

MDP08N055TH

Single N-channel Trench MOSFET 80V

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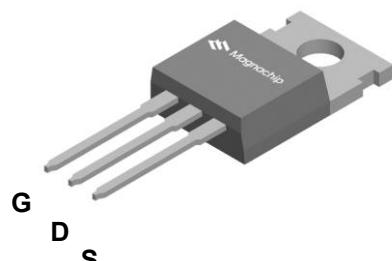
General Description

The MDP08N055TH, Magnachip's latest generation of MV MOSFET Technology, which provides high performance in the lowest $R_{ds(on)}$, fast switching performance, and excellent quality.

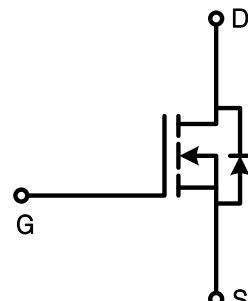
These devices can also be utilized in industrial applications such as Low Power Drives of E-bike, Light electric vehicles, DC/DC converter, and general purpose applications

Features

- $V_{DS} = 80V$
- $I_D = 120 A @ V_{GS} = 10V$
- Very low on-resistance $R_{DS(ON)}$
 $< 5.5 m\Omega @ V_{GS} = 10V$
- 175 °C operating temperature
- 100% UIL Tested
- 100% R_g Tested
- 100% ΔV_{DS} Tested



TO-220



Absolute Maximum Ratings ($T_J = 25^\circ C$)

Characteristics		Symbol	Rating	Unit
Drain-Source Voltage		V_{DSS}	80	V
Gate-Source Voltage		V_{GSS}	± 20	V
Continuous Drain Current ⁽¹⁾	$T_C=25^\circ C$ (Silicon Limited)	I_D	130	A
	$T_C=25^\circ C$ (Package Limited)		120	
	$T_C=100^\circ C$ (Silicon Limited)		92	
	$T_A=25^\circ C$		15	
Pulsed Drain Current ⁽²⁾		I_{DM}	480	
Power Dissipation	$T_C=25^\circ C$	P_D	188	W
	$T_C=100^\circ C$		94	
	$T_A=25^\circ C$		2.4	
Single Pulse Avalanche Energy ⁽³⁾		E_{AS}	181	mJ
Junction and Storage Temperature Range		T_J, T_{stg}	-55~175	°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	$R_{\theta JC}$	0.8	

Ordering Information

Part Number	Temp. Range	Package	Packing	RoHS Status
MDP08N055TH	-55~175°C	TO-220	Tube	Halogen Free

Electrical Characteristics ($T_J = 25^\circ\text{C}$)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D = 250\mu\text{A}, V_{GS} = 0\text{V}$	80	-	-	V
Gate Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	2.4		3.8	
Drain Cut-Off Current	I_{DSS}	$V_{DS} = 80\text{V}, V_{GS} = 0\text{V}$	-	-	1.0	μA
Gate Leakage Current	I_{GSS}	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$	-	-	± 100	nA
Drain-Source ON Resistance	$R_{DS(\text{ON})}$	$V_{GS} = 10\text{V}, I_D = 50\text{A}$		4.5	5.5	$\text{m}\Omega$
Forward Transconductance	g_{fs}	$V_{DS} = 10\text{V}, I_D = 50\text{A}$	-	81	-	S
Dynamic Characteristics						
Total Gate Charge	$Q_{g(10\text{V})}$	$V_{DD} = 40\text{V}, I_D = 50\text{A}, V_{GS} = 10\text{V}$	-	61	-	nC
Gate-Source Charge	Q_{gs}		-	18	-	
Gate-Drain Charge	Q_{gd}		-	15	-	
Input Capacitance	C_{iss}	$V_{DS} = 40\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$	-	4137	-	pF
Reverse Transfer Capacitance	C_{rss}		-	40	-	
Output Capacitance	C_{oss}		-	969	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = 10\text{V}, V_{DD} = 40\text{V}, I_D = 50\text{A}, R_G = 3\Omega,$ $I_F = 50\text{A}, dI/dt = 100\text{A}/\mu\text{s}$	-	23.5	-	ns
Rise Time	t_r		-	13.1	-	
Turn-Off Delay Time	$t_{d(off)}$		-	42.9	-	
Fall Time	t_f		-	13.6	-	
Gate Resistance	R_g	$f=1.0\text{ MHz}$	-	2.5	-	Ω
Drain-Source Body Diode Characteristics						
Source-Drain Diode Forward Voltage	V_{SD}	$I_S = 50\text{A}, V_{GS} = 0\text{V}$	-	0.9	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 50\text{A}, dI/dt = 100\text{A}/\mu\text{s}$	-	86	-	ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	270	-	nC

