MDP08N032TH

Single N-channel Trench MOSFET 80V 3.23mΩ 120A

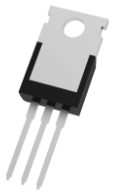
General description

The MDP08N032TH uses advanced Magnachip's MV MOSFET Technology, which provides high performance in on-state resistance, fast switching performance, and excellent quality.

MDP08N032TH is suitable device for Motor Drive applications and general purpose applications.

Top View

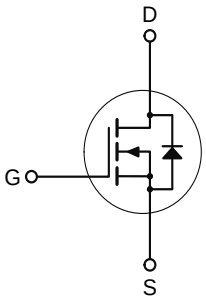
TO-220



Bottom View

Features and benefits

- **Magnachip's MOSFET Technology**
- **Very low on-resistance $R_{DS(on)}$**
- **100% Avalanche / Rg Tested**



Applications

- **Specifically for E-Bike applications**
- **Switching Applications**
- **Drives**

Key performance parameters

V_{DS}	**80**	V
$R_{DS(on),\ max}$	**0.00323**	Ω
I_D	**120**	A
Q_G	**106**	nC
Junction temperature, max	**175**	°C

RoHS Compliant
HALOGEN-FREE

Ordering information

Type / Ordering Code	Package	Marking	Packing	RoHS Status
MDP08N032TH	TO-220	08N032	Tube	Halogen Free

http://www.magnachip.com/powersolutions

MX LISTED NYSE

Maximum ratings, at T_A = 25°C, unless otherwise specified

Parameter		Symbol	Rating	Unit
Drain-source Voltage		V_{DS}	80	V
Gate-source Voltage		V_{GS}	± 20	V
Drain current	Tc=25°C Silicon Limited	I_D	188	A
	Tc=25°C Package Limited		120	A
	Tc=100°C Silicon Limited		133	A
1) Pulsed drain current	Tc=25°C	I_{DM}	480	A
Total power dissipation	Tc=25°C	P_{tot}	231	W
	Tc=100°C		115	W
2) Avalanche energy, single pulse		E_{AS}	365	mJ
Operating and storage temperature		T_j, T_{stg}	- 55 ~ 175	°C

Thermal characteristics

Parameter	Symbol	Rating	Unit
Thermal resistance, junction - case	$R_{\theta JC}$	0.65	°C/W
3) Thermal resistance, junction - ambient	$R_{\theta JA}$	62.5	°C/W

Notes
1. Pulse width limited by Tjmax
2. EAS is tested at starting Tj = 25℃, L = 1.0mH, I_{AS} = 27A, V_{DD} = 50V, V_{GS} = 10V
3. Surface mounted FR-4 board by JEDEC (jesd51-7)

Electrical Characteristics (T_J = 25°C)

Static characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions / Note
Drain-source breakdown voltage	$V_{(BR)DSS}$	80	-	-	V	V_{GS}=0 V, I_D=250 μA
Gate threshold voltage	$V_{GS(th)}$	2.25	3.0	3.75	V	V_{DS}=V_{GS}, I_D=250 μA
Zero gate voltage drain current	I_{DSS}	-	-	1	μA	V_{DS}=80 V, V_{GS}=0 V
Gate-source leakage current	I_{GSS}	-	-	± 100	nA	V_{GS}=±20 V, V_{DS}=0 V
Drain-source on-state resistance	$R_{DS(on)}$	-	2.70	3.23	mΩ	V_{GS}=10 V, I_D=60 A
Gate resistance	R_G	-	3.0	-	Ω	f=1MHz
Transconductance	g_{fs}	-	104	-	S	V_{DS}=10 V, I_D=60 A

