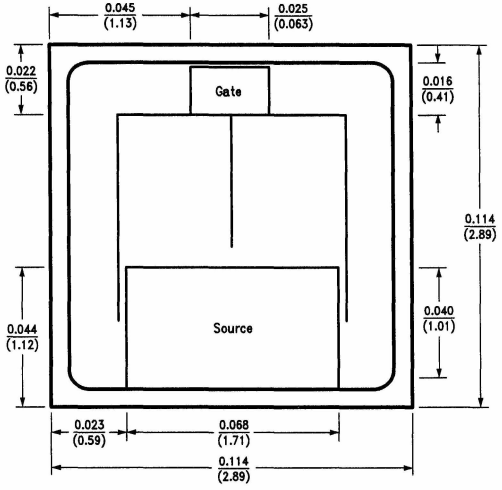
National Semiconductor

Process B1
N-Channel Power MOSFET



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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)

FMP18N05

FMP20N05

FMP18N06

FMP20N06

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

Symbol	Parameter	Test Conditions	Min	Max	Units
V_{DSS}	Drain to Source Voltage (Note 1)	I_D = 250 μA; V_{GS} = 0V	50		V
I_{DSS}	Zero Gate Voltage Drain	V_{DS} = Rated Voltage V_{GS} = 0V		250	μA
I_{GSS}	Gate Leakage Current	V_{DS} = ±20V; V_{DS} = 0V		100	nA
$V_{GS(TH)}$	Gate Threshold Voltage	I_D = 250 μA; V_{DS} = V_{GS}	2.0	4.0	V
$R_{DS(ON)}$	Static On-Resistance (Note 2)	V_{GS} = 10V; I_D = 10A		0.085	Ω
g_{FS}	Forward Transconductance	V_{DS} = 10V; I_D = 10A	5		Siemens
C_{iss}	Input Capacitance	V_{DS} = 25V; V_{GS} = 0V f = 1 MHz		850	pF
C_{oss}	Output Capacitance			400	pF
C_{rss}	Reverse Transfer			150	pF
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 40V; I_D = 10A V_{GS} = 10V; R_{GEN} = 50Ω		50	ns
t_r	Rise Time	R_{GS} = 50Ω		90	ns
$t_{d(off)}$	Turn-Off Delay Time			60	ns
t_f	Fall Time			75	ns
Q_g	Total Gate Charge	V_{GS} = 10V; I_D = 25A V_{DD} = 40V		20	nC

Note 1: T_J = +25°C to +150°C.

Note 2: Pulse Test: Pulse Width ≤ 80 μs, Duty Cycle ≤ 1%.

Process B1

Typical Performance Characteristics

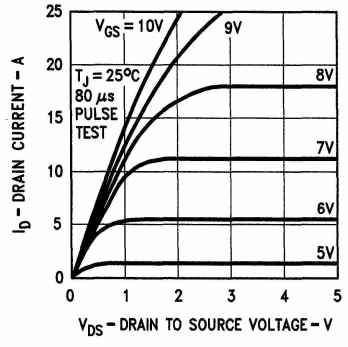

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FIGURE 1. Output Characteristics

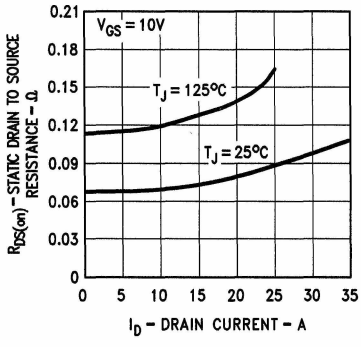

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FIGURE 2. Static Drain to Source Resistance vs Drain Current

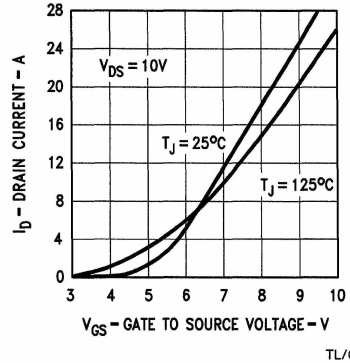

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FIGURE 3. Transfer Characteristics

