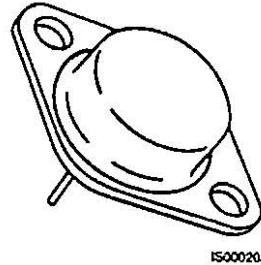


Description

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.

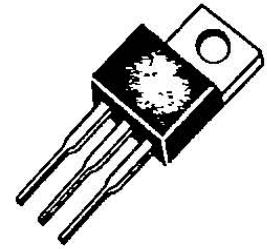
- V_{GS} Rated at $\pm 20V$
- Silicon Gate for Fast Switching Speeds
- I_{DSS} , $V_{DS(on)}$, S_{OA} and $V_{GS(th)}$ Specified at Elevated Temperature
- Rugged

TO-204AA



IS00020F

TO-220AB



IS00010F

IRF340
IRF341
IRF342
IRF343
MTM8N35
MTMT8N40

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 $R_{GS}=1.0M \Omega$ | 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 | |
| T_L | Maximum Lead Temperature for Soldering Purposes, 1/8" From Case for 5S | 275 | 275 | |

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 | | | | A |
| | Continuous | 10 | 8 | 8 | |
| | Pulsed | 40 | 32 | 48 | |

Maximum Thermal Characteristics

| $R_{\theta JC}$ | Thermal Resistance, Junction to Case | 1.0 | 1.0 | 0.83 | /W |
|-----------------|---|-----|-----|------|----|
| P_D | Total Power Dissipation at $T_c=25$ | 125 | 125 | 150 | W |

Notes

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



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

Electrical Characteristics (Tc=25 unless otherwise noted)

| Symbol | Characteristic | Min | Max | Unit | Test Conditions |
|---|---|-----|------|------|--|
| Off Characteristics | | | | | |
| V _{(BR)DSS} | Drain-Source Breakdown Voltage1 IRF340/342/740/742 Irf341/343/741/743 | | | V | V _{GS} =0V, I _D =250μA |
| | | 400 | | | |
| | | 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 V _{ds} , V _{GS} =0V, Tc=125 |
| I _{GSS} | Gate-Body Leakage Current IRF340-343 IRF740-743 | | | nA | V _{GS} =±20V, V _{DS} =0V |
| | | | ±100 | | |
| | | | ±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 IRF340/341/740/741 IRF342/343/742/743 | | | Ω | V _{GS} =10V, I _D =5.0A |
| | | | 0.55 | | |
| | | | 0.80 | | |
| g _{fs} | Forward Transconductance | 4.0 | | S(Ω) | V _{DS} =10V, I _D =5.0A |
| Dynamic Characteristics | | | | | |
| C _{iss} | Input Capacitance | | 1600 | pF | V _{DS} =25V, V _{GS} =0V f=1.0MHz |
| C _{oss} | Output Capacitance | | 450 | pF | |
| C _{rss} | Reverse Transfer Capacitance | | 150 | pF | |
| Switching Characteristics (Tc=25, Figures 9, 10) | | | | | |
| td(on) | Turn-On Delay Time | | 35 | ns | V _{DD} =175V, I _D =5.0A V _{GS} =10V, R _{GEN} =4.7 Ω R _{GS} =4.7 Ω |
| tr | Rise Time | | 15 | ns | |
| td(off) | Turn-Off Delay Time | | 90 | ns | |
| tf | Fall Time | | 35 | ns | |
| Qg | Total Gate Charge | | 60 | nC | V _{GS} =10V, I _D =12A V _{DD} =400V |
| Symbol Characteristic | | | | | |
| Symbol | Characteristic | TYP | Max | Unit | Test Conditions |
| Source-Drain Diode Characteristics | | | | | |
| V _{SD} | Diode Forward Voltage IRF340/341/740/741 Irf342/343/742/743 | | 2.0 | V | I _S =10A; V _{GS} =0V |
| | | | 1.9 | V | I _S =8A; V _{GS} =0V |
| | | | | | |
| t _{rr} | Reverse Recovery Time | 600 | | ns | I _S =10A; dI _S /dt=100A/μS |



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

Electrical Characteristics (Tc=25 unless otherwise noted)

| Symbol | Characteristic | Min | Max | Unit | Test Conditions |
|---|---|-----|------|------|---|
| Off Characteristics | | | | | |
| V _{(BR)DSS} | Drain-Source Breakdown Voltage ¹ MTM8N40 MTM8N35 | | | V | V _{GS} =0V, I _D =5.0mA |
| | | 400 | | | |
| | | 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 |
| 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 |
| 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 |
| R _{DS(on)} | Static Drain-Source On-Resistance ² | | 0.55 | Ω | V _{GS} =10V, I _D =4.0A |
| g _{fs} | Forward Transconductance | 3.0 | | S(Ū) | V _{DS} =10V, I _D =4.0A |
| Dynamic Characteristics | | | | | |
| C _{iss} | Input Capacitance | | 1800 | pF | V _{DS} =25V, V _{GS} =0V F=1.0MHz |
| C _{oss} | Output Capacitance | | 350 | pF | |
| C _{rss} | Reverse Transfer Capacitance | | 150 | pF | |
| Switching Characteristics (Tc=25, Figures 9,10) ³ | | | | | |
| t _{d(on)} | Turn-On Delay Time | | 60 | ns | V _{DD} =25V, I _D =4.0A V _{GS} =10V, R _{GEN} =50 Ω R _{GS} =50 Ω |
| t _r | Rise Time | | 150 | ns | |
| t _{d(off)} | Turn-Off Delay Time | | 200 | ns | |
| t _f | Fall Time | | 120 | ns | |
| Q _g | Total Gate Charge | | 60 | nC | V _{GS} =10V, I _D =12A V _{DD} =400V |

