

MDU1516

Single N-channel Trench MOSFET 30V, 47.6A, 9.0mΩ

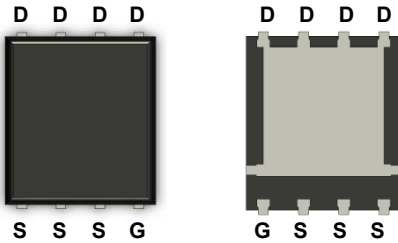
MDU1516 – Single N-Channel Trench MOSFET 30V

General Description

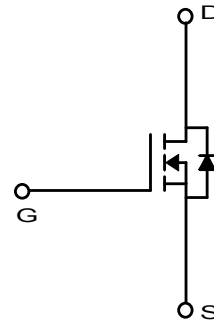
The MDU1516 uses advanced MagnaChip's MOSFET Technology, which provides high performance in on-state resistance, fast switching performance and excellent quality. MDU1516 is suitable device for DC/DC Converter and general purpose applications.

Features

- $V_{DS} = 30V$
- $I_D = 47.6A @ V_{GS} = 10V$
- $R_{DS(ON)} < 9.0 m\Omega @ V_{GS} = 10V$
 $< 14.0 m\Omega @ V_{GS} = 4.5V$
- 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⁾	I_D	$T_C=25^{\circ}C$	47.6
		$T_C=70^{\circ}C$	38.0
		$T_A=25^{\circ}C$	18.6 ⁽³⁾
		$T_A=70^{\circ}C$	14.9 ⁽³⁾
Pulsed Drain Current	I_{DM}	100	A
Power Dissipation	P_D	$T_C=25^{\circ}C$	35.7
		$T_C=70^{\circ}C$	22.8
		$T_A=25^{\circ}C$	5.5 ⁽³⁾
		$T_A=70^{\circ}C$	3.5 ⁽³⁾
Single Pulse Avalanche Energy ⁽²⁾	E_{AS}	53.0	mJ
Junction and Storage Temperature Range	T_J, T_{stg}	-55~150	°C

Thermal Characteristics

Characteristics	Symbol	Rating	Unit
Thermal Resistance, Junction-to-Ambient ⁽¹⁾	$R_{\theta JA}$	22.7	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	3.5	

Ordering Information

Part Number	Temp. Range	Package	Packing	Quantity	RoHS Status
MDU1516URH	-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	1.9	2.7	
Drain Cut-Off Current	I _{DSS}	V _{DS} = 30V, V _{GS} = 0V T _J =55°C	-	-	1 5	μA
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 = 14A T _J =125°C	-	7.8 11.3	9.0 13.0	mΩ
		V _{GS} = 4.5V, I _D = 11A	-	11.7	14.0	
Forward Transconductance	g _{fs}	V _{DS} = 5V, I _D = 10A	-	31	-	S
Dynamic Characteristics						
Total Gate Charge	Q _{g(10V)}	V _{DS} = 15.0V, I _D = 14A, V _{GS} = 10V	11.0	14.6	18.3	nC
Total Gate Charge	Q _{g(4.5V)}		5.2	6.9	8.6	
Gate-Source Charge	Q _{gs}		-	3.0	-	
Gate-Drain Charge	Q _{gd}		-	2.6	-	
Input Capacitance	C _{iss}	V _{DS} = 15.0V, V _{GS} = 0V, f = 1.0MHz	662	882	1103	pF
Reverse Transfer Capacitance	C _{rss}		65	86	108	
Output Capacitance	C _{oss}		134	178	223	
Turn-On Delay Time	t _{d(on)}	V _{GS} = 10V, V _{DS} = 15.0V, I _D = 14A, R _G = 3.0Ω	-	10.3	-	ns
Rise Time	t _r		-	10.6	-	
Turn-Off Delay Time	t _{d(off)}		-	23.0	-	
Fall Time	t _f		-	7.4	-	
Gate Resistance	R _g	f=1 MHz	2.0	3.0	4.5	Ω
Drain-Source Body Diode Characteristics						
Source-Drain Diode Forward Voltage	V _{SD}	I _S = 14A, V _{GS} = 0V	-	0.8	1.1	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = 14A, di/dt = 100A/μs	-	19.5	29.3	ns
Body Diode Reverse Recovery Charge	Q _{rr}		-	11.0	16.5	nC

Note :

1. Surface mounted FR-4 board by JEDEC (jesd51-7)
2. E_{AS} is tested at starting T_J = 25°C, L = 0.1mH, I_{AS} = 18A, V_{DD} = 27V, V_{GS} = 10V
3. T < 10sec.

