MDU1511

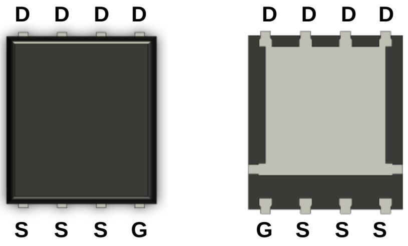
Single N-channel Trench MOSFET 30V, 100.0A, 2.4mΩ

General Description

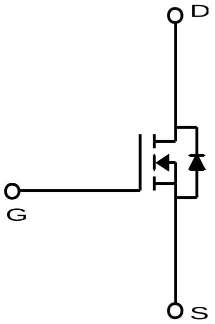
The MDU1511 uses advanced MagnaChip's MOSFET Technology, which provides high performance in on-state resistance, fast switching performance and excellent quality. MDU1511 is suitable device for DC/DC Converter and general purpose applications.

Features

- V_{DS} = 30V
- I_D = 100A @V_{GS} = 10V
- $R_{DS(ON)}$
  < 2.4 mΩ @V_{GS} = 10V
  < 3.3 mΩ @V_{GS} = 4.5V
- 100% UIL Tested
- 100% Rg Tested



PowerDFN56



Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Drain-Source Voltage		V_{DSS}	30	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current (1)	T_C=25°C	I_D	100.0	A
	T_C=70°C		94.0	
	T_A=25°C		36.1(3)	
	T_A=70°C		28.8(3)	
Pulsed Drain Current		I_{DM}	400	A
Power Dissipation	T_C=25°C	P_D	78.1	W
	T_C=70°C		50.0	
	T_A=25°C		5.5(3)	
	T_A=70°C		3.5(3)	
Single Pulse Avalanche Energy (2)		E_{AS}	287	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	$R_{\theta JC}$	1.8	

Ordering Information

Part Number	Temp. Range	Package	Packing	Quantity	Rohs Status
MDU1511RH	-55~150°C	PowerDFN56	Tape & Reel	3000 units	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	30	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1.3	1.8	2.7	
Drain Cut-Off Current	I_{DSS}	V_{DS} = 30V, V_{GS} = 0V	-	-	1	μA
		T_J=55°C	-	-	5	
Gate Leakage Current	I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V	-	-	±0.1	
Drain-Source ON Resistance	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 28A	-	2.0	2.4	mΩ
		T_J=125°C	-	2.9	3.5	
		V_{GS} = 4.5V, I_D = 24A	-	2.7	3.3	
Forward Transconductance	g_{fs}	V_{DS} = 5V, I_D = 10A	-	45	-	S
Dynamic Characteristics						
Total Gate Charge	$Q_{g(10V)}$	V_{DS} = 15V, I_D = 28A, V_{GS} = 10V	38.8	51.8	64.8	nC
Total Gate Charge	$Q_{g(4.5V)}$		18.7	25.0	31.3	
Gate-Source Charge	Q_{gs}		-	9.9	-	
Gate-Drain Charge	Q_{gd}		-	9.4	-	
Input Capacitance	C_{iss}	V_{DS} = 15V, V_{GS} = 0V, f = 1.0MHz	2510	3347	4184	pF
Reverse Transfer Capacitance	C_{rss}		246	328	410	
Output Capacitance	C_{oss}		490	653	817	
Turn-On Delay Time	$t_{d(on)}$	V_{GS} = 10V, V_{DS} = 15V, I_D = 28A, R_G = 3.0Ω	-	11.2	-	ns
Rise Time	t_r		-	23.2	-	
Turn-Off Delay Time	$t_{d(off)}$		-	45.6	-	
Fall Time	t_f		-	18.6	-	
Gate Resistance	Rg	f=1 MHz	-	1.0	2.0	Ω
Drain-Source Body Diode Characteristics						
Source-Drain Diode Forward Voltage	V_{SD}	I_S = 28A, V_{GS} = 0V	-	0.8	1.1	V
Body Diode Reverse Recovery Time	t_{rr}	I_F = 28A, dI/dt = 100A/μs	-	33.8	50.7	ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	22.3	33.5	nC

Note :

1. Surface mounted FR-4 board by JEDEC (jesd51-7)
2. E_{AS} is tested at starting Tj = 25℃, L = 0.1mH, I_{AS} = 42.0A, V_{DD} = 27V, V_{GS} = 10V
3. T < 10sec.

