

MTP3N60
MTP3N60FI

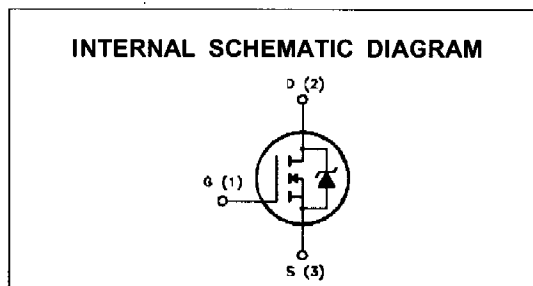
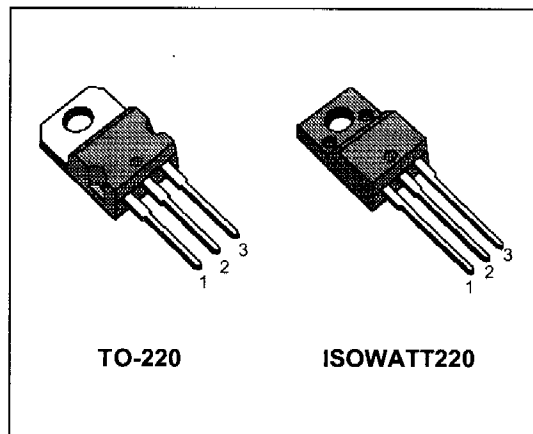
**N - CHANNEL ENHANCEMENT MODE
POWER MOS TRANSISTOR**

TYPE	V _{DSS}	R _{DS(on)}	I _D
MTP3N60	600 V	< 2.5 Ω	3.9 A
MTP3N60FI	600 V	< 2.5 Ω	2.5 A

- TYPICAL R_{DS(on)} = 2 Ω
- AVALANCHE RUGGED TECHNOLOGY
- 100% AVALANCHE TESTED
- REPETITIVE AVALANCHE DATA AT 100°C
- APPLICATION ORIENTED CHARACTERIZATION

APPLICATIONS

- HIGH CURRENT, HIGH SPEED SWITCHING
- SWITCH MODE POWER SUPPLIES (SMPS)
- CHOPPER REGULATORS, CONVERTERS, MOTOR CONTROL, LIGHTING FOR INDUSTRIAL AND CONSUMER ENVIRONMENT

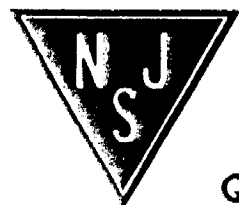


ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value		Unit
		MTP3N60	MTP3N60FI	
V _{DS}	Drain-source Voltage (V _{GS} = 0)	600		V
V _{DGR}	Drain- gate Voltage (R _{GS} = 20 kΩ)	600		V
V _{GS}	Gate-source Voltage	± 20		V
I _D	Drain Current (continuous) at T _c = 25 °C	3.9	2.5	A
I _D	Drain Current (continuous) at T _c = 100 °C	2.4	1.5	A
I _{DM} (*)	Drain Current (pulsed)	14	14	A
P _{tot}	Total Dissipation at T _c = 25 °C	100	35	W
	Derating Factor	0.8	0.28	W/°C
V _{ISO}	Insulation Withstand Voltage (DC)	—	2000	V
T _{stg}	Storage Temperature	-65 to 150		°C
T _j	Max. Operating Junction Temperature	150		°C

(*) Pulse width limited by safe operating area

NJ Semi-Conductors reserves the right to change test conditions, parameter limits and package dimensions without notice. Information furnished by NJ Semi-Conductors is believed to be both accurate and reliable at the time of going to press. However, NJ Semi-Conductors assumes no responsibility for any errors or omissions discovered in its use. NJ Semi-Conductors encourages customers to verify that datasheets are current before placing orders.



MTP3N60/FI

THERMAL DATA

			TO-220	ISOWATT220	
R _{thj-case}	Thermal Resistance Junction-case	Max	1.25	3.57	°C/W
R _{thj-amb}	Thermal Resistance Junction-ambient	Max	62.5		°C/W
R _{thc-sink}	Thermal Resistance Case-sink	Typ	0.5		°C/W
T _l	Maximum Lead Temperature For Soldering Purpose		300		°C

