

General Description

The MDD5N50G uses advanced Magnachip's MOSFET Technology, which provides low on-state resistance, high switching performance and excellent quality.

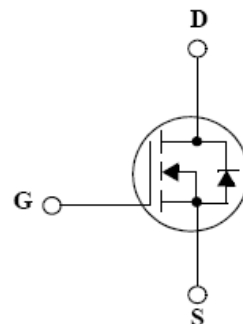
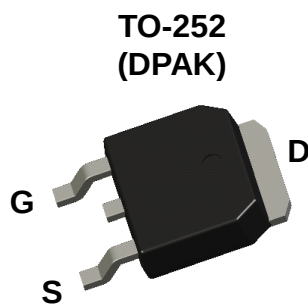
MDD5N50G is suitable device for SMPS, HID and general purpose applications.

Features

- $V_{DS} = 500V$
- $V_{DS} = 550V$ @ T_{jmax}
- $I_D = 4.4A$ @ $V_{GS} = 10V$
- $R_{DS(ON)} \leq 1.4\Omega$ @ $V_{GS} = 10V$

Applications

- Power Supply
- PFC
- Ballast



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

Characteristics		Symbol	Rating	Unit
Drain-Source Voltage		V_{DSS}	500	V
Drain-Source Voltage @ T_{jmax}		$V_{DSS} @ T_{jmax}$	550	V
Gate-Source Voltage		V_{GSS}	± 30	V
Continuous Drain Current	$T_C = 25^\circ C$	I_D	4.4	A
	$T_C = 100^\circ C$		2.8	A
Pulsed Drain Current ⁽¹⁾		I_{DM}	17.6	A
Power Dissipation	$T_C = 25^\circ C$	P_D	70	W
	Derate above $25^\circ C$		0.56	W/°C
Peak Diode Recovery dv/dt ⁽³⁾		Dv/dt	4.5	V/ns
Single Pulse Avalanche Energy ⁽⁴⁾		E_{AS}	230	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⁾	$R_{\theta JA}$	110	°C/W
Thermal Resistance, Junction-to-Case ⁽¹⁾	$R_{\theta JC}$	1.8	

Ordering Information

Part Number	Temp. Range	Package	Packing	RoHS Status
MDD5N50G	-55~150°C	DPAK	Reel	Halogen Free

Electrical Characteristics (Ta =25°C)

Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	I _D = 250μA, V _{GS} = 0V	500	-	-	V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	3.0	-	5.0	
Drain Cut-Off Current	I _{DSS}	V _{DS} = 500V, V _{GS} = 0V	-	-	1	μA
Gate Leakage Current	I _{GSS}	V _{GS} = ±30V, V _{DS} = 0V	-	-	100	nA
Drain-Source ON Resistance	R _{DS(ON)}	V _{GS} = 10V, I _D = 2.2A		1.15	1.4	Ω
Forward Transconductance	g _{fs}	V _{DS} = 30V, I _D = 2.2A	-	5	-	S
Dynamic Characteristics						
Total Gate Charge	Q _g	V _{DS} = 400V, I _D = 5.0A, V _{GS} = 10V ⁽³⁾	-	12.2	16	nC
Gate-Source Charge	Q _{gs}		-	3.6	5	
Gate-Drain Charge	Q _{gd}		-	4.7	6.5	
Input Capacitance	C _{iss}	V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz	-	500	650	pF
Reverse Transfer Capacitance	C _{rss}		-	3	4.0	
Output Capacitance	C _{oss}		-	65	85	
Turn-On Delay Time	t _{d(on)}	V _{GS} = 10V, V _{DS} = 250V, I _D = 5.0A, R _G = 25Ω ⁽³⁾	-	16	21	ns
Rise Time	t _r		-	27	35	
Turn-Off Delay Time	t _{d(off)}		-	30	39	
Fall Time	t _f		-	25	33	
Drain-Source Body Diode Characteristics						
Maximum Continuous Drain to Source Diode Forward Current	I _S		-	4.4	-	A
Source-Drain Diode Forward Voltage	V _{SD}	I _S = 4.4A, V _{GS} = 0V	-		1.4	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = 5.0A, dI/dt = 100A/μs ⁽³⁾	-	270		ns
Body Diode Reverse Recovery Charge	Q _{rr}		-	1.8		μC

Note :

1. Pulse width is based on $R_{\theta JC}$ & $R_{\theta JA}$ and the maximum allowed junction temperature of 150°C.
2. Pulse test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$, pulse width limited by junction temperature $T_J(MAX)=150^\circ C$.
3. $I_{SD} \leq 5.0A$, $di/dt \leq 200A/\mu s$, $V_{DD}=50V$, $R_G=25\Omega$, Starting $T_J=25^\circ C$
4. $L=16.5mH$, $I_{AS}=5.0A$, $V_{DD}=50V$, $R_G=25\Omega$, Starting $T_J=25^\circ C$