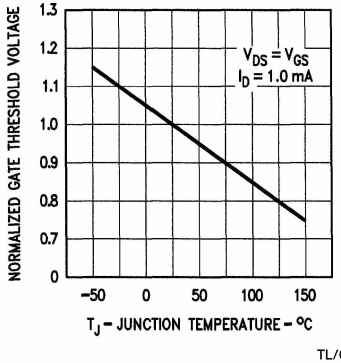

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FIGURE 4. Temperature Variation of Gate to Source Threshold Voltage

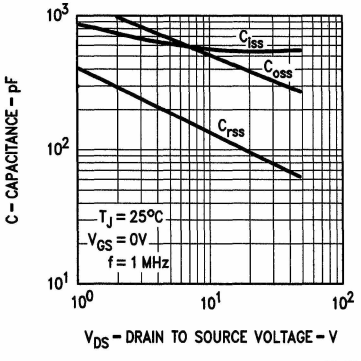

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FIGURE 5. Capacitance vs Drain to Source Voltage

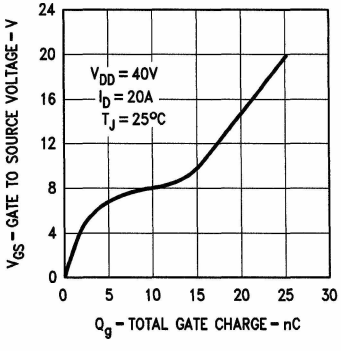

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FIGURE 6. Gate to Source Voltage vs Total Gate Charge

Typical Performance Characteristics (Continued)

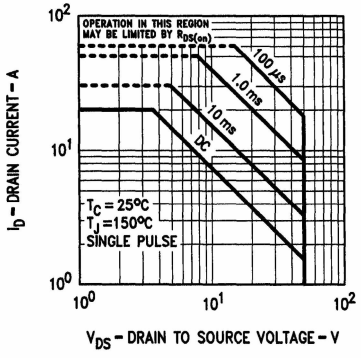

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FIGURE 7. Forward Biased Safe Operating Area

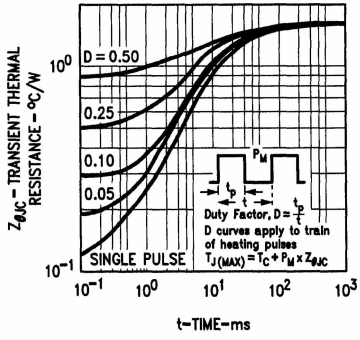

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FIGURE 8. Transient Thermal Resistance vs Time

Typical Electrical Characteristics

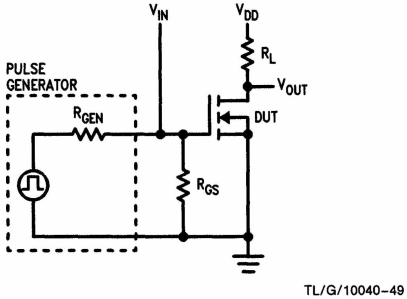

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FIGURE 9. Switching Test Circuit

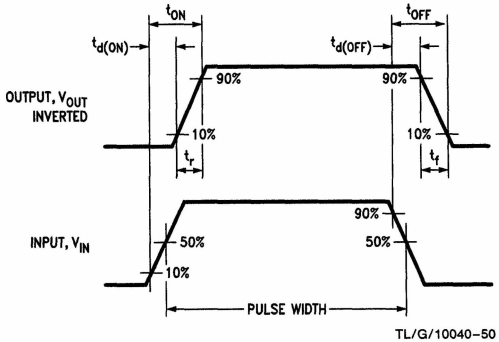

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FIGURE 10. Switching Waveforms