RoHS Compliant

MagnaChip

MDP15N075

Single N-channel Trench MOSFET 150V, 120A, 7.5mΩ

General Description

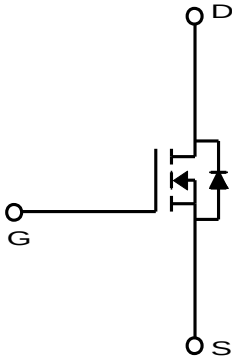
The MDP15N075 uses advanced MagnaChip's MV MOSFET Technology, which provides high performance in on-state resistance, fast switching performance, and excellent quality.

These devices can also be utilized in industrial applications such as Low Power Drives of E-bike (E-Vehicles), DC/DC converter, and general purpose applications.

Features

- V_{DS} = 150V
- I_D = 120A @V_{GS} = 10V
- Very low on-resistance $R_{DS(ON)}$ < 7.5 mΩ @V_{GS} = 10V
- 100% UIL Tested
- 100% Rg Tested

TO-220



Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Drain-Source Voltage		V_{DSS}	150	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current (1)	T_C=25°C (Silicon Limited)	I_D	144	A
	T_C=25°C (Package Limited)		120	
	T_C=100°C		91	
Pulsed Drain Current (3)		I_{DM}	480	
Power Dissipation	T_C=25°C	P_D	312	W
	T_C=100°C		125	
Single Pulse Avalanche Energy (2)		E_{AS}	450	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	$R_{\theta JC}$	0.4	

Ordering Information

Part Number	Temp. Range	Package	Packing	RoHS Status
MDP15N075TH	-55~150°C	TO-220	Tube	Halogen Free

Electrical Characteristics (T_J =25°C)

Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	I_D = 250μA, V_{GS} = 0V	150	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	2.1	-	4.1	
Drain Cut-Off Current	I_{DSS}	V_{DS} = 120V, V_{GS} = 0V	-	-	1.0	μA
Gate Leakage Current	I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V	-	-	±0.1	
Drain-Source ON Resistance	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 50A	-	6.2	7.5	mΩ
Forward Transconductance	g_{fs}	V_{DS} = 10V, I_D = 100A	-	70	-	S
Dynamic Characteristics						
Total Gate Charge	Q_g	V_{DS} = 50V, I_D = 50A, V_{GS} = 10V	-	91	-	nC
Gate-Source Charge	Q_{gs}		-	33	-	
Gate-Drain Charge	Q_{gd}		-	25	-	
Input Capacitance	C_{iss}	V_{DS} = 40V, V_{GS} = 0V, f = 1.0MHz	-	6,220	-	pF
Output Capacitance	C_{oss}		-	2,220	-	
Reverse Transfer Capacitance	C_{rss}		-	94	-	
Turn-On Delay Time	$t_{d(on)}$	V_{GS} = 10V, V_{DS} = 50V, I_D = 50A , R_G = 3.0Ω	-	40	-	ns
Rise Time	t_r		-	28	-	
Turn-Off Delay Time	$t_{d(off)}$		-	69	-	
Fall Time	t_f		-	20	-	
Gate Resistance	Rg	f=1 MHz	-	3	-	Ω
Drain-Source Body Diode Characteristics						
Source-Drain Diode Forward Voltage	V_{SD}	I_S = 50A, V_{GS} = 0V	-	0.9	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	I_F = 50A, dI/dt = 100A/μs	-	153	-	ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	655	-	nC

Note :

1. Surface mounted FR-4 board by JEDEC (jesd51-7). Continuous current at T_C=25℃ is silicon limited
2. E_{AS} is tested at starting Tj = 25℃, L = 1.0mH, I_{AS} = 30.0A, V_{GS} = 10V.
3. Pulse width limited by TJmax

