

General Description

The MDU3603 uses advanced Magnachip's MOSFET Technology to provide low on-state resistance.

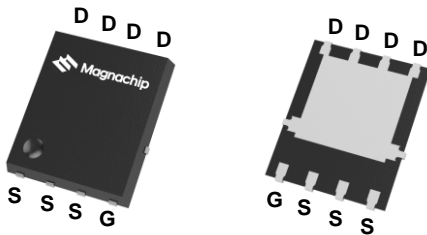
This device is suited for Power Management and load switching applications common in Notebook Computers and Portable Battery Packs.

Features

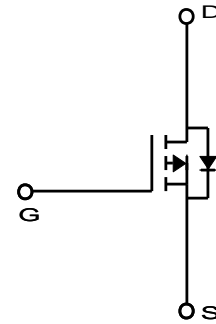
- $V_{DS} = -30V$
- $I_D = -67A$ @ $V_{GS} = -10V$
- $R_{DS(ON)}$
 $< 7.5m\Omega$ @ $V_{GS} = -20V$
 $< 9.1m\Omega$ @ $V_{GS} = -10V$
 $< 13.6m\Omega$ @ $V_{GS} = -5V$

Applications

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



PDFN56



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

Characteristics		Symbol	Rating	Unit
Drain-Source Voltage		V_{DSS}	-30	V
Gate-Source Voltage		V_{GSS}	± 25	V
Continuous Drain Current	$T_C = 25^\circ C$ (Silicon limited)	I_D	-67.0	A
	$T_C = 25^\circ C$ (Package limited)		-43.5	
	$T_C = 70^\circ C$		-53.6	
	$T_A = 25^\circ C$		-13.4	
	$T_A = 70^\circ C$		-10.7	
Pulsed Drain Current		I_{DM}	-120	A
Power Dissipation (Note 1)	$T_C = 25^\circ C$	P_D	62.5	W
	$T_C = 70^\circ C$		40.0	
	$T_A = 25^\circ C$		2.5	
	$T_A = 70^\circ C$		1.6	
Single Pulse Avalanche Energy (Note 2)		E_{AS}	112.5	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 (Note 1)		$R_{\theta JA}$	50	$^\circ C/W$
Thermal Resistance, Junction-to-Case		$R_{\theta JC}$	2	

Ordering Information

Part Number	Temp. Range	Package	Packing	Quantity	RoHS Status
MDU3603RH	-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	-1.0	-1.8	-3.0	
Drain Cut-Off Current	I _{DSS}	V _{DS} = -30V, V _{GS} = 0V	-		-1	μA
Gate Leakage Current	I _{GSS}	V _{GS} = ±25V, V _{DS} = 0V	-	-	±0.1	
Drain-Source ON Resistance	R _{DS(on)}	V _{GS} = -20V, I _D = -12A	-	6.4	7.5	mΩ
		V _{GS} = -10V, I _D = -12A	-	7.5	9.1	
		V _{GS} = -5V, I _D = -10A		10.8	13.6	
Forward Transconductance	g _{FS}	V _{DS} = -5V, I _D = -10A		34	-	S
Dynamic Characteristics						
Total Gate Charge	Q _g	V _{DS} = -15V, I _D = -12A V _{GS} = -10V	-	38.4	-	nC
Gate-Source Charge	Q _{gs}		-	5.9	-	
Gate-Drain Charge	Q _{gd}		-	8.2	-	
Input Capacitance	C _{iss}	V _{DS} = -15V, V _{GS} = 0V, f = 1.0MHz	-	1788	-	pF
Reverse Transfer Capacitance	C _{rss}		-	268	-	
Output Capacitance	C _{oss}		-	445	-	
Turn-On Delay Time	t _{d(on)}	V _{GS} = -10V, V _{DS} = -15V, R _L = 1.25Ω, R _{GEN} = 3Ω	-	15.3	-	ns
Turn-On Rise Time	t _r		-	13.0	-	
Turn-Off Delay Time	t _{d(off)}		-	61.6	-	
Turn-Off Fall Time	t _f		-	53.2	-	
Drain-Source Body Diode Characteristics						
Source-Drain Diode Forward Voltage	V _{SD}	I _S = -1A, V _{GS} = 0V	-	-0.71	-1.0	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = -12A, di/dt = 100A/μs	-	42.3		ns
Body Diode Reverse Recovery Charge	Q _{rr}		-	40.7	-	nC

