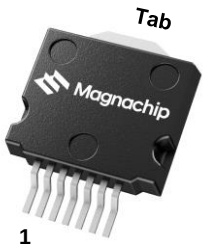
MDY10N025RH

Single N-channel Trench MOSFET 100V 2.5mΩ 240A

General description

MDY10N025RH uses advanced Magnachip's MV MOSFET Technologies, which provides high performance in on-state resistance, fast switching, parallel performance and excellent quality.
MDY10N025RH is the best solution for high power application where thermal behavior.
Driver source pin avoids gate ringing and false triggering which would normally require switching loss to be limited to manage the source stray inductance of normal package.



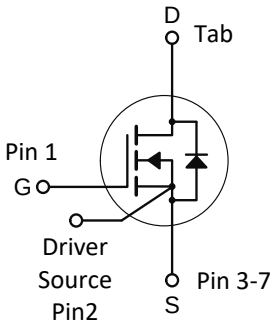
Top View

M2PAK-7P

Bottom View

Features and benefits

- **Very low on-resistance $R_{DS(on)}$**
- **100% Avalanche / R_g / $\triangle V_{DS}$ Tested**
- **High Reliability Package Solution**



Applications

- **Motor Inverter**
- **Battery Management**
- **Power Inverter**

Key performance parameters

V_{DS}	**100**	V
$R_{DS(on),\ max}$	**0.0025**	Ω
I_D	**240**	A
Q_G	**167**	nC
Junction temperature, max	**175**	°C

RoHS Compliant
HALOGEN-FREE

Ordering information

Type / Ordering Code	Package	Marking	Packing	RoHS Status
MDY10N025RH	M2PAK-7P	10N025	Tape & Reel	Halogen Free

http://www.magnachip.com/powersolutions

MX LISTED NYSE

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

Parameter		Symbol	Rating	Unit
Drain-source Voltage		V_{DS}	100	V
Gate-source Voltage		V_{GS}	± 20	V
Drain current	Tc=25°C Silicon Limited	I_D	306	A
	Tc=25°C Package Limited		240	A
	Tc=100°C Silicon Limited		217	A
1) Pulsed drain current	Tc=25°C	I_{DM}	960	A
Total power dissipation	Tc=25°C	P_{tot}	469	W
	Tc=100°C		234	W
2) Avalanche energy, single pulse		E_{AS}	613	mJ
Operating and storage temperature		T_j, T_{stg}	- 55 ~ 175	°C

Thermal characteristics

Parameter	Symbol	Rating	Unit
Thermal resistance, junction - case	$R_{\theta JC}$	0.32	°C/W
3) Thermal resistance, junction - ambient	$R_{\theta JA}$	30	°C/W

Notes
1. Pulse width limited by Tjmax
2. EAS is tested at starting Tj = 25℃, L = 1.0mH, I_{AS} = 35A, 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	$V_{(BR)DSS}$	100	-	-	V	V_{GS}=0 V, I_D=250 μA
Gate threshold voltage	$V_{GS(th)}$	2.0	2.8	4.0	V	V_{DS}=V_{GS}, I_D=250 μA
Zero gate voltage drain current	I_{DSS}	-	-	1	μA	V_{DS}=100 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	$R_{DS(on)}$	-	2.2	2.5	mΩ	V_{GS}=10 V, I_D=100 A
Gate resistance	R_G	-	3.0	-	Ω	f=1MHz
Transconductance	g_{fs}	-	120	-	S	V_{DS}=10 V, I_D=100 A

