-Resistance Variation with Temperature

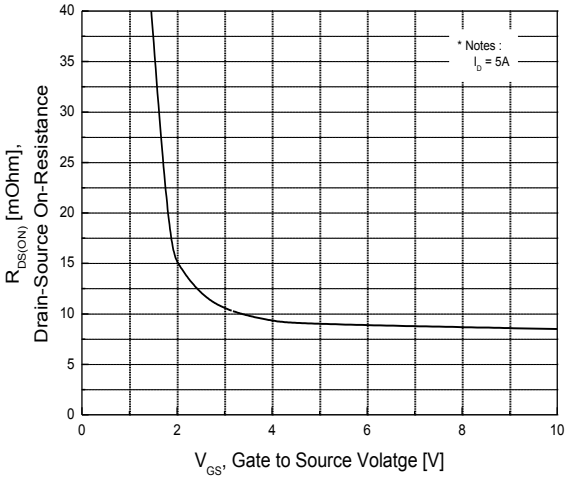


Fig.4 On-Resistance Variation with Gate to Source Voltage

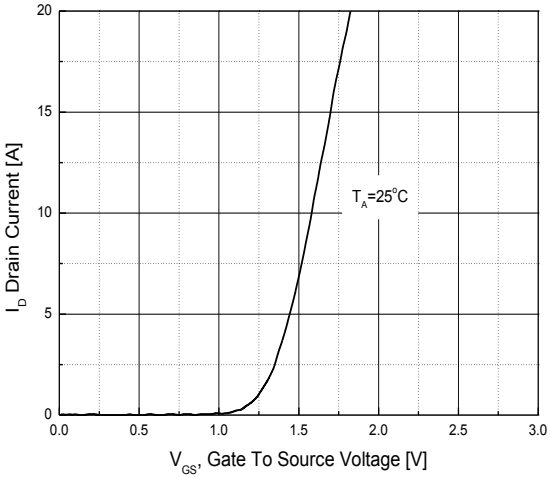


Fig.5 Transfer Characteristics

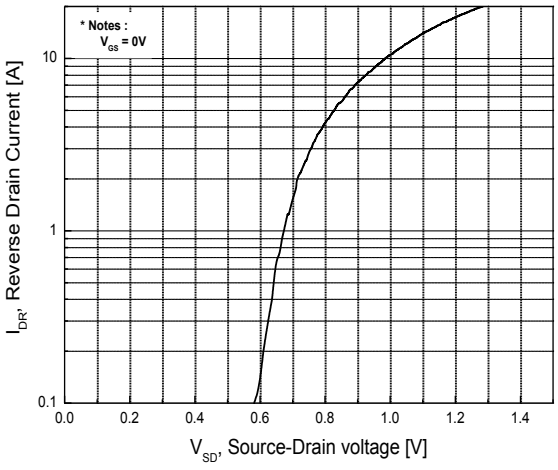


Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature

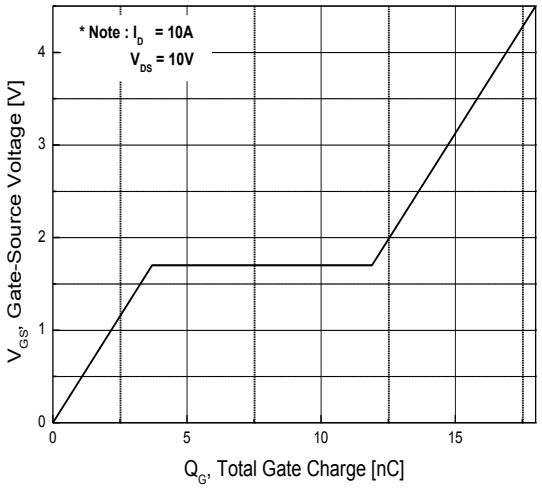


Fig.7 Gate Charge Characteristics