Note :

1. Surface mounted FR-4 board by JEDEC (jesd51-7)
2. Starting T_J=25°C, L=1mH, I_{AS}= -15A V_{DD}=-20V, V_{GS}=-10V.

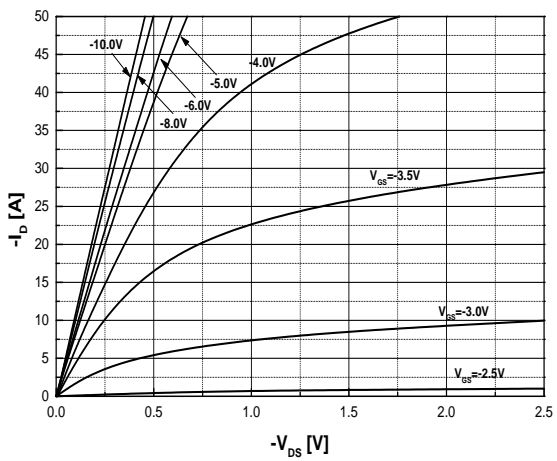


Fig.1 On-Region Characteristics

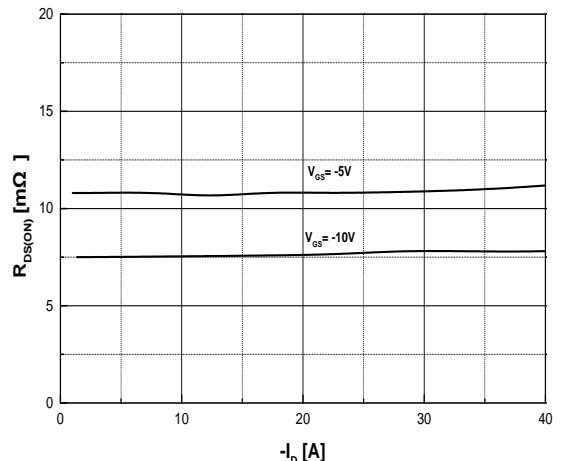


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

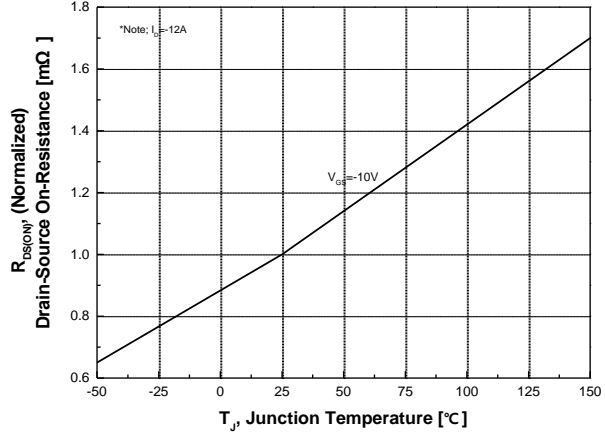


Fig.3 On-Resistance Variation with Temperature

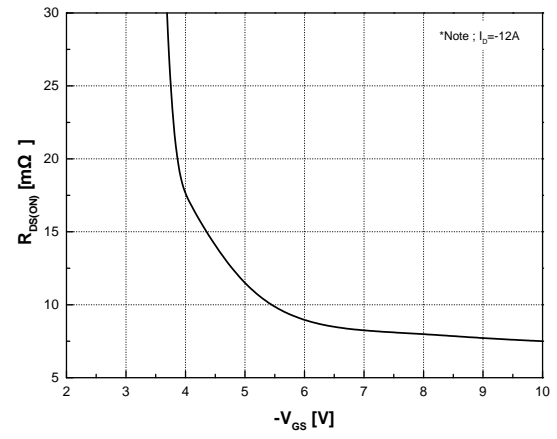