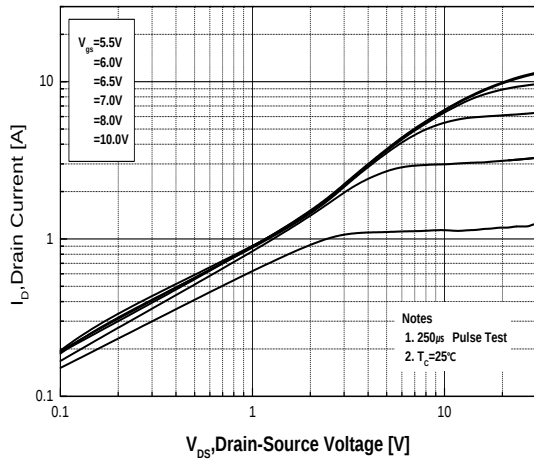


Fig.1 On-Region Characteristics

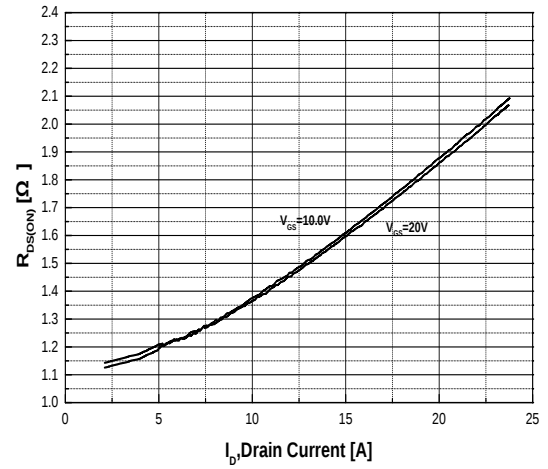


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

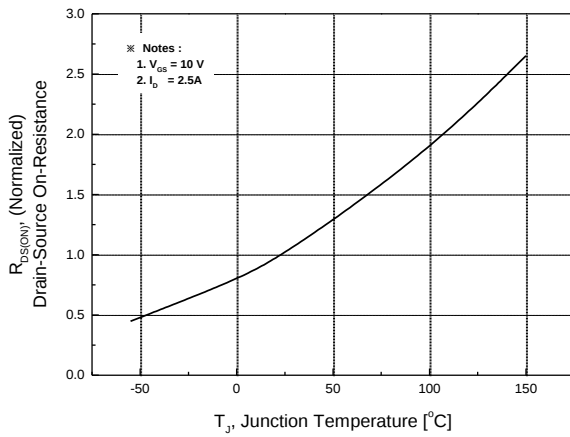


Fig.3 On-Resistance Variation with Temperature

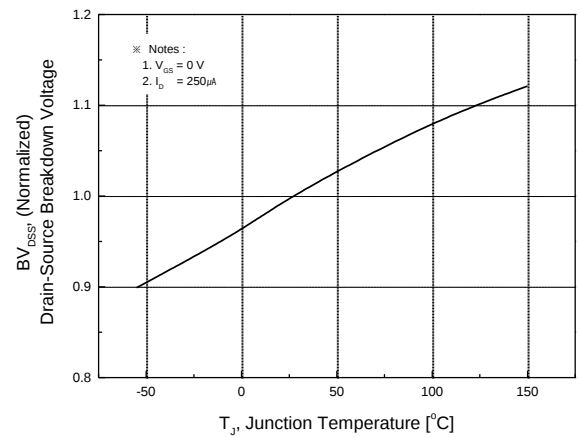


Fig.4 Breakdown Voltage Variation vs. Temperature