Notes

1. T_J=+25 to +150
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

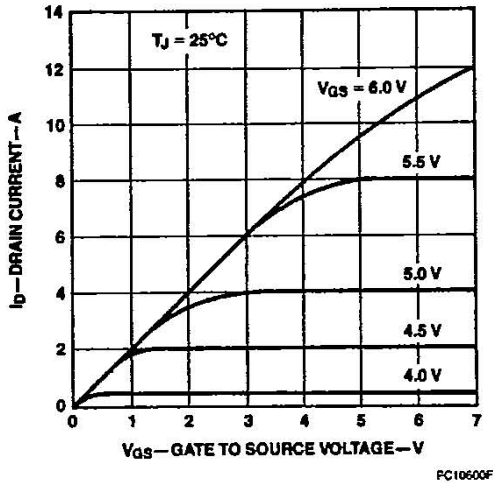


Figure 2 Static Drain to Source Resistance vs Drain Current

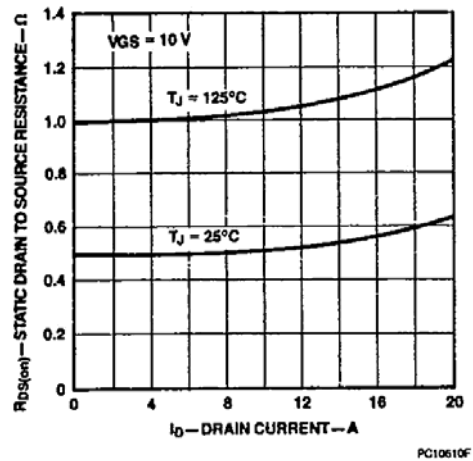


Figure 3 Transfer Characteristics

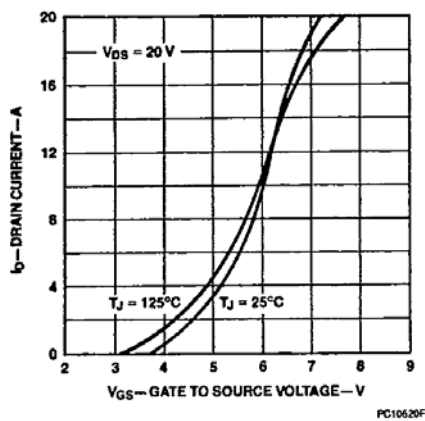


Figure 4 Temperature Variation of Gate to Source Threshold Voltage

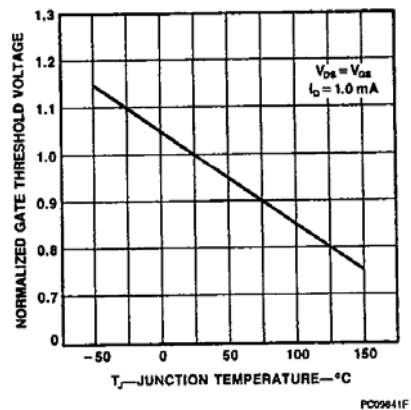


Figure 5 Capacitance vs Drain to Source Voltage

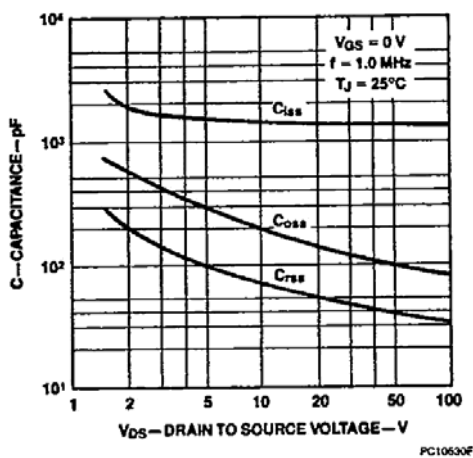
