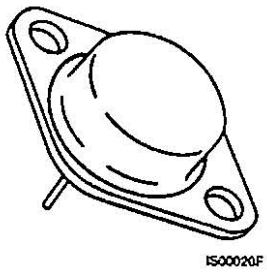
IRF340-343/IRF740-743 T-39-13
MTM8N35/8N40
N-Channel Power MOSFETs
10A, 350V/400V

Description

These devices are n-channel, enhancement mode, power MOSFETs designed especially for high voltage, high speed applications, such as off-line switching power supplies, UPS, AC and DC motor controls, relay and solenoid drivers.

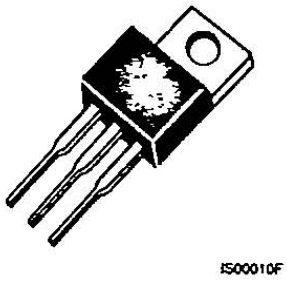
- V_{GS} Rated at ±20V
- Silicon Gate for Fast Switching Speeds
- I_{DSS}, $V_{DS(on)}$, S_{OA} and $V_{GS(th)}$ Specified at Elevated Temperature
- Rugged

TO-204AA



IRF340
IRF341
IRF342
IRF343
MTM8N35
MTMT8N40

TO-220AB



IRF740
IRF741
IRF742
IRF743

Maximum Ratings

Symbol	Characteristic	Rating IRF340/342 IRF740/742 MTM8N40	Rating IRF341/343 IRF741/743 MTM8N35	Unit
V_{DSS}	Drain to Source Voltage	400	350	V
V_{DGR}	Drain to Gate Voltage R_{GS}=1.0M Ω	400	350	V
V_{GS}	Gate to Source Voltage	±20	±20	V
T_J,T_{stg}	Operating Junction Temperature Storage Temperature	-55 to +150	-55 to +150	°C
T_L	Maximum Lead Temperature for Soldering Purposes, 1/8" From Case for 5S	275	275	°C

Maximum On-State Characteristics

		IRF340/341 IRF740/741	IRF342/343 IRF742/743	MTM8N35 MTM8N40	
$R_{DS(on)}$	Static Drain-to-Source On Resistance	0.55	0.80	0.55	Ω
I_D	Drain Current Continuous Pulsed	10 40	8 32	8 48	A
Maximum Thermal Characteristics					
$R_{\Theta JC}$	Thermal Resistance, Junction to Case	1.0	1.0	0.83	°C/W
P_D	Total Power Dissipation at Tc=25°C	125	125	150	W

Notes

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

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

Symbol	Characteristic	Min	Max	Unit	Test Conditions
Off Characteristics					
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage1			V	V_{GS}=0V, I_D=250μA
	IRF340/342/740/742	400			
	Irf341/343/741/743	350			
I_{DSS}	Zero Gate Voltage Drain Current		250	μA	V_{DS}=Rated V_{DSS}, V_{GS}=0V
			1000	μA	V_{DS}=0.8 x Rated Vds, V_{GS}=0V, Tc=125°C
I_{GSS}	Gate-Body Leakage Current			nA	V_{GS}=±20V, V_{DS}=0V
	IRF340-343		±100		
	IRF740-743		±500		
On Characteristics					
$V_{GS(th)}$	Gate Threshold Voltage	2.0	4.0	V	I_D=250μA, V_{DS}=V_{GS}
$R_{DS(on)}$	Static Drain-Source On-Resistance 2			Ω	V_{GS}=10V, I_D=5.0A
	IRF340/341/740/741		0.55		
	IRF342/343/742/743		0.80		
gfs	Forward Transconductance	4.0		S(℧)	V_{DS}=10V, I_D=5.0A
Dynamic Characteristics					
Ciss	Input Capacitance		1600	pF	V_{DS}=25V, V_{GS}=0V f=1.0MHz
Coss	Output Capacitance		450	pF	
Crss	Reverse Transfer Capacitance		150	pF	
Switching Characteristics (Tc=25°C, Figures 9, 10)					
td(on)	Turn-On Delay Time		35	ns	V_{DD}=175V, I_D=5.0A
tr	Rise Time		15	ns	V_{GS}=10V, R_{GEN}=4.7 Ω
td(off)	Turn-Off Delay Time		90	ns	R_{GS}=4.7 Ω
tf	Fall Time		35	ns	
Qg	Total Gate Charge		60	nC	V_{GS}=10V, I_D=12A V_{DD}=400V
Symbol	**Characteristic**	**TYP**	**Max**	**Unit**	**Test Conditions**
Source-Drain Diode Characteristics					
V_{SD}	Diode Forward Voltage				
	IRF340/341/740/741		2.0	V	I_S=10A; V_{GS}=0V
	Irf342/343/742/743		1.9	V	I_S=8A; V_{GS}=0V
trr	Reverse Recovery Time	600		ns	I_S=10A; dI_S/dt=100A/μS