AVALANCHE CHARACTERISTICS

Symbol	Parameter	Max Value	Unit
I _{AR}	Avalanche Current, Repetitive or Not-Repetitive (pulse width limited by T _J max, δ < 1%)	3.9	A
E _{AS}	Single Pulse Avalanche Energy (starting T _J = 25 °C, I _D = I _{AR} , V _{DD} = 25 V)	300	mJ
E _{AR}	Repetitive Avalanche Energy (pulse width limited by T _J max, δ < 1%)	7.7	mJ
I _{AR}	Avalanche Current, Repetitive or Not-Repetitive (T _c = 100 °C, pulse width limited by T _J max, δ < 1%)	2.4	A

ELECTRICAL CHARACTERISTICS (T_{case} = 25 °C unless otherwise specified)

OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V _{(BR)DSS}	Drain-source Breakdown Voltage	I _D = 250 μA V _{GS} = 0	600			V
I _{DSS}	Zero Gate Voltage Drain Current (V _{GS} = 0)	V _{DS} = Max Rating V _{DS} = Max Rating x 0.8 T _c = 125 °C			25 250	μA μA
I _{GSS}	Gate-body Leakage Current (V _{DS} = 0)	V _{GS} = ± 20 V			± 100	nA

ON (*)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} I _D = 1 mA	2	3	4.5	V
R _{DS(on)}	Static Drain-source On Resistance	V _{GS} = 10V I _D = 1.5 A		2	2.5	Ω
I _{D(on)}	On State Drain Current	V _{DS} > I _{D(on)} x R _{DS(on)max} V _{GS} = 10 V	3.9			A

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g _{fs} (*)	Forward Transconductance	V _{DS} > I _{D(on)} x R _{DS(on)max} I _D = 1.5 A	1.5	2.6		S
C _{iss}	Input Capacitance	V _{DS} = 25 V f = 1 MHz V _{GS} = 0		560	800	pF
C _{oss}	Output Capacitance			90	130	pF
C _{rss}	Reverse Transfer Capacitance			40	55	pF

ELECTRICAL CHARACTERISTICS (continued)
SWITCHING ON

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Time	$V_{DD} = 225\text{ V}$ $I_D = 2.5\text{ A}$		45	60	ns
t_r	Rise Time	$R_G = 15\ \Omega$ $V_{GS} = 10\text{ V}$ (see test circuit, figure 3)		33	42	ns
$(di/dt)_{on}$	Turn-on Current Slope	$V_{DD} = 480\text{ V}$ $I_D = 4\text{ A}$ $R_G = 15\ \Omega$ $V_{GS} = 10\text{ V}$ (see test circuit, figure 5)		200		A/ μ s
Q_g	Total Gate Charge	$V_{DD} = 480\text{ V}$ $I_D = 4\text{ A}$ $V_{GS} = 10\text{ V}$		43	55	nC
Q_{gs}	Gate-Source Charge			6		nC
Q_{gd}	Gate-Drain Charge			21		nC

SWITCHING OFF

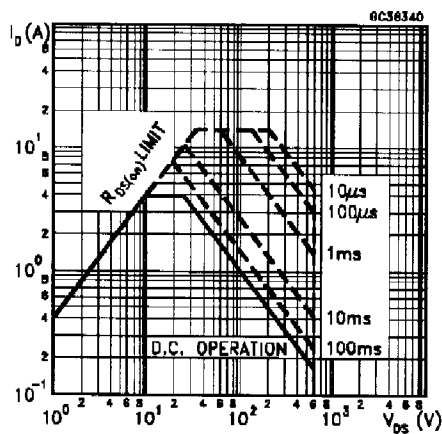
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{r(voff)}$	Off-voltage Rise Time	$V_{DD} = 480\text{ V}$ $I_D = 4\text{ A}$		35	45	ns
t_f	Fall Time	$R_G = 15\ \Omega$ $V_{GS} = 10\text{ V}$		40	55	ns
t_c	Cross-over Time	(see test circuit, figure 5)		60	75	ns

SOURCE DRAIN DIODE

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain Current				3.9	A
$I_{SDM}(\bullet)$	Source-drain Current (pulsed)				14	A
$V_{SD}(\ast)$	Forward On Voltage	$I_{SD} = 3.9\text{ A}$ $V_{GS} = 0$			2	V
t_{rr}	Reverse Recovery Time	$I_{SD} = 4\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$ $V_{DD} = 100\text{ V}$ $T_J = 150\text{ }^\circ\text{C}$ (see test circuit, figure 5)		420		ns
Q_{rr}	Reverse Recovery Charge			3.7		μ C
I_{RRM}	Reverse Recovery Current			18		A

(*) Pulsed: Pulse duration = 300 μ s, duty cycle 1.5 %
(\bullet) Pulse width limited by safe operating area

Safe Operating Areas For TO-220



Safe Operating Areas For ISOWATT220

