

TL/G/10040-A3

DESCRIPTION

These dice are n-channel, enhancement mode, power MOSFETs designed especially for high power, high speed applications, such as power supplies, AC and DC motor control and high energy pulse circuits.

This process is available in the following device types:

TO-204 (Case 42)	TO-220 (Case 37)
IRF130	IRF530
IRF131	IRF531
IRF132	IRF532
IRF133	IRF533
	MTP20N08
	MTP20N10

Electrical Characteristics $T_C = 25^\circ\text{C}$ (unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Max	Units
V_{DSS}	Drain to Source Voltage (Note 1)	$I_D = 250 \mu\text{A}; V_{GS} = 0\text{V}$	100		V
I_{DSS}	Zero Gate Voltage Drain	$V_{DS} = \text{Rated Voltage}$ $V_{GS} = 0\text{V}$		250	μA
I_{GSS}	Gate Leakage Current	$V_{DS} = \pm 20\text{V}; V_{GS} = 0\text{V}$		100	nA
$V_{GS(TH)}$	Gate Threshold Voltage	$I_D = 250 \mu\text{A}; V_{DS} = V_{GS}$	2.0	4.0	V
$R_{DS(ON)}$	Static On-Resistance (Note 2)	$V_{GS} = 10\text{V}; I_D = 8\text{A}$		0.18	Ω
g_{FS}	Forward Transconductance	$V_{DS} = 10\text{V}; I_D = 8\text{A}$	4.0		Siemens
C_{iss}	Input Capacitance	$V_{DS} = 25\text{V}; V_{GS} = 0\text{V}$ $f = 1 \text{ MHz}$		800	pF
C_{oss}	Output Capacitance			500	pF
C_{rss}	Reverse Transfer			150	pF
$t_{d(on)}$	Turn-On Delay Time (Note 3)	$V_{DD} = 25\text{V}; I_D = 10\text{A}$ $V_{GS} = 10\text{V}; R_{GEN} = 15\Omega$		50	ns
t_r	Rise Time	$R_{GS} = 15\Omega$		450	ns
$t_{d(off)}$	Turn-Off Delay Time			100	ns
t_f	Fall Time			200	ns
Q_g	Total Gate Charge	$V_{GS} = 10\text{V}; I_D = 18\text{A}$ $V_{DD} = 80\text{V}$		30	nC

Note 1: $T_J = +25^\circ\text{C}$ to $+150^\circ\text{C}$.

Note 2: Pulse width limited by T_J .

Note 3: Switching time measurements performed on LEM TR-58 test equipment.

