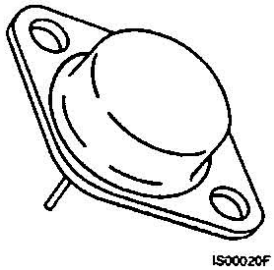
IRF120-123/IRF520-523
MTP10N08/10N10
N-Channel Power Mosfets, 11A,60-100V

Description

These devices are n-channel, enhancement mode, power MOSFETs designed especially for high speed applications, such as switching power supplies, converters, AC and DC motor controls, relay and solenoid drivers and other pulse circuits.

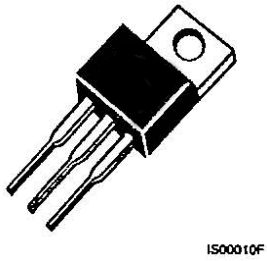
- Low RDS(on)
- VGS Rated at ±20V
- Silicon Gate for Fast Switching Speeds
- IDSS, VDS(on), Specified at Elevated Temperature
- Rugged
- Low Drive Requirements
- Ease of Paralleling

TO-204AA



IRF120
IRF121
IRF122
IRF123

TO-220AB



IRF520
IRF521
IRF522
IRF523
MTP10N08
MTP10N10

Product Summary

Part Number	V_{DSS}	$R_{DS(on)}$	I_D at Tc=25℃	ID at TC=100℃	Case Style
IRF120	100V	0.30 Ω	8.0A	5.0A	TO-204AA
IRF121	60V	0.30 Ω	8.0A	5.0A	
IRF122	100V	0.40 Ω	7.0A	4.0A	
IRF123	60V	0.40 Ω	7.0A	4.0A	
IRF520	100V	0.30 Ω	8.0A	5.0A	TO-220AB
IRF521	60V	0.30 Ω	8.0A	5.0A	
IRF522	100V	0.40 Ω	7.0A	4.0A	
IRF523	60V	0.40 Ω	7.0A	4.0A	
MTP10N08	80V	0.30 Ω	10A	6.4A	
MTP10N10	100V	0.30 Ω	10A	6.4A	

Notes

For information concerning connection diagram and package outline, refer to Section 7.

Maximum Rating

Symbol	Characteristic	Rating IRF120/122 IRF520/522 MTP10N10	Rating MTP10N08	Rating IRF122/123 IRF522/523	Unit
V_{DSS}	Drain to Source Voltage[1]	100	80	60	V
V_{DGR}	Drain to Gate Voltage[1] R_{GS}=20kΩ	100	80	60	V
V_{GS}	Gate to Source Voltage	±20	±20	±20	V
TJ,Tstg	Operating Junction and Storage Temperature	-55 to +150	-55 to +150	-55 to +150	°C
TL	Maximum Lead Temperature for Soldering Purposes, 1/8" From Case for 5s	275	275	275	°C

Maximum Thermal Characteristics

		IRF120-123/IRF520-523	MTP10N08/10	
$R_{\Theta JC}$	Thermal Reistance Junction to Case	3.12	1.67	°C/W
$R_{\Theta JA}$	Thermal Resistance, Junction to Ambient	30/80	80	°C/W
P_D	Total Power Dissipation at Tc=25°C	40	75	W
I_{DM}	Pulsed Drain Current [2]	20	32	A

Electrical Characteristics (Tc=25°C unless otherwise noted)

Symbol	Characteristic	Min	Max	Unit	Test Conditionss
Off Characteristics					
$V_{(BR)DSS}$	Drain Source Breakdown Voltage1 IRF120/122/520/522/ MTP10N10	100		V	V_{GS}=0V, I_D=250μA
	MTP10N08	80			
	IRF121/123/521/523	60			
I_{DSS}	Zero Gate Voltage Drain Current		250	μA	V_{DS}=Rated V_{DSS},V_{GS}=0V
			1000	μA	V_{DS}=0.8x Rated V_{DSS}, V_{GS}=0V, Tc=125°C
I_{GSS}	Gate-Body Leakage Current IRF120-123 IRF520-523/MTP10N08/10		 ±100 ±500	nA	V_{GS}=±20V,V_{DS}=0V

