

General Description

The MDU3601 uses advanced MagnaChip's MOSFET Technology to provide low on-state resistance.

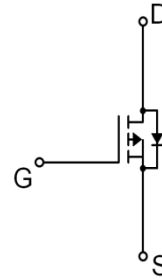
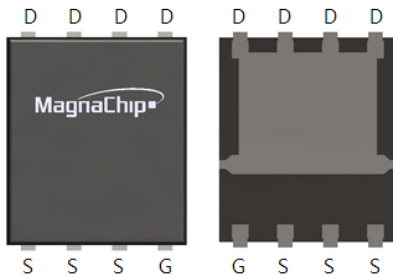
This device is suited for Power Management and load switching applications common in Notebook Computers and Portable Battery Packs.

Features

- $V_{DS} = -30V$
- $I_D = -85A$ @ $V_{GS} = -10V$
- $R_{DS(ON)} < 2.9m\Omega$ @ $V_{GS} = -10V$
 $< 4.3m\Omega$ @ $V_{GS} = -4.5V$
- 100% UIL Tested
- 100% Rg Tested

Applications

- Load Switch
- General purpose applications
- Smart Module for Note PC Battery



Absolute Maximum Ratings ($T_J = 25^\circ C$ unless otherwise noted)

Characteristics		Symbol	Rating	Unit
Drain-Source Voltage		V_{DSS}	-30	V
Gate-Source Voltage		V_{GSS}	± 20	V
Continuous Drain Current ⁽¹⁾	$T_c = 25^\circ C$ (Silicon Limited)	I_D	-128	A
	$T_c = 25^\circ C$ (Package Limited)		-85	
	$T_c = 100^\circ C$		-81	
	$T_A = 25^\circ C$		-30	
	$T_A = 100^\circ C$		-19	
Pulsed Drain Current ⁽²⁾		I_{DM}	-340	A
Power Dissipation	$T_c = 25^\circ C$	P_D	96	W
	$T_c = 100^\circ C$		38	
Single Pulse Avalanche Energy ⁽³⁾		E_{AS}	364	mJ
Junction and Storage Temperature Range		T_J, T_{stg}	-55~150	$^\circ C$

Thermal Characteristics

Characteristics	Symbol	Rating	Unit
Thermal Resistance, Junction-to-Ambient ⁽¹⁾	$R_{\theta JA}$	22.7	$^\circ C/W$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.3	

Ordering Information

Part Number	Temp. Range	Package	Packing	RoHS Status
MDU3601VRH	-55~150°C	DFN56	Tape & Reel	Halogen Free

Electrical Characteristics (T_J = 25°C unless otherwise noted)

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	-1.1	-1.6	-2.1	
Drain Cut-Off Current	I _{DSS}	V _{DS} = -30V, V _{GS} = 0V	-	-	-1	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 = -20A	-	2.4	2.9	mΩ
		V _{GS} = -4.5V, I _D = -20A	-	3.5	4.3	
Forward Transconductance	g _{FS}	V _{DS} = -5V, I _D = -20A	-	75	-	S
Dynamic Characteristics						
Total Gate Charge	Q _{g(10V)}	V _{DS} = -15V, I _D = -20A V _{GS} = -10V	-	158	-	nC
Total Gate Charge	Q _{g(4.5V)}		-	77	-	
Gate-Source Charge	Q _{gs}		-	24	-	
Gate-Drain Charge	Q _{gd}		-	30	-	
Input Capacitance	C _{ISS}	V _{DS} = -15V, V _{GS} = 0V, f = 1.0MHz	-	6,575	-	pF
Reverse Transfer Capacitance	C _{rss}		-	969	-	
Output Capacitance	C _{OSS}		-	1,386	-	
Gate Resistance	R _g	V _{GS} = 0V, V _{DS} = 0V, f = 1.0MHz	-	1.5	-	Ω
Turn-On Delay Time	t _{d(on)}	V _{GS} = -10V, V _{DS} = -20V, R _L = 1.25Ω, R _{GEN} = 3Ω	-	19	-	ns
Turn-On Rise Time	t _r		-	18	-	
Turn-Off Delay Time	t _{d(off)}		-	88	-	
Turn-Off Fall Time	t _f		-	27	-	
Drain-Source Body Diode Characteristics						
Source-Drain Diode Forward Voltage	V _{SD}	I _S = -1A, V _{GS} = 0V	-	-0.7	-1.0	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = -20A, di/dt = 120A/μs	-	60	-	ns
Body Diode Reverse Recovery Charge	Q _{rr}		-	88	-	nC

