

### General Description

The MDP7N60 uses advanced MagnaChip's MOSFET Technology, which provides low on-state resistance, high switching performance and excellent quality.

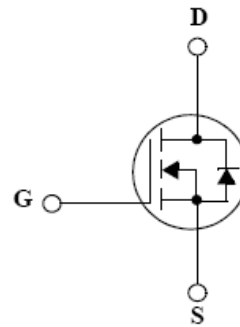
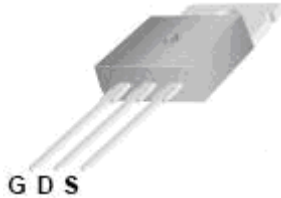
MDP7N60 is suitable device for SMPS, high Speed switching and general purpose applications.

### Features

- $V_{DS} = 600V$
- $V_{DS} = 660V$  @  $T_{jmax}$
- $I_D = 7.0A$  @  $V_{GS} = 10V$
- $R_{DS(ON)} \leq 1.15\Omega$  @  $V_{GS} = 10V$

### Applications

- Power Supply
- PFC
- High Current, High Speed Switching



### Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Drain-Source Voltage		$V_{DSS}$	600	V
Drain-Source Voltage @ $T_{jmax}$		$V_{DSS} @ T_{jmax}$	660	V
Gate-Source Voltage		$V_{GSS}$	±30	V
Continuous Drain Current (※)	$T_C=25^\circ C$	$I_D$	7.0	A
	$T_C=100^\circ C$		4.4	A
Pulsed Drain Current <sup>(1)</sup>		$I_{DM}$	28	A
Power Dissipation	$T_C=25^\circ C$	$P_D$	131	W
	Derate above 25 °C		1.05	W/°C
Repetitive Avalanche Energy $E_{AR}$ <sup>(1)</sup>		$E_{AR}$	13.1	mJ
Peak Diode Recovery $dv/dt$ <sup>(3)</sup>		$Dv/dt$	4.5	V/ns
Single Pulse Avalanche Energy <sup>(4)</sup>		$E_{AS}$	220	mJ
Junction and Storage Temperature Range		$T_J, T_{stg}$	-55~150	°C

※  $I_D$  limited by maximum junction temperature

### Thermal Characteristics

Characteristics	Symbol	Rating	Unit
Thermal Resistance, Junction-to-Ambient <sup>(1)</sup>	$R_{\theta JA}$	62.5	°C/W
Thermal Resistance, Junction-to-Case <sup>(1)</sup>	$R_{\theta JC}$	0.95	

## Ordering Information

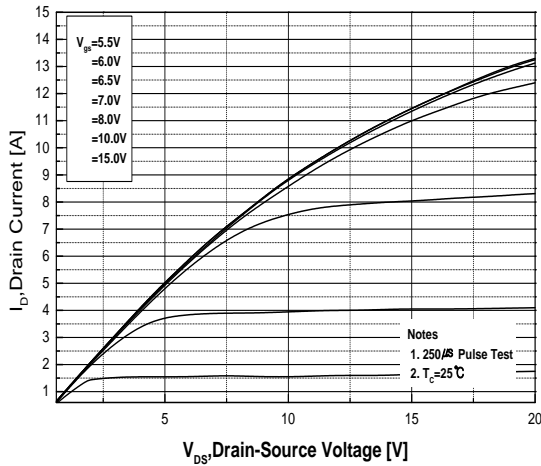
Part Number	Temp. Range	Package	Packing	RoHS Status
MDP7N60TH	-55~150°C	TO-220	Tube	Halogen Free