Dynamic characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions / Note
Input capacitance	C_{iss}	-	7077	-	pF	V_{GS}=0 V, V_{DS}=40 V, f=1 MHz
Output capacitance	C_{oss}	-	1408	-	pF	V_{GS}=0 V, V_{DS}=40 V, f=1 MHz
Reverse transfer capacitance	C_{rss}	-	40	-	pF	V_{GS}=0 V, V_{DS}=40 V, f=1 MHz
Turn-on delay time	$t_{d(on)}$	-	28	-	ns	V_{DD}=40 V, V_{GS}=10 V, ID=60 A, $R_{G,ext}$=3Ω
Rise time	t_r	-	17	-	ns	V_{DD}=40 V, V_{GS}=10 V, ID=60 A, $R_{G,ext}$=3Ω
Turn-off delay time	$t_{d(off)}$	-	81	-	ns	V_{DD}=40 V, V_{GS}=10 V, ID=60 A, $R_{G,ext}$=3Ω
Fall time	t_f	-	30	-	ns	V_{DD}=40 V, V_{GS}=10 V, ID=60 A, $R_{G,ext}$=3Ω

Gate charge characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions / Note
Gate to source charge	Q_{gs}	-	30	-	nC	V_{DD}=40 V, I_D=60 A, V_{GS}=0 to 10 V
Gate charge at threshold	$Q_{gs(th)}$	-	22	-	nC	V_{DD}=40 V, I_D=60 A, V_{GS}=0 to 10 V
Gate to drain charge	Q_{gd}	-	24	-	nC	V_{DD}=40 V, I_D=60 A, V_{GS}=0 to 10 V
Switching charge	Q_{sw}	-	32	-	nC	V_{DD}=40 V, I_D=60 A, V_{GS}=0 to 10 V
Gate charge total	Q_g	-	106	-	nC	V_{DD}=40 V, I_D=60 A, V_{GS}=0 to 10 V
Gate plateau voltage	$V_{plateau}$	-	5.1	-	V	V_{DD}=40 V, I_D=60 A, V_{GS}=0 to 10 V

Source-drain diode

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions / Note
Diode continuous forward current	I_S	-	-	120	A	-
Diode pulse current	$I_{S,pulse}$	-	-	480	A	pulsed; tp ≤ 10 μs
Diode forward voltage	V_{SD}	-	0.9	1.2	V	V_{GS}=0 V, I_F=60 A
Reverse recovery time	t_{rr}	-	111	-	ns	I_F=60 A, d_{iF}/dt=100 A/μs
Reverse recovery charge	Q_{rr}	-	304	-	nC	I_F=60 A, d_{iF}/dt=100 A/μs