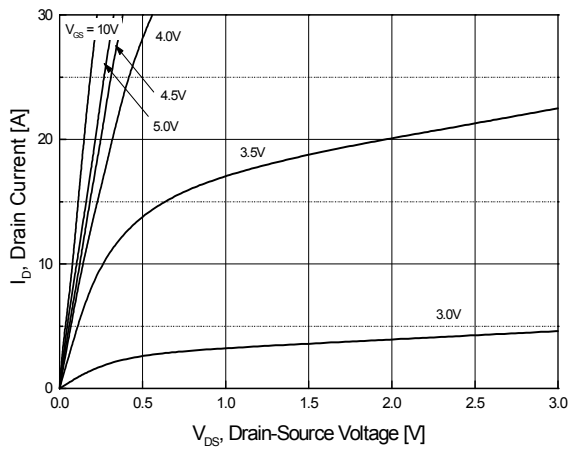


Fig.1 On-Region Characteristics

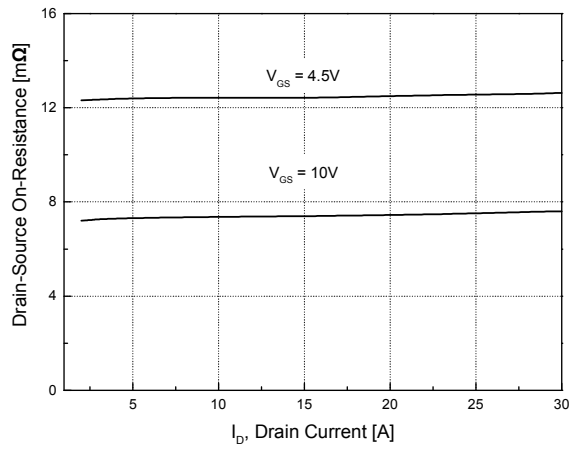


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

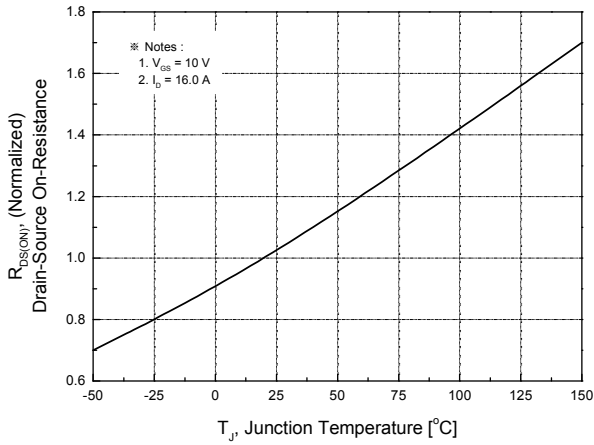


Fig.3 On-Resistance Variation with Temperature

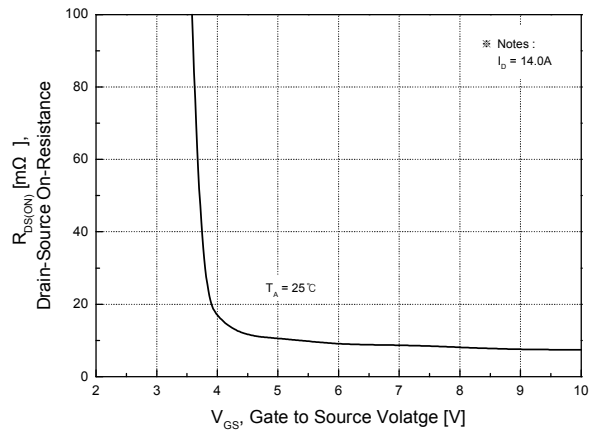


Fig.4 On-Resistance Variation with Gate to Source Voltage

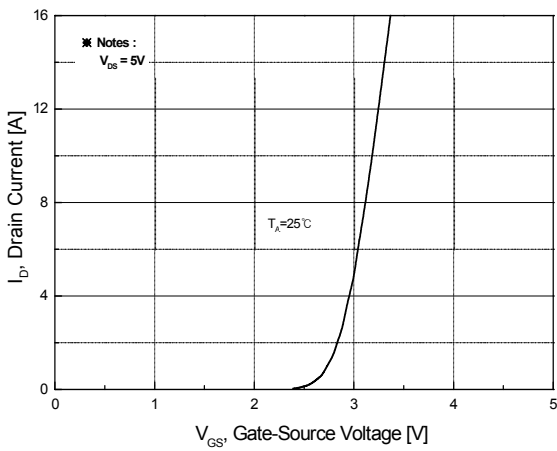