Electrical Characteristics (Cont.) (Tc=25°C unless otherwise noted)

Symbol	Characteristic	Min	Max	Unit	Test Conditions
On Characteristics					
$V_{GS(th)}$	Gate Threshold Voltage			V	
	IRF12-123/IRF520-523	2.0	4.0		I_D=250μA, V_{DS}=V_{GS}
	MTP10N08/10N10	2.0	4.5		I_D=1mA, V_{DS}=V_{GS}
$R_{DS(on)}$	Static Drain-Source On-Resistance[2]			Ω	V_{GS}=10V
	IRF120/121/520/521		0.30		I_D=4.0A
	MTP10N08/10N10		0.33		I_D=5.0A
	IRF122/123/522/523		0.40		I_D=4.0A
$V_{DS(on)}$	Drain-Source On-Voltage [2]		4.0	V	V_{GS}=10V; I_D=10.0A
	MTP 10N08/10N10		3.3	V	V_{GS}=10V, I_D=5.0A Tc=100°C
gfs	Forward Transconductance	1.5		S(Ü)	V_{DS}=10V, I_D=4.0A
Dynamic Characteristics					
Ciss	Input Capacitance		600	pF	V_{DS}=25V, V_{GS}=0V
Coss	Output Capacitance		400	pF	f=1.0MHz
Crss	Reverse Transfer Capacitance		100	pF	
Switching Characteristics (Tc=25°C, Figure 1,2)[3]					
$t_{d(on)}$	Turn-On Delay Time		40	ns	V_{DD}=50V, I_D=4.0A
tr	Rise Time		70	ns	V_{GS}=10V,R_{GEN}=50 Ω
$t_{d(off)}$	Turn-Off Delay Time		100	ns	R_{GS}=50 Ω
tf	Fall Time		70	ns	
Qg	Total Gate Charge		15	nC	V_{GS}=10V, I_D=10A V_{DD}=50V
Symbol	**Characteristic**	**Typ**	**Max**	**Unit**	**Test Conditions**
Source-Drain Diode Characteristics					
V_{SD}	Diode Forward Voltage				
	IRF120/121/520/521		2.5	V	I_S=8.0A; V_{GS}=0V
	IRF122/123/522/523		2.3	V	I_S=7.0A; V_{GS}=0V
trr	Reverse Recovery Time	280		ns	I_S=4.0A; dIs/dt=25A/

Notes

1. TJ=+25°C to +150°C
2. Pulse width limited by TJ
3. Switching time measurements performed on LEM TR-58 test equipment.

Typical Electrical Characteristics

Figure 1 Switching Test Circuit

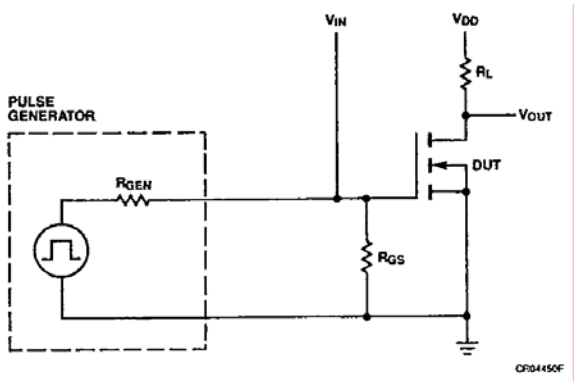
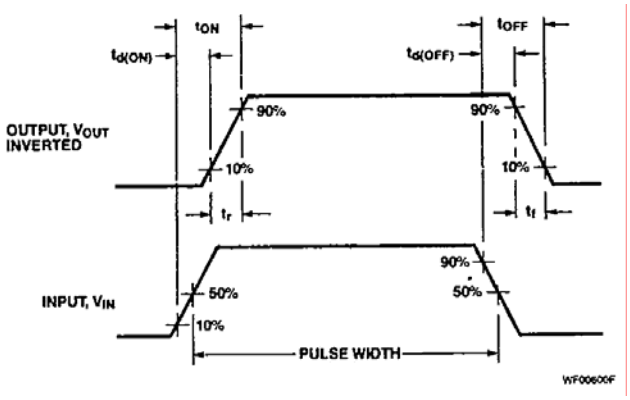