Note :

1. Surface mounted FR-4 board by JEDEC (jesd51-7)
2. Pulse width limited by $T_{j,\text{max}}$
3. E_{AS} is tested at starting $T_J = 25^\circ\text{C}$, $L = 1.0\text{mH}$, $I_{AS} = 19\text{A}$, $V_{DD} = 50\text{V}$, $V_{GS} = 10\text{V}$

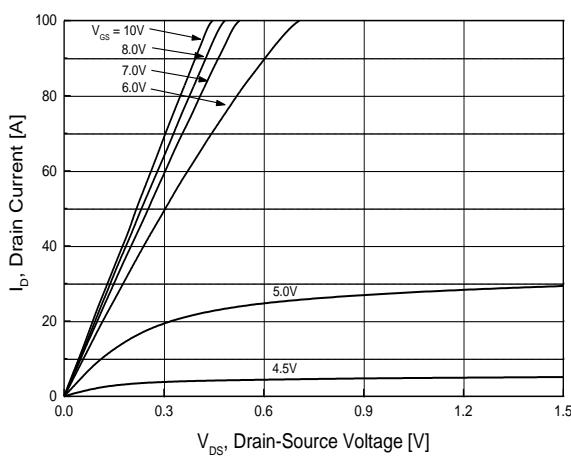


Fig.1 On-Region Characteristics

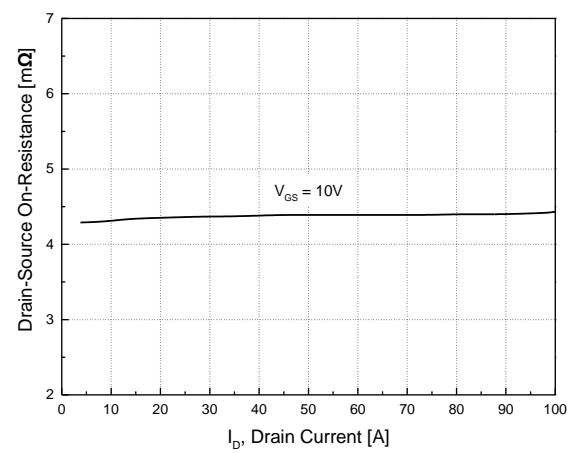


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

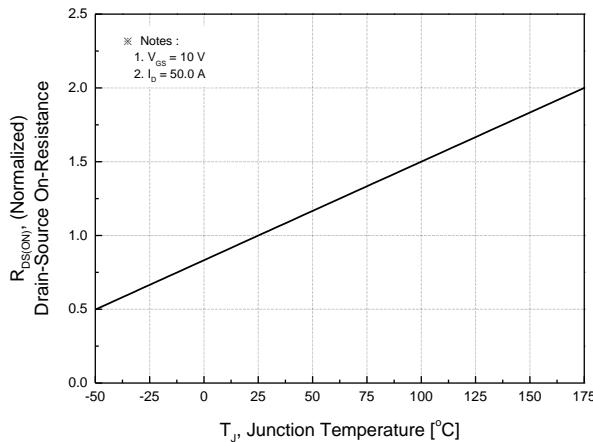


