

General Description

The MDD3N50G uses advanced Magnachip's MOSFET Technology, which provides low on-state resistance, high switching performance and excellent quality.

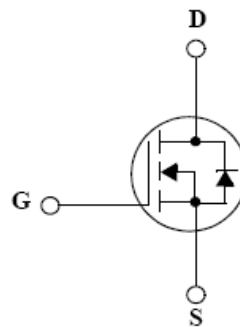
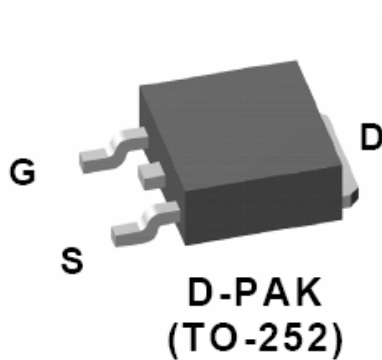
MDD3N50G is suitable device for SMPS, HID and general purpose applications.

Features

- $V_{DS} = 500V$
 - $I_D = 2.8A$
 - $R_{DS(ON)} \leq 2.5\Omega$
- @ $V_{GS} = 10V$
@ $V_{GS} = 10V$

Applications

- Power Supply
- PFC
- Ballast



Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Drain-Source Voltage		V_{DSS}	500	V
Gate-Source Voltage		V_{GSS}	±30	V
Continuous Drain Current	$T_C=25^\circ C$	I_D	2.8	A
	$T_C=100^\circ C$		1.7	A
Pulsed Drain Current ⁽¹⁾		I_{DM}	11.2	A
Power Dissipation	$T_C=25^\circ C$	P_D	45	W
	Derate above 25 °C		0.36	W/°C
Peak Diode Recovery dv/dt ⁽³⁾		dv/dt	4.5	V/ns
Repetitive Pulse Avalanche Energy ⁽⁴⁾		E_{AR}	4.5	mJ
Single Pulse Avalanche Energy ⁽⁴⁾		E_{AS}	170	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⁾	$R_{\theta JC}$	2.75	

Ordering Information

Part Number	Temp. Range	Package	Packing	RoHS Status
MDD3N50GRH	-55~150°C	D-Pak	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 = 1.4A		2.1	2.5	Ω
Forward Transconductance	g _{fs}	V _{DS} = 30V, I _D = 1.4A	-	4.8	-	S
Dynamic Characteristics						
Total Gate Charge	Q _g	V _{DS} = 400V, I _D = 3A, V _{GS} = 10V ⁽³⁾	-	6.75	-	nC
Gate-Source Charge	Q _{gs}		-	2	-	
Gate-Drain Charge	Q _{gd}		-	2.6	-	
Input Capacitance	C _{iss}	V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz	-	285	-	pF
Reverse Transfer Capacitance	C _{rss}		-	1.6	-	
Output Capacitance	C _{oss}		-	25	-	
Turn-On Delay Time	t _{d(on)}	V _{GS} = 10V, V _{DS} = 250V, I _D = 3A, R _G = 25Ω ⁽³⁾	-	19	-	ns
Rise Time	t _r		-	22	-	
Turn-Off Delay Time	t _{d(off)}		-	33	-	
Fall Time	t _f		-	20	-	
Drain-Source Body Diode Characteristics						
Maximum Continuous Drain to Source Diode Forward Current	I _S	I _S = 2.8A, V _{GS} = 0V	-	2.8	-	A
Source-Drain Diode Forward Voltage	V _{SD}		-		1.4	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = 3.0A, dI/dt = 100A/μs ⁽³⁾	-	190		ns
Body Diode Reverse Recovery Charge	Q _{rr}		-	0.9		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. $I_{SD} \leq 3.0A$, $di/dt \leq 200A/\mu s$, $V_{DD}=50V$, $R_G=25\Omega$, Starting $T_J=25^\circ C$
4. $L=40mH$, $I_{AS}=2.8A$, $V_{DD}=50V$, $R_G=25\Omega$, Starting $T_J=25^\circ C$

