

General Description

The MDD3N40 use advanced Magnachip's MOSFET Technology, which provides low on-state resistance, high switching performance and excellent quality.

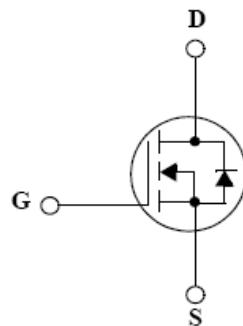
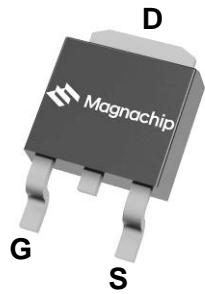
MDD3N40 are suitable device for SMPS and general purpose applications.

Features

- $V_{DS} = 400V$
- $I_D = 2.0A$
- $R_{DS(ON)} \leq 3.4\Omega$
- @ $V_{GS} = 10V$
- @ $V_{GS} = 10V$

Applications

- Power Supply
- PFC
- LED TV



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

Characteristics	Symbol	Rating	Unit
Drain-Source Voltage	V_{DSS}	400	V
Gate-Source Voltage	V_{GSS}	± 30	V
Continuous Drain Current	I_D	2.0	A
$T_c=100^\circ C$		1.2	A
Pulsed Drain Current ⁽¹⁾	I_{DM}	8.0	A
Power Dissipation	P_D	30	W
$T_c=25^\circ C$		0.24	$W/^\circ C$
Peak Diode Recovery dv/dt ⁽³⁾	dv/dt	4.5	V/ns
Repetitive Pulse Avalanche Energy ⁽⁴⁾	E_{AR}	3.0	mJ
Avalanche current ⁽¹⁾	I_{AR}	2.0	A
Single Pulse Avalanche Energy ⁽⁴⁾	E_{AS}	45	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 ⁽¹⁾	$R_{\theta JA}$	110	$^\circ C/W$
Thermal Resistance, Junction-to-Case ⁽¹⁾	$R_{\theta JC}$	4.1	

Ordering Information

Part Number	Marking	Temp. Range	Package	Packing	RoHS Status
MDD3N40RH	MDD3N40	-55~150°C	TO-252(DPAK)	Reel and Tape	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	400	-	-	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} = 400V, 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 = 1.0A	-	2.8	3.4	Ω
Forward Transconductance	g _{fs}	V _{DS} = 30V, I _D = 1.0A	-	2.0	-	S
Dynamic Characteristics						
Total Gate Charge	Q _g	V _{DS} = 320V, I _D = 3.0A, V _{GS} = 10V ⁽³⁾	-	5.1	-	nC
Gate-Source Charge	Q _{gs}		-	1.4	-	
Gate-Drain Charge	Q _{gd}		-	3.9	-	
Input Capacitance	C _{iss}	V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz	-	167	-	pF
Reverse Transfer Capacitance	C _{rss}		-	2	-	
Output Capacitance	C _{oss}		-	27	-	
Turn-On Delay Time	t _{d(on)}		-	10	-	
Rise Time	t _r	V _{GS} = 10V, V _{DS} = 200V, I _D = 3.0A, R _G = 25Ω ⁽³⁾	-	30	-	ns
Turn-Off Delay Time	t _{d(off)}		-	12	-	
Fall Time	t _f		-	25	-	
Drain-Source Body Diode Characteristics						
Maximum Continuous Drain to Source Diode Forward Current	I _S	I _F = 3.0A, dI/dt = 100A/μs ⁽³⁾	-	0.5	-	A
Source-Drain Diode Forward Voltage	V _{SD}		-	-	1.4	V
Body Diode Reverse Recovery Time	t _{rr}		-	185	-	ns
Body Diode Reverse Recovery Charge	Q _{rr}		-	0.6	-	μC

Note :

1. Pulse width is based on R_{θJC} & R_{θJA} and the maximum allowed junction temperature of 150°C.
2. Pulse test: pulse width ≤300us, duty cycle≤2%, pulse width limited by junction temperature T_{J(MAX)}=150°C.
3. I_{SD} ≤3.0A, di/dt≤200A/us, V_{DD}=50V, R_g =25Ω, Starting T_J=25°C
4. L=9.2mH, I_{AS}=3.0A, V_{DD}=50V, , R_g =25Ω, Starting T_J=25°C