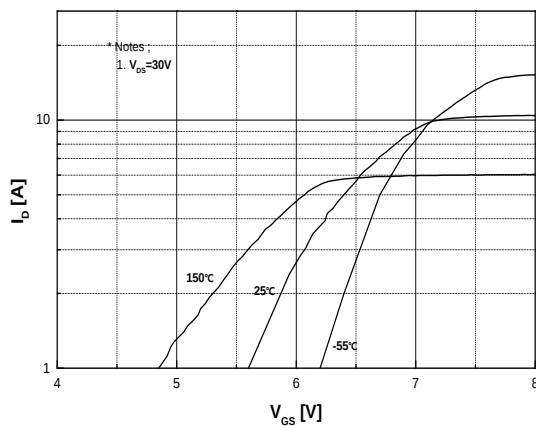


Fig.5 Transfer Characteristics

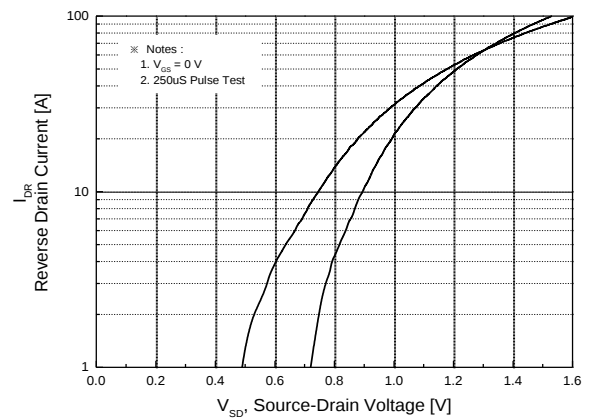
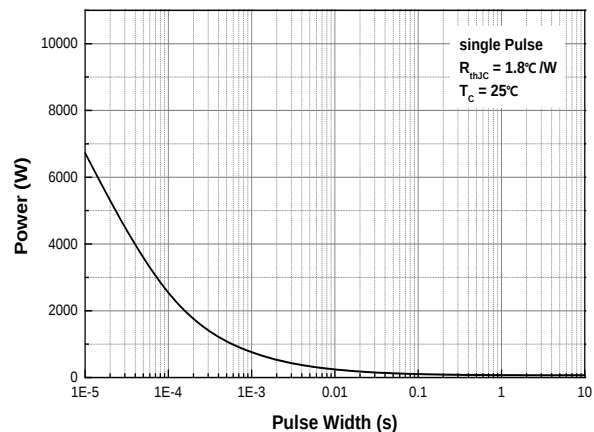
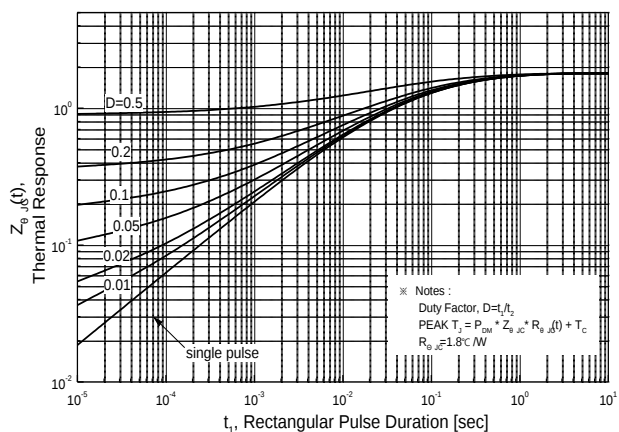
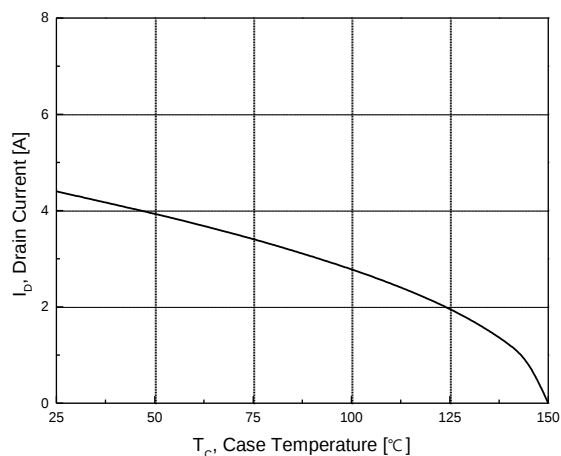
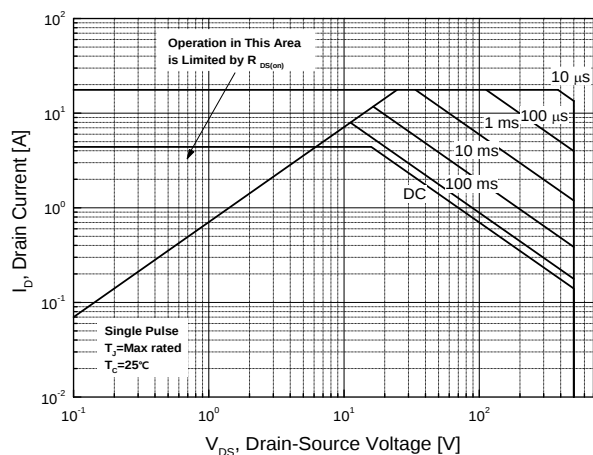
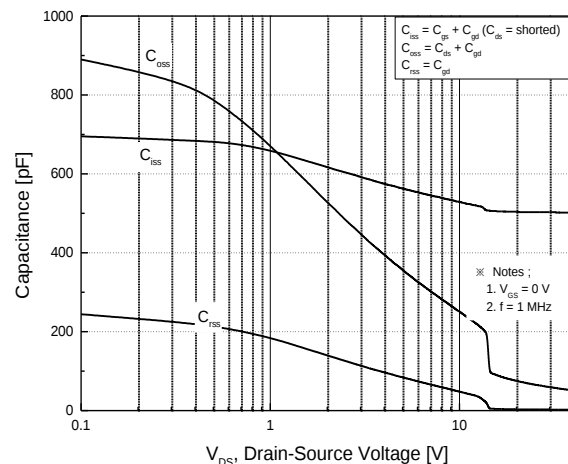
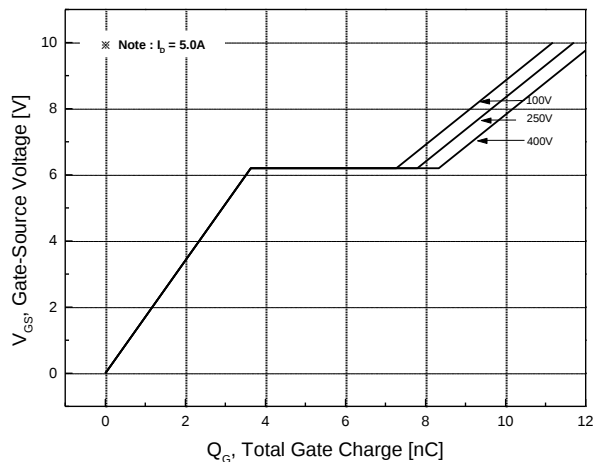


