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2N6904

N-Channel Logic Level Power MOS Field-Effect Transistors (L^2 FET)

8 A, 200 V
$r_{DS}(on)$: 0.6 Ω

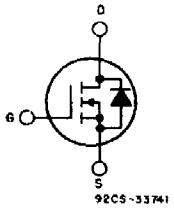
Features:

- *Design optimized for 5 volt gate drive*
- *Can be driven directly from Q-MOS, N-MOS, TTL Circuits*
- *Compatible with automotive drive requirements*
- *SOA is power-dissipation limited*
- *Nanosecond switching speeds*
- *Linear transfer characteristics*
- *High input impedance*
- *Majority carrier device*

The 2N6904 is an n-channel enhancement-mode silicon-gate power MOS field-effect transistor specifically designed for use with logic level (5 volt) driving sources in applications such as programmable controllers, automotive switching, and solenoid drivers. This performance is accomplished through a special gate oxide design which provides full rated conduction at gate biases in the 3-5 volt range, thereby facilitating true on-off power control directly from logic circuit supply voltages.

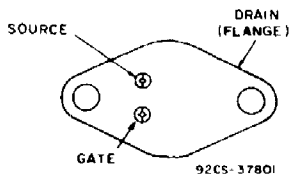
The 2N6904 is supplied in the JEDEC TO-204AA steel package.

N-CHANNEL ENHANCEMENT MODE



TERMINAL DIAGRAM

TERMINAL DESIGNATION



JEDEC TO-204AA

MAXIMUM RATINGS, *Absolute Maximum Values* (T_C = 25° C):

* DRAIN-SOURCE VOLTAGE, V_{DSS}	200 V
* DRAIN-GATE VOLTAGE (R_{GS} = 1 MΩ), V_{DGR}	200 V
* GATE-SOURCE VOLTAGE, V_{GS}	±10 V
* DAIN CURRENT, RMS Continuous, I_D	8 A
Pulsed, I_{DM}	20 A
* POWER DISSIPATION, P_T	
At T_C = 25° C	75 W
Above T_C = 25° C, Derate Linearly	0.6 W/° C
* OPERATING AND STORAGE TEMPERATURE, T_J, T_{stg}	-55 to +150° C
* LEAD TEMPERATURE, T_L	
At distance ≥ 1/8 in. (3.17 mm) from seating plane for 10 s max.	260° C

2N6904

ELECTRICAL CHARACTERISTICS at Case Temperature (T_C = 25° C) unless otherwise specified

	CHARACTERISTIC		TEST CONDITIONS	LIMITS		UNITS
				MIN.	MAX.	
*	Drain-Source Breakdown Voltage	BV_{DSS}	I_D = 1 mA, V_{GS} = 0	200	—	V
*	Gate Threshold Voltage	$V_{GS}(th)$	V_{GS} = V_{DS}, I_D = 1 mA	1	2	V
*	Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 160 V	—	1	μA
			T_C = 125° C, V_{DS} = 160 V	—	50	
*	Gate-Source Leakage Current	I_{GSS}	V_{GS} = ±10 V, V_{DS} = 0	—	100	nA
*	Drain-Source On Voltage	$V_{DS}(on)$[a]	I_D = 5.1 A, V_{GS} = 5 V	—	3.06	V
			I_D = 8 A, V_{GS} = 5 V	—	5.5	
*	Static Drain-Source On Resistance	$r_{DS}(on)$[a]	I_D = 5.1 A	—	0.6	Ω
			T_C=125° C, I_D=5.1 A, V_{GS}=5 V	—	1.11	
*	Forward Transconductance	g_{fs}[a]	V_{DS} = 5 V, I_D = 5.1 A	3	12	mho
*	Input Capacitance	C_{iss}	V_{DS} = 25 V	350	900	pF
*	Output Capacitance	C_{oss}	V_{GS} = 0 V	75	250	
*	Reverse-Transfer Capacitance	C_{rss}	f = 0.1 MHz	20	100	
*	Turn-On Delay Time	$t_d(on)$	V_{DD} = 100 V	—	45	ns
*	Rise Time	t_r	I_D = 5.1 A	—	150	
*	Turn-Off Delay Time	$t_d(off)$	R_{gen} = R_{gs} = 15 Ω	—	135	
*	Fall Time	t_f	V_{GS} = 5 V	—	150	
*	Thermal Resistance Junction-to-Case	$R\theta_{JC}$		—	1.67	°C/W

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

	CHARACTERISTIC		TEST CONDITIONS	LIMITS		UNITS
				MIN.	MAX.	
*	Diode Forward Voltage	V_{SD}[a]	I_{SD} = 8 A	0.8	1.6	V
	Reverse Recovery Time	t_{rr}	I_F = 4 A d_{IF}/d_t = 100 A/μs	—	625	ns

* In accordance with JEDEC registration data.

[a]Pulsed: Pulse duration = 300 μs, max., duty cycle = 2%.