MDY20N113PTFRH

Single N-channel Trench MOSFET 200V 11.6mΩ 100A

FEATURES

- **Trench power MOSFET technology**
- **N-channel, normal level**
- **Enhanced avalanche ruggedness**
- **100% Avalanche tested**
- **Maximum 175°C junction temperature**
- **Improved diode reverse recovery time(trr) for increased efficiency**

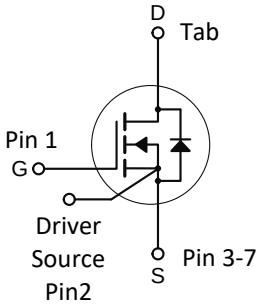
Top View

M2PAK-7P

Bottom View

APPLICATIONS

- **DC/DC and AC/DC converters**
- **Motor drive systems**
- **Battery powered systems**



KEY PERFORMANCE PARAMETERS

V_{DS}	**200**	V
$R_{DS(on),\ typ.}$	**0.0101**	Ω
I_D	**100**	A
$Q_{G,\ typ.}$	**80**	nC
Junction temperature$_{,\ max.}$	**175**	°C

RoHS Compliant
HALOGEN-FREE

ORDERING INFORMATION

Type / Ordering Code	Package	Marking	Packing	RoHS Status
MDY20N113PTFRH	M2PAK-7P	MDY20N113F	Tape & Reel	Halogen Free

http://www.magnachip.com/

MAXIMUM RATINGS, at T_J = 25°C, unless otherwise specified

PARAMETER		SYMBOL	RATING	UNIT
Drain-source Voltage		V_{DS}	200	V
Gate-source Voltage		V_{GS}	± 20	V
Drain current	Tc=25°C	I_D	100	A
	Tc=100°C		71	A
1) Pulsed drain current	Tc=25°C	I_{DM}	402	A
Total power dissipation	Tc=25°C	P_{tot}	326	W
	Tc=100°C		163	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	$R_{\theta JC}$	0.46	°C/W
3) Thermal resistance, junction - ambient	$R_{\theta JA}$	30	°C/W

ELECTRICAL CHARACTERISTICS (T_J = 25°C)

STATIC CHARACTERISTICS

PARAMETER	Symbol	Min.	Typ.	Max.	Unit	Conditions / Note
Drain-source breakdown voltage	$V_{(BR)DSS}$	200	-	-	V	V_{GS}=0 V, I_D=250 μA
Gate threshold voltage	$V_{GS(th)}$	2.25	3.00	3.75	V	V_{DS}=V_{GS}, I_D=250 μA
Zero gate voltage drain current	I_{DSS}	-	-	10	μA	V_{DS}=200 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	$R_{DS(on)}$	-	10.1	11.3	mΩ	V_{GS}=10 V, I_D=50 A
[4] Gate resistance	R_G	-	2.7	-	Ω	f=1MHz
[4] Transconductance	g_{fs}	-	94	-	S	V_{DS}=10 V, I_D=50 A

[4] DYNAMIC CHARACTERISTICS

PARAMETER	Symbol	Min.	Typ.	Max.	Unit	Conditions / Note
Input capacitance	C_{iss}	-	6951	-	pF	V_{GS}=0 V, V_{DS}=100 V, f=1 MHz
Output capacitance	C_{oss}	-	428	-	pF	
Reverse transfer capacitance	C_{rss}	-	12	-	pF	
Turn-on delay time	$t_{d(on)}$	-	30	-	ns	V_{DD}=100 V, V_{GS}=10 V, ID=50 A, $R_{G,ext}$=3Ω
Rise time	t_r	-	13	-	ns	
Turn-off delay time	$t_{d(off)}$	-	64	-	ns	
Fall time	t_f	-	8	-	ns	