Dynamic characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions / Note
Input capacitance	C_{iss}	-	12508	-	pF	V_{GS}=0 V, V_{DS}=50 V, f=1 MHz
Output capacitance	C_{oss}	-	1457	-	pF	V_{GS}=0 V, V_{DS}=50 V, f=1 MHz
Reverse transfer capacitance	C_{rss}	-	14	-	pF	V_{GS}=0 V, V_{DS}=50 V, f=1 MHz
Turn-on delay time	$t_{d(on)}$	-	33	-	ns	V_{DD}=50 V, V_{GS}=10 V, ID=100 A, $R_{G,ext}$=3Ω
Rise time	t_r	-	21	-	ns	V_{DD}=50 V, V_{GS}=10 V, ID=100 A, $R_{G,ext}$=3Ω
Turn-off delay time	$t_{d(off)}$	-	137	-	ns	V_{DD}=50 V, V_{GS}=10 V, ID=100 A, $R_{G,ext}$=3Ω
Fall time	t_f	-	43	-	ns	V_{DD}=50 V, V_{GS}=10 V, ID=100 A, $R_{G,ext}$=3Ω

Gate charge characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions / Note
Gate to source charge	Q_{gs}	-	45	-	nC	V_{DD}=50 V, I_D=100 A, V_{GS}=0 to 10 V
Gate charge at threshold	$Q_{gs(th)}$	-	39	-	nC	V_{DD}=50 V, I_D=100 A, V_{GS}=0 to 10 V
Gate to drain charge	Q_{gd}	-	37	-	nC	V_{DD}=50 V, I_D=100 A, V_{GS}=0 to 10 V
Switching charge	Q_{sw}	-	43	-	nC	V_{DD}=50 V, I_D=100 A, V_{GS}=0 to 10 V
Gate charge total	Q_g	-	167	-	nC	V_{DD}=50 V, I_D=100 A, V_{GS}=0 to 10 V
Gate plateau voltage	$V_{plateau}$	-	4.3	-	V	V_{DD}=50 V, I_D=100 A, V_{GS}=0 to 10 V

Source-drain diode

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions / Note
Diode continuous forward current	I_S	-	-	240	A	-
Diode pulse current	$I_{S,pulse}$	-	-	960	A	pulsed; tp ≤ 10 μs
Diode forward voltage	V_{SD}	-	0.9	1.2	V	V_{GS}=0 V, I_F=100 A
Reverse recovery time	t_{rr}	-	117	-	ns	I_F=100 A, d_{iF}/dt=100 A/μs
Reverse recovery charge	Q_{rr}	-	408	-	nC	I_F=100 A, d_{iF}/dt=100 A/μs