Note :

1. Surface mounted FR-4 board by JEDEC (jesd51-7)
2. Pulse width limited by T_{Jmax}
3. E_{AS} is tested at starting T_J = 25V °C, L = 1.0mH, I_{AS} = -27A, V_{GS} = -10V

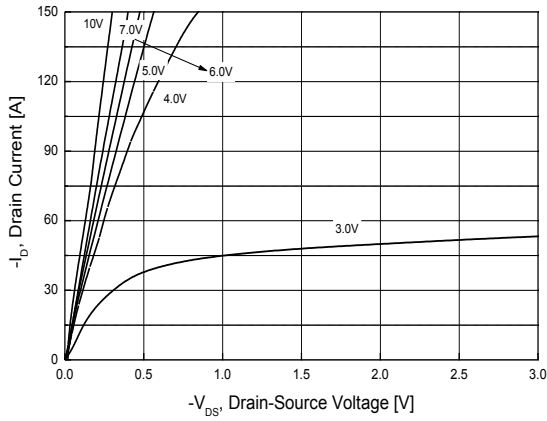


Fig.1 On-Region Characteristics

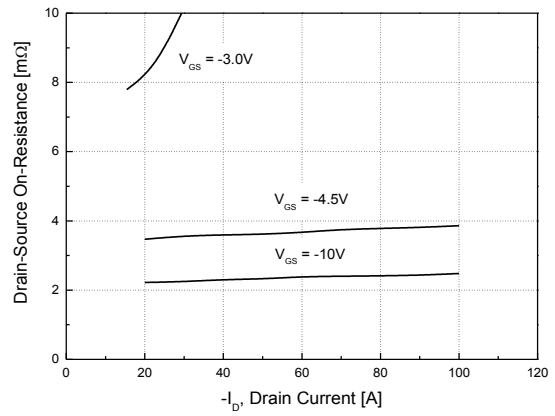


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

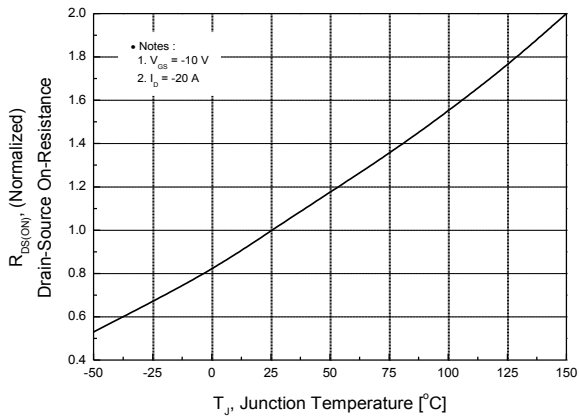


Fig.3 On-Resistance Variation with Temperature

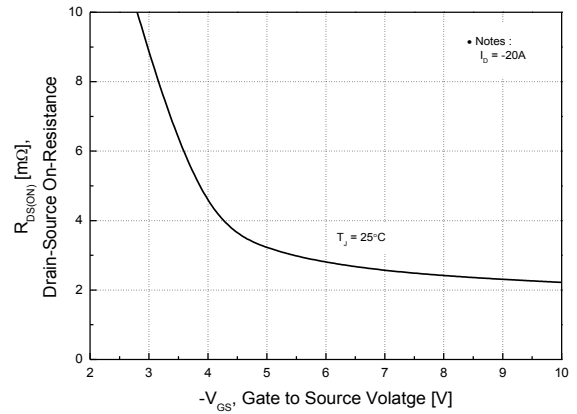