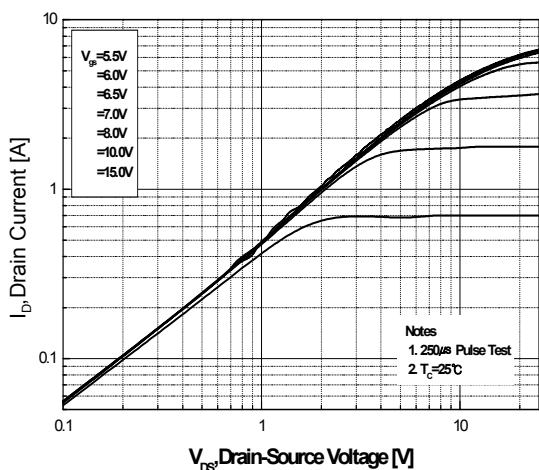


Fig.1 On-Region Characteristics

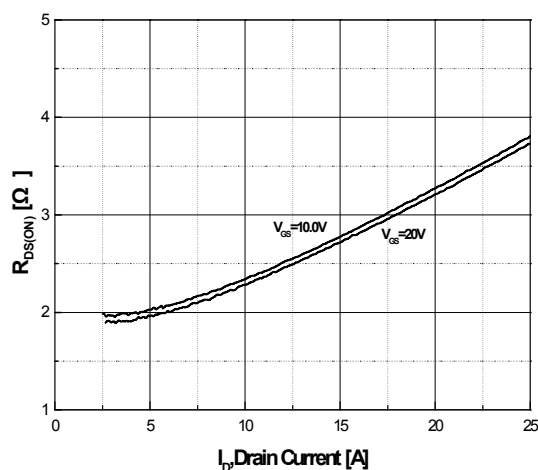


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

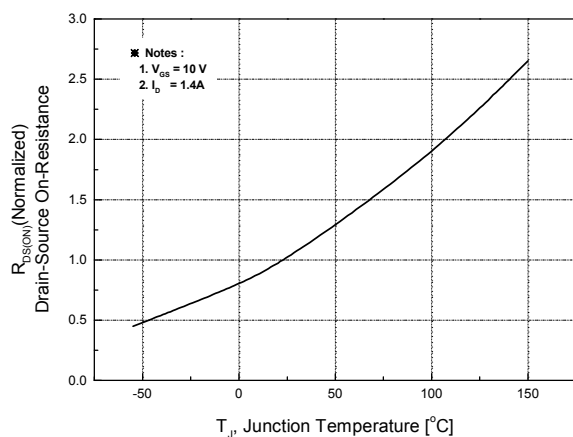


Fig.3 On-Resistance Variation with Temperature

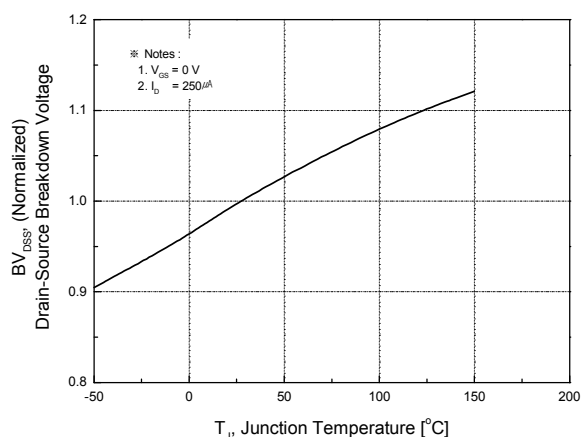


Fig.4 Breakdown Voltage Variation vs. Temperature