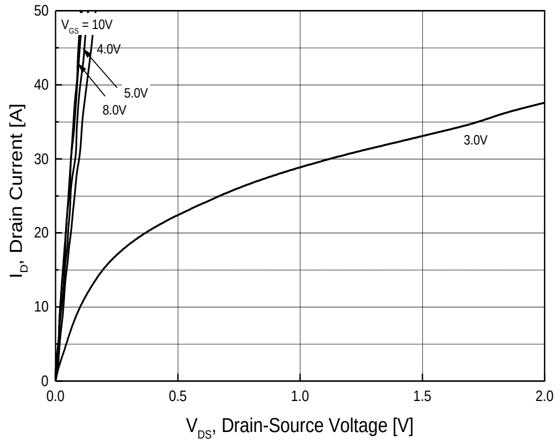


Fig.1 On-Region Characteristics

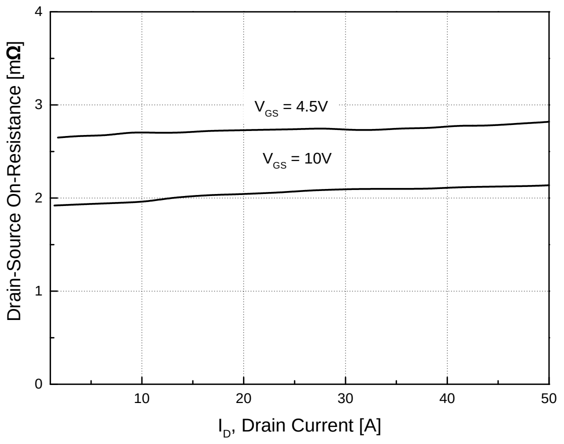


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

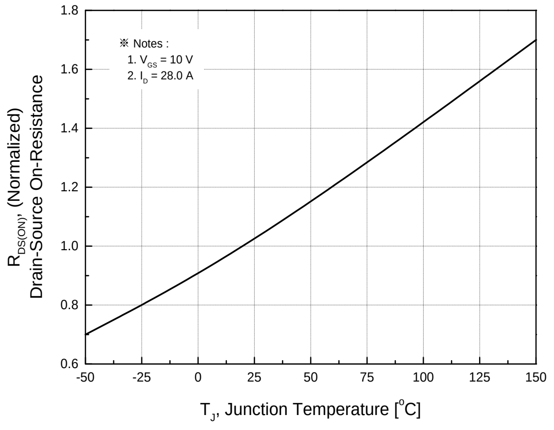


Fig.3 On-Resistance Variation with Temperature

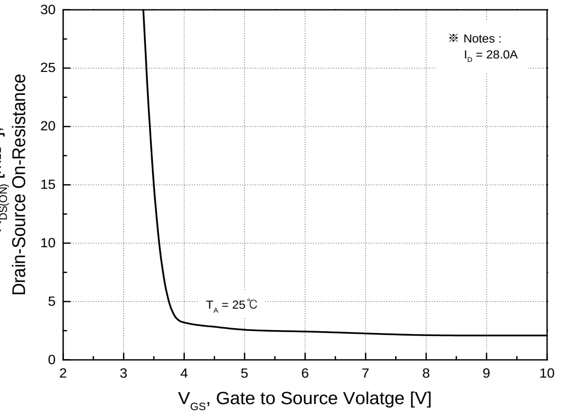


Fig.4 On-Resistance Variation with Gate to Source Voltage

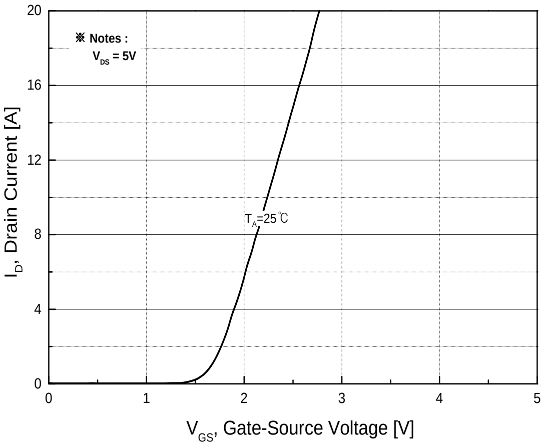


