MagnaChip

MDD3N50

N-Channel MOSFET 500V, 2.8 A, 2.5Ω

General Description

The MDD3N50 uses advanced Magnachip's MOSFET Technology, which provides low on-state resistance, high switching performance and excellent quality.

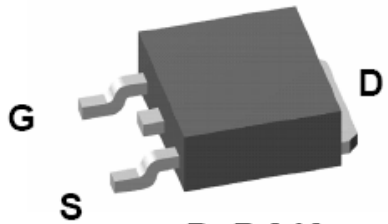
MDD3N50 is suitable device for SMPS, HID and general purpose applications.

Features

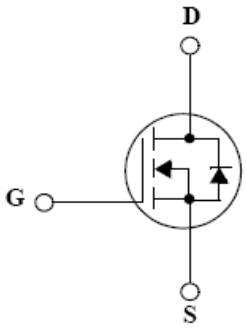
- V_{DS} = 500V
- I_D = 2.8A @V_{GS} = 10V
- $R_{DS(ON)}$ ≤ 2.5Ω @V_{GS} = 10V

Applications

- Power Supply
- PFC
- Ballast



D-PAK
(TO-252)



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°C	I_D	2.8	A
	T_C=100°C		1.7	A
Pulsed Drain Current[1]		I_{DM}	11.2	A
Power Dissipation	T_C=25°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]	$R_{\theta JA}$	62.5	°C/W
Thermal Resistance, Junction-to-Case[1]	$R_{\theta JC}$	2.75	

Ordering Information

Part Number	Temp. Range	Package	Packing	RoHS Status
MDD3N50RH	-55~150°C	D-Pak	Tape and 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	-	5	-	S
Dynamic Characteristics						
Total Gate Charge	Q_g	V_{DS} = 400V, I_D = 2.8A, V_{GS} = 10V(3)	-	6	8	nC
Gate-Source Charge	Q_{gs}		-	2	2.5	
Gate-Drain Charge	Q_{gd}		-	2.5	3.5	
Input Capacitance	C_{iss}	V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz	-	300	390	pF
Reverse Transfer Capacitance	C_{rss}		-	1.7	2.5	
Output Capacitance	C_{oss}		-	30	40	
Turn-On Delay Time	$t_{d(on)}$	V_{GS} = 10V, V_{DS} = 250V, I_D = 2.8A, R_G = 25Ω(3)	-	7	25	ns
Rise Time	t_r		-	16	45	
Turn-Off Delay Time	$t_{d(off)}$		-	17	45	
Fall Time	t_f		-	14	40	
Drain-Source Body Diode Characteristics						
Maximum Continuous Drain to Source Diode Forward Current	I_S		-	2.8	-	A
Source-Drain Diode Forward Voltage	V_{SD}	I_S = 2.8A, V_{GS} = 0V	-		1.4	V
Body Diode Reverse Recovery Time	t_{rr}	I_F = 2.8A, dI/dt = 100A/μs(3)	-	220		ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	1.2		μC

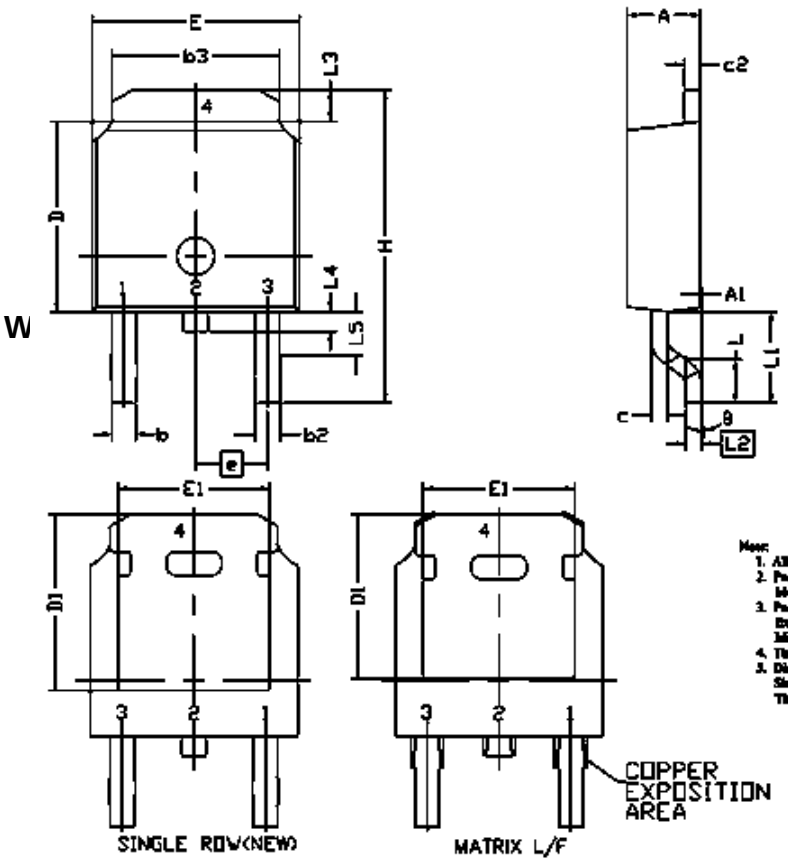
Note :