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

Symbol	Characteristic	Min	Max	Unit	Test Conditions
Off Characteristics					
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage1			V	V_{GS}=0V, I_D=5.0mA
	MTM8N40	400			
	MTM8N35	350			
I_{DSS}	Zero Gate Voltage Drain Current		0.25	mA	V_{DS}=0.85 x Rated V_{DSS}, V_{GS}=0V
			2.5	mA	V_{DS}=0.85 x Rated V_{DSS}, V_{GS}=0V, Tc=100°C
I_{GSS}	Gate-Body Leakage Current		±500	nA	V_{GS}=±20V, V_{DS}=0V
On Characteristics					
$V_{GS(th)}$	Gate Threshold Voltage	2.0	4.5	V	I_D=1.0mA, V_{DS}=V_{GS}
		1.5	4.0	V	I_D=1.0mA, V_{DS}=V_{GS} Tc=100°C
$V_{DS(on)}$	Drain-Source On-Voltage[2]		2.2	V	V_{GS}=10V; I_D=4.0A
			5.3	V	V_{GS}=10V; I_D=8.0A
			4.4	V	V_{GS}=10V, I_D=4.0A Tc=100°C
$R_{DS(on)}$	Static Drain-Source On-Resistance[2]		0.55	Ω	V_{GS}=10V, I_D=4.0A
gfs	Forward Transconductance	3.0		S(℧)	V_{DS}=10V, I_D=4.0A
Dynamic Characteristics					
Ciss	Input Capacitance		1800	pF	V_{DS}=25V, V_{GS}=0V F=1.0MHz
Coss	Output Capacitance		350	pF	
Crss	Reverse Transfer Capacitance		150	pF	
Switching Characteristics (Tc=25°C, Figures 9,10)[3]					
td(on)	Turn-On Delay Time		60	ns	V_{DD}=25V, I_D=4.0A
tr	Rise Time		150	ns	V_{GS}=10V, R_{GEN}=50 Ω
td(off)	Turn-Off Delay Time		200	ns	R_{GS}=50 Ω
tf	Fall Time		120	ns	
Qg	Total Gate Charge		60	nC	V_{GS}=10V, I_D=12A V_{DD}=400V

Notes

1. T_J=+25°C to +150°C
2. Pulse test: Pulse width ≤80μs, Duty cycle≤1%
3. Switching time measurements performed on LEM TR-58 test equipment.

