MDV3605

Single P-Channel Trench MOSFET, -30V, -20A, 18.0mΩ

General Description

The MDV3605 uses advanced MagnaChip's MOSFET Technology to provide low on-state resistance.

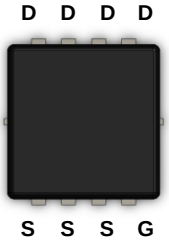
This device is suited for Power Management and load switching applications common in Notebook Computers and Portable Battery Packs.

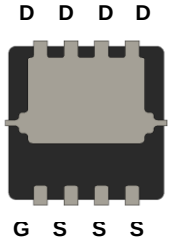
Features

- V_{DS} = -30V
- I_D = -20A @V_{GS} = -10V
- $R_{DS(ON)}$
  < 18.0mΩ @V_{GS} = -10V
  < 33.0mΩ @V_{GS} = -4.5V

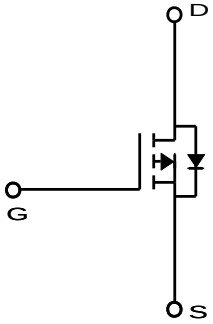
Applications

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





PDFN33



Absolute Maximum Ratings (T_a =25°C unless otherwise noted)

Characteristics		Symbol	Rating	Unit
Drain-Source Voltage		V_{DSS}	-30	V
Gate-Source Voltage		V_{GSS}	±25	V
Continuous Drain Current [1]	T_C=25 °C (Package limited)	I_D	-20.0	A
	T_C=25 °C (Silicon limited)		-29.0	
	T_C=70 °C (Silicon limited)		-24.0	
	T_A=25°C		-10.8[3]	
	T_A=70°C		-8.8	
Pulsed Drain Current		I_{DM}	-80.0	A
Power Dissipation	T_C=25°C	P_D	25.0	W
	T_C=70°C		16	
	T_A=25°C		3.4[3]	
	T_A=70°C		2.2	
Single Pulse Avalanche Energy [2]		E_{AS}	60.5	mJ
Junction and Storage Temperature Range		T_J, T_{stg}	-55~150	°C

Thermal Characteristics

Characteristics		Symbol	Rating	Unit
Thermal Resistance, Junction-to-Ambient	(Note 1)	$R_{\theta JA}$	36	°C/W
Thermal Resistance, Junction-to-Case		$R_{\theta JC}$	5.0	

Ordering Information

Part Number	Temp. Range	Package	Packing	RoHS Status
MDV3605URH	-55~150°C	PDFN33	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	-1.0	-2.0	-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} = -10V, I_D = -8A	-	14.0	18.0	mΩ
		V_{GS} = -5.0V, I_D = -8A		21.0	28.0	
		V_{GS} = -4.5V, I_D = -8A		25.0	33.0	
Forward Transconductance	g_{FS}	V_{DS} = -5V, I_D = -10A		21.5	-	S
Dynamic Characteristics						
Total Gate Charge	Q_g	V_{DS} = -15V, I_D = -8A V_{GS} = -10V	-	22.0	-	nC
Gate-Source Charge	Q_{gs}		-	3.3	-	
Gate-Drain Charge	Q_{gd}		-	4.3	-	
Input Capacitance	C_{iss}	V_{DS} = -15V, V_{GS} = 0V, f = 1.0MHz	-	1035	-	pF
Reverse Transfer Capacitance	C_{rss}		-	150	-	
Output Capacitance	C_{oss}		-	260	-	
Gate Resistance	R_g	f = 1.0MHz	-	6.4	-	Ω
Turn-On Delay Time	$t_{d(on)}$	V_{GS} = -10V ,V_{DS} = -15V, I_D = -8A, R_{GEN} = 3Ω	-	12.0	-	ns
Turn-On Rise Time	t_r		-	12.4	-	
Turn-Off Delay Time	$t_{d(off)}$		-	52.1	-	
Turn-Off Fall Time	t_f		-	8.9	-	
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 = -8A, di/dt = 100A/μs	-	30.8		ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	26.4	-	nC

Note :

1. Surface mounted RF4 board with 2oz. Copper.
2. Starting T_J=25°C, L=1.0mH, I_{AS}= -11.0A V_{DD}=-20.0V, V_{GS}=-10.0V. Tested at I_{AS}=-8.5A.
3. T < 10sec