## Electrical Characteristics (Ta =25°C)

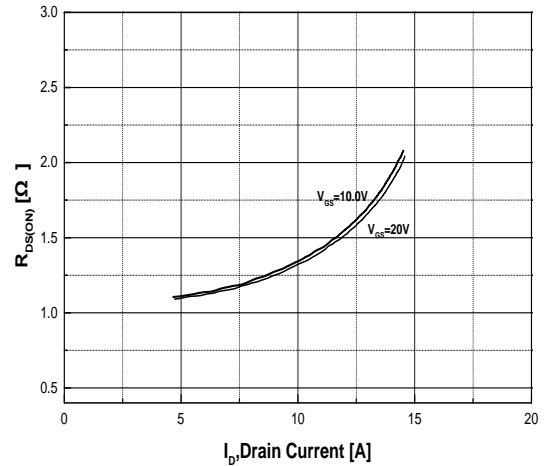
Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$I_D = 250\mu A, V_{GS} = 0V$	600	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	3.0	-	5.0	
Drain Cut-Off Current	$I_{DSS}$	$V_{DS} = 600V, V_{GS} = 0V$	-	-	1	$\mu A$
Gate Leakage Current	$I_{GSS}$	$V_{GS} = \pm 30V, V_{DS} = 0V$	-	-	100	nA
Drain-Source ON Resistance	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 3.5A$	-	1.0	1.15	$\Omega$
Forward Transconductance	$g_{fs}$	$V_{DS} = 30V, I_D = 3.5A$	-	8.5	-	S
<b>Dynamic Characteristics</b>						
Total Gate Charge	$Q_g$	$V_{DS} = 480V, I_D = 7.0A, V_{GS} = 10V^{(3)}$	-	17.8	-	nC
Gate-Source Charge	$Q_{gs}$		-	4.9	-	
Gate-Drain Charge	$Q_{gd}$		-	7.3	-	
Input Capacitance	$C_{iss}$	$V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz$	-	750		pF
Reverse Transfer Capacitance	$C_{rss}$		-	5		
Output Capacitance	$C_{oss}$		-	95		
Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = 10V, V_{DS} = 300V, I_D = 7.0A, R_G = 25\Omega^{(3)}$	-	22		ns
Rise Time	$t_r$		-	36		
Turn-Off Delay Time	$t_{d(off)}$		-	35		
Fall Time	$t_f$		-	25		
<b>Drain-Source Body Diode Characteristics</b>						
Maximum Continuous Drain to Source Diode Forward Current	$I_S$		-	7.0	-	A
Source-Drain Diode Forward Voltage	$V_{SD}$	$I_S = 7.0A, V_{GS} = 0V$	-		1.4	V
Body Diode Reverse Recovery Time	$t_{rr}$	$I_F = 7.0A, di/dt = 100A/\mu s^{(3)}$	-	345		ns
Body Diode Reverse Recovery Charge	$Q_{rr}$		-	3.2		$\mu C$

Note :

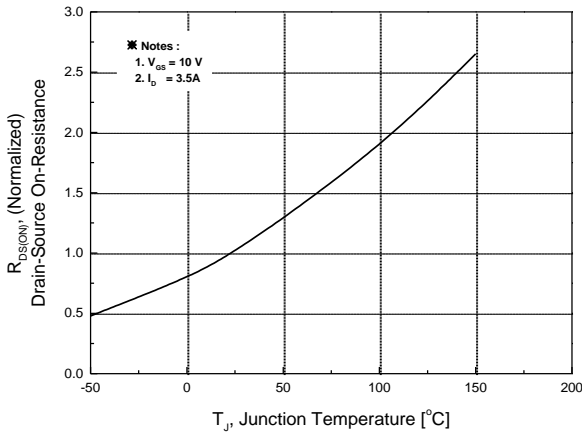
1. Pulse width is based on  $R_{\theta JC}$  &  $R_{\theta JA}$  and the maximum allowed junction temperature of 150°C.
2. Pulse test: pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ , pulse width limited by junction temperature  $T_{J(MAX)}=150^\circ C$ .
3.  $I_{SD} \leq 7.0A$ ,  $di/dt \leq 200A/\mu s$ ,  $V_{DD}=50V$ ,  $R_G=25\Omega$ , Starting  $T_J=25^\circ C$
4.  $L=8.2mH$ ,  $I_{AS}=7.0A$ ,  $V_{DD}=50V$ ,  $R_G=25\Omega$ , Starting  $T_J=25^\circ C$



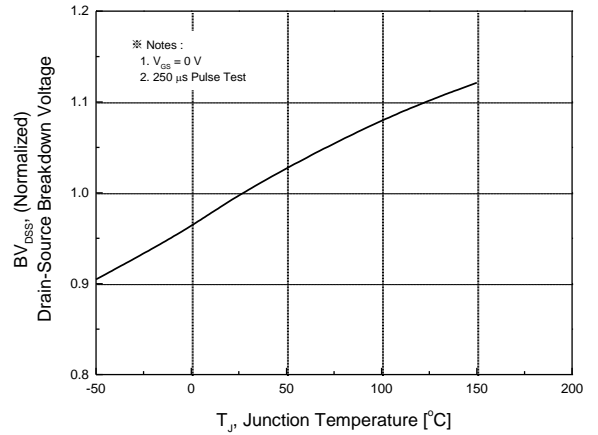
**Fig.1 On-Region Characteristics**



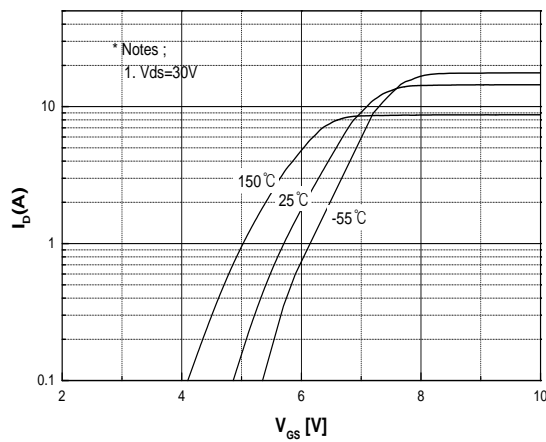
**Fig.2 On-Resistance Variation with Drain Current and Gate Voltage**



