

General Description

The MDS3653 uses advanced Magnachip's MOSFET Technology to provide low on-state resistance.

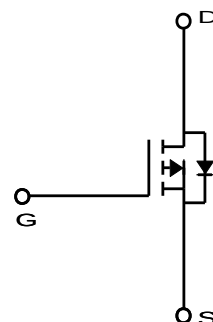
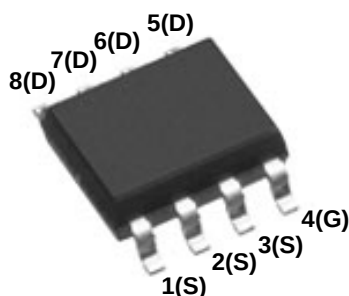
This device is suited for Power Management and load switching applications common in Note PC Battery.

Features

- $V_{DS} = -30V$
- $I_D = -13A$ @ $V_{GS} = -10V$
- $R_{DS(ON)} < 7m\Omega$ @ $V_{GS} = -10V$
 $< 12m\Omega$ @ $V_{GS} = -4V$

Applications

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



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

Characteristics	Symbol	Rating	Unit
Drain-Source Voltage	V_{DSS}	-30	V
Gate-Source Voltage	V_{GSS}	± 20	V
Continuous Drain Current (Note 1)	I_D	-13	A
Pulsed Drain Current	I_{DM}	-52	A
Power Dissipation	P_D	2.5	W
Single Pulse Avalanche Energy (Note 2)	E_{AS}	180	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	$R_{\theta JC}$	25	

Ordering Information

Part Number	Temp. Range	Package	Packing	RoHS Status
MDS3653URH	-55~150°C	SOIC-8	Tape & Reel	Halogen Free

Electrical Characteristics (T_a = 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	-0.8	-1.5	-2.0	
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 = -6.5A	-	5.8	7	mΩ
		V _{GS} = -4V, I _D = -6.5A	-	8.3	12	
Forward Transconductance	g _{FS}	V _{DS} = -10V, I _D = -6.5A		30	-	S
Dynamic Characteristics						
Total Gate Charge	Q _g	V _{DS} = -15V, I _D = -13A V _{GS} = -10V	-	70	-	nC
Gate-Source Charge	Q _{gs}		-	8	-	
Gate-Drain Charge	Q _{gd}		-	15	-	
Input Capacitance	C _{iss}	V _{DS} = -15V, V _{GS} = 0V, f = 1.0MHz	-	3000	-	pF
Reverse Transfer Capacitance	C _{rss}		-	454	-	
Output Capacitance	C _{oss}		-	740	-	
Turn-On Delay Time	t _{d(on)}	V _{GS} = -10V ,V _{DS} = -15V, R _L = 2.3Ω, R _{GEN} = 4.7Ω	-	12	-	ns
Turn-On Rise Time	t _r		-	15	-	
Turn-Off Delay Time	t _{d(off)}		-	100	-	
Turn-Off Fall Time	t _f		-	60	-	
Drain-Source Body Diode Characteristics						
Source-Drain Diode Forward Voltage	V _{SD}	I _S = -13A, V _{GS} = 0V	-	-0.82	-1.2	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = -13A, di/dt = 100A/μs	-	39.2		ns
Body Diode Reverse Recovery Charge	Q _{rr}		-	52.5	-	nC

Note :