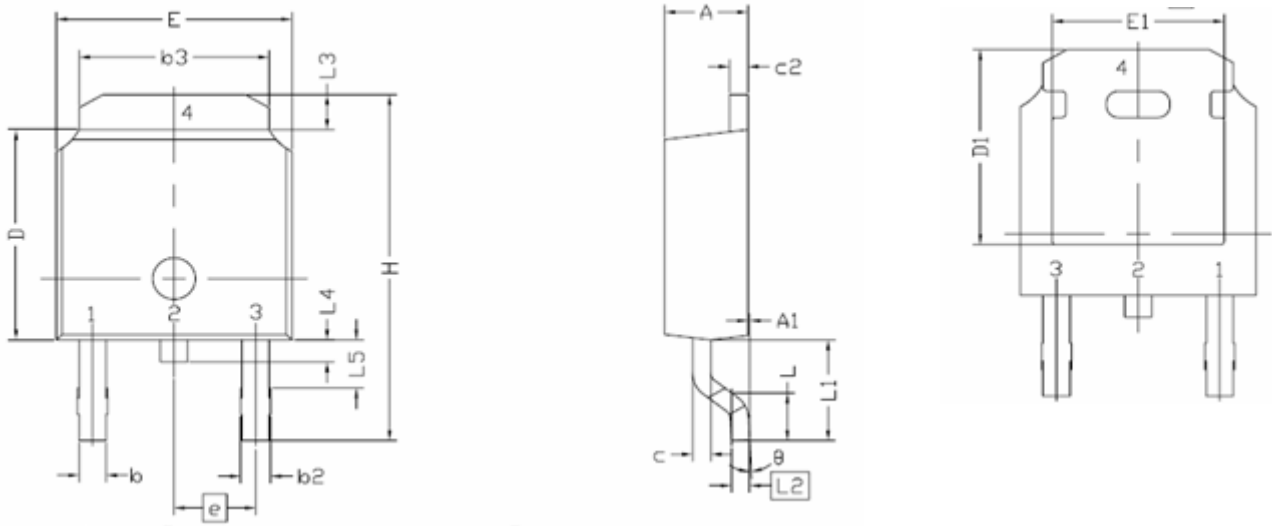
Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature



Physical Dimension

D- pak , 3L

Dimensions are in millimeters, unless otherwise specified



Symbol	Min.	Nom.	Max.
E	6,35	-	6,73
L	1,40	1,52	1,78
L1	2,74 REF		
L2	0,508 BCS		
L3	0,89	-	1,27
L4	-	-	1,02
L5	1,14	-	1,52
D	5,97	6,10	6,22
H	9,40	-	10,41
b	0,64	-	0,89
b2	0,76	-	1,14
b3	4,95	-	5,46
e	2,286 BSC		
A	2,18	-	2,39
A1	-	-	0,13
c	0,46	-	0,61
c2	0,46	-	0,89
D1	5,21	-	-
E1	4,32	-	-
⌀	0,00	-	10,00

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

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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