[4] GATE CHARGE CHARACTERISTICS

PARAMETER	Symbol	Min.	Typ.	Max.	Unit	Conditions / Note
Gate to source charge	Q_{gs}	-	34	-	nC	V_{DD}=100 V, I_D=50 A, V_{GS}=0 to 10 V
Gate charge at threshold	$Q_{gs(th)}$	-	19	-	nC	
Gate to drain charge	Q_{gd}	-	9	-	nC	
Switching charge	Q_{sw}	-	24	-	nC	
Gate charge total	Q_g	-	80	-	nC	
Gate plateau voltage	$V_{plateau}$	-	5.4	-	V	

SOURCE-DRAIN DIODE

PARAMETER	Symbol	Min.	Typ.	Max.	Unit	Conditions / Note
[4] Diode continous forward current	I_S	-	-	100	A	-
[4] Diode pulse current	$I_{S,pulse}$	-	-	402	A	pulsed; tp ≤ 10 μs
Diode forward voltage	V_{SD}	-	0.86	1.20	V	V_{GS}=0 V, I_F=50 A
[4] Reverse recovery time	t_{rr}	-	148	-	ns	I_F=50 A, d_{iF}/dt=100 A/μs
[4] Reverse recovery charge	Q_{rr}	-	785	-	nC	I_F=50 A, d_{iF}/dt=100 A/μs

Notes

1. Pulse width limited by Tjmax
2. Starting TJ=25°C, L=1mH, I_{AS}=27A, V_{DD}=50V, V_{GS}=10V
3. Surface mounted FR-4 board by JEDEC (jesd51-7)
4. The parameter is not subject to production testing - guaranteed by design.

