



MDY08N019RH

Single N-channel Trench MOSFET 80V 1.9mΩ 240A

General description

MDY08N019RH uses advanced MagnaChip's MV MOSFET Technologies, which provides high performance in on-state resistance, fast switching, parallel performance and excellent quality.

MDY08N019RH 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.

Features and benefits

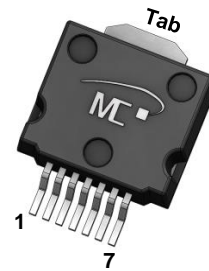
- Very low on-resistance $R_{DS(on)}$
- 100% Avalanche / R_g / ΔV_{DS} Tested
- High Reliability Package Solution

Applications

- Motor Inverter
- Battery Management
- Power Inverter

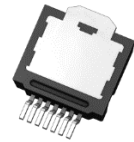
Key performance parameters

V_{DS}	80	V
$R_{DS(on), max}$	0.0019	Ω
I_D	240	A
Q_G	166	nC
Junction temperature, $_{max}$	175	$^{\circ}C$

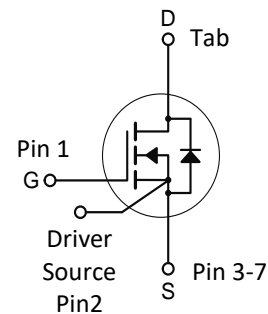


Top View

M2PAK-7P



Bottom View



Ordering information

Type / Ordering Code	Package	Marking	Packing	RoHS Status
MDY08N019RH	M2PAK-7P	08N019	Tape & Reel	Halogen Free

<http://www.magnachip.com/powersolutions>

Maximum ratings, at $T_j = 25^\circ\text{C}$, unless otherwise specified

Parameter		Symbol	Rating	Unit
Drain-source Voltage		V_{DS}	80	V
Gate-source Voltage		V_{GS}	± 20	V
Drain current	$T_C=25^\circ\text{C}$ Silicon Limited	I_D	314	A
	$T_C=25^\circ\text{C}$ Package Limited		240	A
	$T_C=100^\circ\text{C}$ Silicon Limited		222	A
¹⁾ Pulsed drain current	$T_C=25^\circ\text{C}$	I_{DM}	960	A
Total power dissipation	$T_C=25^\circ\text{C}$	P_{tot}	375	W
	$T_C=100^\circ\text{C}$		188	W
²⁾ Avalanche energy, single pulse		E_{AS}	800	mJ
Operating and storage temperature		T_j, T_{stg}	- 55 ~ 175	$^\circ\text{C}$

Thermal characteristics

Parameter		Symbol	Rating	Unit
Thermal resistance, junction - case		$R_{\theta JC}$	0.4	$^\circ\text{C/W}$
³⁾ Thermal resistance, junction - ambient		$R_{\theta JA}$	30	$^\circ\text{C/W}$

Notes

- Pulse width limited by T_{jmax}
- EAS is tested at starting $T_j = 25^\circ\text{C}$, $L = 1.0\text{mH}$, $I_{AS} = 40\text{A}$, $V_{DD} = 50\text{V}$, $V_{GS} = 10\text{V}$
- 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)}	2.4	-	3.8	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)}	-	1.6	1.9	mΩ	V _{GS} =10 V, I _D =100 A
		-	2.0	3.3	mΩ	V _{GS} =6 V, I _D =50 A
Gate resistance	R _G	-	3.3	-	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}	-	12,025	-	pF	V _{GS} =0 V, V _{DS} =40 V, f=1 MHz
Output capacitance	C _{oss}	-	2,634	-	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)}	-	34	-	ns	V _{DD} =40 V, V _{GS} =10 V, I _D =100 A, R _{G,ext} =3Ω
Rise time	t _r	-	25	-	ns	V _{DD} =40 V, V _{GS} =10 V, I _D =100 A, R _{G,ext} =3Ω
Turn-off delay time	t _{d(off)}	-	128	-	ns	V _{DD} =40 V, V _{GS} =10 V, I _D =100 A, R _{G,ext} =3Ω
Fall time	t _f	-	60	-	ns	V _{DD} =40 V, V _{GS} =10 V, I _D =100 A, R _{G,ext} =3Ω

