RoHS Compliant

Magnachip

MDU10N070RH

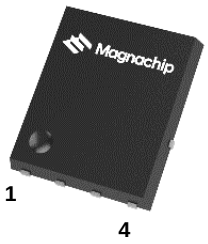
Single N-channel Trench MOSFET 100V, 53A, 7.4mΩ

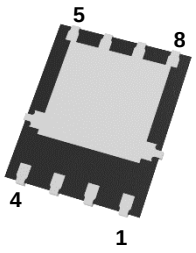
General Description

The MDU10N070RH uses advanced Magnachip's MOSFET Technology, which provides high performance in on-state resistance, fast switching performance and excellent quality. MDU10N070RH is suitable device for Synchronous Rectification for Server and general purpose applications.

Features

- V_{DS} = 100V
- I_D = 53 A @V_{GS} = 10V
- Very low on-resistance $R_{DS(ON)}$
  < 7.4 mΩ @V_{GS} = 10V
  < 9.1 mΩ @V_{GS} = 4.5V
- 100% UIL Tested
- 100% Rg Tested





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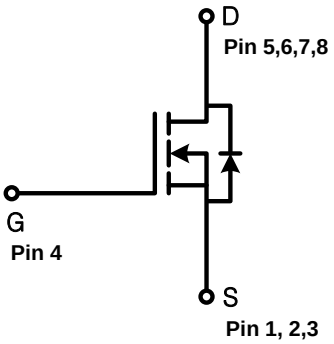


Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Drain-Source Voltage		V_{DSS}	100	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current [1]	T_C=25°C (Silicon Limited)	I_D	85	A
	T_C=25°C (Package Limited)		53	
	T_C=100°C (Silicon Limited)		54	
	T_A=25°C		19	
Pulsed Drain Current [2]		I_{DM}	212	
Power Dissipation	T_C=25°C	P_D	119	W
	T_C=100°C		47	
	T_A=25°C (T ≤ 10s)		5.5	
Single Pulse Avalanche Energy [3]		E_{AS}	84	mJ
Junction and Storage Temperature Range		T_J, T_{stg}	-55~150	°C

Thermal Characteristics

Characteristics	Symbol	Rating	Unit
Thermal Resistance, Junction-to-Ambient (T ≤ 10s) [1]	$R_{\theta JA}$	22.7	°C/W
Thermal Resistance, Junction-to-Ambient (Steady State) [1]	$R_{\theta JA}$	50.0	
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.05	

Ordering Information

Part Number	Temp. Range	Package	Packing	RoHS Status
MDU10N070RH	-55~150°C	PDFN56	Tape & Reel	Halogen Free

Electrical Characteristics (T_J =25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	I_D = 250μA, V_{GS} = 0V	100	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1.2	-	2.2	
Drain Cut-Off Current	I_{DSS}	V_{DS} = 100V, V_{GS} = 0V	-	-	1.0	uA
Gate Leakage Current	I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V	-	-	±100	nA
Drain-Source ON Resistance	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 20A	-	5.9	7.4	mΩ
		V_{GS} = 4.5V, I_D = 15A	-	7.0	9.1	
Forward Transconductance	g_{fs}	V_{DS} = 10V, I_D = 20A	-	92	-	S
Dynamic Characteristics						
Total Gate Charge	$Q_{g(10V)}$	V_{DD} = 50V, I_D = 20A, V_{GS} = 10V	-	63	-	nC
Gate-Source Charge	Q_{gs}		-	10	-	
Gate-Drain Charge	Q_{gd}		-	10	-	
Input Capacitance	C_{iss}	V_{DS} = 40V, V_{GS} = 0V, f = 1.0MHz	-	4140	-	pF
Reverse Transfer Capacitance	C_{rss}		-	31	-	
Output Capacitance	C_{oss}		-	586	-	
Turn-On Delay Time	$t_{d(on)}$	V_{GS} = 10V, V_{DD} = 50V, I_D = 20A, R_G =3Ω,	-	13.5	-	ns
Rise Time	t_r		-	12	-	
Turn-Off Delay Time	$t_{d(off)}$		-	61	-	
Fall Time	t_f		-	8.8	-	
Gate Resistance	R_g	f=1.0 MHz	-	3.0	-	Ω
Drain-Source Body Diode Characteristics						
Diode continuous forward current	I_S	T_C=25°C (Package Limited)	-	-	53	A
Source-Drain Diode Forward Voltage	V_{SD}	I_S = 20A, V_{GS} = 0V	-	0.8	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	I_F = 20A, dI/dt = 100A/μs	-	70	-	ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	183	-	nC