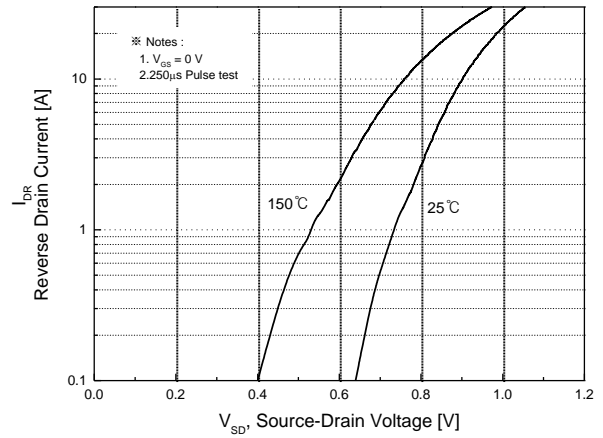
**Fig.3 On-Resistance Variation with Temperature**



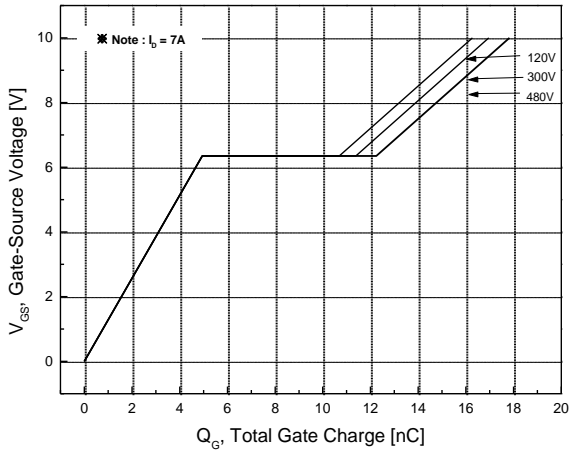
**Fig.4 Breakdown Voltage Variation vs. Temperature**



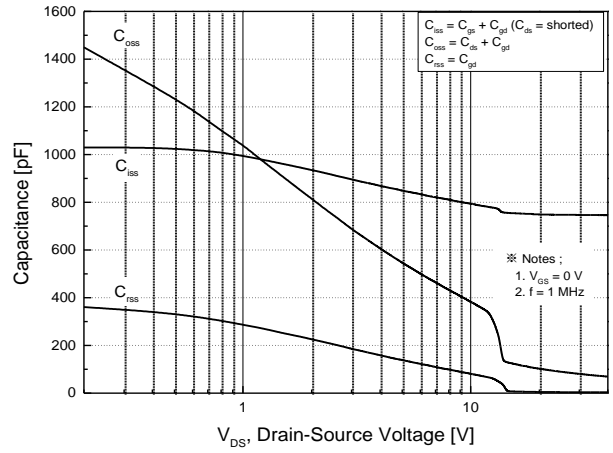
**Fig.5 Transfer Characteristics**



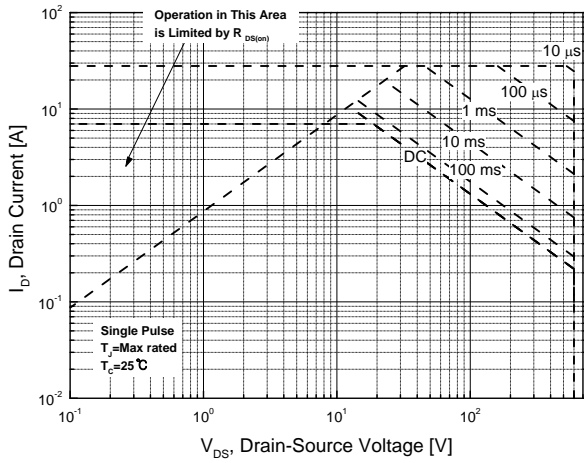
**Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature**