Typical Performance Curves

Figure 1 Output Characteristics

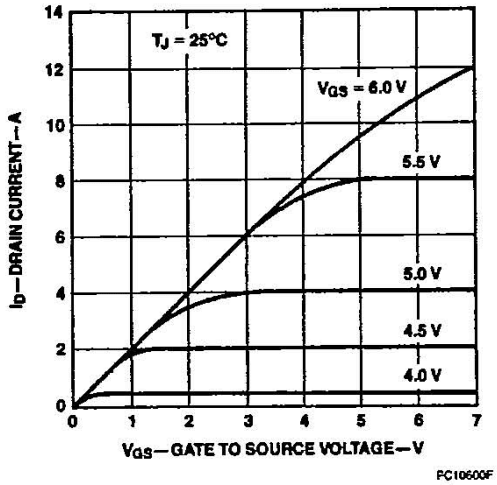


Figure 2 Static Drain to Source Resistance vs Drain Current

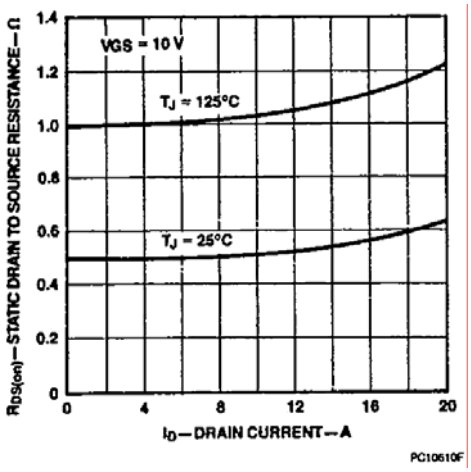


Figure 3 Transfer Characteristics

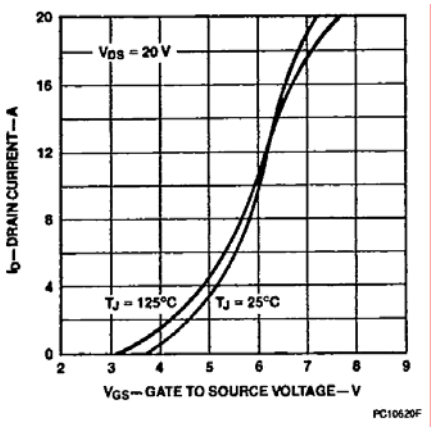


Figure 4 Temperature Variation of Gate to Source Threshold Voltage

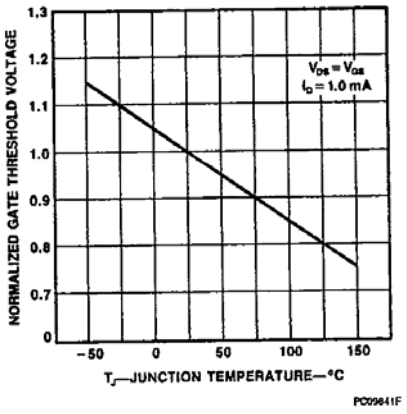


Figure 5 Capacitance vs Drain to Source Voltage

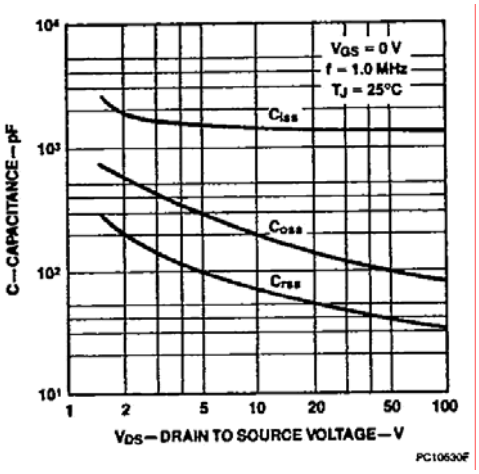
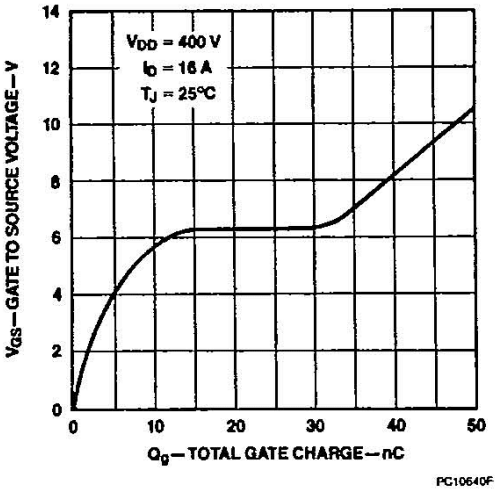


Figure 6 Gate to Source Voltage vs Total Gate Charge



Typical Performance Curves (Cont.)