Gate charge characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions / Note
Gate to source charge	Q _{gs}	-	42	-	nC	V _{DD} =40 V, I _D =100 A, V _{GS} =0 to 10 V
Gate charge at threshold	Q _{gs(th)}	-	32	-	nC	V _{DD} =40 V, I _D =100 A, V _{GS} =0 to 10 V
Gate to drain charge	Q _{gd}	-	38	-	nC	V _{DD} =40 V, I _D =100 A, V _{GS} =0 to 10 V
Switching charge	Q _{sw}	-	48	-	nC	V _{DD} =40 V, I _D =100 A, V _{GS} =0 to 10 V
Gate charge total	Q _g	-	166	-	nC	V _{DD} =40 V, I _D =100 A, V _{GS} =0 to 10 V
Gate plateau voltage	V _{plateau}	-	4.4	-	V	V _{DD} =40 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; t _p ≤ 10 μs
Diode forward voltage	V _{SD}	-	1.0	1.2	V	V _{GS} =0 V, I _F =100 A
Reverse recovery time	t _{rr}	-	136	-	ns	I _F =100 A, d _I /dt=100 A/μs
Reverse recovery charge	Q _{rr}	-	454	-	nC	I _F =100 A, d _I /dt=100 A/μs

Electrical characteristics diagrams

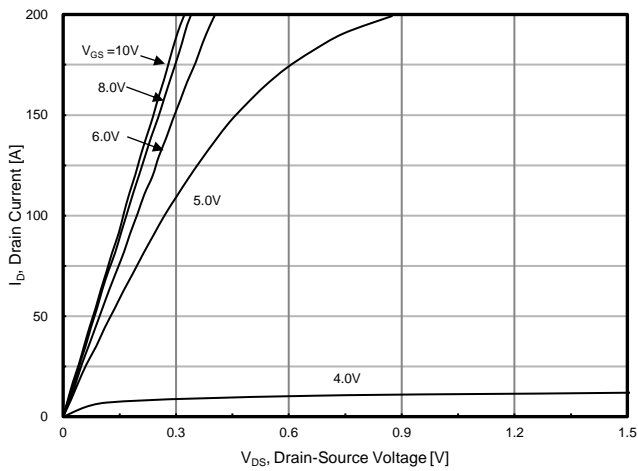


Fig. 1. Output Characteristics

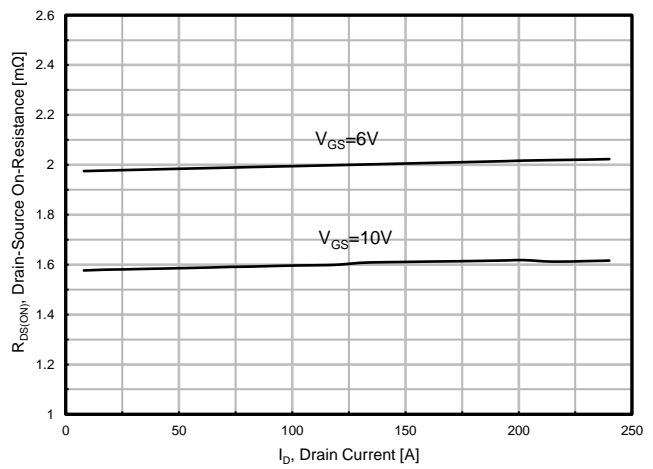


Fig. 2. Static On-Resistance Variation