Fig.5 Transfer Characteristics

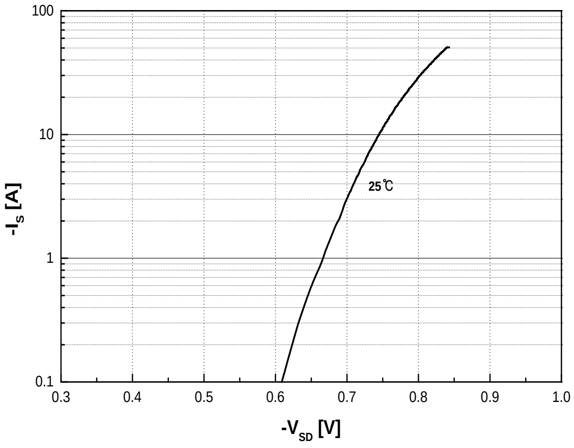


Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature

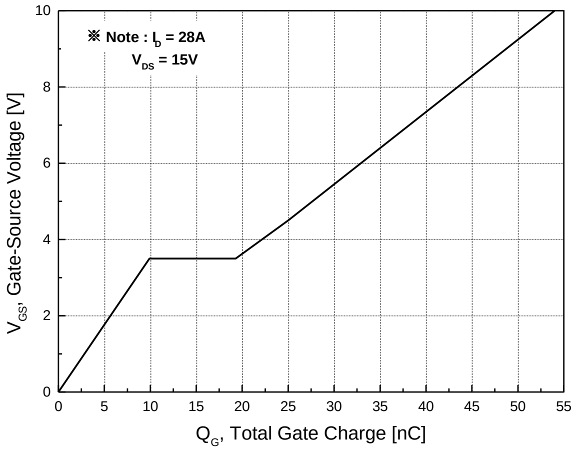


Fig.7 Gate Charge Characteristics

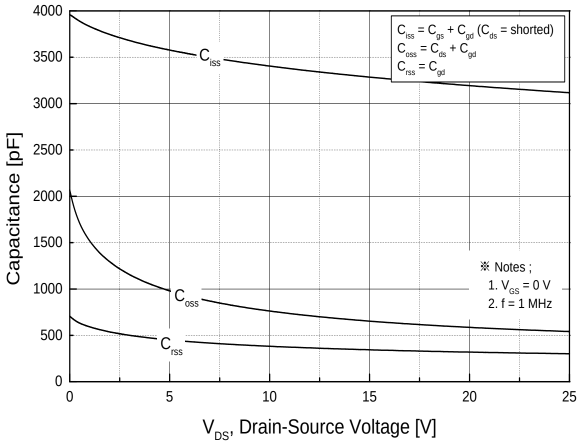


Fig.8 Capacitance Characteristics

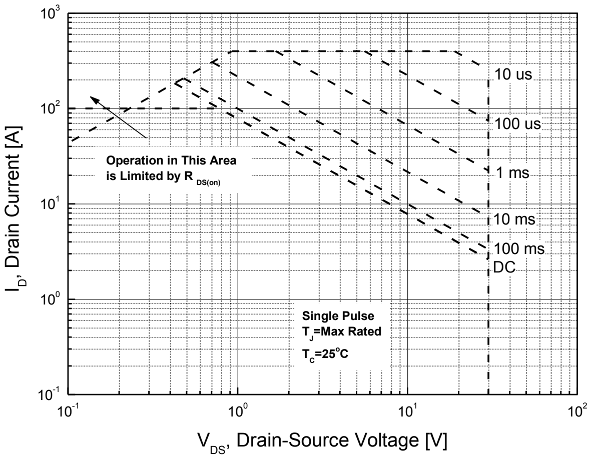


Fig.9 Maximum Safe Operating Area

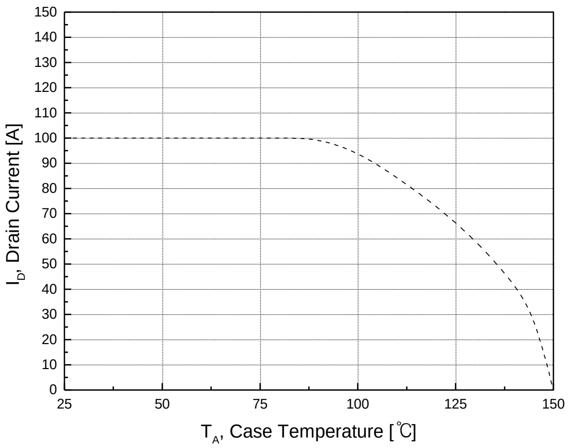