Fig.4 On-Resistance Variation with Gate to Source Voltage

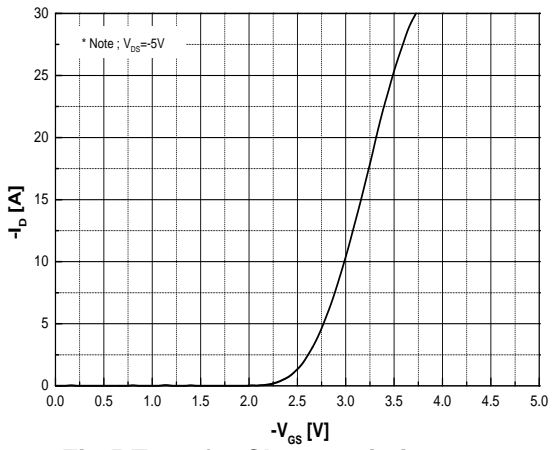


Fig.5 Transfer Characteristics

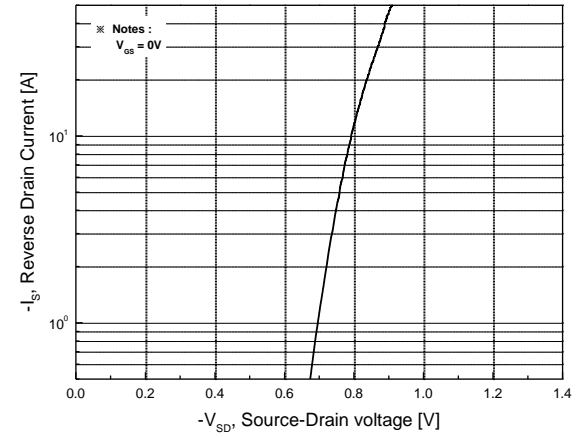


Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature

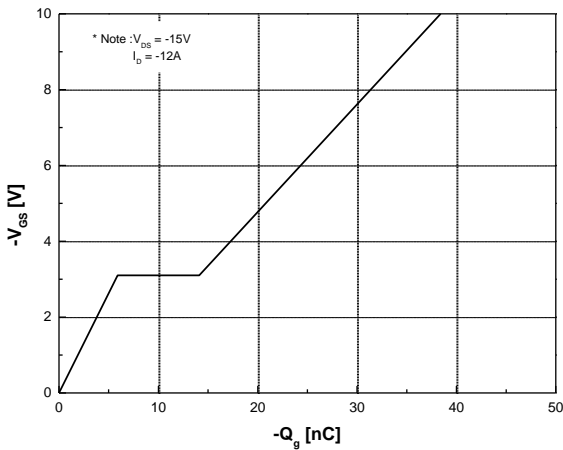


Fig.7 Gate Charge Characteristics

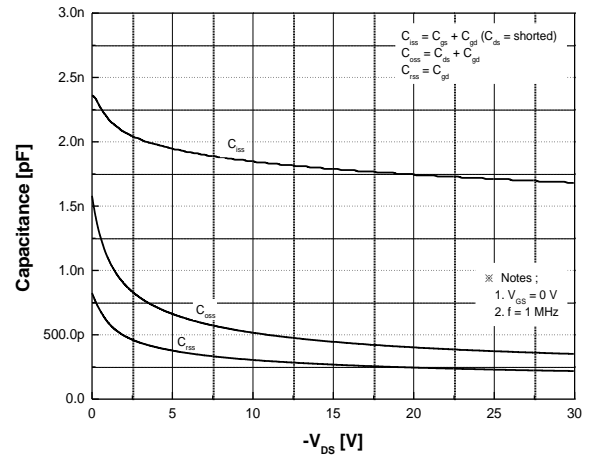


Fig.8 Capacitance Characteristics

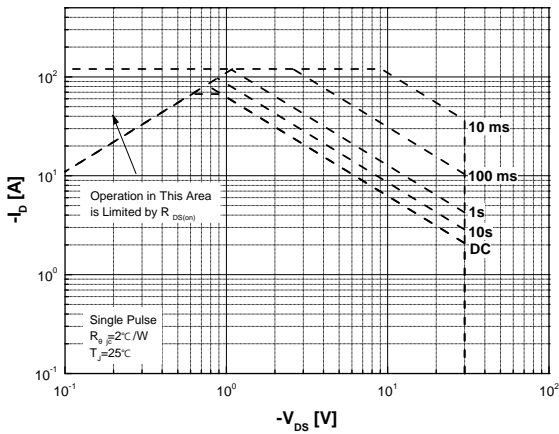


Fig.9 Maximum Safe Operating Area