Process C1

Typical Performance Characteristics

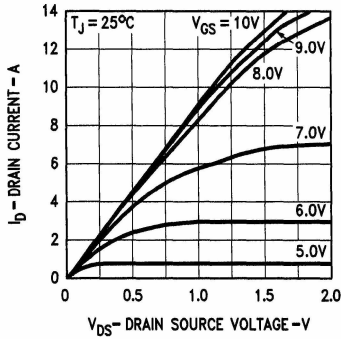


FIGURE 1. Output Characteristics

TL/G/10040-A4

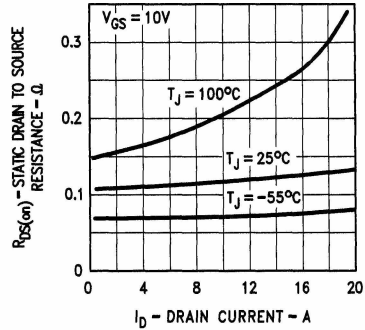


FIGURE 2. Static Drain to Source Resistance vs Drain Current

TL/G/10040-A5

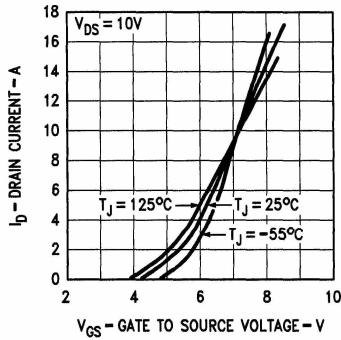


FIGURE 3. Transfer Characteristics

TL/G/10040-A6

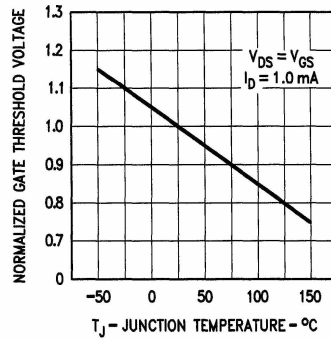


FIGURE 4. Temperature Variation of Gate to Source Threshold Voltage

TL/G/10040-A7

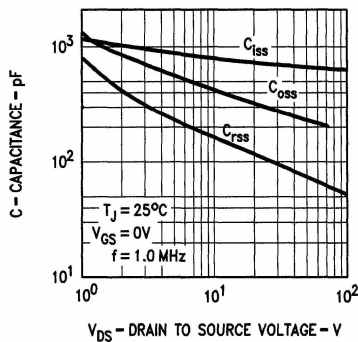


FIGURE 5. Capacitance vs Drain to Source Voltage

TL/G/10040-A8

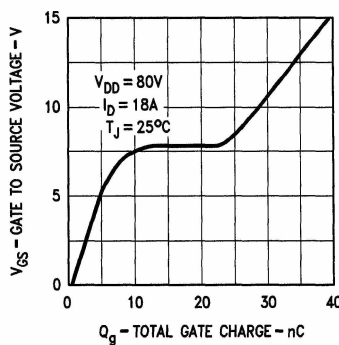
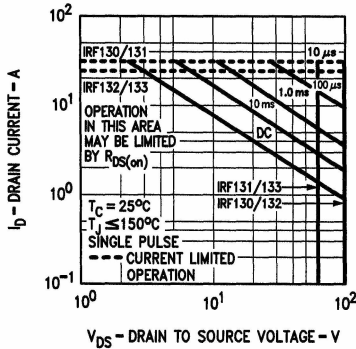


FIGURE 6. Gate to Source Voltage vs Total Gate Charge

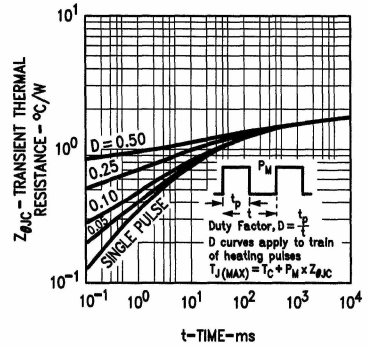
TL/G/10040-A9

Typical Performance Characteristics (Continued)



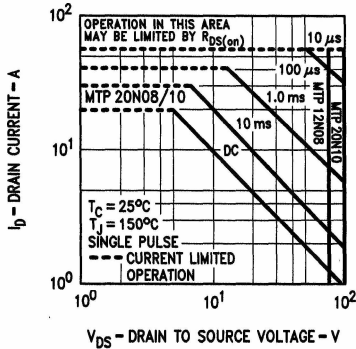
TL/G/10040-B0

FIGURE 7. Forward Biased Safe Operating Area for IRF130-133 and IRF530-533



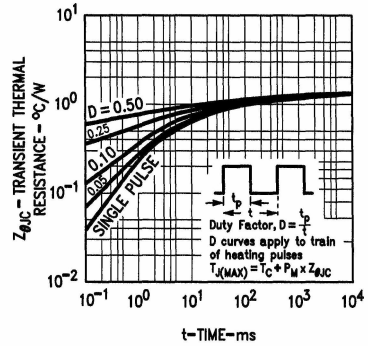
TL/G/10040-B1

FIGURE 8. Transient Thermal Resistance vs Time for IRF130-133 and IRF530-533



TL/G/10040-B2

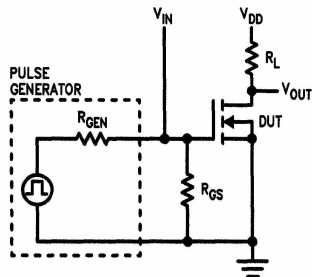
FIGURE 9. Forward Biased Safe Operating Area for MTP20N08/20N10



TL/G/10040-B3

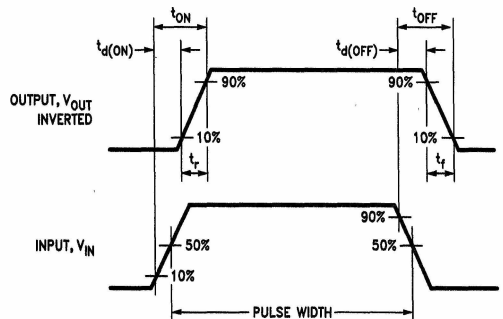
FIGURE 10. Transient Thermal Resistance vs Time for MTP20N08/20N10

Typical Electrical Characteristics



TL/G/10040-B4

FIGURE 11. Switching Test Circuit



TL/G/10040-B5

FIGURE 12. Switching Waveforms