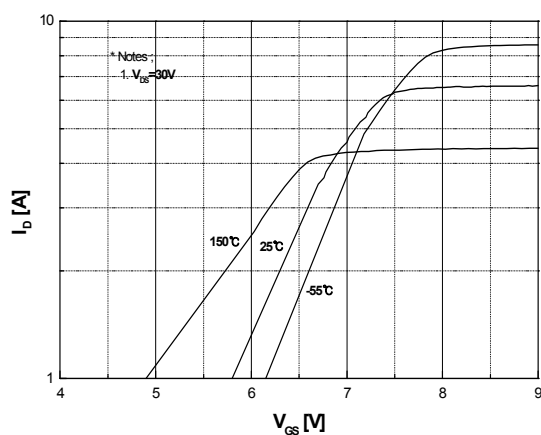


Fig.5 Transfer Characteristics

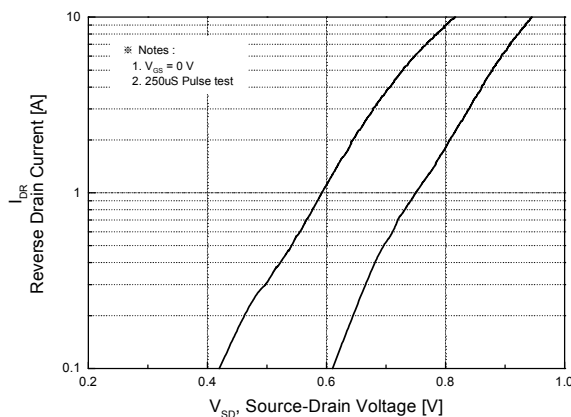
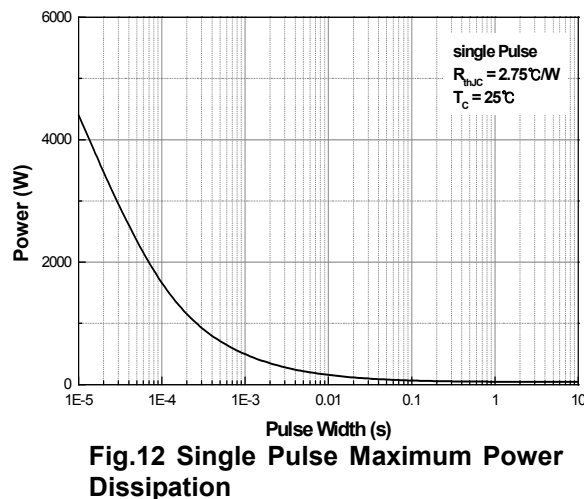
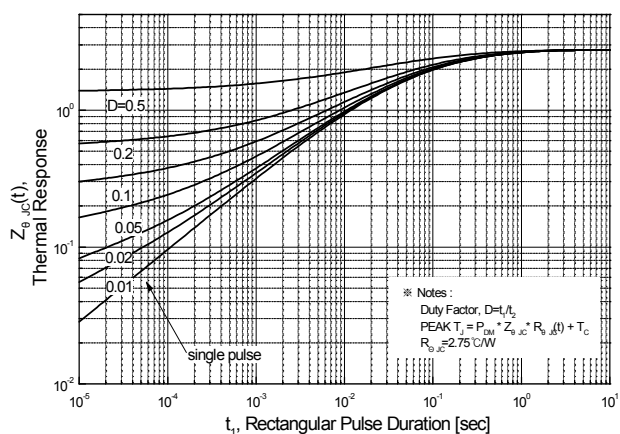
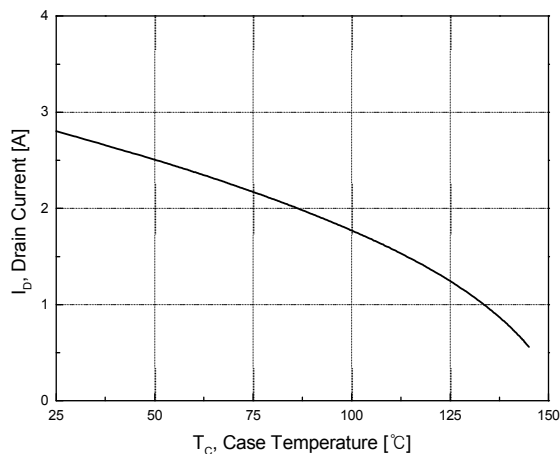
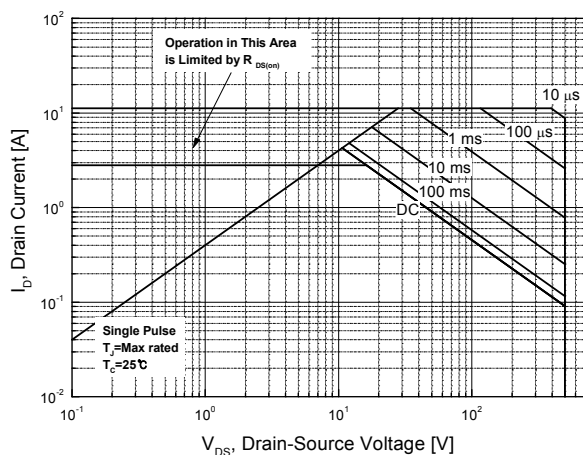
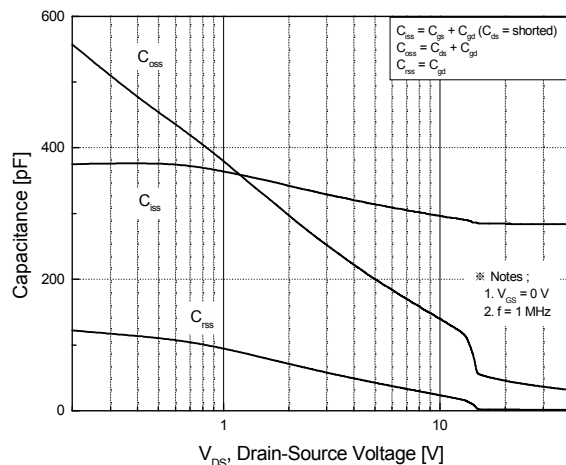
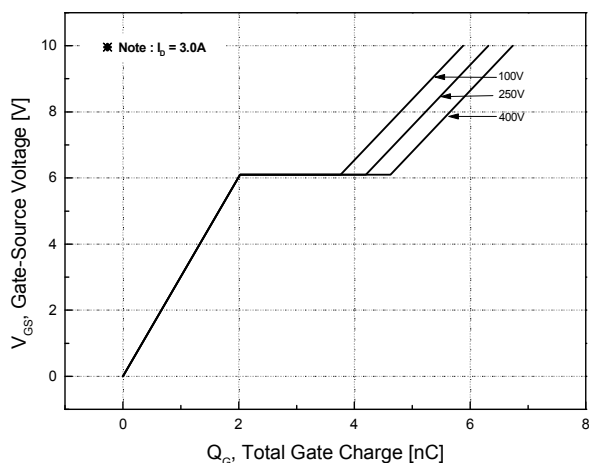