Electrical characteristics diagrams

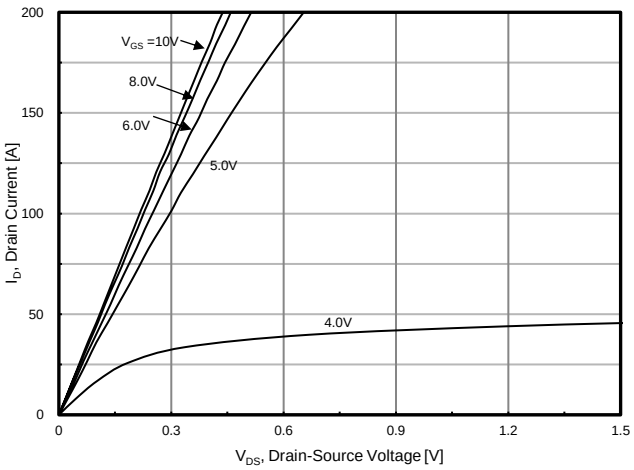


Fig. 1. Output Characteristics

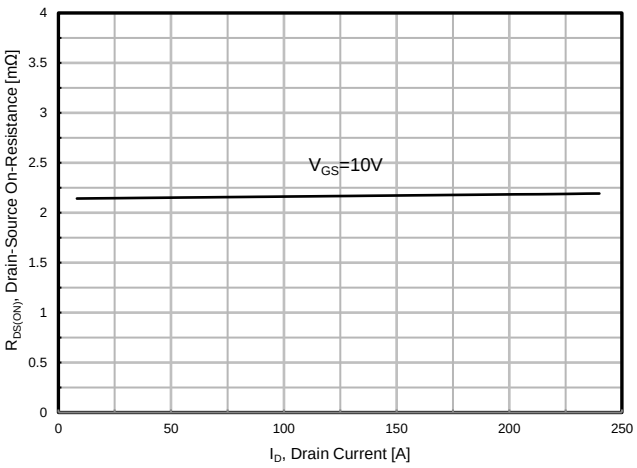


Fig. 2. Static On-Resistance Variation

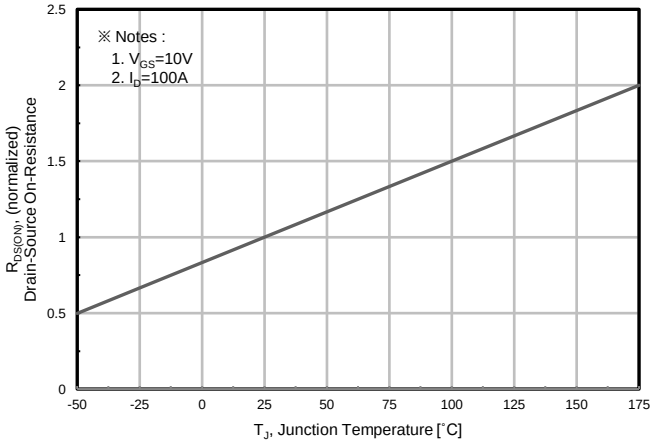


Fig. 3. On-Resistance vs. Junction Temperature

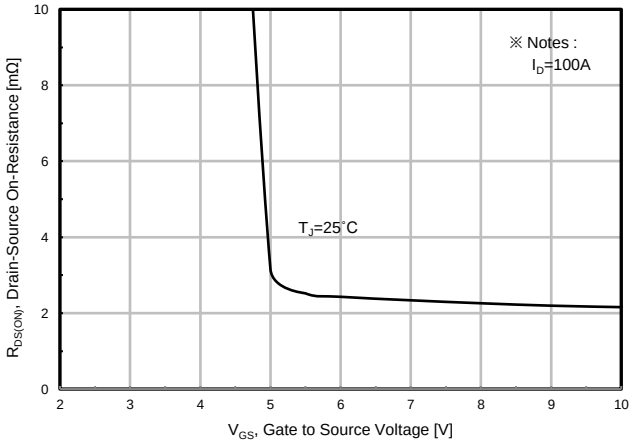


Fig. 4. On-Resistance vs. Gate to Source Voltage