Fig.4 On-Resistance Variation with Gate to Source Voltage

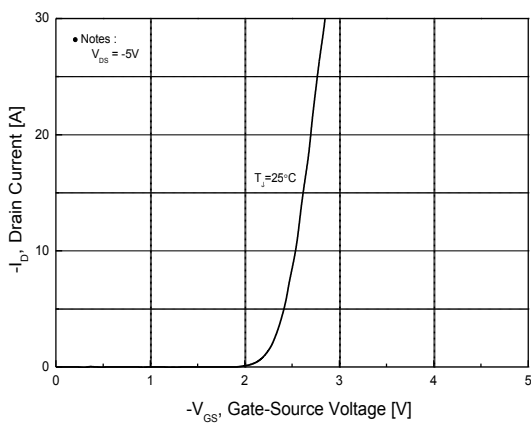


Fig.5 Transfer Characteristics

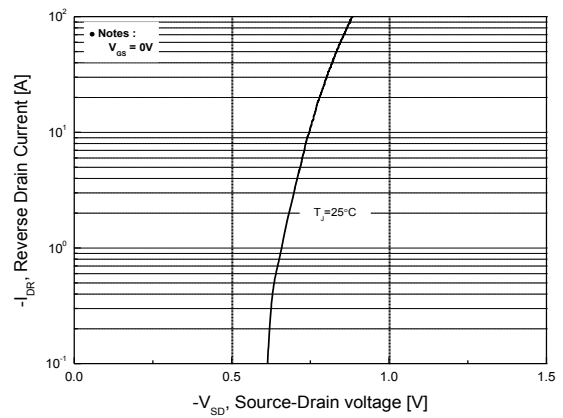


Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature

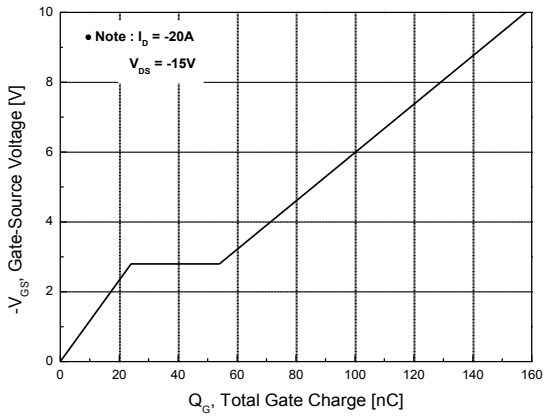


Fig.7 Gate Charge Characteristics

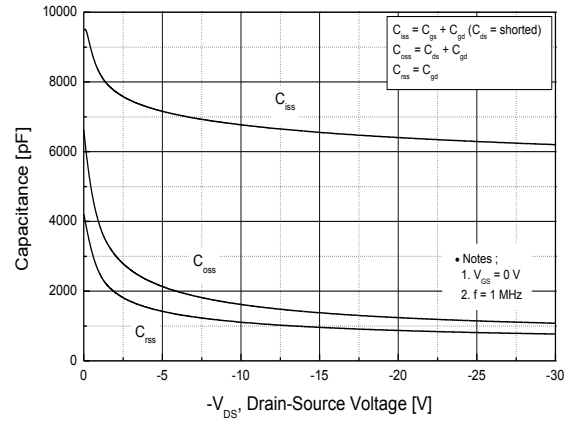


Fig.8 Capacitance Characteristics

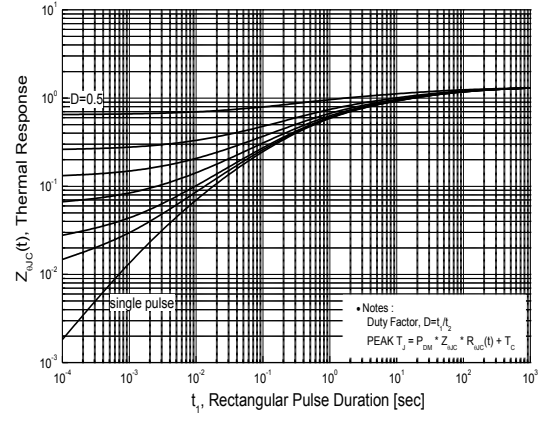


Fig.9 Maximum Safe Operating Area

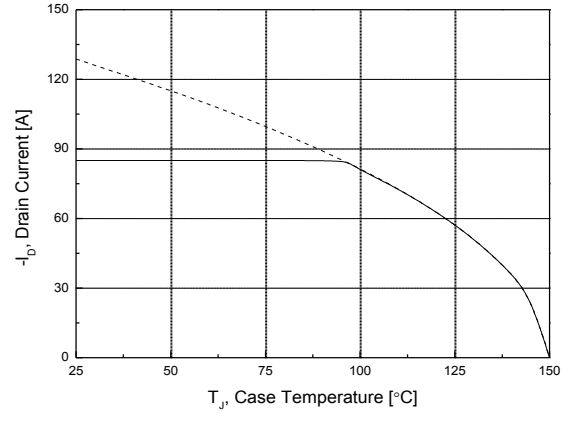