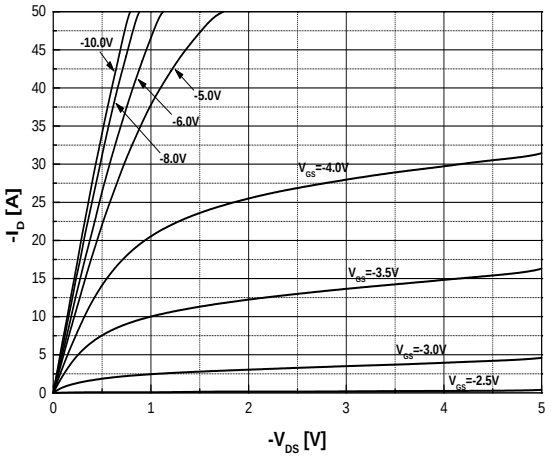


Fig.1 On-Region Characteristics

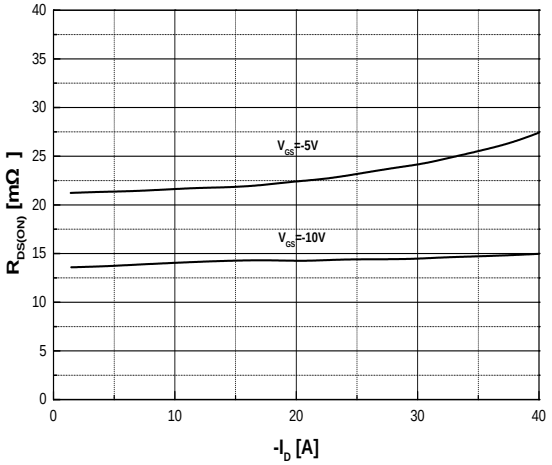


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

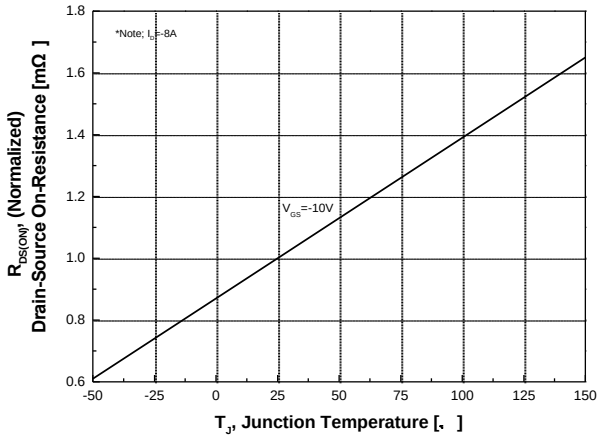


Fig.3 On-Resistance Variation with Temperature

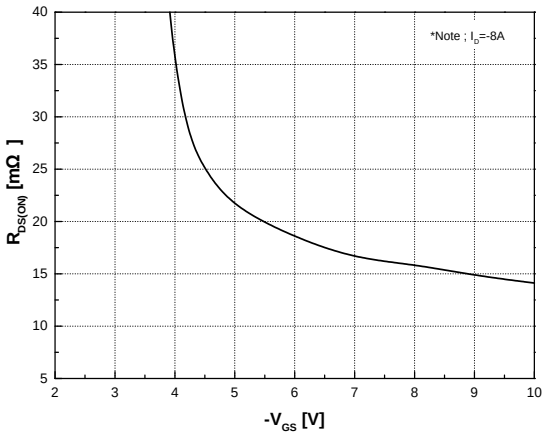


Fig.4 On-Resistance Variation with Gate to Source Voltage

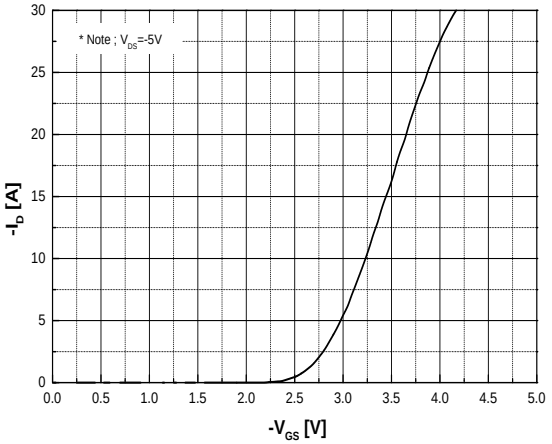


Fig.5 Transfer Characteristics

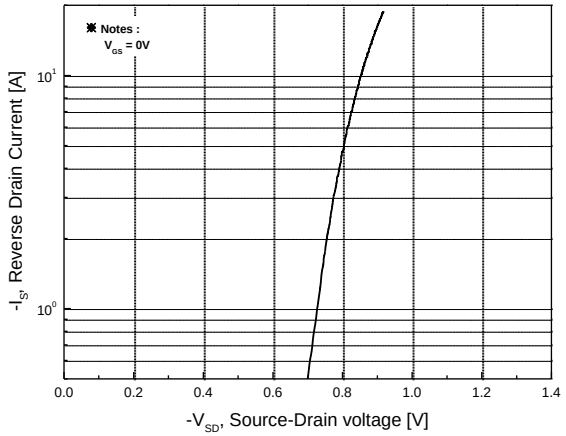


Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature

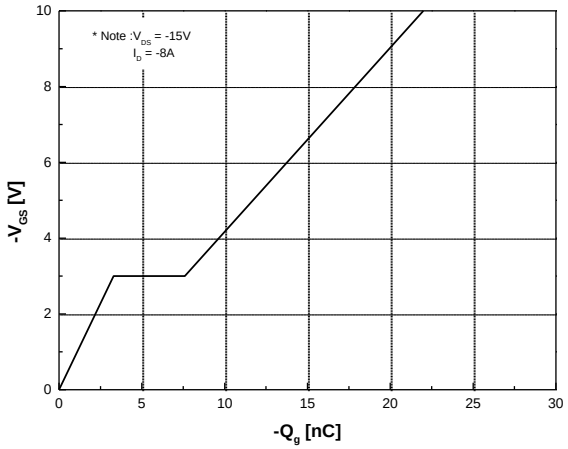


Fig.7 Gate Charge Characteristics

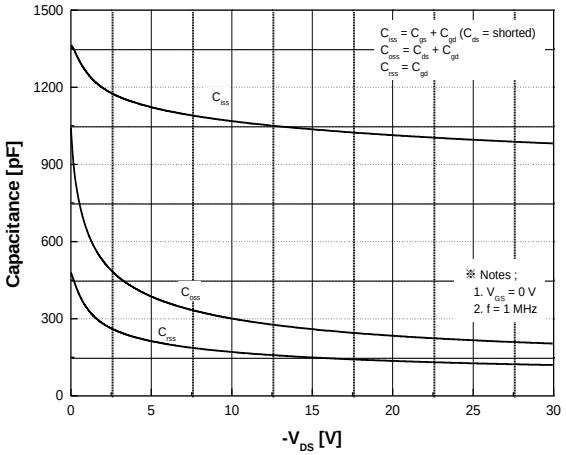


Fig.8 Capacitance Characteristics

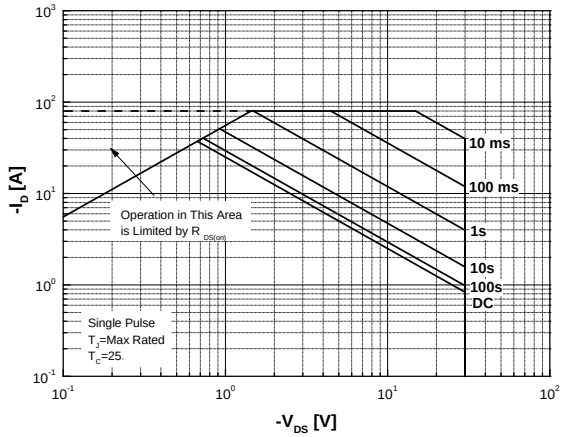


Fig.9 Maximum Safe Operating Area

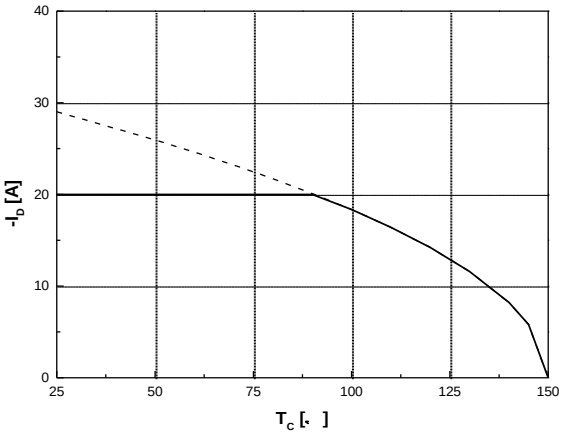


Fig.10 Maximum Drain Current vs. Ambient Temperature

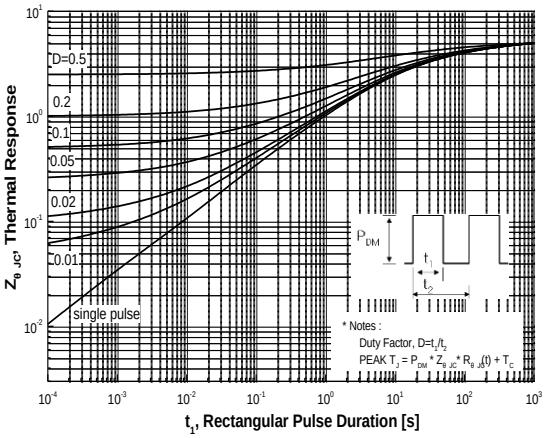
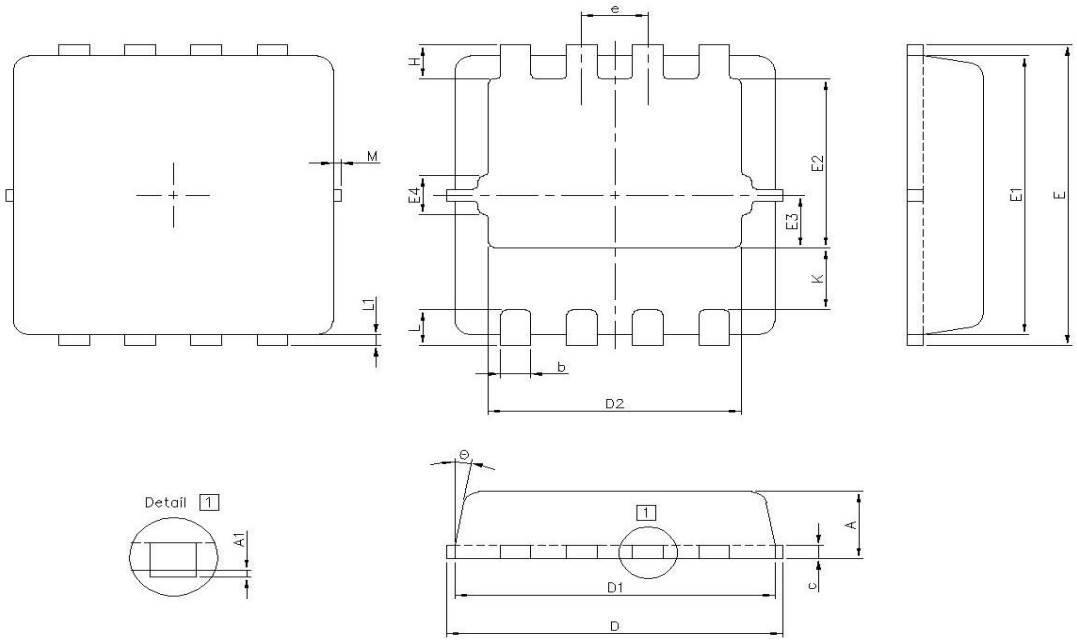


Fig.11 Transient Thermal Response Curve

Package Dimension

PowerDFN33 (3.3x3.3mm)

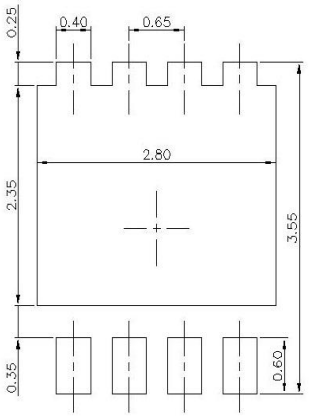
Dimensions are in millimeters, unless otherwise specified



(Unit: mm)

DIM	Min	Max	DIM	Min	Max
A	0.70	0.80	E2	1.78	1.98
A1	0.00	0.05	E3	0.49	0.69
b	0.25	0.35	E4	0.35 TYP.	
c	0.10	0.25	e	0.65 BSC	
D	3.20	3.40	K	0.70 TYP.	
D1	3.00	3.20	L	0.30	0.50
D2	2.39	2.59	L1	0.13 TYP.	
E	3.25	3.45	H	0.27	0.47
E1	3.00	3.20	Θ	0	12

Land Pattern
(Only for Reference)



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