ELECTRICAL CHARACTERISTICS DIAGRAMS

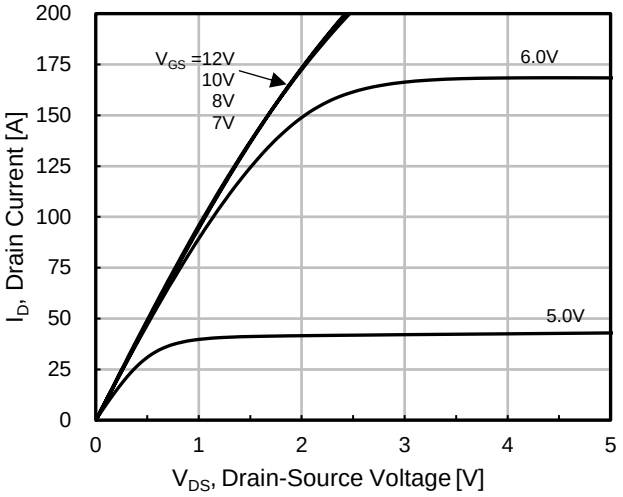


Fig. 1. Typ. Output Characteristics

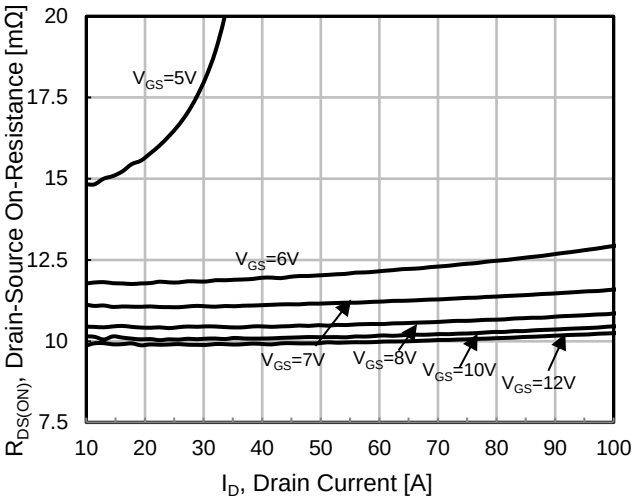


Fig. 2. Typ. Drain to Source On-Resistance

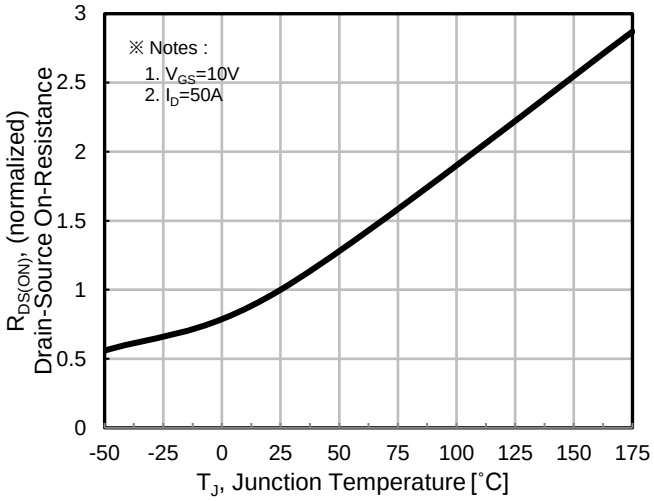


Fig. 3. On-Resistance vs. Junction Temperature

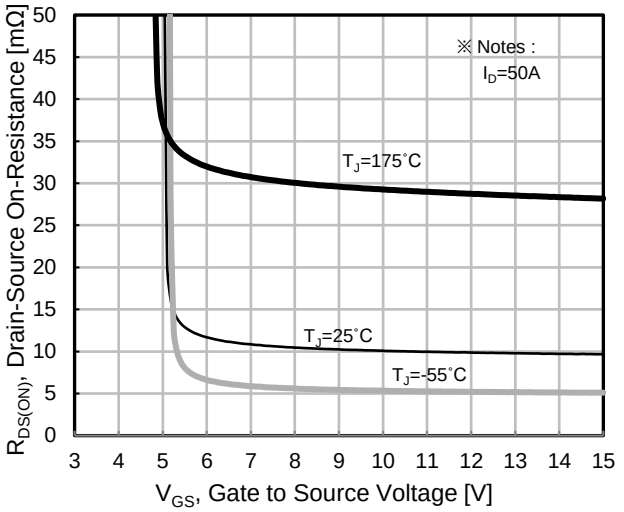


Fig. 4. On-Resistance vs. Gate to Source Voltage

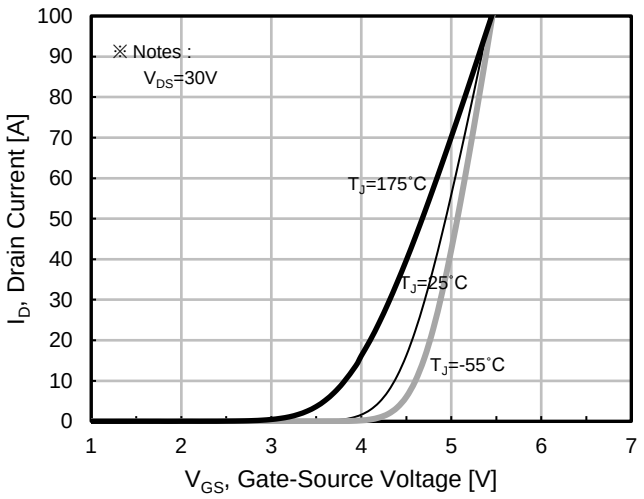