Electrical characteristics diagrams

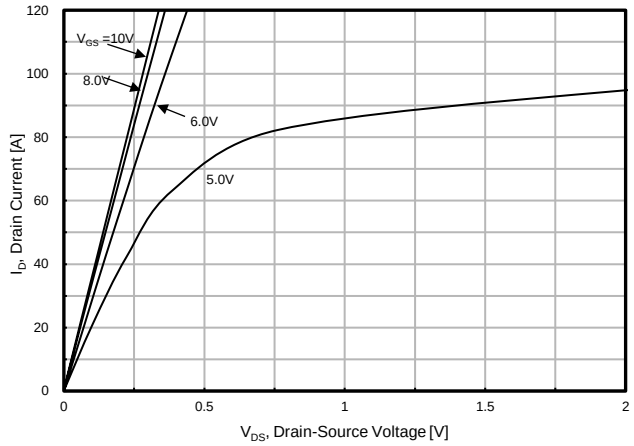


Fig. 1. Output Characteristics

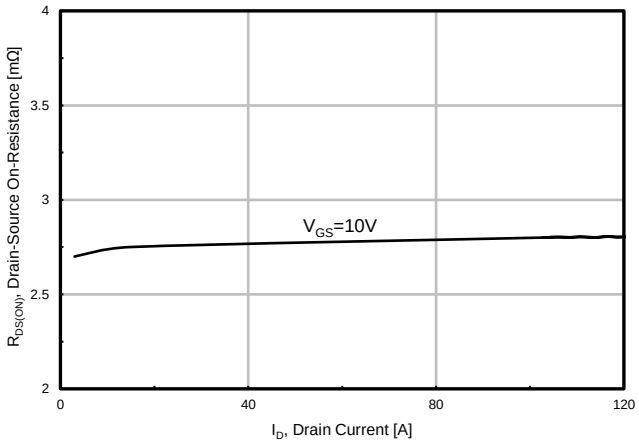


Fig. 2. Static On-Resistance Variation

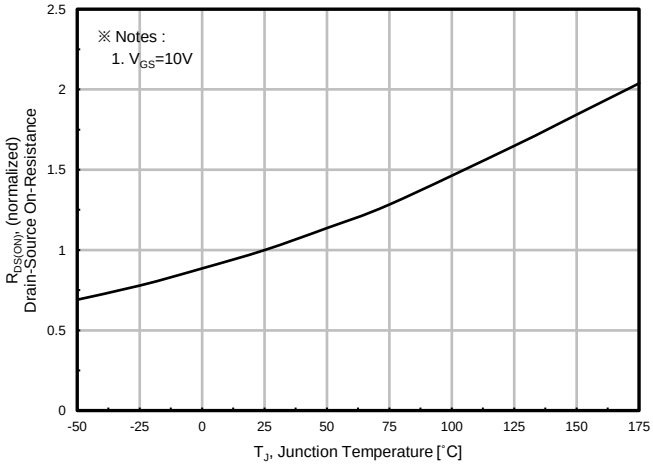


Fig. 3. On-Resistance vs. Junction Temperature

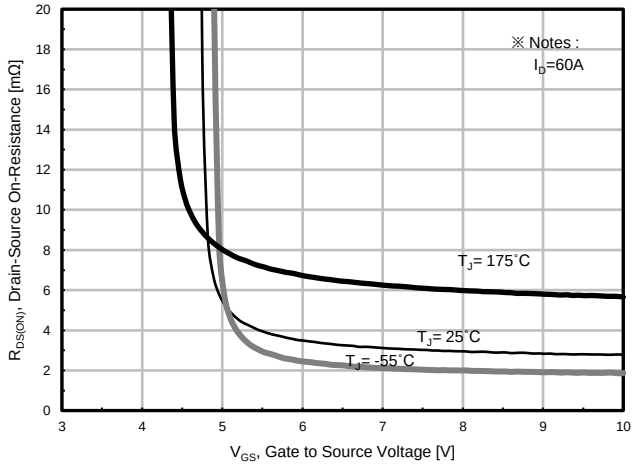


Fig. 4. On-Resistance vs. Gate to Source Voltage

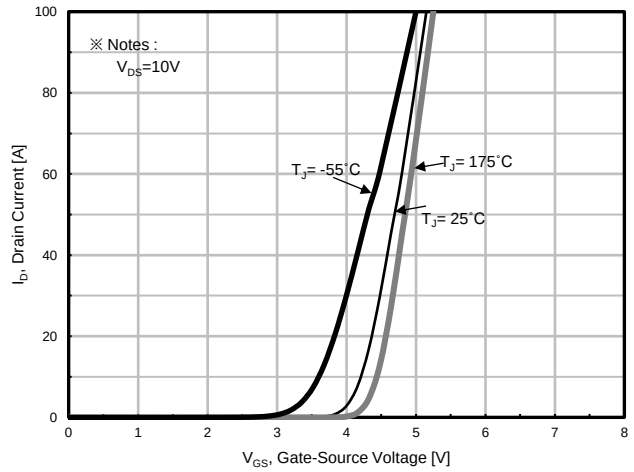


Fig. 5. Transfer Characteristics