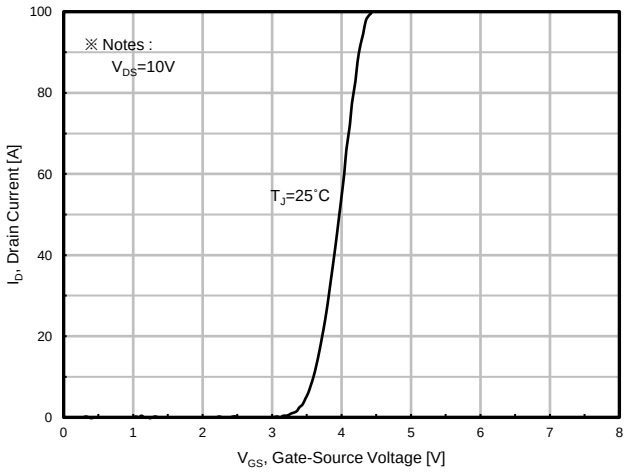


Fig. 5. Transfer Characteristics

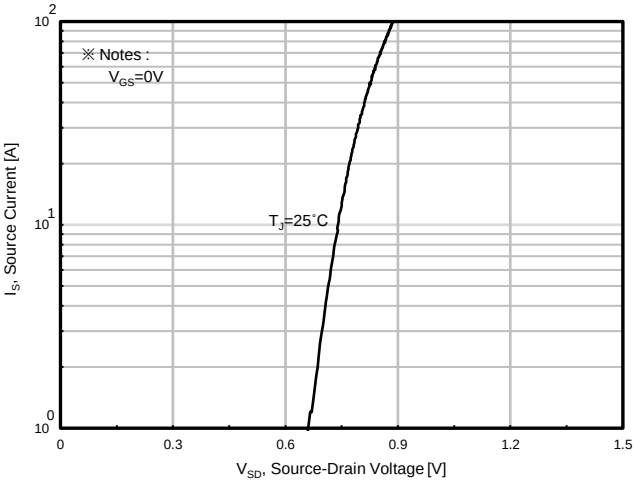


Fig. 6. Body Diode Forward Voltage Variation with Source Current and Temperature

Electrical characteristics diagrams

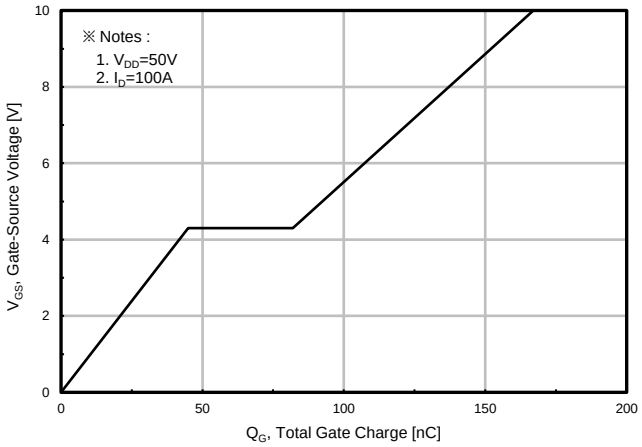


Fig. 7. Gate Charge

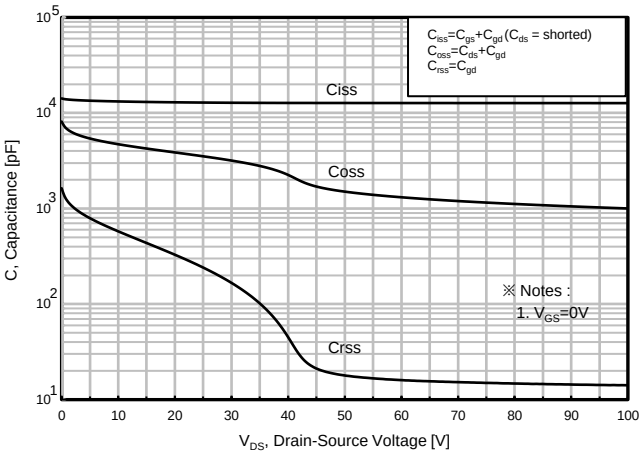


Fig. 8. Capacitances

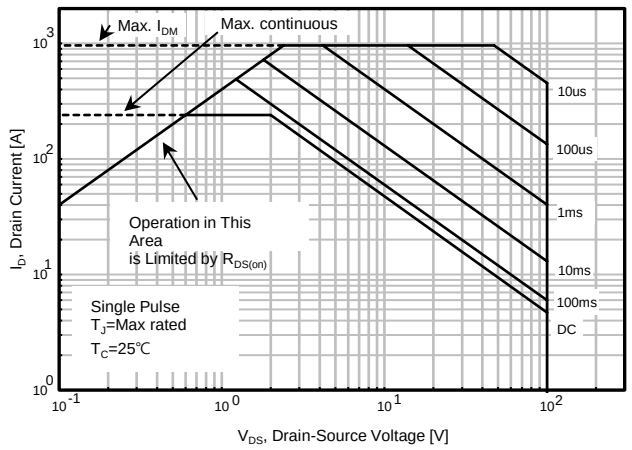