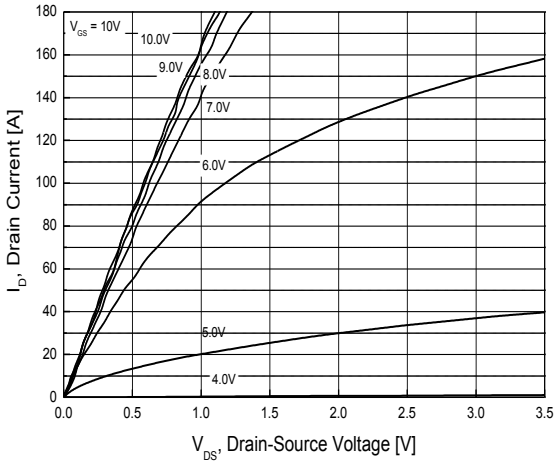


Fig.1 On-Region Characteristics

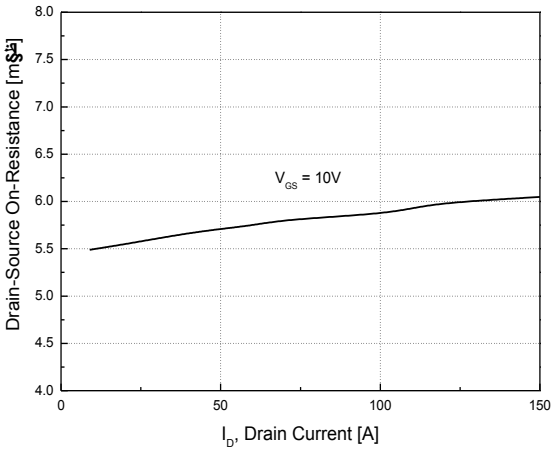


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

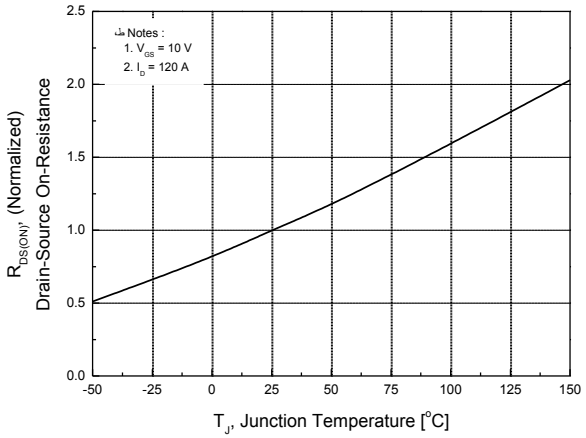


Fig.3 On-Resistance Variation with Temperature

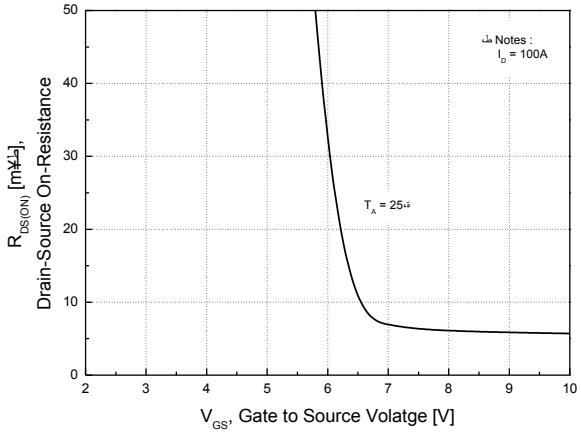


Fig.4 On-Resistance Variation with Gate to Source Voltage

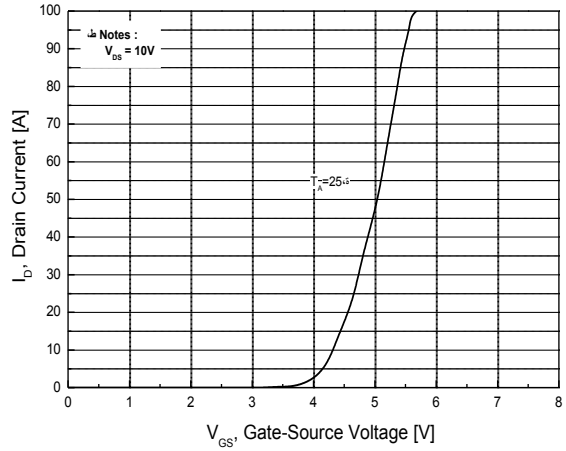