Figure 2 Switching Waveforms



Typical Performance Curves

Figure 3 Output Characteristics

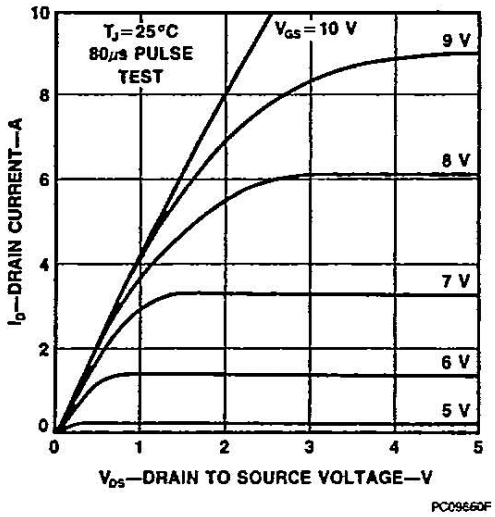


Figure 4 Static Drain to Source Resistance VS Drain Current

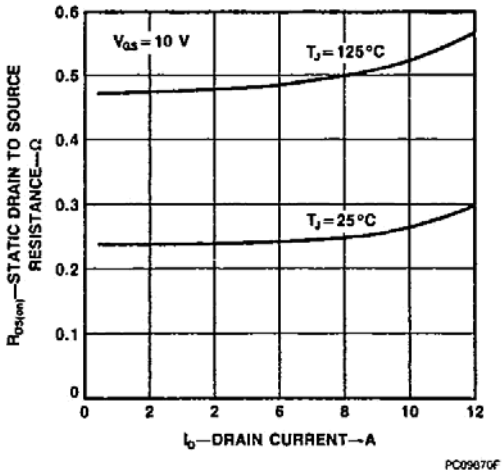


Figure5 Transfer Characteristics

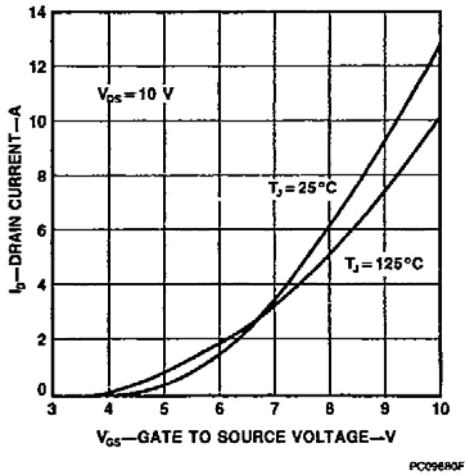
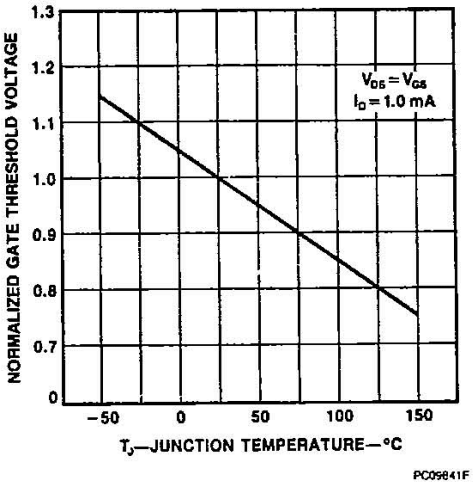


Figure 6 Temperature Variation of Gate to Source Threshold Voltage



Typical Performance Curves (Cont.)