Fig. 9. Safe Operating Area

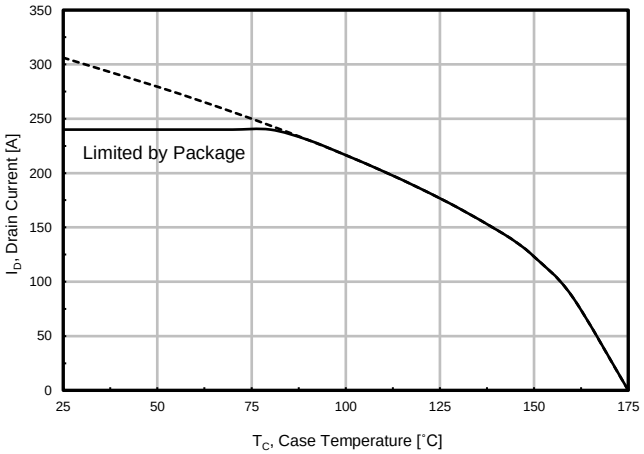


Fig. 10. Maximum Drain Current vs. Case Temperature

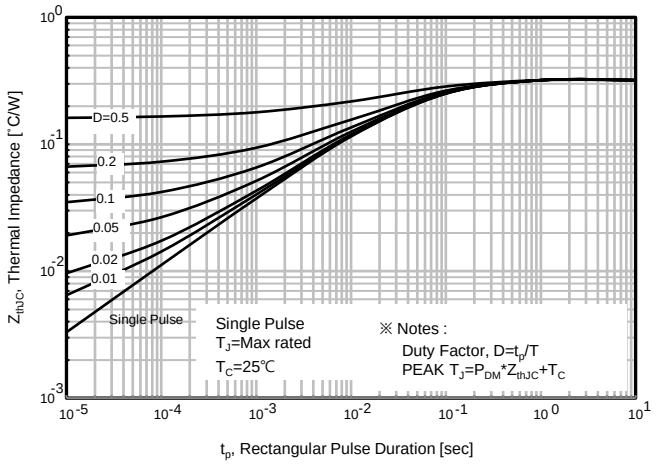
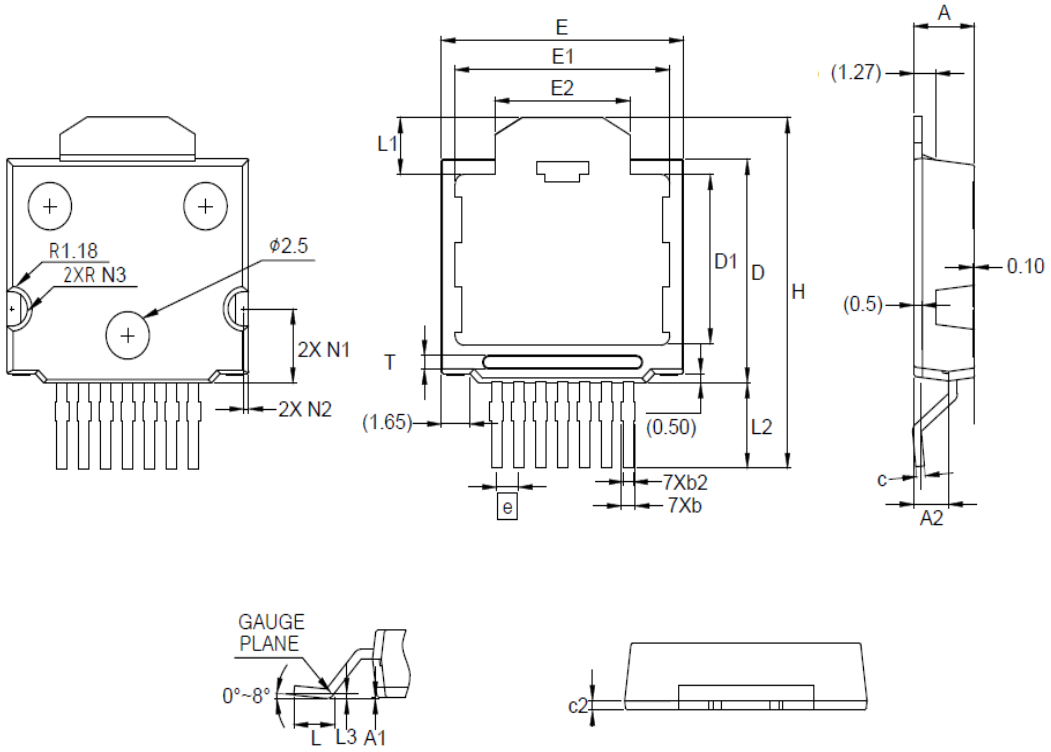


Fig. 11. Transient Thermal Impedance

Package information

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

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.