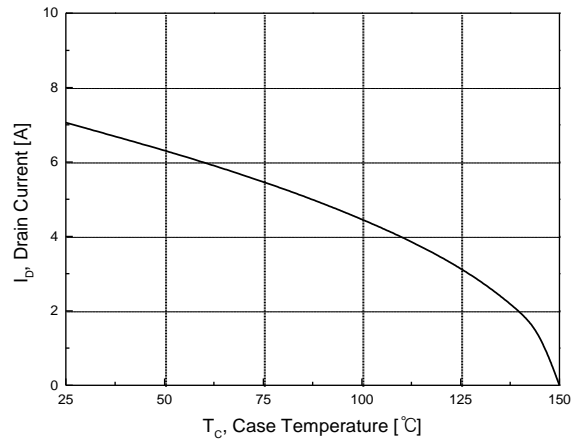
**Fig.7 Gate Charge Characteristics**



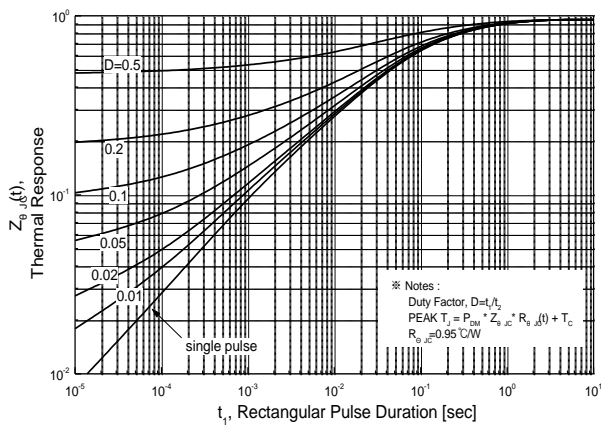
**Fig.8 Capacitance Characteristics**



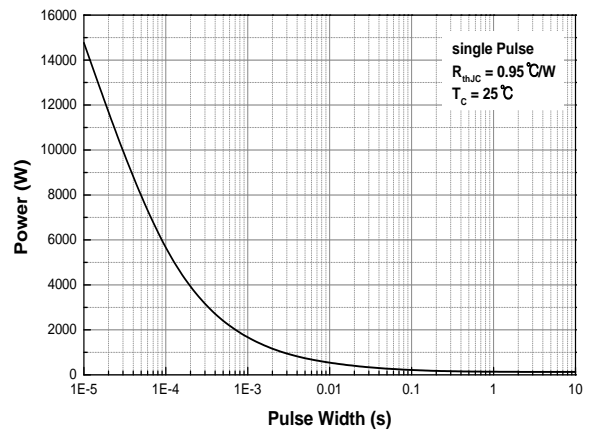
**Fig.9 Maximum Safe Operating Area**



**Fig.10 Maximum Drain Current vs. Case Temperature**



**Fig.11 Transient Thermal Response Curve**

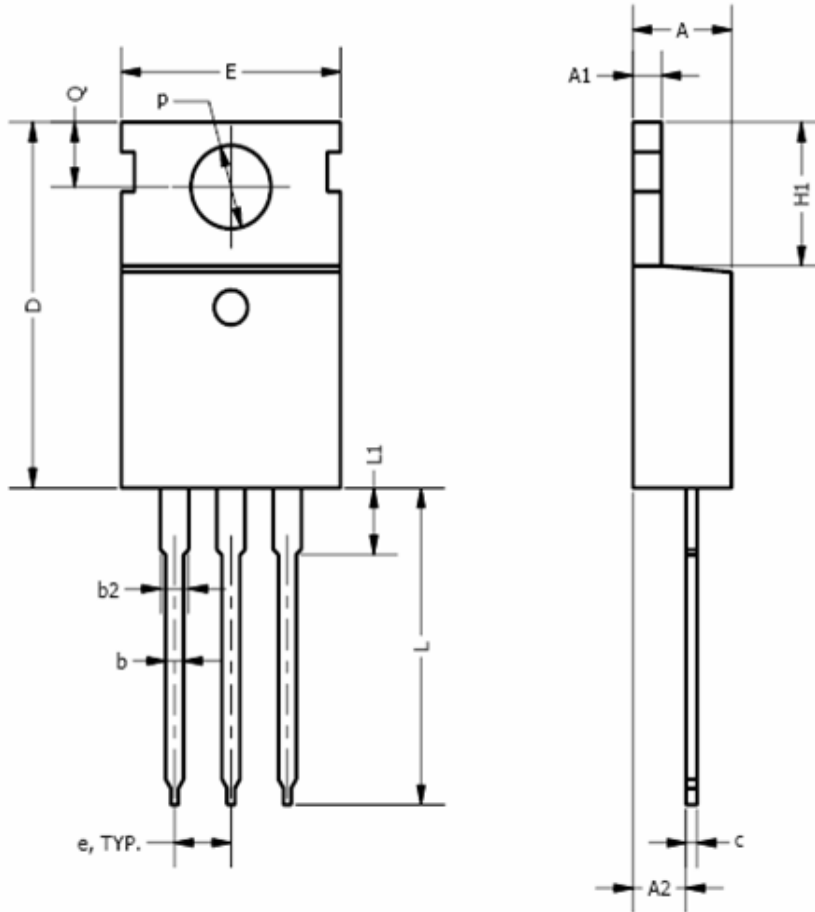


**Fig.12 Single Pulse Maximum Power Dissipation**

■ Physical 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:**

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