Fig. 5. Typ. Transfer Characteristics

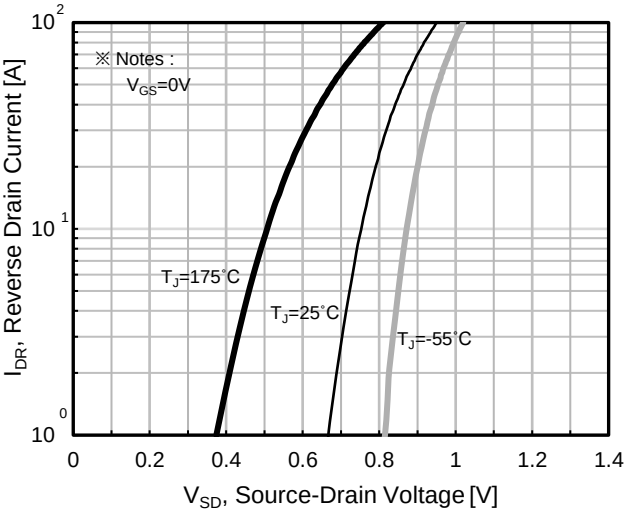


Fig. 6. Forward Characteristics of Reverse Diode

ELECTRICAL CHARACTERISTICS DIAGRAMS

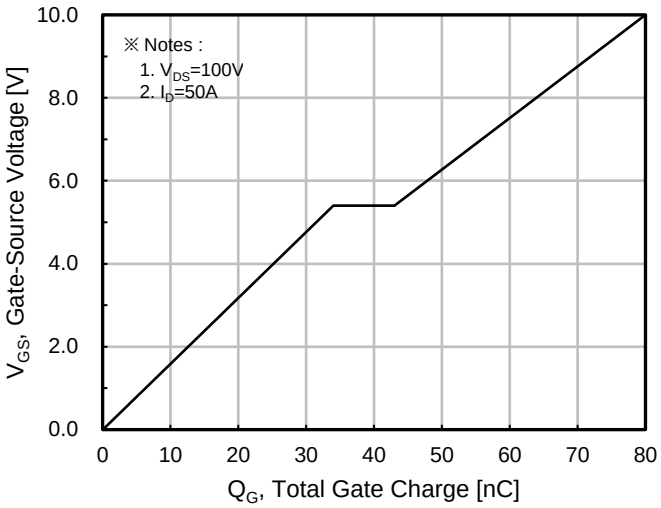


Fig. 7. Typ. Gate Charge

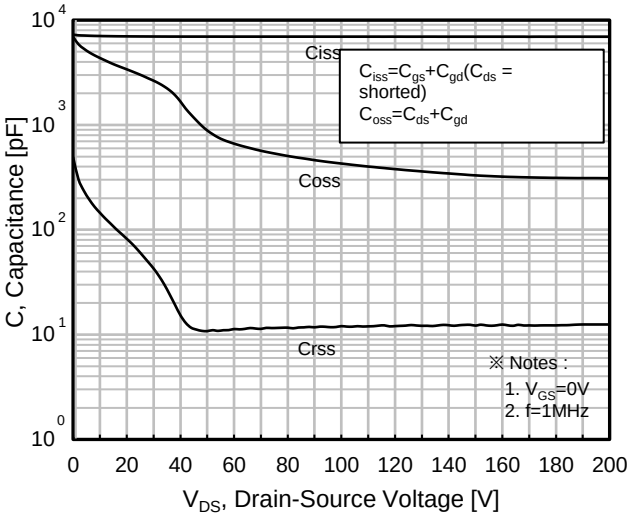


Fig. 8. Typ. Capacitances

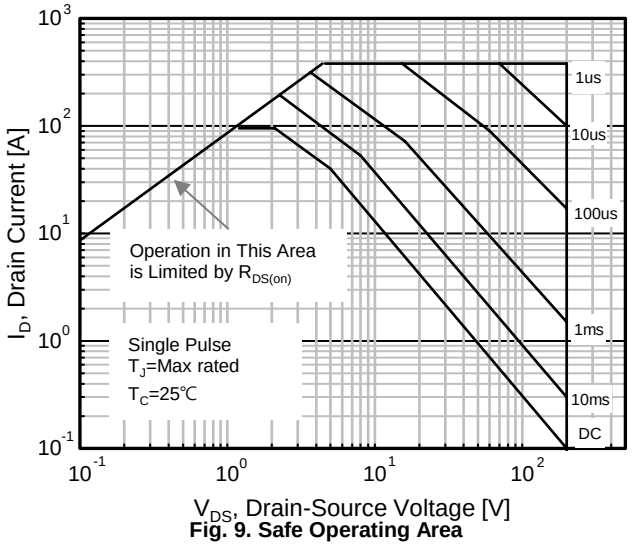


Fig. 9. Safe Operating Area

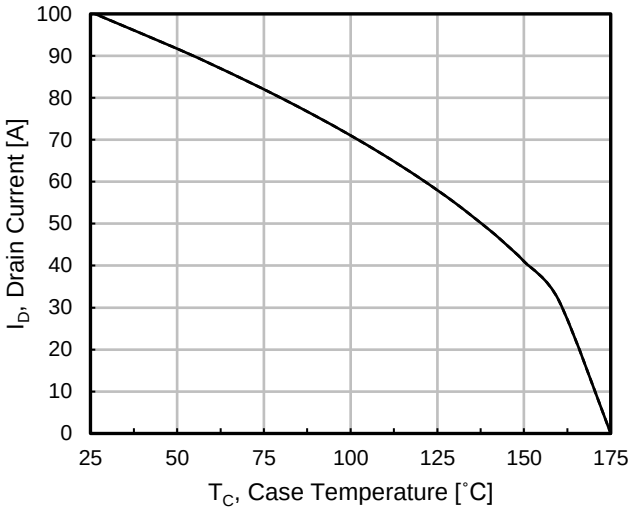