Fig.5 Transfer Characteristics

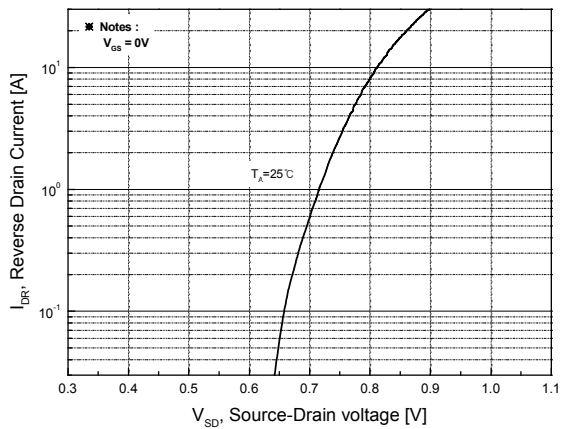


Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature

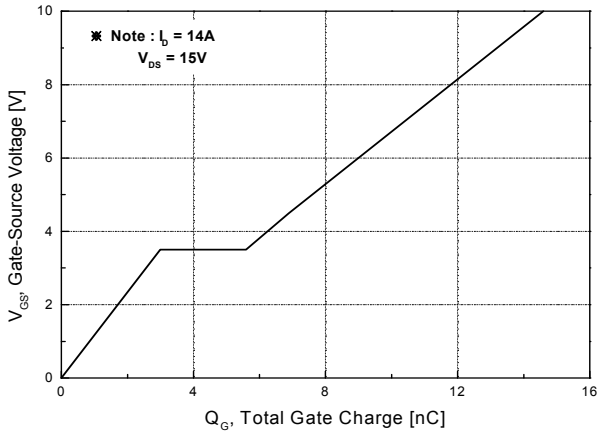


Fig.7 Gate Charge Characteristics

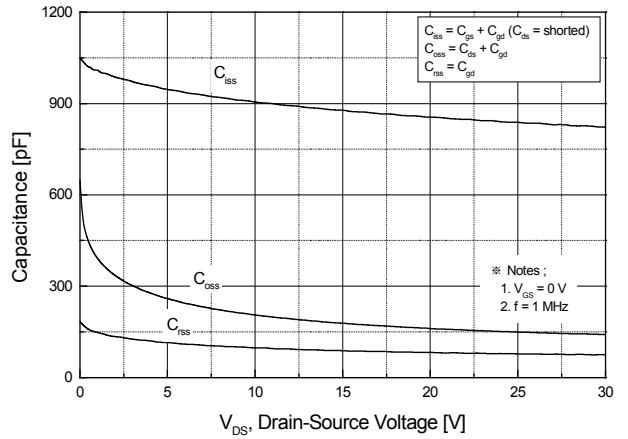


Fig.8 Capacitance Characteristics

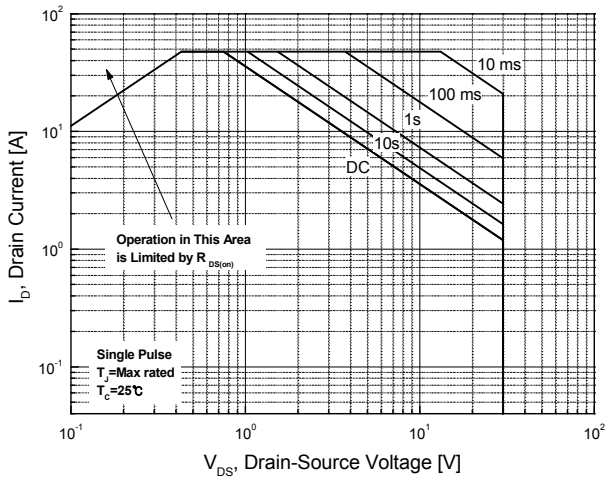


Fig.9 Maximum Safe Operating Area