Fig.3 On-Resistance Variation with Temperature

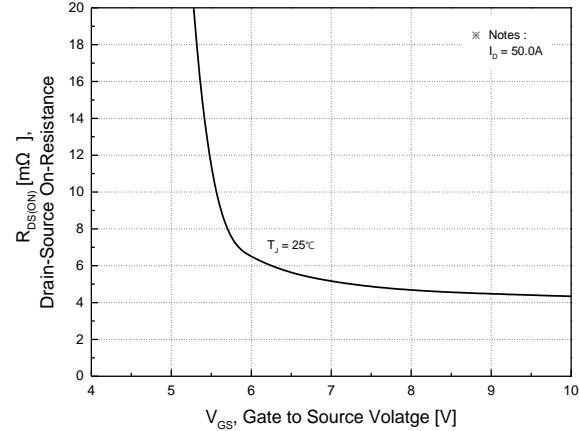


Fig.4 On-Resistance Variation with Gate to Source Voltage

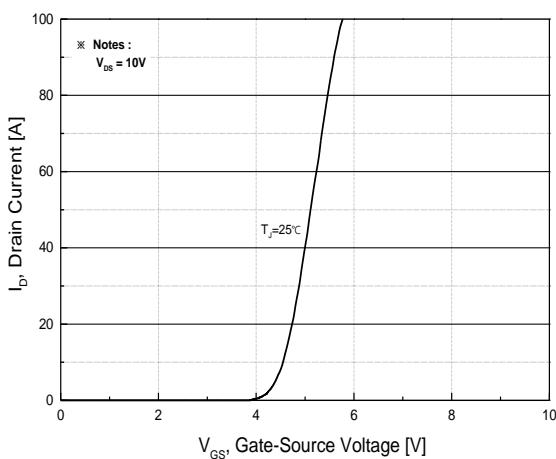


Fig.5 Transfer Characteristics

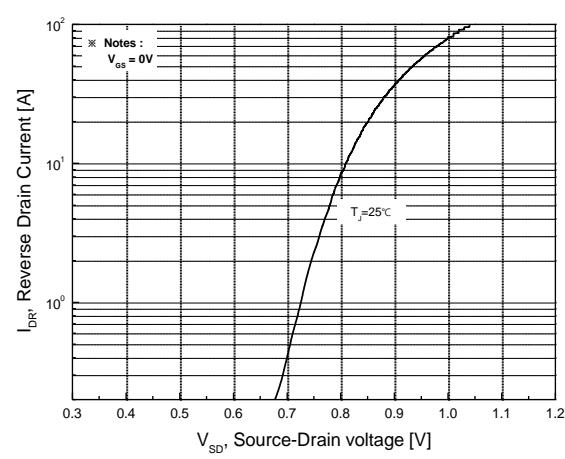


Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature

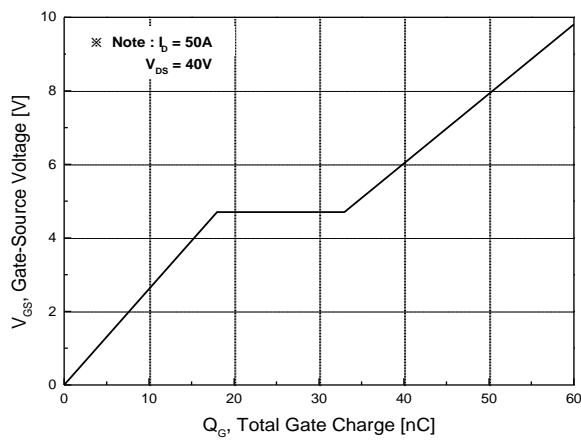


Fig.7 Gate Charge Characteristics

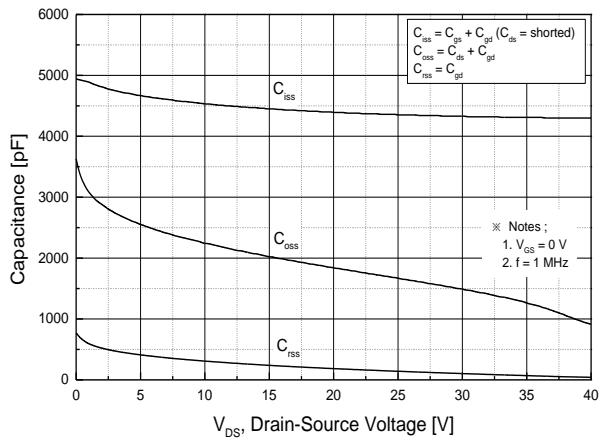


Fig.8 Capacitance Characteristics