Fig. 10. Drain Current vs. Temperature

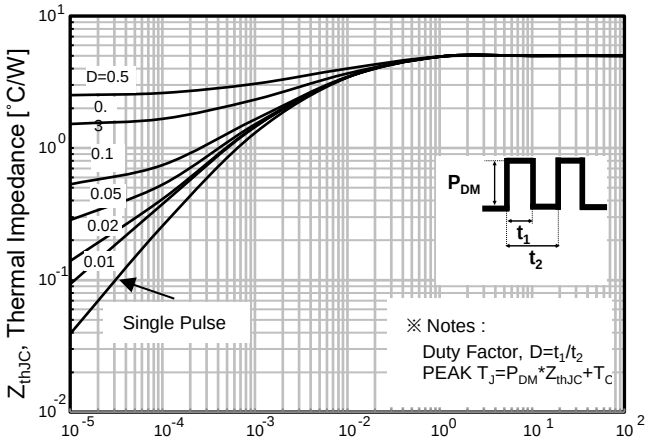


Fig. 11. Transient Thermal Impedance

ELECTRICAL CHARACTERISTICS DIAGRAMS

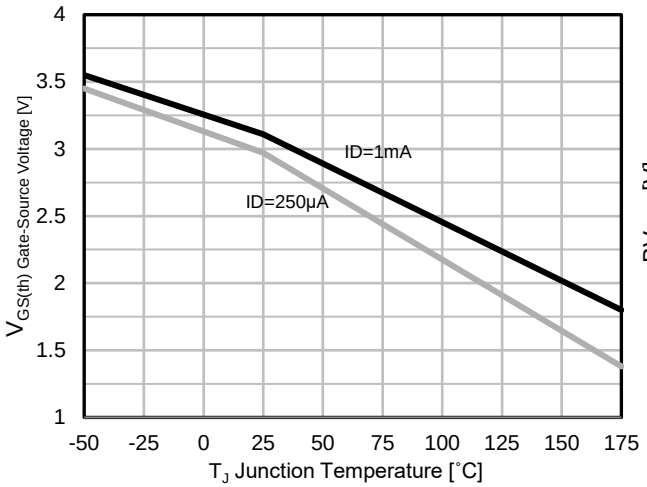


Fig.12 Gate-Source Threshold Voltage vs. Temperature

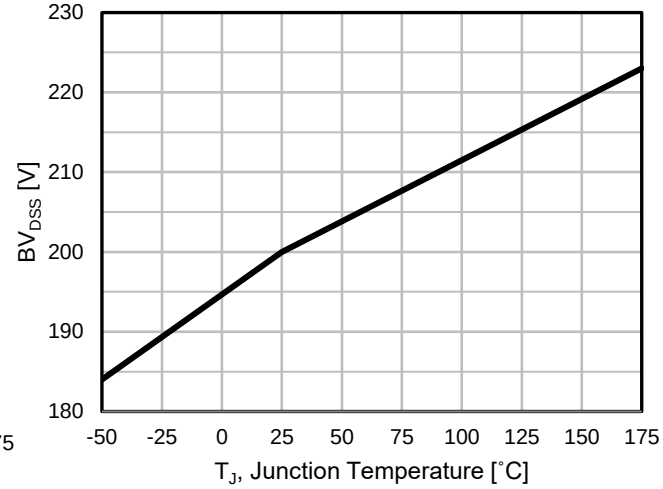
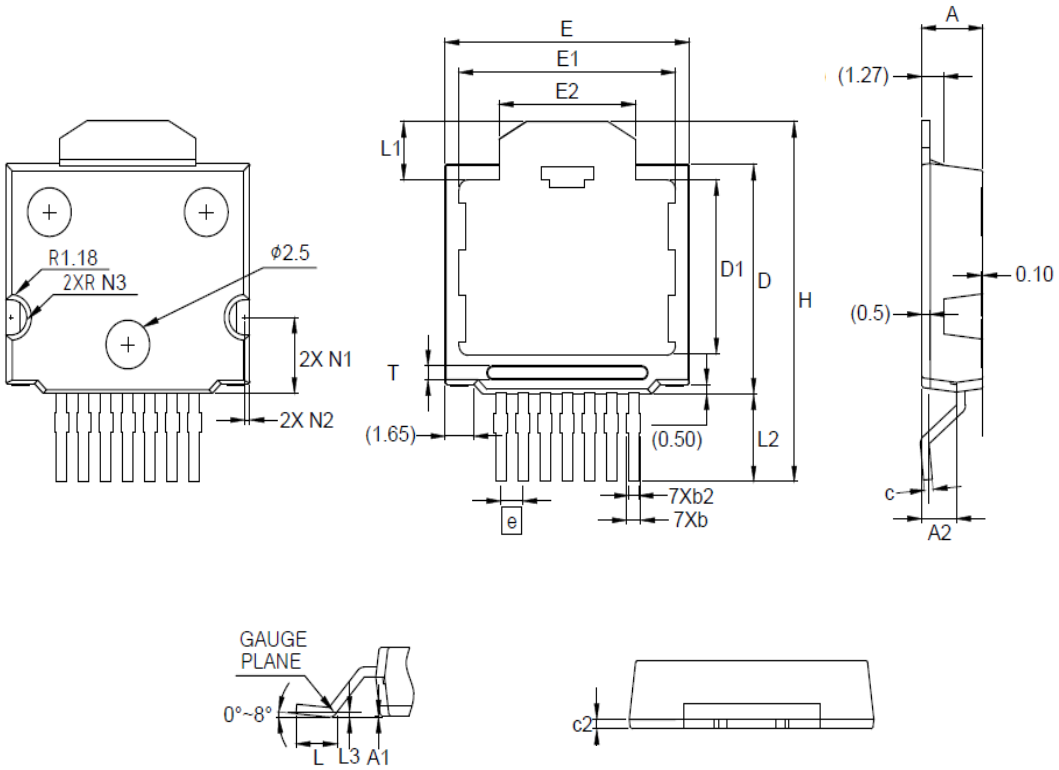


Fig.13 Drain-Source Voltage vs. Temperature

Package Outlines

M2PAK-7P



Symbol	Dimension (mm)		
	Min	Nom	Max
A	3.40	–	3.60
A1	0.00	–	0.25
A2	1.80	–	2.20
b	0.50	–	0.70
b2	0.50	–	1.00
c	0.40	–	0.60
c2	0.40	–	0.60
D	11.70	–	11.90
D1	8.90	–	9.10
E	13.90	–	14.10
E1	12.30	–	12.50
E2	7.75	–	7.85
T	0.60		0.70
e	BSC 1.27		
H	18.00	–	19.00
L	2.22	–	2.42
L1	2.90	–	3.10
L2	4.35	–	4.65
L3	BSC 0.25		
N1	3.80	–	4.00
N2	0.25	–	0.35
N3	0.80	–	1.00

Notes

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.