Fig.5 Transfer Characteristics

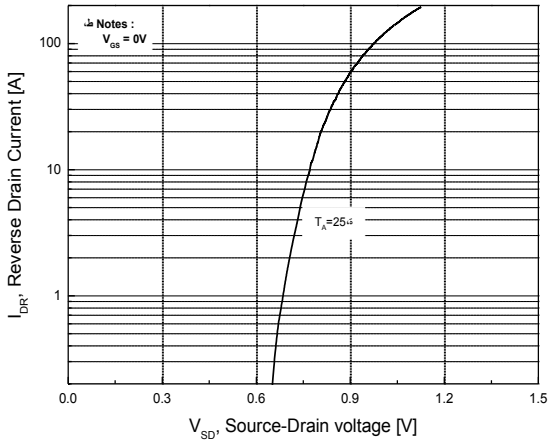


Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature

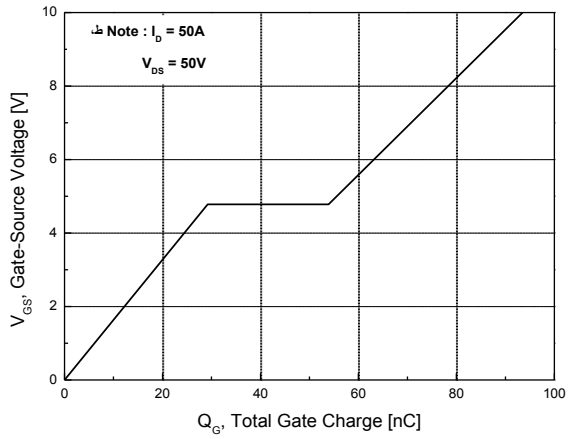


Fig.7 Gate Charge Characteristics

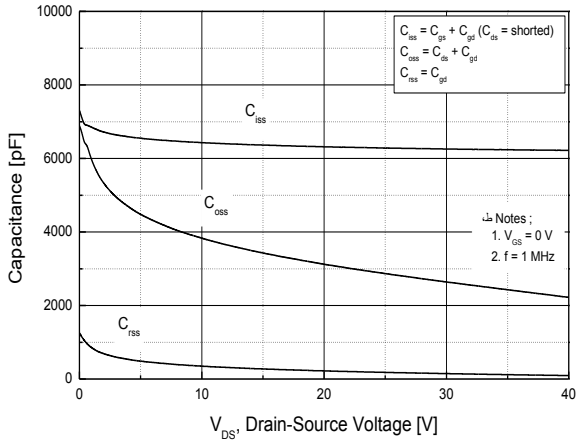


Fig.8 Capacitance Characteristics

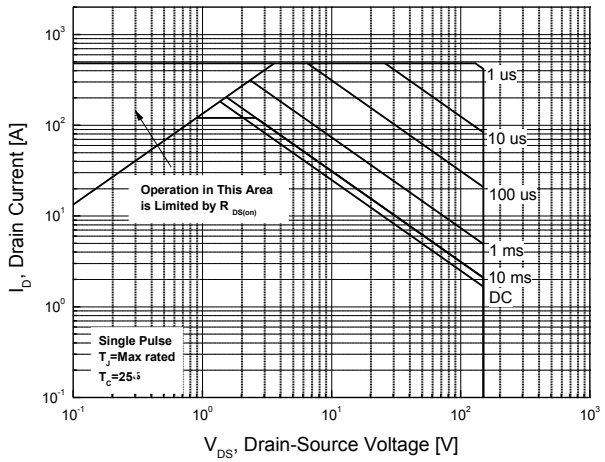


Fig.9 Maximum Safe Operating Area

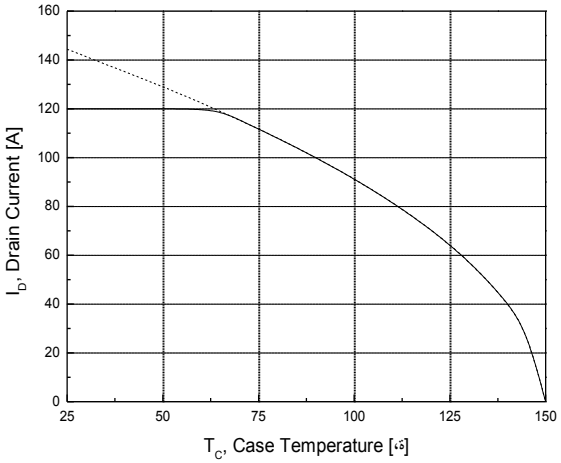