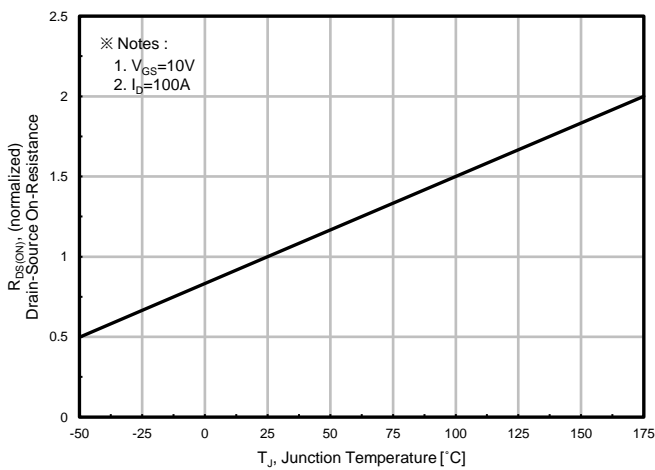


Fig. 3. On-Resistance vs. Junction Temperature

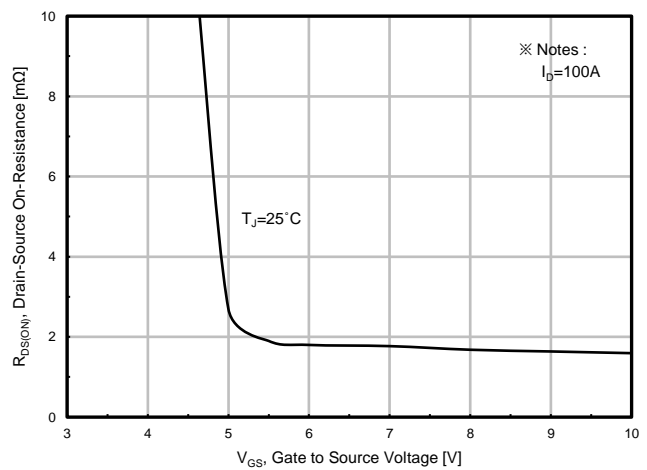


Fig. 4. On-Resistance vs. Gate to Source Voltage

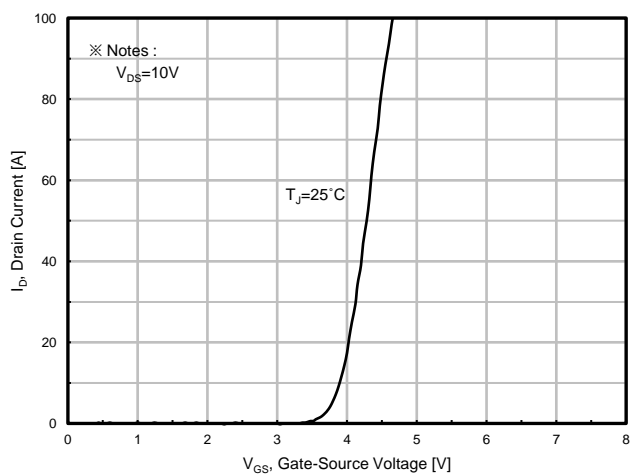


Fig. 5. Transfer Characteristics

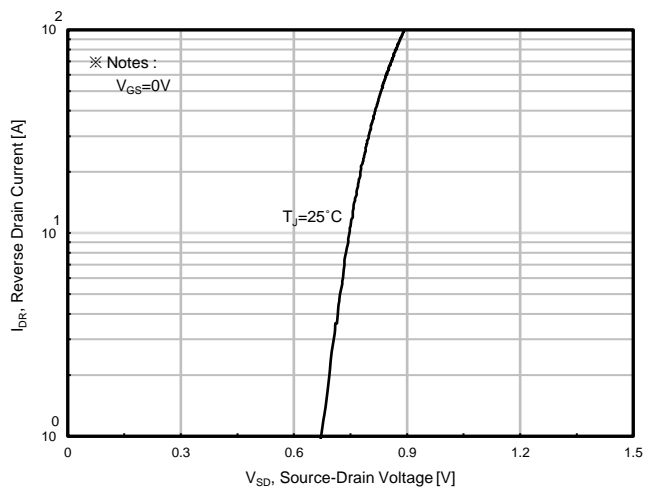


Fig. 6. Body Diode Forward Voltage Variation with Source Current and Temperature

Electrical characteristics diagrams

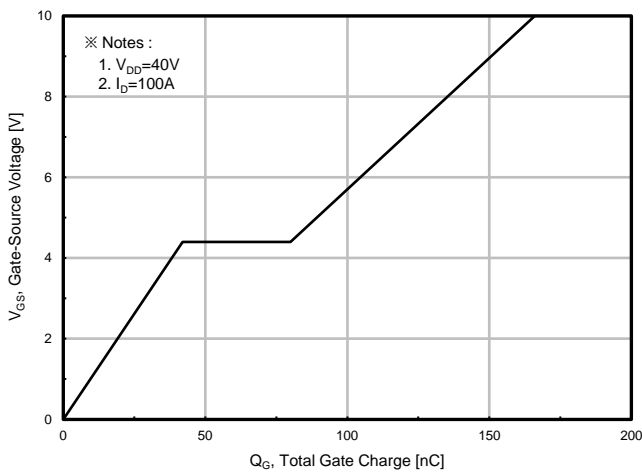


Fig. 7. Gate Charge