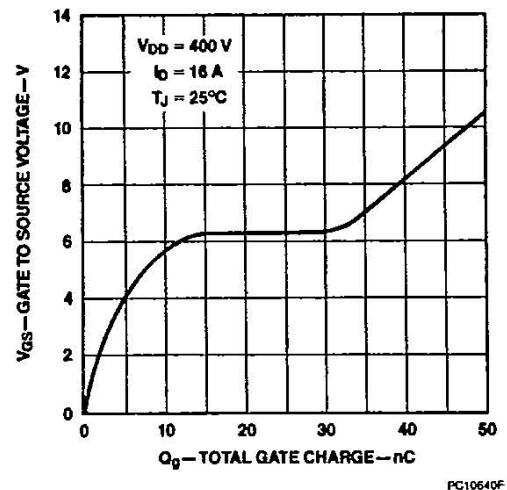
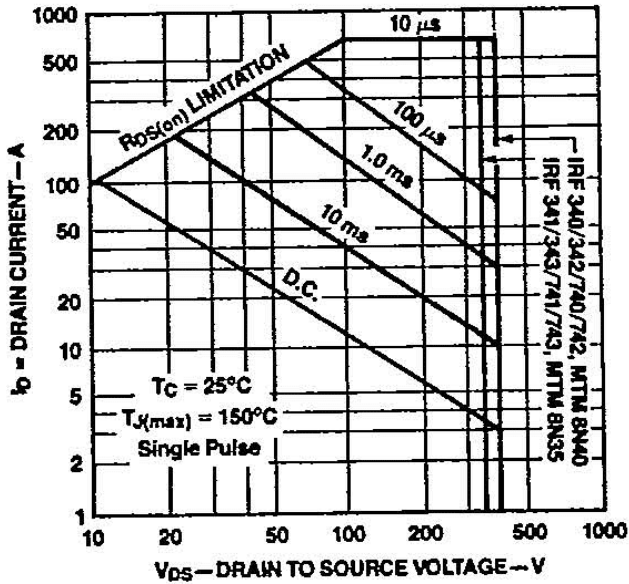


Figure 6 Gate to Source Voltage vs Total Gate Charge



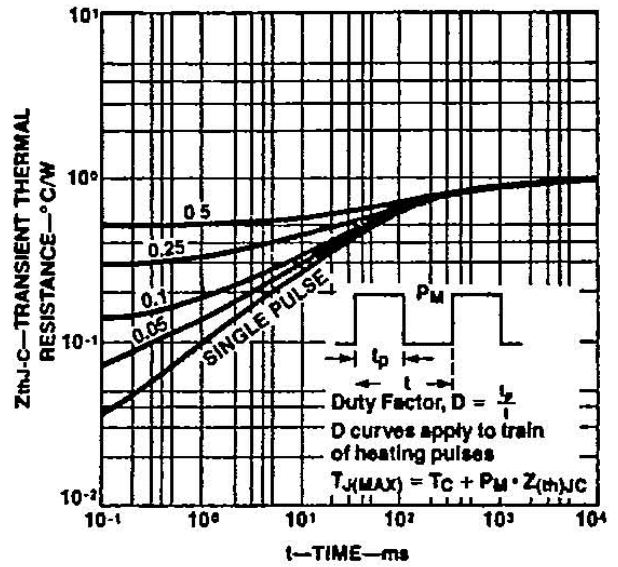
Typical Performance Curves (Cont.)

Figure 7 Forward Biased Safe Operating Area



PC10650F

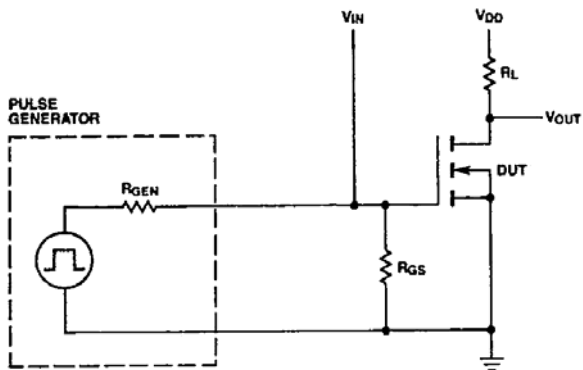
Figure 8 Transient Thermal Resistance vs Time



PC10100F

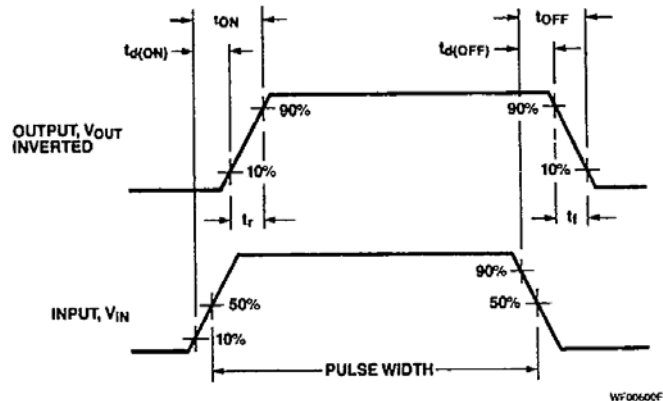
Typical Electrical Characteristics

Figure 9 Switching Test Circuit



CR04150F

Figure 10 Switching Waveforms



WF00600F