Fig.10 Maximum Drain Current vs. Case Temperature

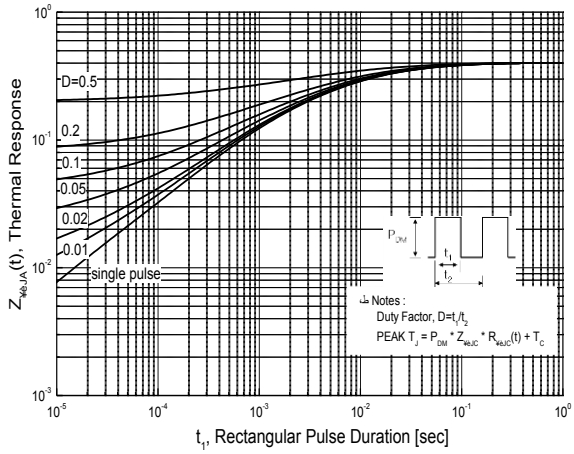
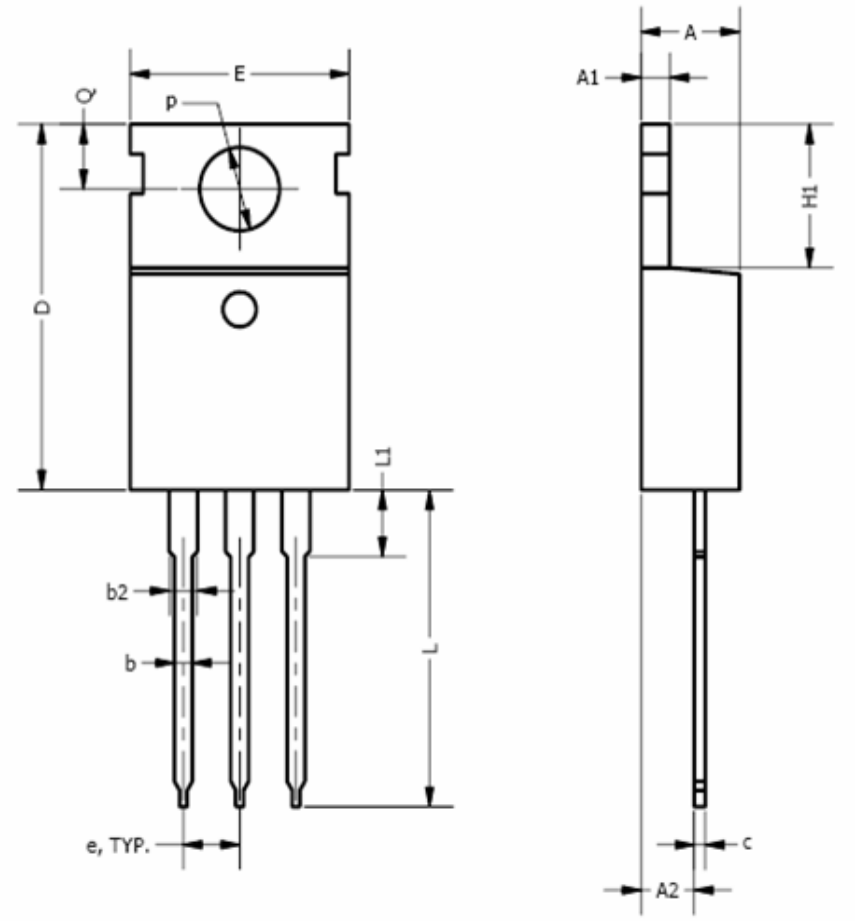


Fig.11 Transient Thermal Response Curve

Package Dimension

3 Leads, TO-220

Dimensions are in millimeters unless otherwise specified



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

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.