Fig.10 Maximum Drain Current Vs. Case Temperature

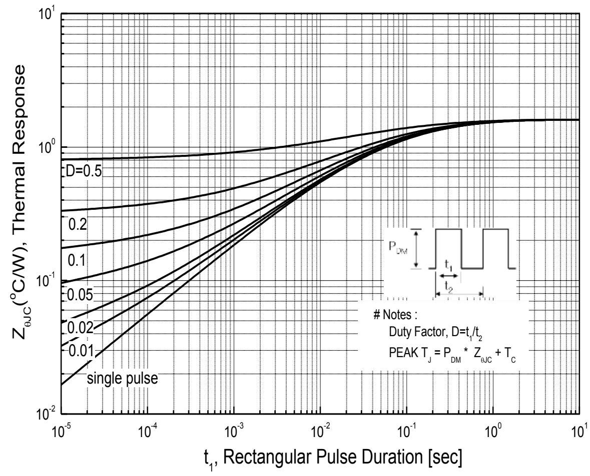
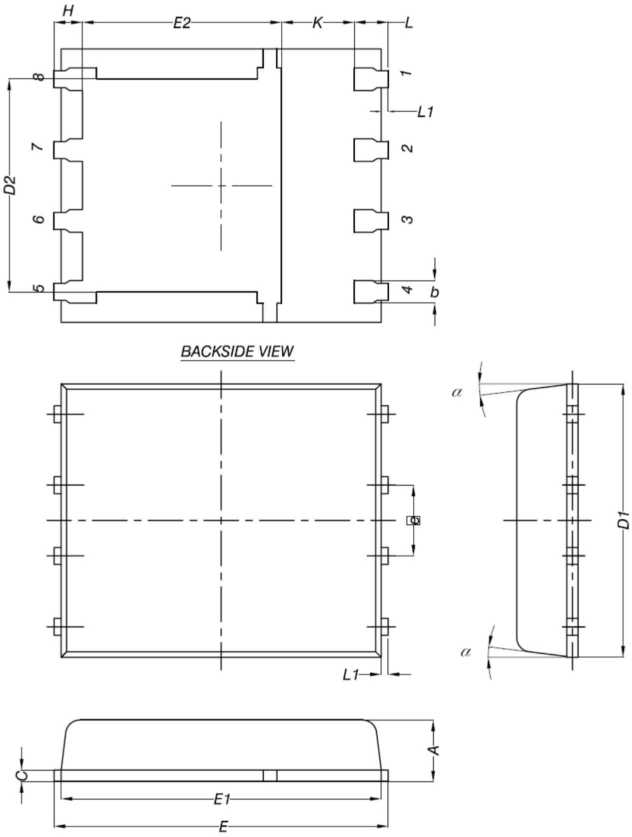


Fig.11 Transient Thermal Response Curve

Package Dimension

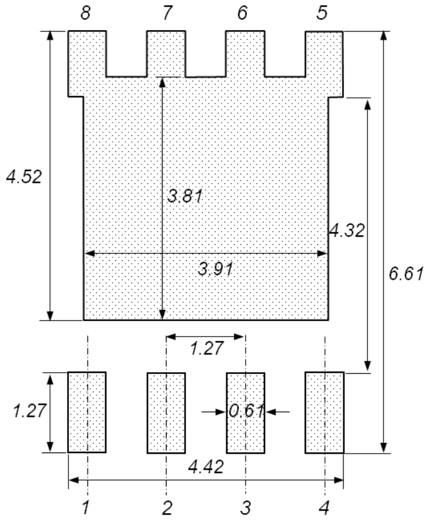
PowerDFN56 (5x6mm)

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
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°

Land Pattern



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