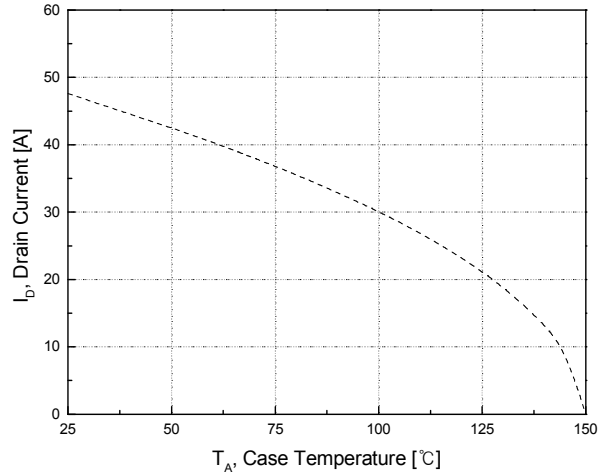


Fig.10 Maximum Drain Current vs. Case Temperature

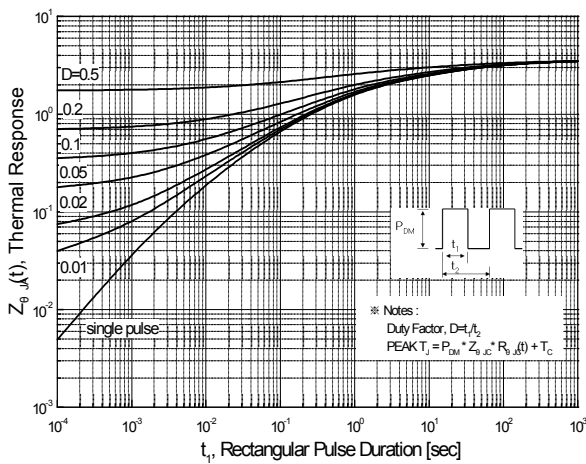
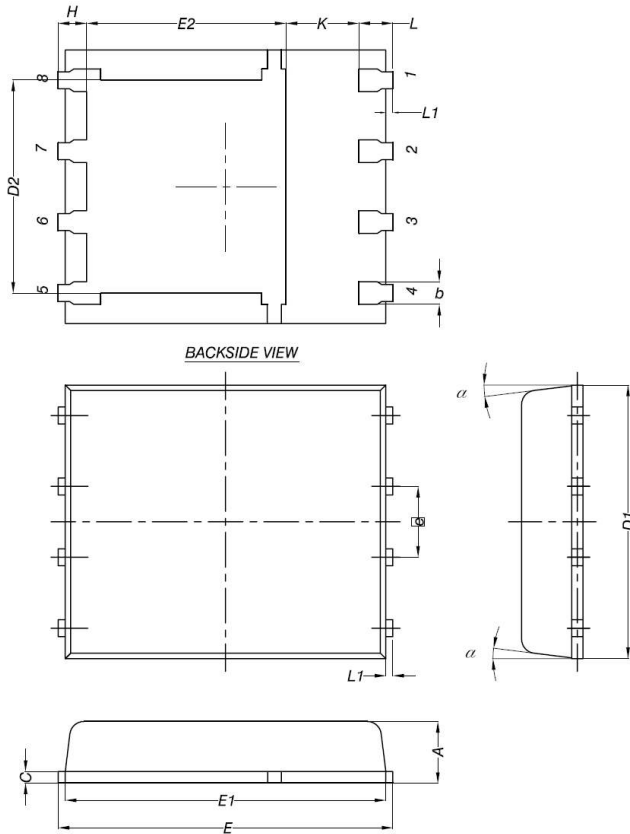


Fig.11 Transient Thermal Response Curve

Package Dimension

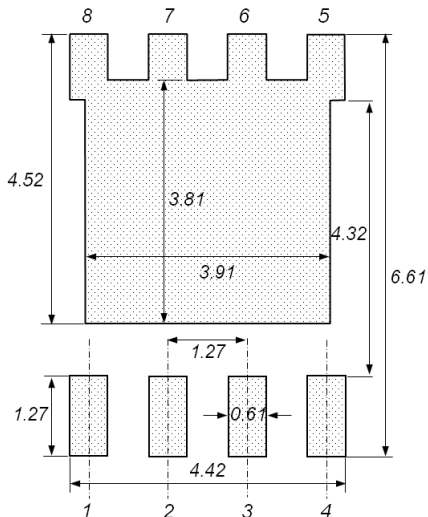
PowerDFN56 (5x6mm)

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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