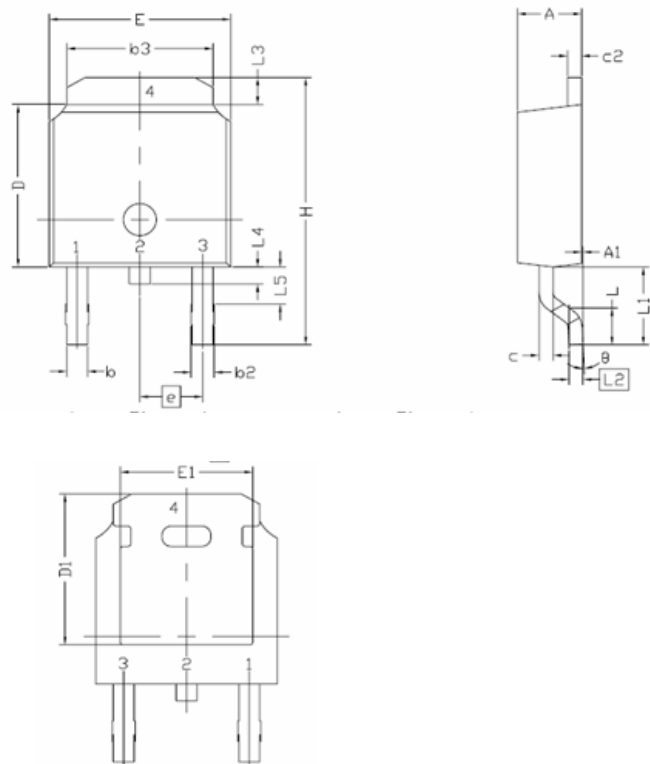
Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature



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

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