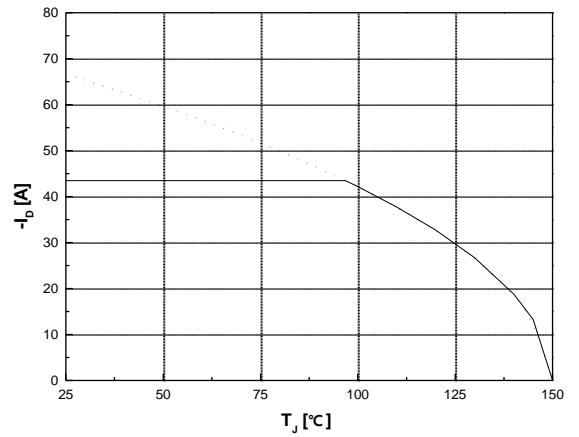


Fig.10 Maximum Drain Current vs. Ambient Temperature

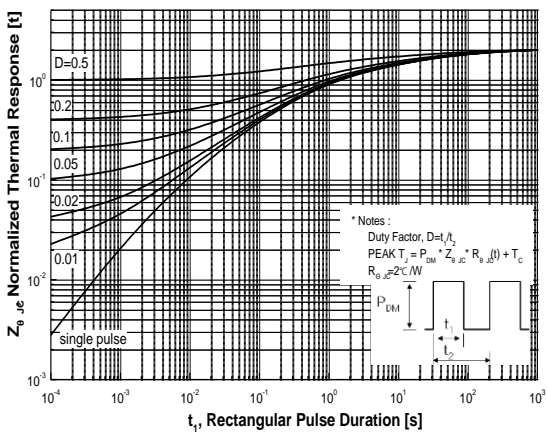
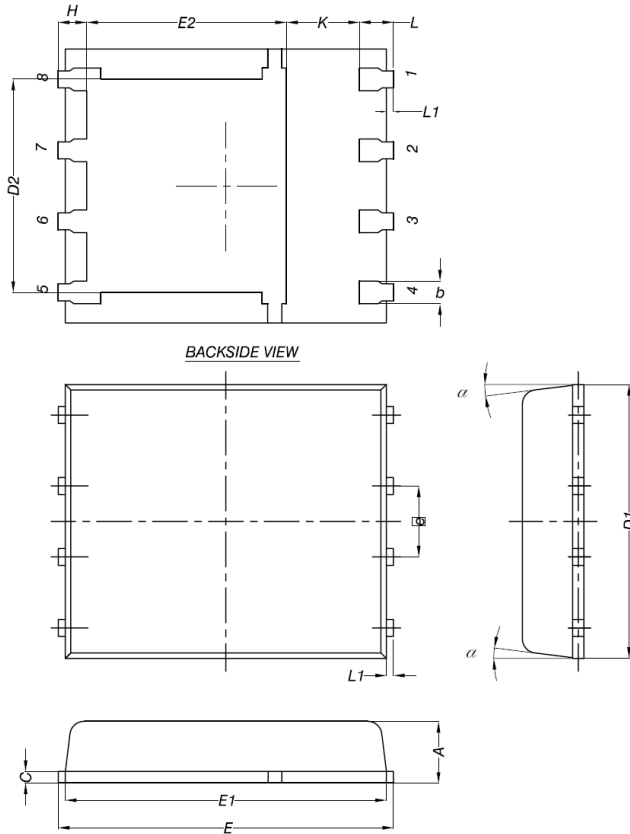


Fig.11 Transient Thermal Response Curve

Package Dimension

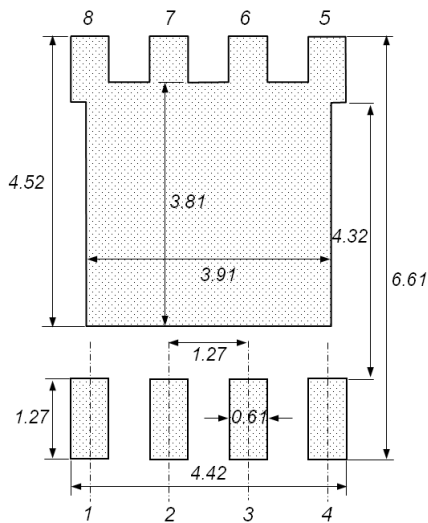
PowerDFN56 (5x6mm)

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



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

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