Note :

1. The Rthja was measured with the device mounted on 74.2 * 74.2 ㎟ Copper buried FR4 board. The heat sink paddle size for the drain connection of device is 4.5 * 6.0 ㎟ .
2. Pulse width limited by T_{jmax}
3. E_{AS} is tested at starting Tj = 25℃, L = 1.0mH, I_{AS} = 13A, V_{DD} = 50V, V_{GS} = 10V

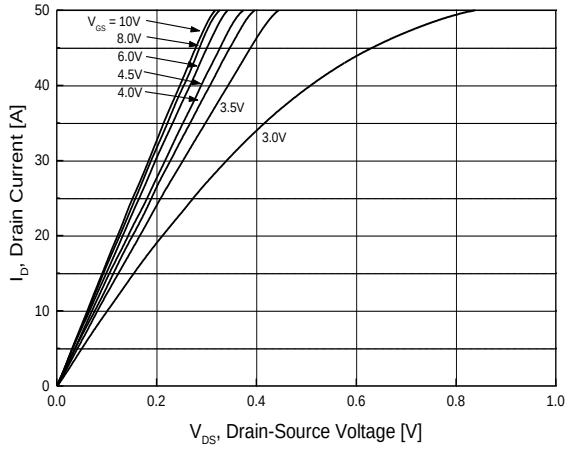


Fig.1 On-Region Characteristics

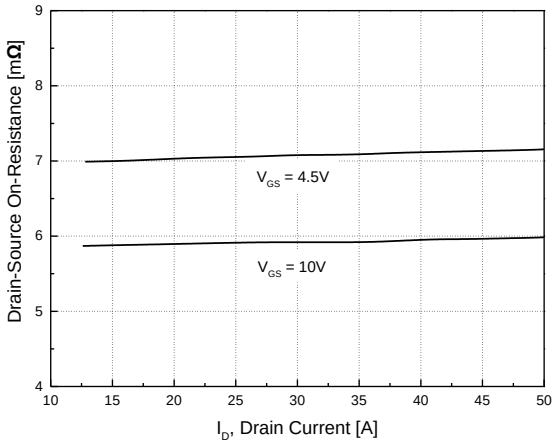