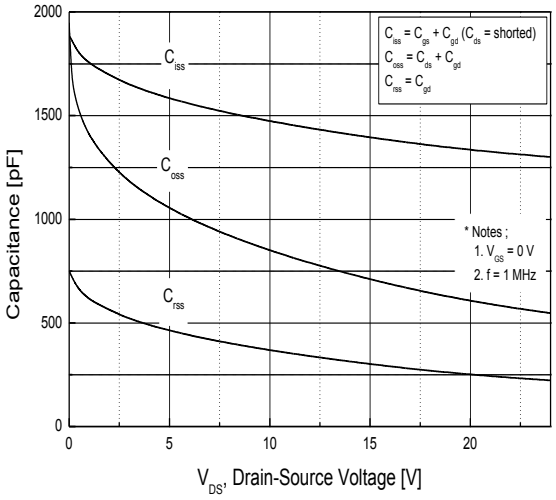


Fig.8 Capacitance Characteristics

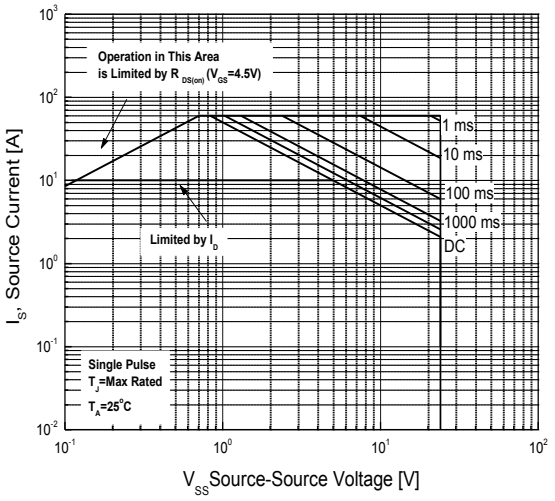


Fig.9 Maximum Safe Operating Area

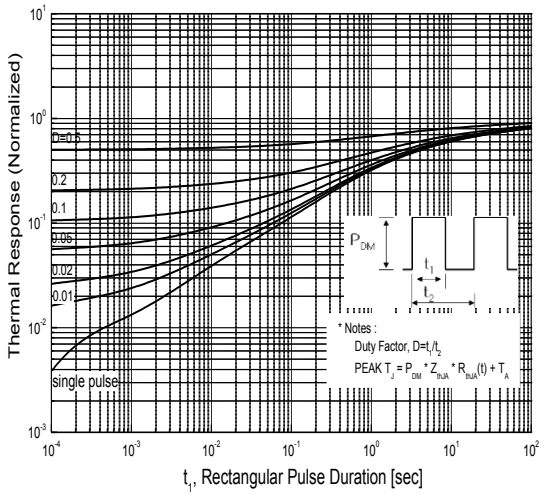
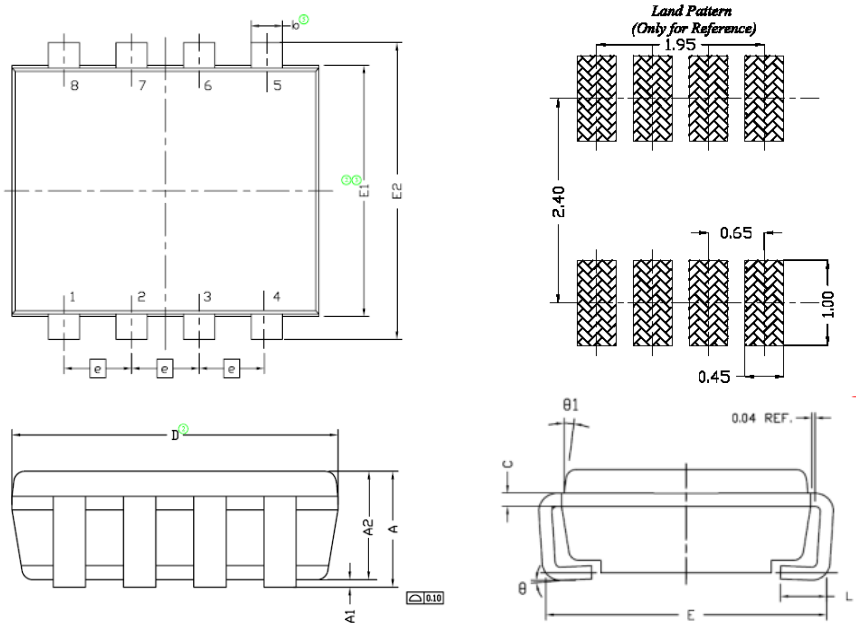


Fig.10 Transient Thermal Response Curve

Package Dimension

SOJ, 8 Leads



Unit: mm

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