Figure 7 Forward Biased Safe Operating Area

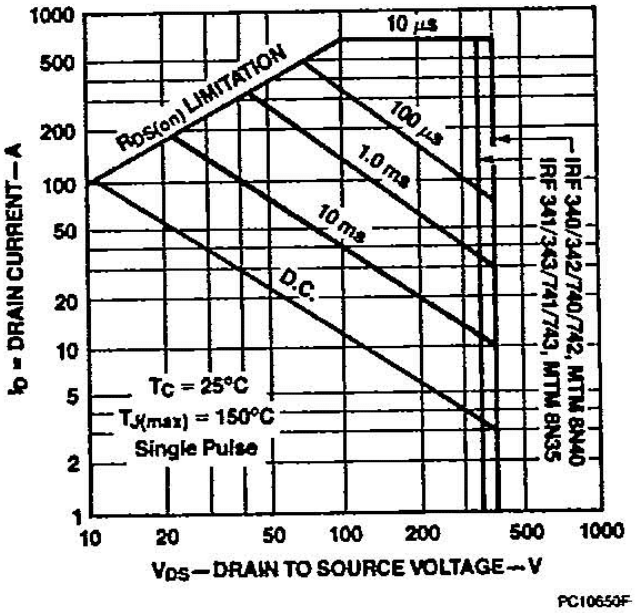
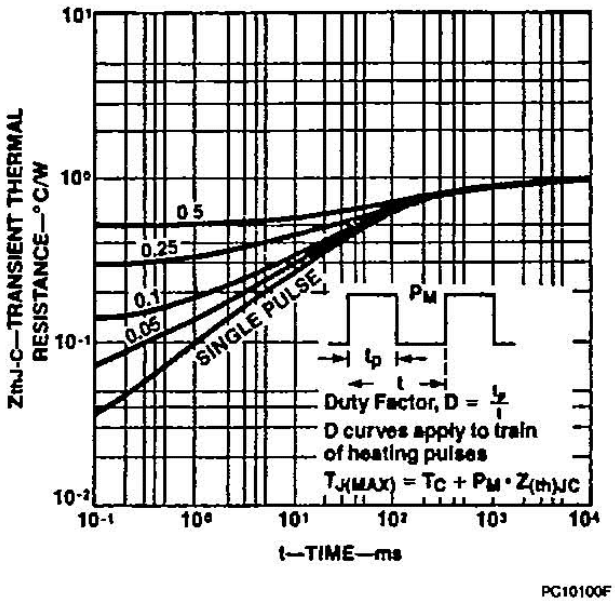


Figure 8 Trainsient Thermal Resistance vs Time



Typical Electrical Characteristics

Figure 9 Switching Test Circuit

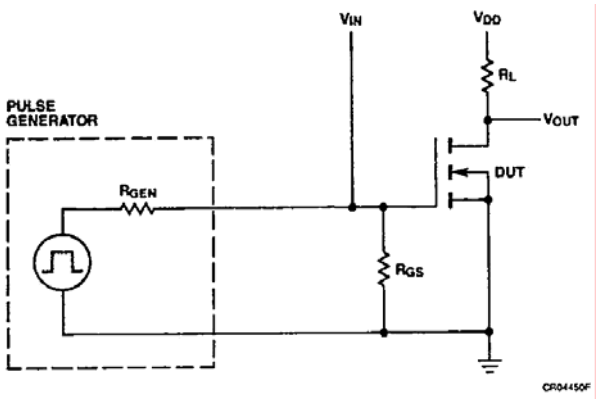


Figure 10 Switching Waveforms