1. Surface mounted RF4 board with 2oz. Copper.
2. Starting T_J=25°C, L=1mH, I_{AS}= -19A V_{DD}=-20V, V_{GS}=-10V.

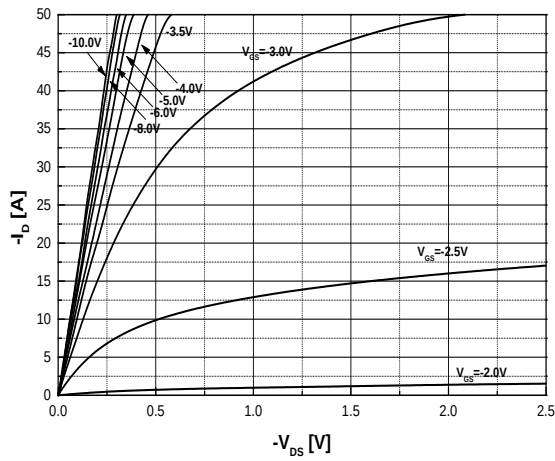


Fig.1 On-Region Characteristics

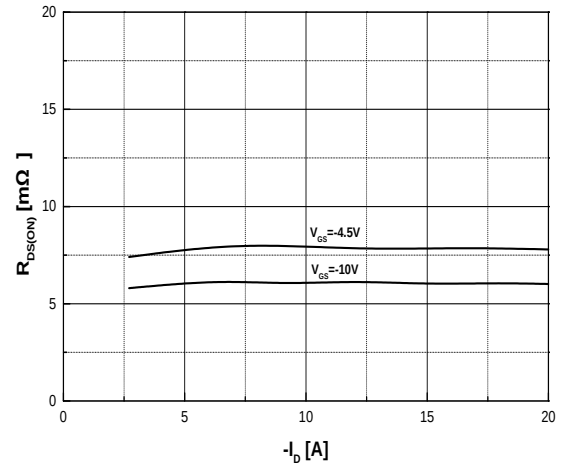


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

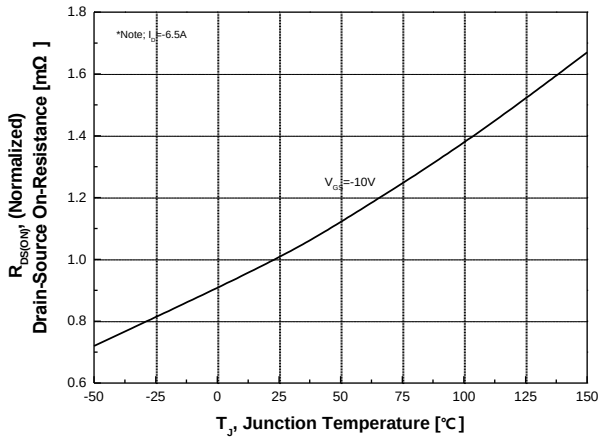


Fig.3 On-Resistance Variation with Temperature

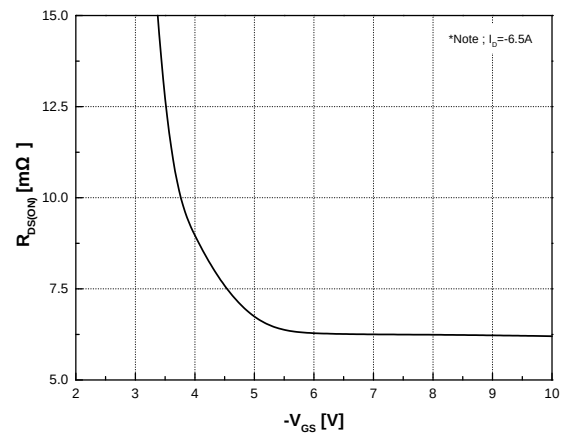


Fig.4 On-Resistance Variation with Gate to Source Voltage

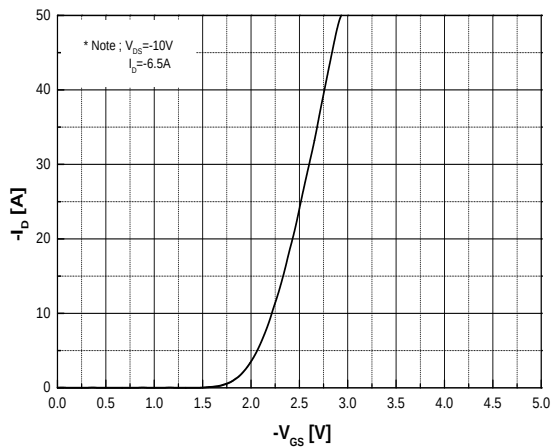