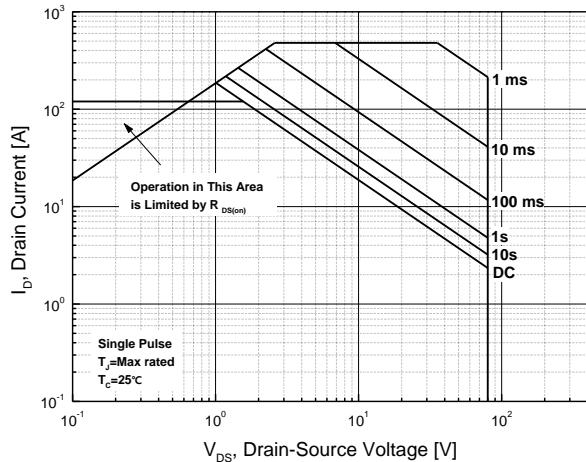


Fig.9 Maximum Safe Operating Area

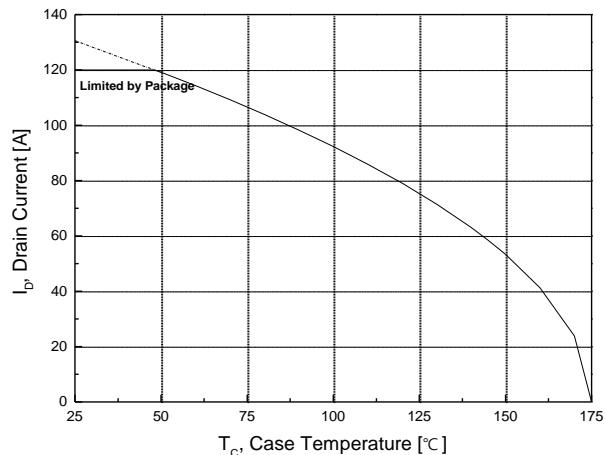


Fig.10 Maximum Drain Current vs. Case Temperature

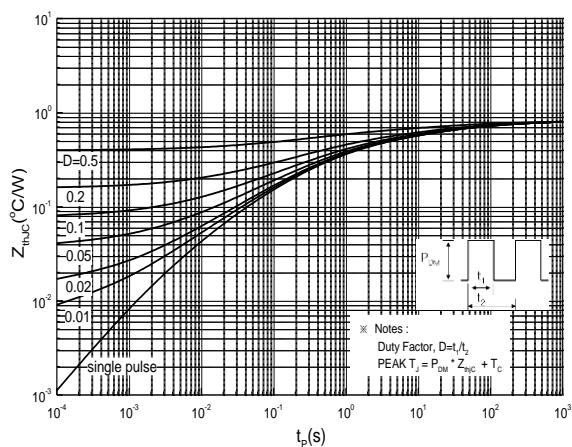
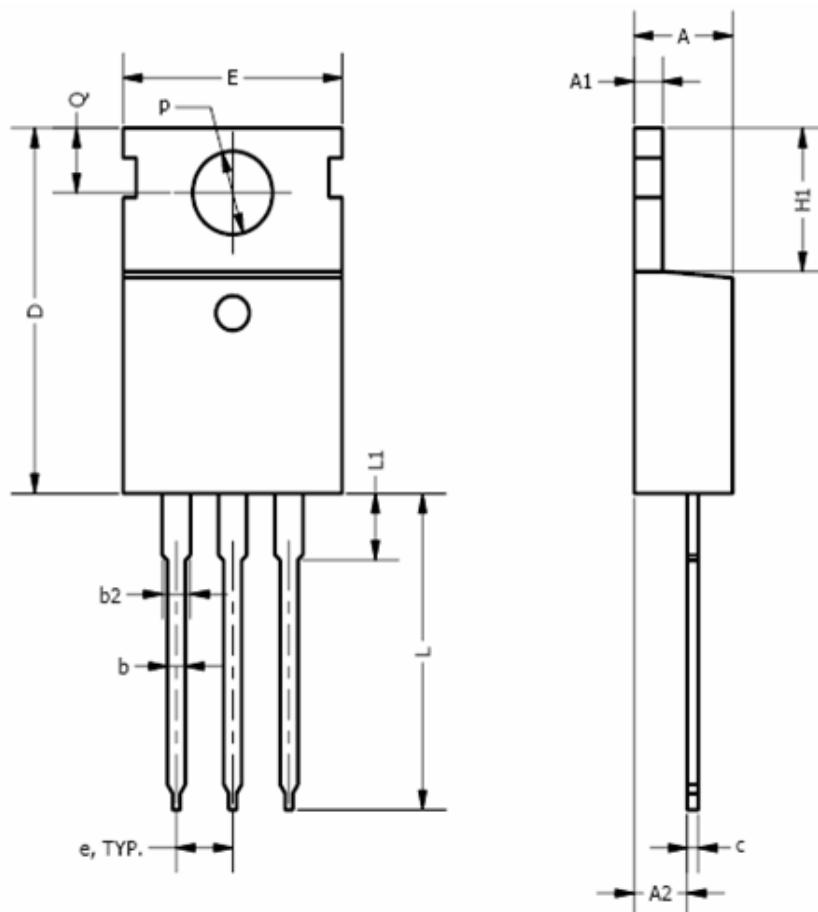


Fig.11 Transient Thermal Response Curve

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
Φ P	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.

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