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

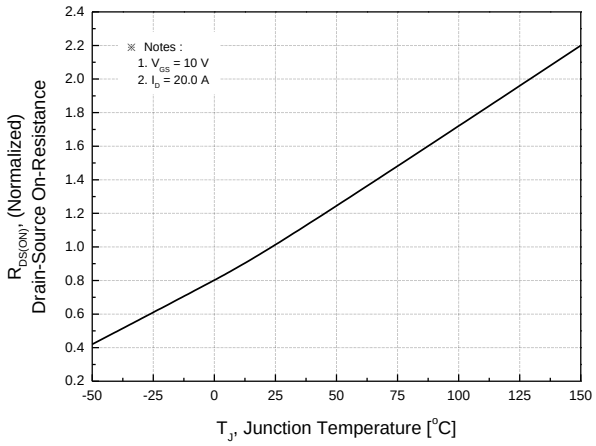


Fig.3 On-Resistance Variation with Temperature

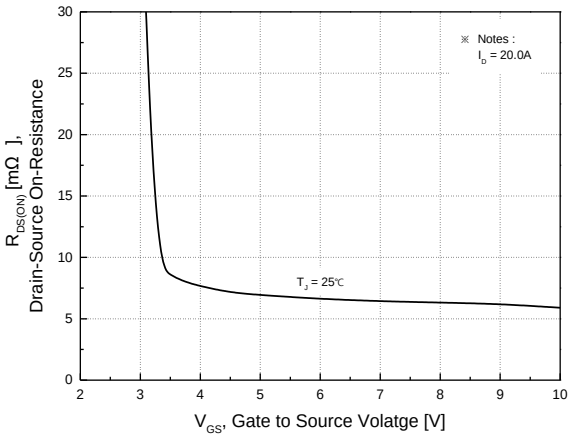


Fig.4 On-Resistance Variation with Gate to Source Voltage

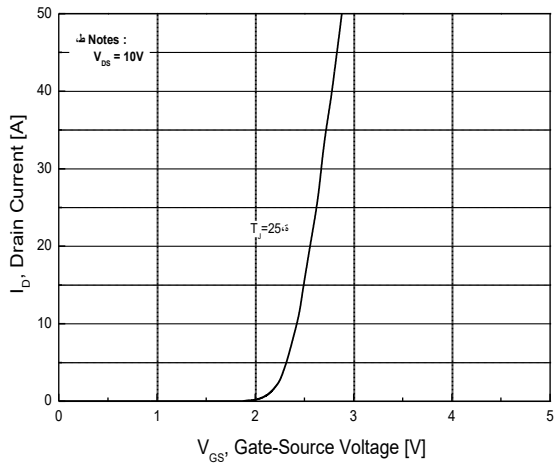


Fig.5 Transfer Characteristics

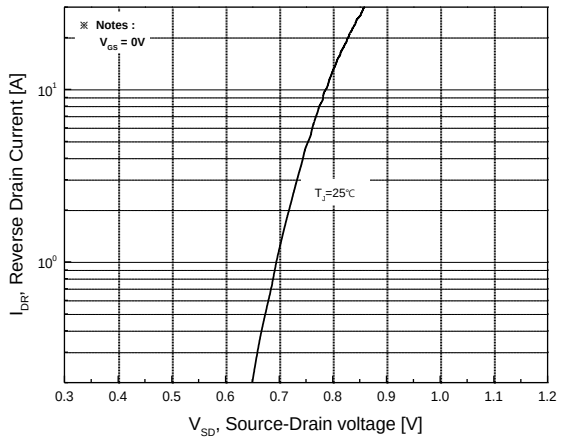


Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature

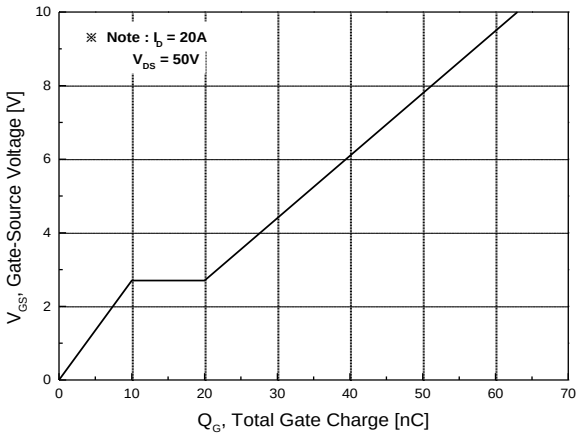