Fig.5 Transfer Characteristics

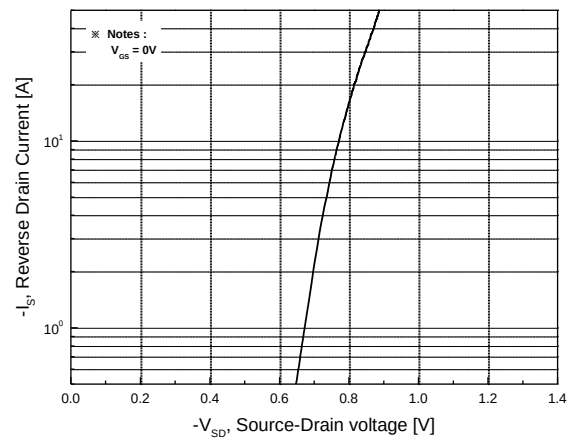


Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature

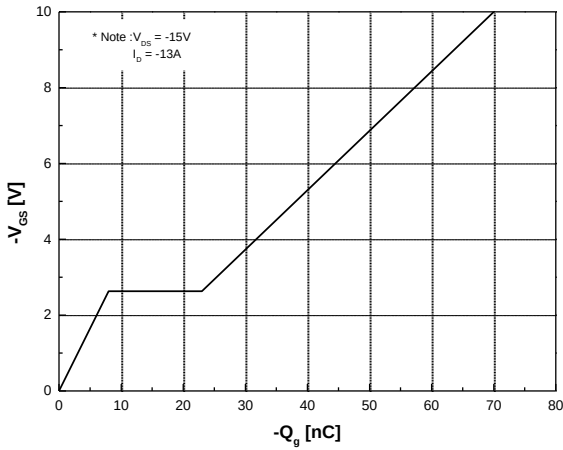


Fig.7 Gate Charge Characteristics

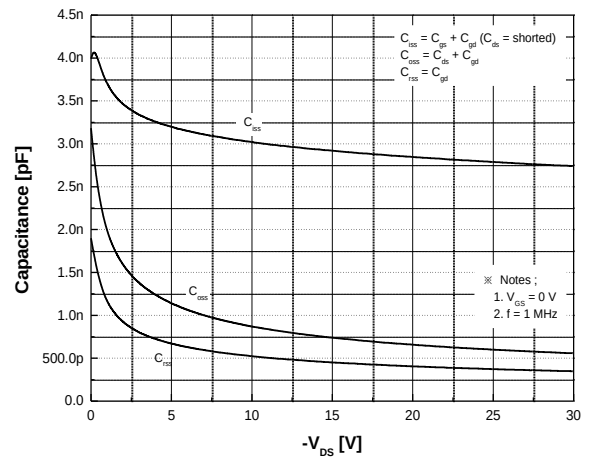


Fig.8 Capacitance Characteristics

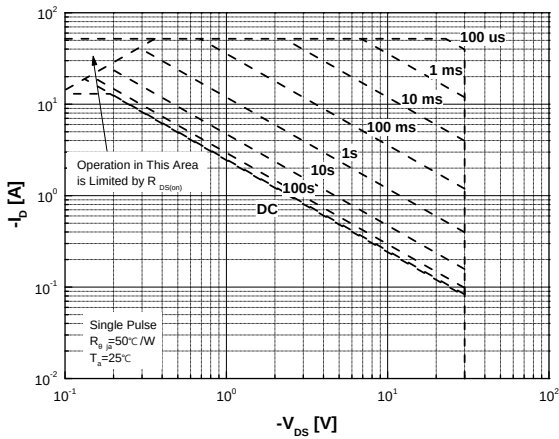


Fig.9 Maximum Safe Operating Area

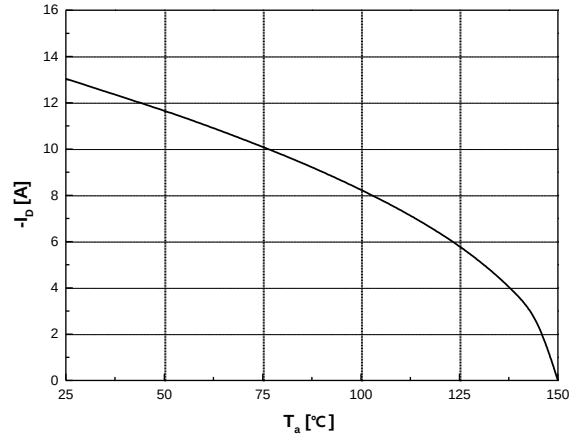


Fig.10 Maximum Drain Current vs. Ambient Temperature

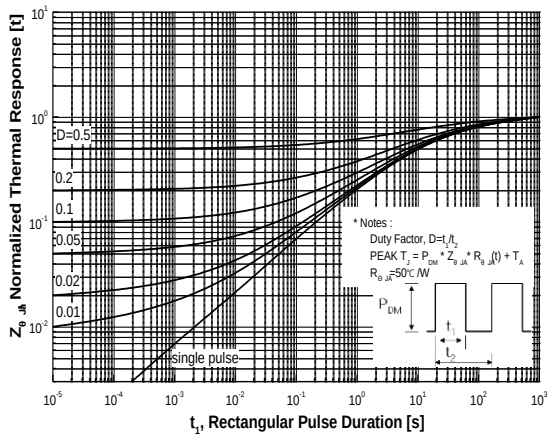
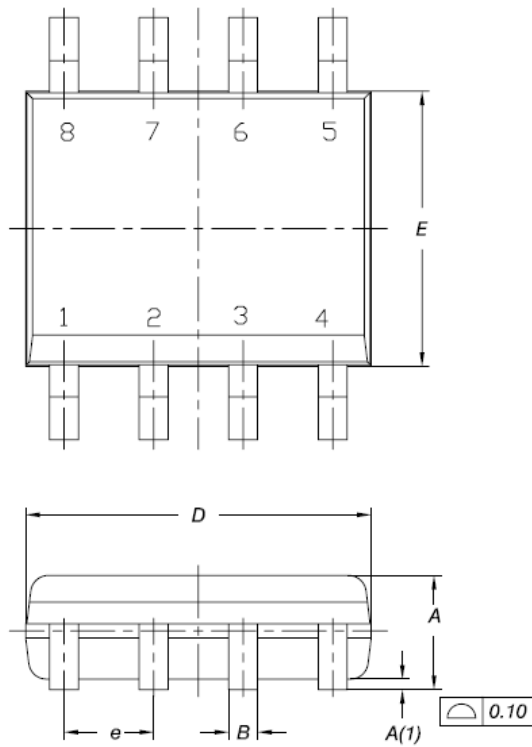


Fig.11 Transient Thermal Response Curve

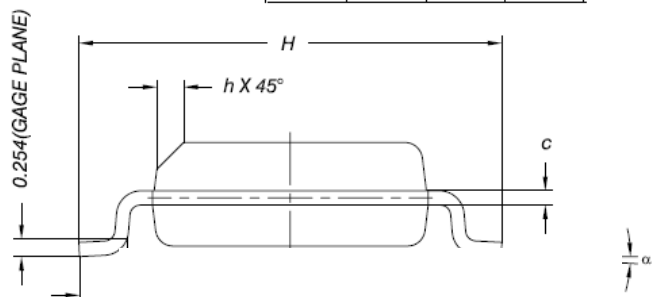
Physical Dimensions

8 Leads, SOIC

Dimensions are in millimeters unless otherwise specified



DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.
A	1.35	1.55	1.75
A(1)	0.10	0.175	0.25
B	0.38	0.445	0.51
C	0.19	0.22	0.25
D	4.80	4.90	5.00
E	3.80	3.90	4.00
e	1.27 BSC		
H	5.80	6.00	6.20
L	0.50	0.715	0.93
α	0°	4°	8°
h	0.25	0.375	0.50



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

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