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 TJ(MAX)=150°C.
3. I_{SD} ≤3.0A, di/dt≤200A/us, V_{DD}=50V, R_g =25Ω, Starting TJ=25°C
4. L=22.0mH, I_{AS}=3.0A, V_{DD}=50V, , R_g =25Ω, Starting TJ=25°C

Physical Dimension

D-PAK, 3L

Dimensions are in millimeters, unless otherwise specified



SYMBOL	DIMENSIONAL REQMTS		
	MIN	NOM	MAX
E	6.40	6.60	6.731
L	1.40	1.52	1.77
L1	2.743 REF		
L2	0.508 BSC		
L3	0.89	--	1.27
L4	0.64	--	1.01
L5	--	--	--
D	6.00	6.10	6.223
H	9.40	10.00	10.40
b	0.64	0.76	0.88
b2	0.77	0.84	1.14
b3	5.21	5.34	5.46
e	2.286 BSC		
A	2.20	2.30	2.38
A1	0	--	0.127
c	0.45	0.50	0.60
c2	0.45	0.50	0.58
D1	5.30	--	--
E1	4.40	--	--
θ	0°	--	10°

Note:
1. All Dimensions Are In mm.
2. Package Body Sizes Exclude Mold Flash, Protrusion Or Gate Burrs. Mold Flash, Protrusion Or Gate Burrs Shall Not Exceed 0.10 mm Per Side.
3. Package Body Sizes Determined At The Outermost Extremes Of The Plastic Body Exclusive Of Mold Flash, Gate Burrs And Interfeed Flash, But Including Any Mismatch Between The Top And Bottom Of The Plastic Body.
4. The Package Top May Be Smaller Than The Package Bottom.
5. Dimension "b" Does Not Include Dambar Protrusion. Allowable Dambar Protrusion Shall Be 0.10 mm Total In Excess Of "b" Dimension At Maximum Material Condition. The Dambar Cannot Be Located On The Lower Radius Of The Foot.

Worldwide Sales Support Locations

U.S.A
Sunnyvale Office
787 N. Mary Ave. Sunnyvale
CA 94085 U.S.A
Tel : 1-408-636-5200
Fax : 1-408-213-2450
E-Mail : americasales@magnachip.com

U.K
Knyvett House The Causeway,
Staines Middx, TW18 3BA,U.K.
Tel : +44 (0) 1784-898-8000
Fax : +44 (0) 1784-895-115
E-Mail : europesales@magnachip.com

Osaka Office
3F, Shin-Osaka MT-2 Bldg
3-5-36 Miyahara Yodogawa-Ku
Osaka, 532-0003 Japan
Tel : 81-6-6394-8224
Fax : 81-6-6394-8282
E-Mail : osakasales@magnachip.com

Taiwan R.O.C
2F, No.61, Chowize Street, Nei Hu
Taipei,114 Taiwan R.O.C
Tel : 886-2-2657-7898
Fax : 886-2-2657-8751
E-Mail : taiwansales@magnachip.com

China
Hong Kong Office
Office 03, 42/F, Office Tower Convention Plaza
1 Harbour Road, Wanchai, Hong Kong
Tel : 852-2828-9700
Fax : 852-2802-8183
E-Mail : chinasales@magnachip.com

Shenzhen Office
Room 1803, 18/F
International Chamber of Commerce Tower
Fuhua 3Road, Futian District
ShenZhen, China
Tel : 86-755-8831-5561
Fax : 86-755-8831-5565

Korea
891, Daechi-Dong, Kangnam-Gu
Seoul, 135-738 Korea
Tel : 82-2-6903-3451
Fax : 82-2-6903-3668 ~9
Email : koreasales@magnachip.com

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.