

TL/G/10040-64

**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-220 (Case 37)

IRF620

IRF621

IRF622

IRF623

MTP7N18

MTP7N20

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

Symbol	Parameter	Test Conditions	Min	Max	Units
$V_{DS}$	Drain to Source Voltage (Note 1)	$I_D = 250 \mu\text{A}; V_{GS} = 0\text{V}$	200		V
$I_{DSS}$	Zero Gate Voltage Drain	$V_{DS} = \text{Rated Voltage}$ $V_{GS} = 0\text{V}$		250	$\mu\text{A}$
$I_{GSS}$	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)	$V_{GS} = 10\text{V}; I_D = 2.5\text{A}$		0.8	$\Omega$
$g_{FS}$	Forward Transconductance	$V_{DS} = 10\text{V}; I_D = 2.5\text{A}$	1.3		Siemens
$C_{iss}$	Input Capacitance	$V_{DS} = 25\text{V}; V_{GS} = 0\text{V}$ $f = 1 \text{ MHz}$		600	pF
$C_{oss}$	Output Capacitance			300	pF
$C_{rss}$	Reverse Transfer			80	pF
$t_{d(on)}$	Turn-On Delay Time (Note 3)	$V_{DD} = 100\text{V}; I_D = 2.5\text{A}$ $V_{GS} = 10\text{V}; R_{GEN} = 50\Omega$		40	ns
$t_r$	Rise Time	$R_{GS} = 50\Omega$		60	ns
$t_{d(off)}$	Turn-Off Delay Time			100	ns
$t_f$	Fall Time			60	ns
$Q_g$	Total Gate Charge	$V_{GS} = 10\text{V}; I_D = 6.0\text{A}$ $V_{DD} = 45\text{V}$		15	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.

Typical Performance Characteristics

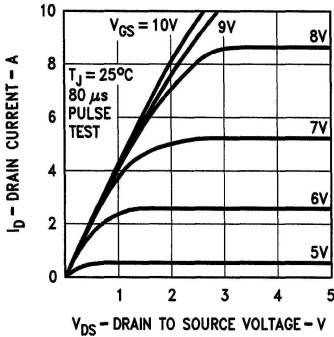


FIGURE 1. Output Characteristics

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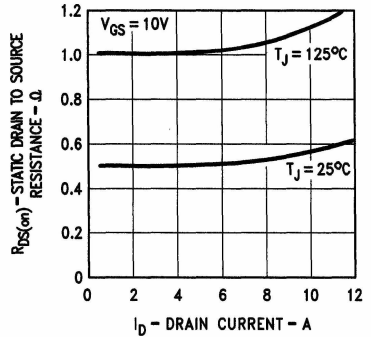


FIGURE 2. Static Drain to Source Resistance vs Drain Current

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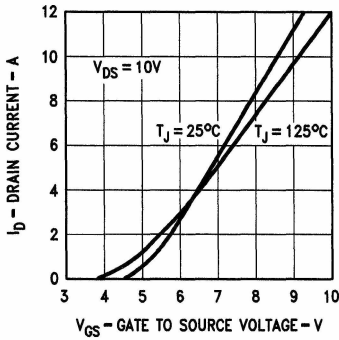


FIGURE 3. Transfer Characteristics

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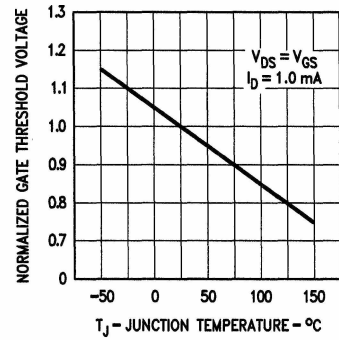


FIGURE 4. Temperature Variation of Gate to Source Threshold Voltage

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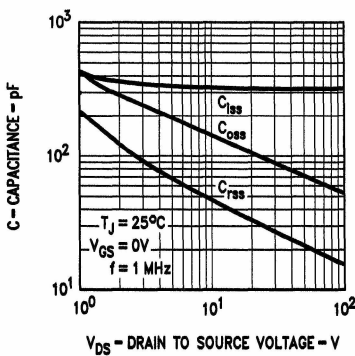