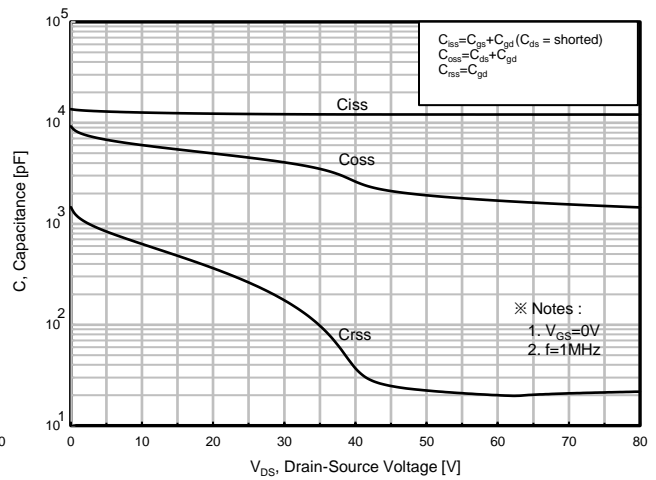


Fig. 8. Capacitances

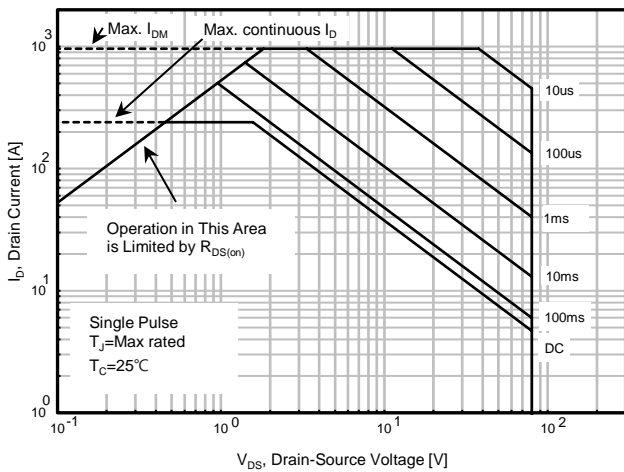


Fig. 9. Safe Operating Area

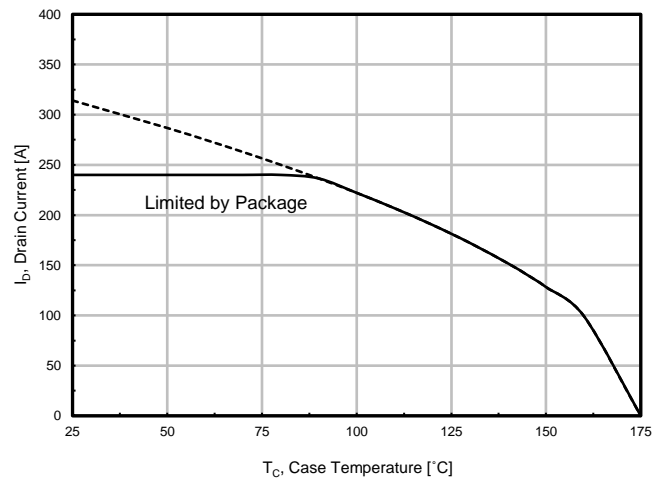


Fig. 10. Maximum Drain Current vs. Case Temperature

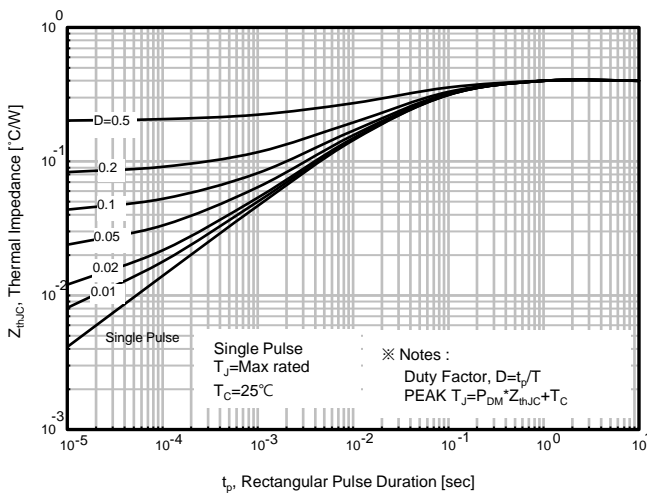
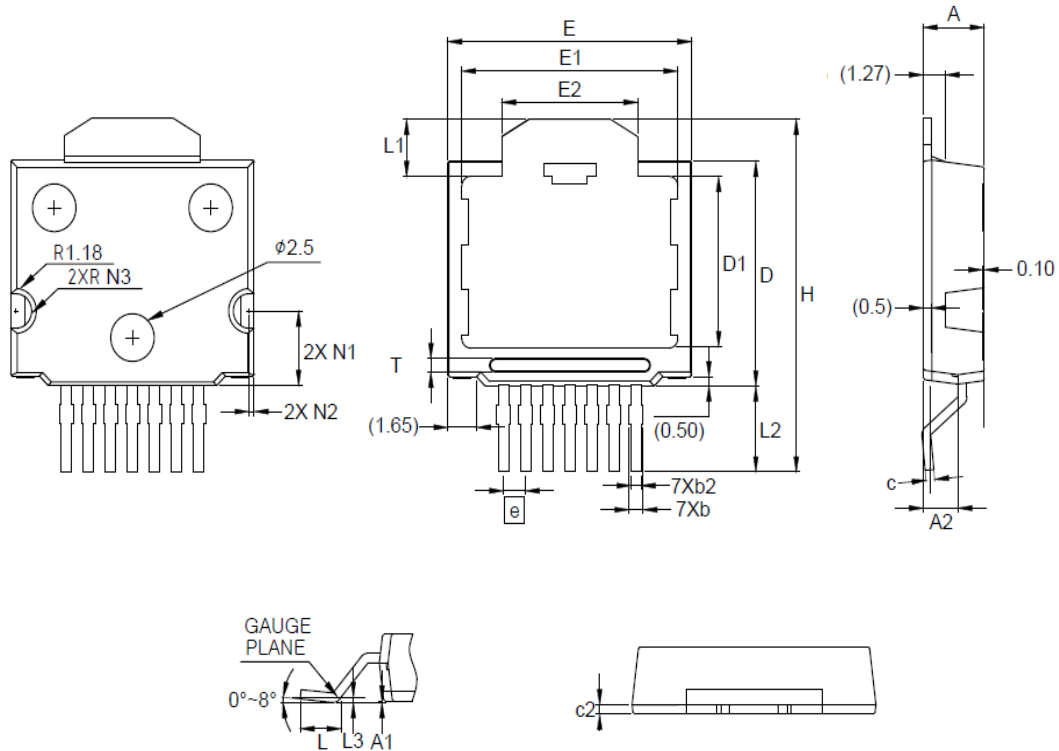


Fig. 11. Transient Thermal Impedance

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

Notes

PKG dimension does not include mold burr and flash

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