Fig.7 Gate Charge Characteristics

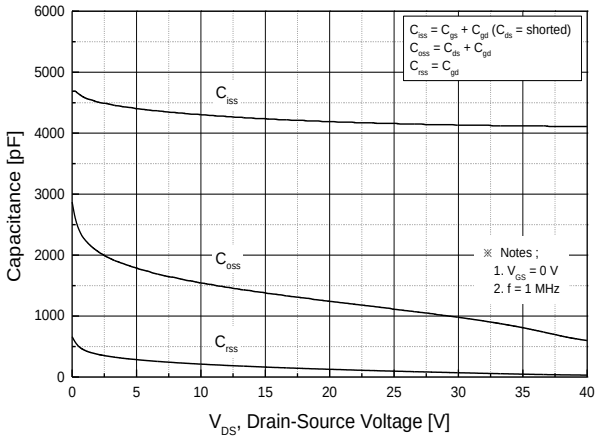


Fig.8 Capacitance Characteristics

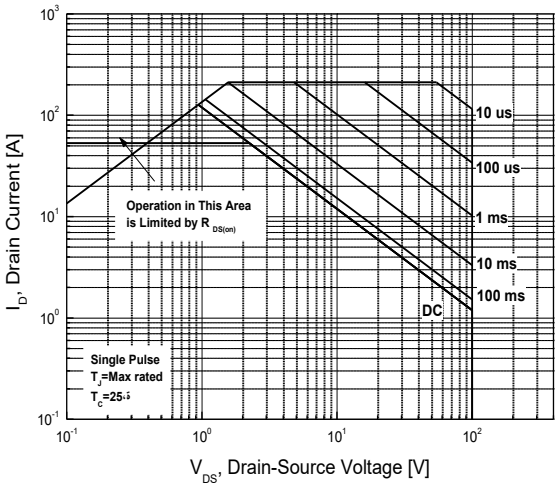


Fig.9 Maximum Safe Operating Area

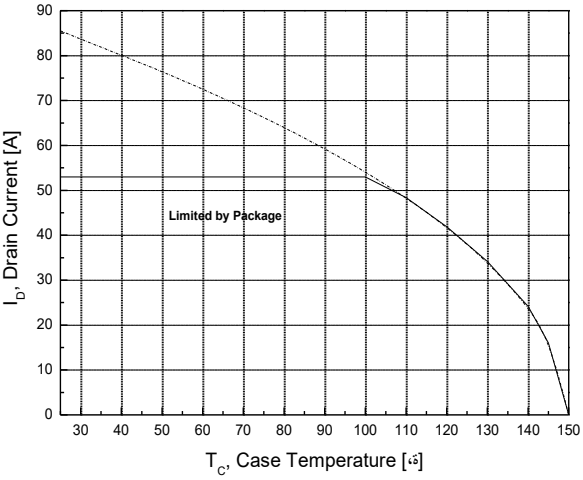


Fig.10 Maximum Drain Current vs. Case Temperature

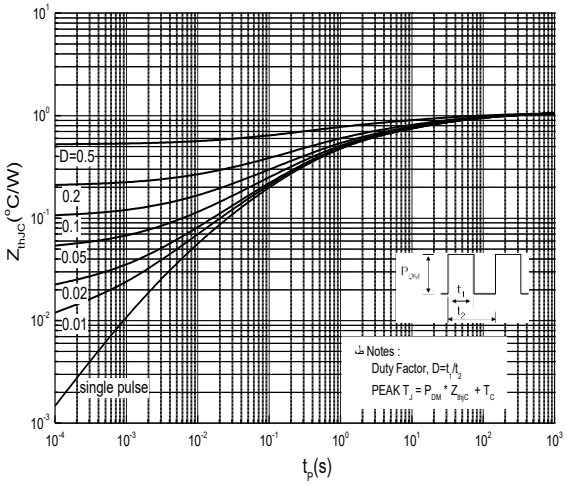
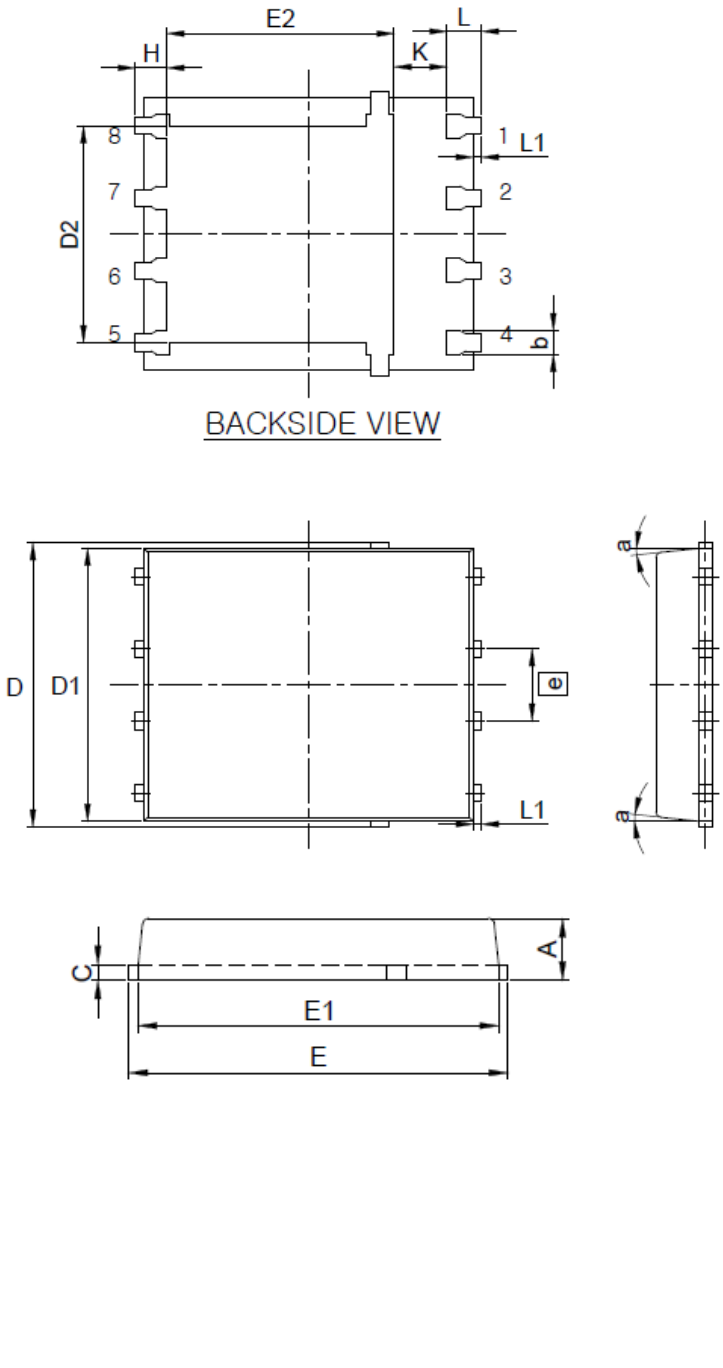


Fig.11 Transient Thermal Response Curve

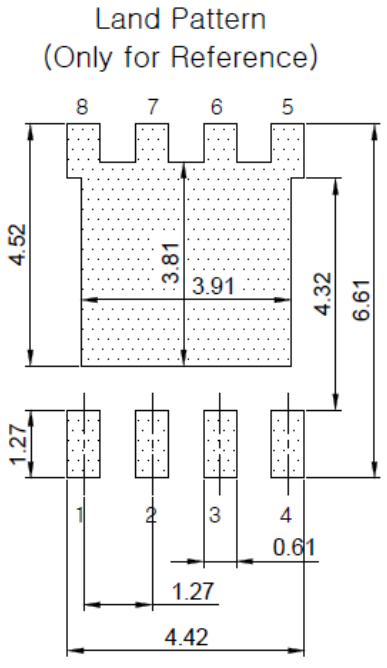
Package Dimension

PDFN56 (5x6mm^2)

Dimensions are in millimeters, unless otherwise specified



Dimension	MILLIMETERS	
	Min	Max
A	0.90	1.10
b	0.33	0.51
C	0.20	0.34
D	4.50	5.30
D1	4.50	5.10
D2	-	4.22
E	5.90	6.30
E1	5.50	6.10
E2	-	4.30
e	1.27BSC	
H	0.41	0.71
K	0.20	-
L	0.51	0.71
α	0°	12°



Note : Package body size, length and width do not include mold flash, protrusions and gate burrs.

DISCLAIMER:

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