

TL/G/10041-45

**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 43)	TO-247 (Case 40)
IRF150CF	IRFP150CF
IRF150	IRFP150
IRF151	IRFP151
IRF152	IRFP152
IRF153	IRFP153

**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	$\mu\text{A}$
$I_{GSS}$	Gate Leakage Current	$V_{DS} = \pm 20\text{V}; V_{GS} = 0\text{V}$		$\pm 100$	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)	$V_{GS} = 10\text{V}; I_D = 20\text{A}$		0.055	$\Omega$
$g_{FS}$	Forward Transconductance	$V_{DS} = 10\text{V}; I_D = 20\text{A}$	9.0		Siemens
$C_{iss}$	Input Capacitance	$V_{DS} = 25\text{V}; V_{GS} = 0\text{V}$ $f = 1 \text{ MHz}$		3000	pF
$C_{oss}$	Output Capacitance			1500	pF
$C_{rss}$	Reverse Transfer			500	pF
$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 48\text{V}; I_D = 20\text{A}$ $V_{GS} = 10\text{V}; R_{GEN} = 4.7\Omega$		75	ns
$t_r$	Rise Time	$R_{GS} = 4.7\Omega$		450	ns
$t_{d(off)}$	Turn-Off Delay Time			300	ns
$t_f$	Fall Time			200	ns
$Q_g$	Total Gate Charge	$V_{GS} = 10\text{V}; I_D = 50\text{A}$ $V_{DD} = 55\text{V}$		120	nC

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

Note 2: Pulse Test: Pulse Width  $\leq 80 \mu\text{s}$ , Duty Cycle  $\leq 1\%$ .

# Process F1

## Typical Performance Characteristics

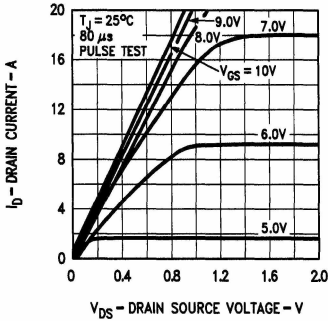


FIGURE 1. Output Characteristics  
TL/G/10041-46

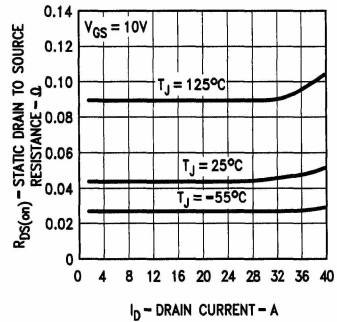


FIGURE 2. Static Drain to Source Resistance vs Drain Current  
TL/G/10041-47

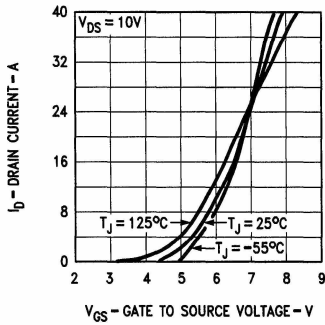


FIGURE 3. Transfer Characteristics  
TL/G/10041-48

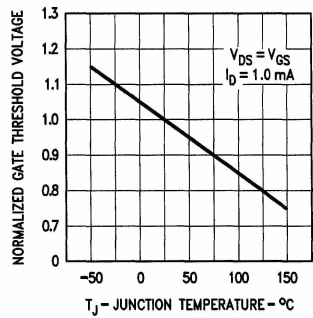


FIGURE 4. Temperature Variation of Gate to Source Threshold Voltage  
TL/G/10041-49

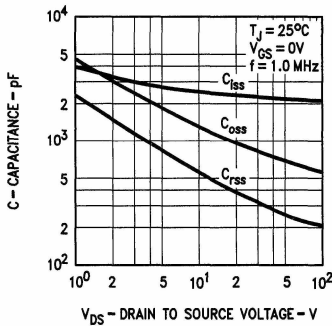


FIGURE 5. Capacitance vs Drain to Source Voltage  
TL/G/10041-50

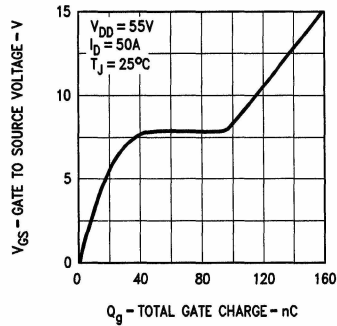


FIGURE 6. Gate to Source Voltage vs Total Gate Charge  
TL/G/10041-51

Typical Performance Characteristics (Continued)

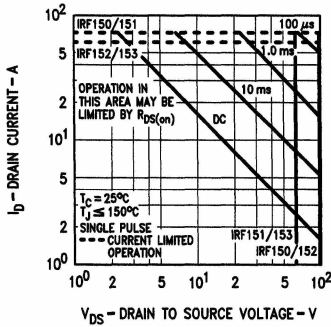


FIGURE 7. Forward Biased Safe Operating Area

TL/G/10041-52

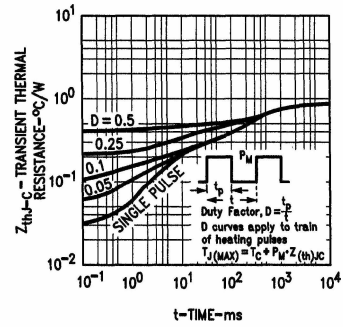


FIGURE 8. Transient Thermal Resistance vs Time

TL/G/10041-53

Typical Electrical Characteristics

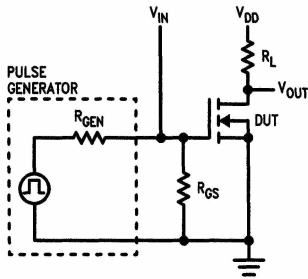


FIGURE 9. Switching Test Circuit

TL/G/10041-54

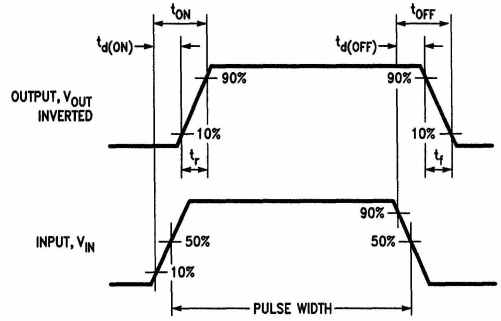


FIGURE 10. Switching Waveforms

TL/G/10041-55

Probe Testing

Each die is probed and electrically tested to the limits specified in the Electrical Characteristics Table. However, high current parameters and thermal characteristics specified in the packaged device data sheets cannot be tested or guaranteed in die form because of the power dissipation limits of unmounted die and current handling limits of probe tips.

These parameters are:

- Thermal Resistance
- Forward Voltage Drop at Rated Current
- Reverse Recovery Characteristics at Rated Current
- Surge Current