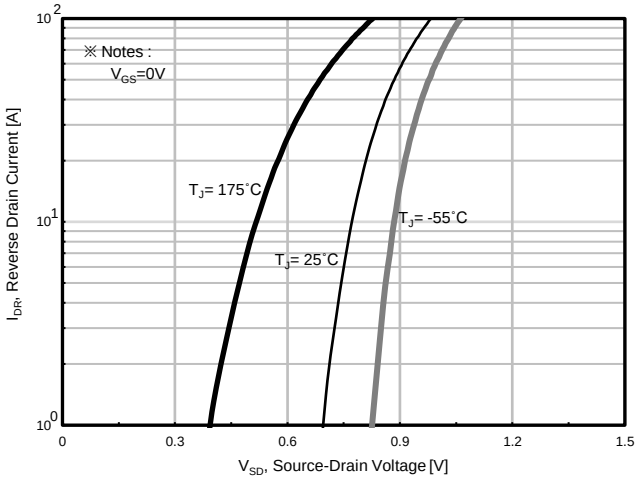


Fig. 6. Body Diode Forward Voltage Variation with Source Current and Temperature

Electrical characteristics diagrams

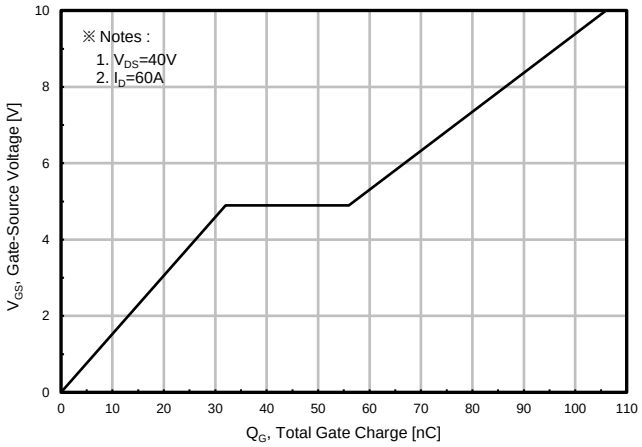


Fig. 7. Gate Charge

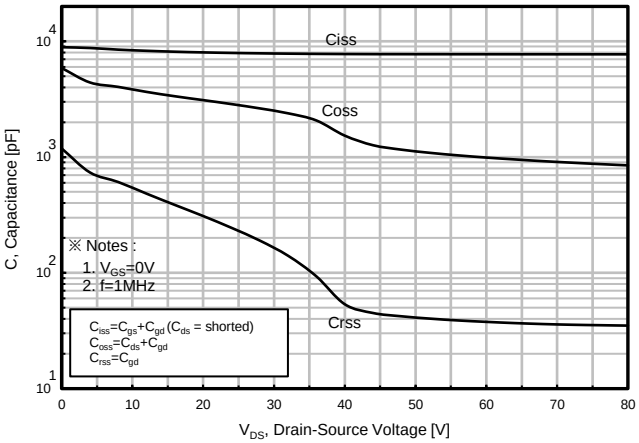


Fig. 8. Capacitance

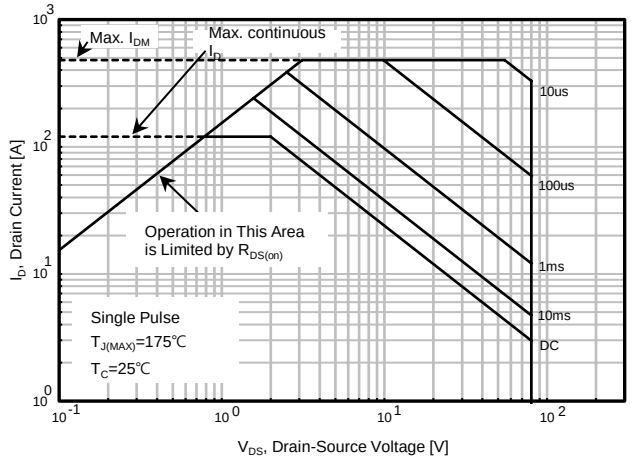


Fig. 9. Safe Operating Area

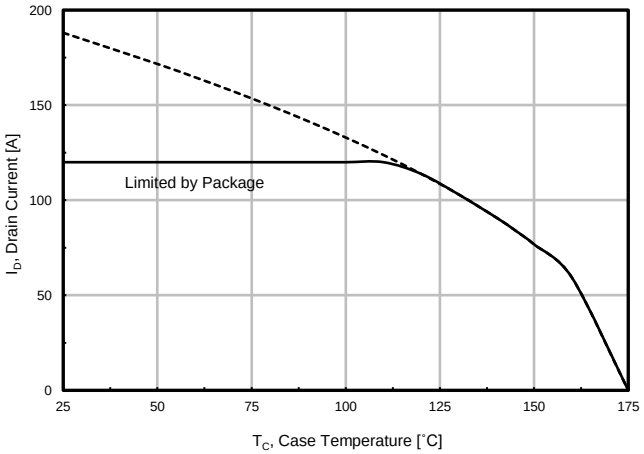


Fig. 10. Maximum Drain Current vs. Case Temperature