FIGURE 5. Capacitance vs Drain to Source Voltage

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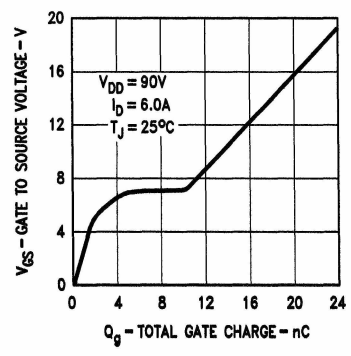
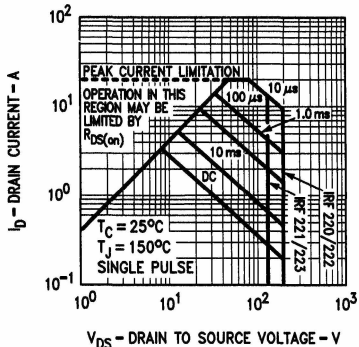


FIGURE 6. Gate to Source Voltage vs Total Gate Charge

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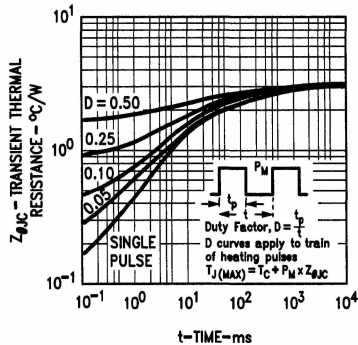
# Process B3

## Typical Performance Characteristics (Continued)



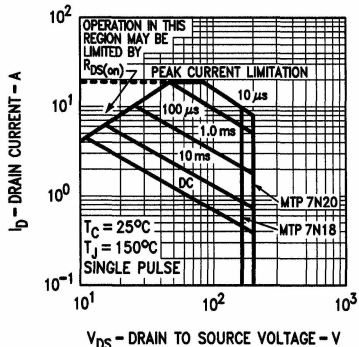
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**FIGURE 7. Forward Biased Safe Operating Area for IRF220-223 and IRF620-623**



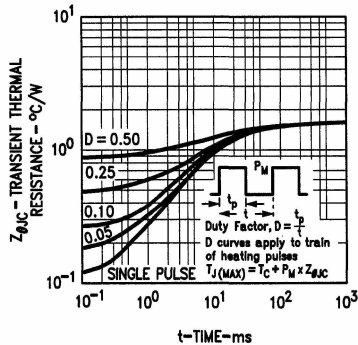
TL/G/10040-72

**FIGURE 8. Transient Thermal Resistance vs Time for IRF220-223 and IRF620-623**



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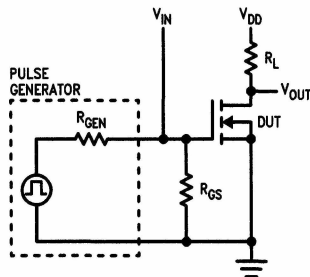
**FIGURE 9. Forward Biased Safe Operating Area for MTP7N18/7N20**



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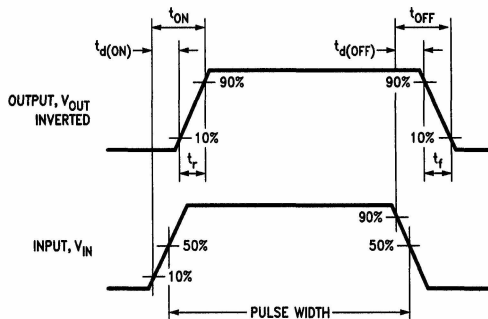
**FIGURE 10. Transient Thermal Resistance vs Time for MTP7N18/7N20**

## Typical Electrical Characteristics



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**FIGURE 11. Switching Test Circuit**



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**FIGURE 12. Switching Waveforms**