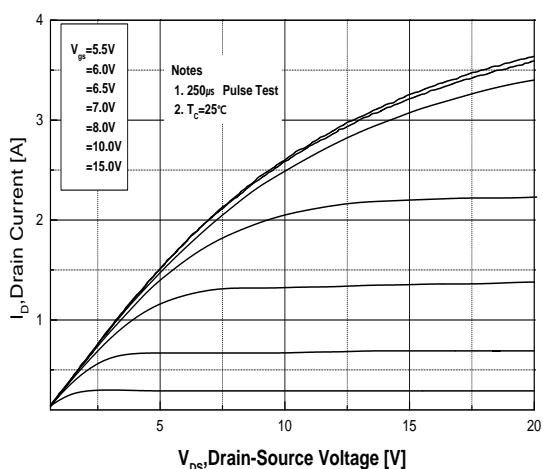


Fig.1 On-Region Characteristics

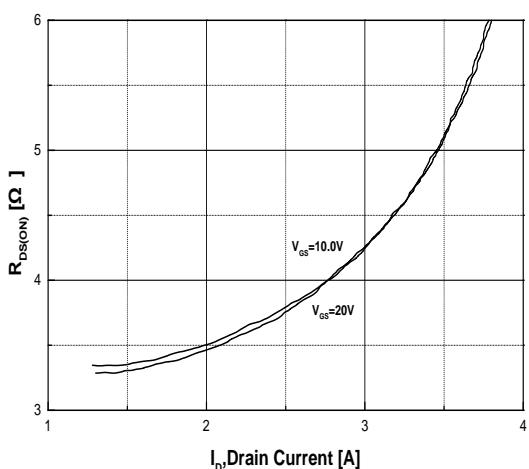


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

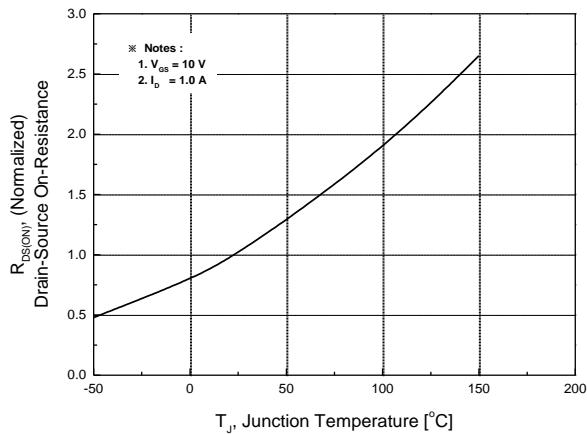


Fig.3 On-Resistance Variation with Temperature

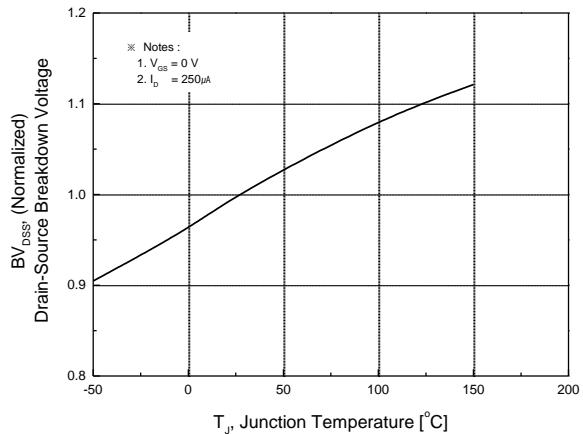


Fig.4 Breakdown Voltage Variation vs. Temperature

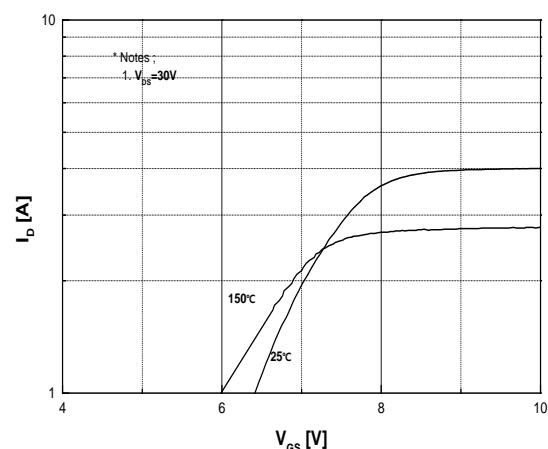


Fig.5 Transfer Characteristics

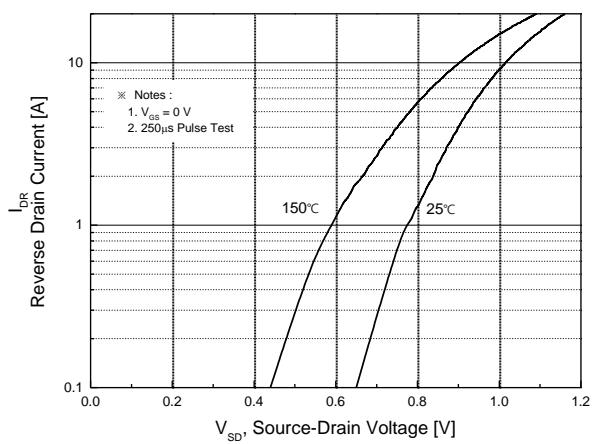


Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature

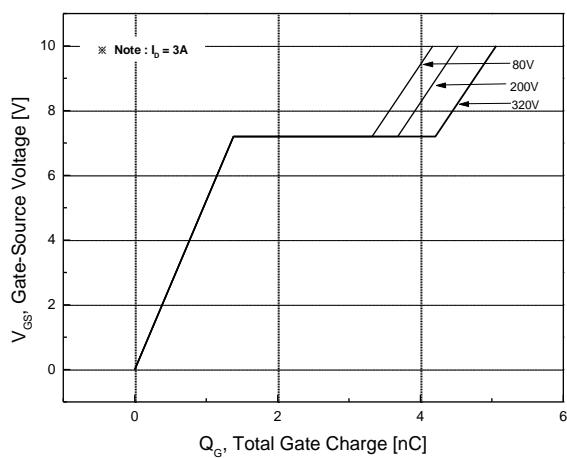


Fig.7 Gate Charge Characteristics

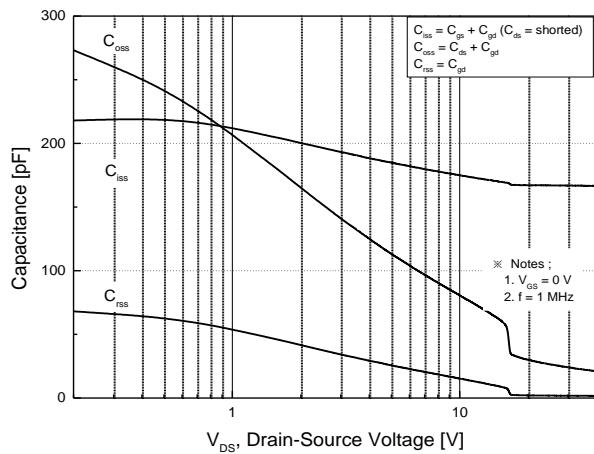


Fig.8 Capacitance Characteristics

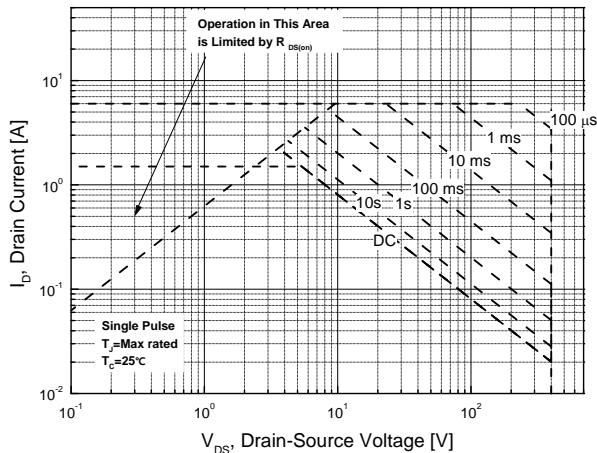


Fig.9 Maximum Safe Operating Area

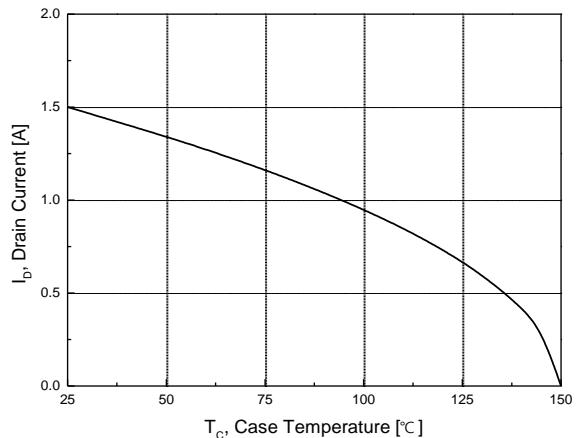


Fig.10 Maximum Drain Current vs. Case Temperature

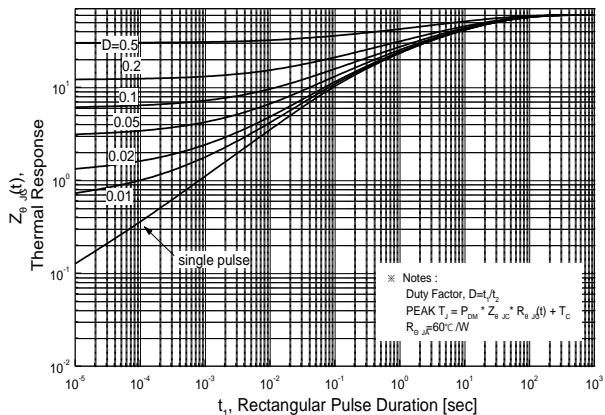


Fig.11 Transient Thermal Response Curve

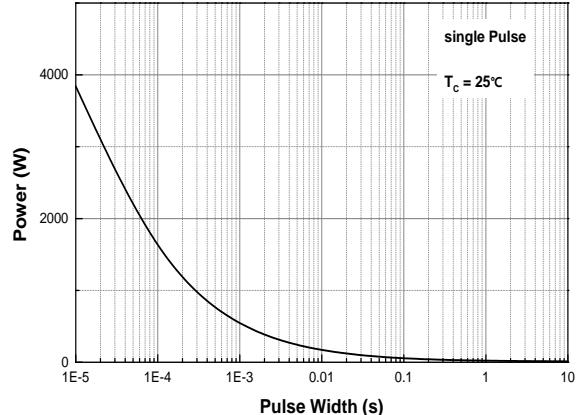
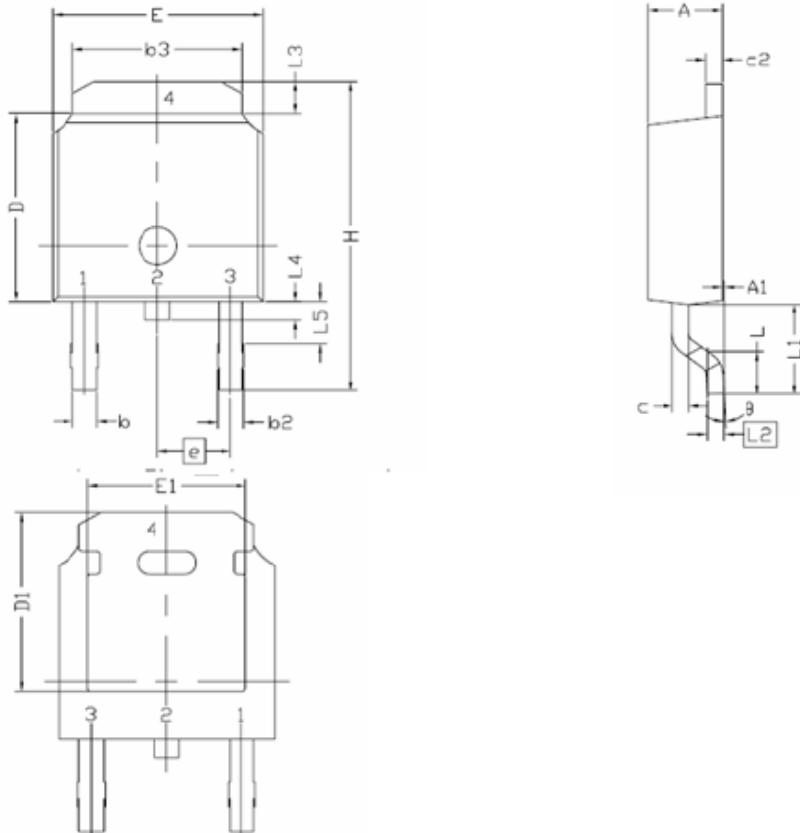


Fig.12 Single Pulse Maximum Power Dissipation

Physical Dimension

TO-252(DPAK)

Dimensions are in millimeters, unless otherwise specified



Symbol	Min	Nom	Max
E	6.35	-	6.73
L	1.40	1.52	1.78
L1		2.74REF	
L2		0.508BCS	
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		2.286BSC	
A	2.18	-	2.39
A1	-	-	0.13
c	0.46	-	0.61
c2	0.46	-	0.89
D1	5.21	-	-
E1	4.32	-	-
Θ	0.00	-	10.00

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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