Figure 7 Capacitance vs Drain to Source Voltage

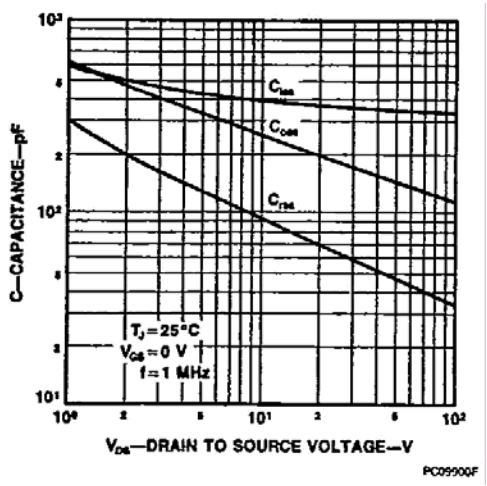


Figure 8 Gate to Source Voltage vs Total Gate Charge

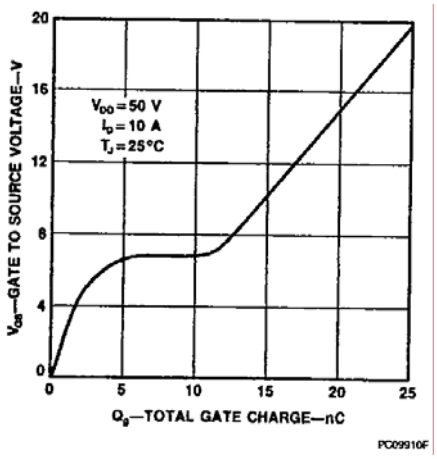


Figure 9 Forward Biased Safe Operating Area For IRF12-123 And IRF520-523

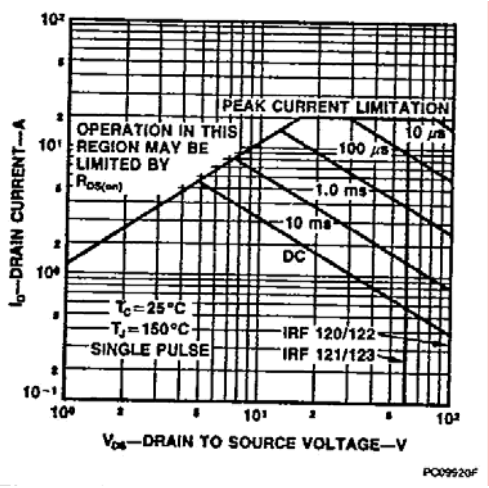


Figure 10 Transient Thermal Resistance vs Time for IRF120-123 And IRF520-523

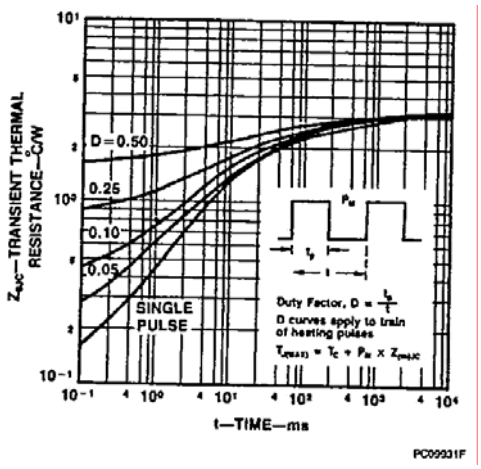


Figure 11 Forward Biased Safe Operating Area For MTP10N08/10N10

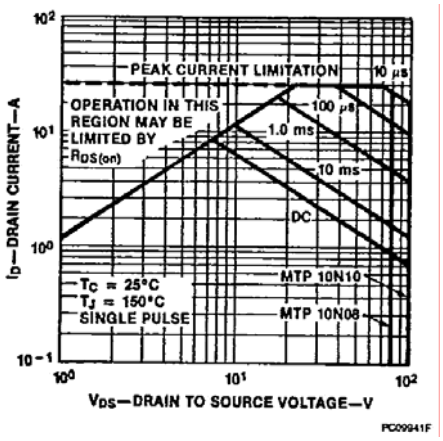


Figure 12 Transient Thermal Resistance vs time for MTP10N08/10N10