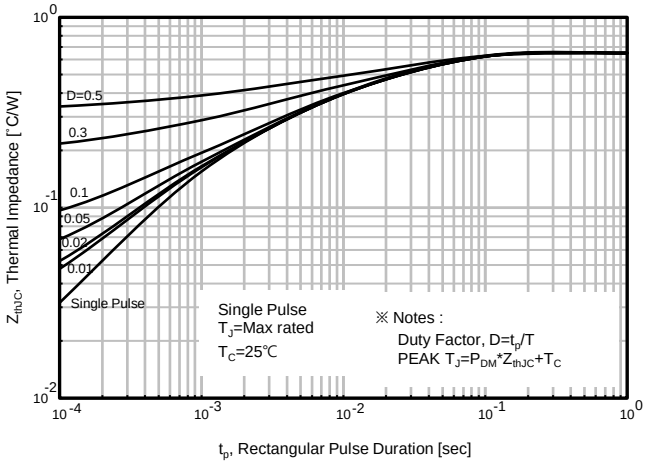
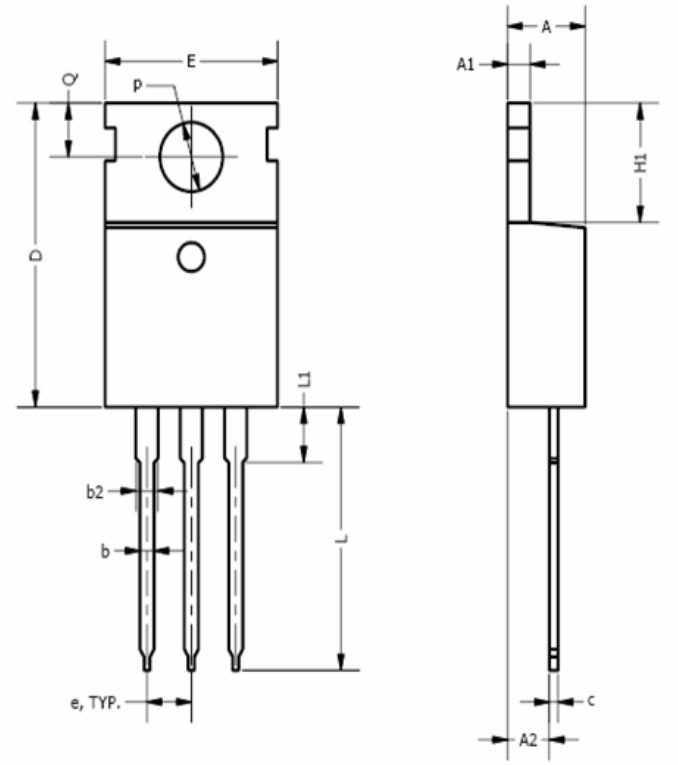


Fig. 11. Transient Thermal Impedance

Package information

TO-220



Symbol	Min	Nom	Max
A	3.56		4.83
A1	0.50		1.40
A2	2.03		2.92
b	0.38	0.69	1.02
b2	1.14	1.45	1.78
c	0.36		0.61
D	14.22		16.51
e	2.54 TYP		
E	9.65		10.67
H1	5.84		6.86
L	12.70		14.73
L1			6.35
ΦP	3.53		4.09
Q	2.54		3.43

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.