Fig.10 Maximum Drain Current vs. Case Temperature

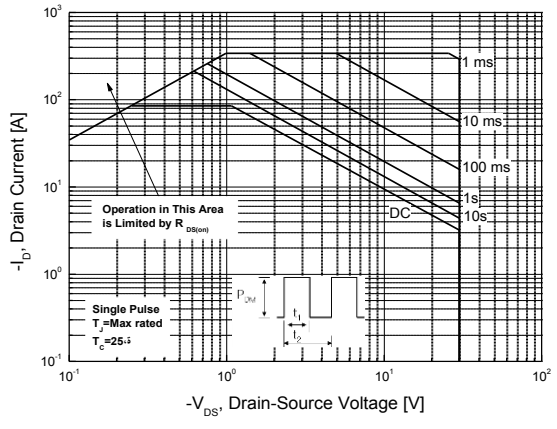


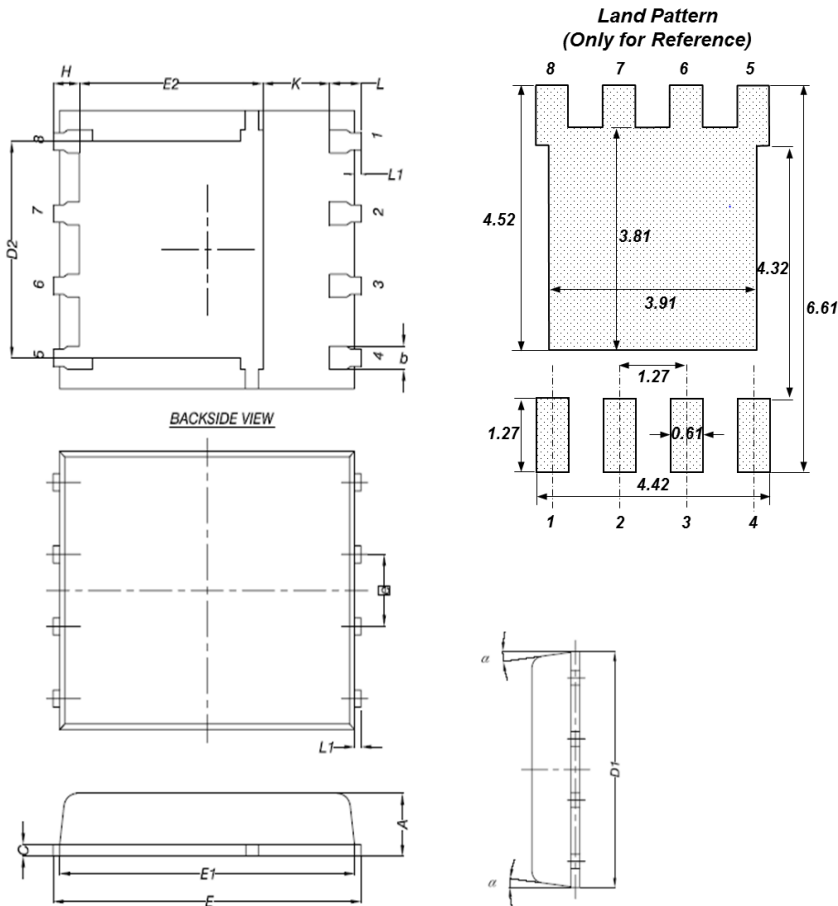
Fig.11 Transient Thermal Response Curve

Package Dimension

PDFN56 (5x6mm²)

Dimensions are in millimeters, unless otherwise specified

Unit [mm]



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	1.27 BSC	
H	0.41	0.71
K	0.20	-
L	0.51	0.71
L1	0.06	0.20
α	0°	12°

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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