

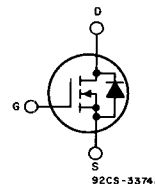
N-Channel Logic Level Power MOS Field-Effect Transistors (L²FET)

$r_{DS(on)}$: 1.4 Ω

Features:

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

N-CHANNEL ENHANCEMENT MODE

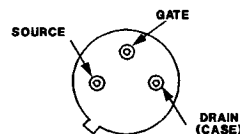


TERMINAL DIAGRAM

The 2N6901 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 2N6901 is supplied in the JEDEC TO-205AF metal package.

TERMINAL DESIGNATION



JEDEC TO-205AF

MAXIMUM RATINGS, Absolute-Maximum Values ($T_C = 25^\circ\text{C}$):

*DRAIN-SOURCE VOLTAGE, V_{DS}	100 V
*DRAIN-GATE VOLTAGE ($R_{DS} = 1\text{ M}\Omega$), V_{DG}	100 V
*GATE-SOURCE VOLTAGE, V_{GS}	$\pm 10\text{ V}$
*DRAIN CURRENT:	
RMS Continuous, I_D	1.69 A
Pulsed, I_{DM}	5 A
*POWER DISSIPATION, P_T :	
At $T_C = 25^\circ\text{C}$	8.33 W
Above $T_C = 25^\circ\text{C}$	Derate linearly 0.0667 W/ $^\circ\text{C}$
*OPERATING AND STORAGE TEMPERATURE, T_J , T_{stg}	-55 to $+150^\circ\text{C}$
*LEAD TEMPERATURE, T_L :	
At distances $\geq \frac{1}{8}$ in. (3.17 mm) from seating plane for 10 s max.	260 $^\circ\text{C}$

*In accordance with JEDEC registration data.

2N6901

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

CHARACTERISTIC		TEST CONDITIONS	LIMITS		UNITS
			Min.	Max.	
* Drain-Source Breakdown Voltage	BV_{DS}	$I_D = 1\text{ mA}, V_{GS} = 0$	100	—	V
* Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS} = V_{DS}, I_D = 1\text{ mA}$	1	2	V
* Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 80\text{ V}$	—	1	μA
		$T_c = 125^\circ\text{C}, V_{DS} = 80\text{ V}$	—	50	
* Gate-Source Leakage Current	I_{GSS}	$V_{GS} = \pm 10\text{ V}, V_{DS} = 0$	—	100	nA
* Drain-Source On Voltage	$V_{DS(on)}^a$	$I_D = 1.07\text{ A}, V_{GS} = 5\text{ V}$	—	1.5	V
		$I_D = 1.69\text{ A}, V_{GS} = 5\text{ V}$	—	2.4	
* Static Drain-Source On Resistance	$r_{DS(on)}^a$	$I_D = 1.07\text{ A}, V_{GS} = 5\text{ V}$	—	1.4	Ω
		$T_c = 125^\circ\text{C}, I_D = 1.07\text{ A}, V_{GS} = 5\text{ V}$	—	2.6	
* Forward Transconductance	g_m^a	$V_{DS} = 5\text{ V}, I_D = 1.07\text{ A}$	500	2000	mmho
* Input Capacitance	C_{iss}	$V_{DS} = 25\text{ V}$	50	200	pF
* Output Capacitance	C_{oss}	$V_{GS} = 0\text{ V}$	20	80	
* Reverse Transfer Capacitance	C_{rss}	$f = 0.1\text{ MHz}$	5	20	
* Turn-On Delay Time	$t_d(on)$	$V_{DD} = 50\text{ V}$	—	25	ns
* Rise Time	t_r	$I_D = 1.07\text{ A}$	—	45	
* Turn-Off Delay Time	$t_d(off)$	$R_{gen} = R_{gs} = 15\ \Omega$	—	45	
* Fall Time	t_f	$V_{GS} = 5\text{ V}$	—	80	
* Thermal Resistance Junction-to-Case	$R_{\theta JC}$		—	15	$^\circ\text{C/W}$

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

CHARACTERISTIC		TEST CONDITIONS	LIMITS		UNITS
			Min.	Max.	
* Diode Forward Voltage	V_{SD}^a	$I_{SD} = 1.69\text{ A}$	0.8	1.6	V
Reverse Recovery Time	t_{rr}	$I_F = 1\text{ A}, dI_F/dt = 50\text{ A}/\mu\text{s}$	—	250	ns

*In accordance with JEDEC registration data.

^aPulsed: Pulse duration = 300 μs max., duty cycle = 2%.

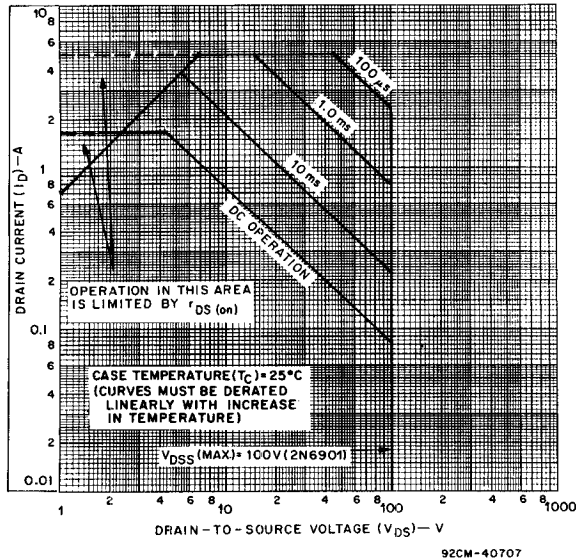


Fig. 1 - Maximum operating areas.

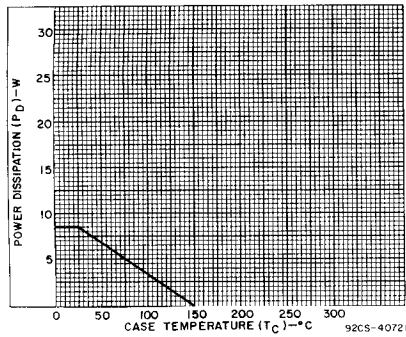


Fig. 2 - Power dissipation vs. temperature derating curve.

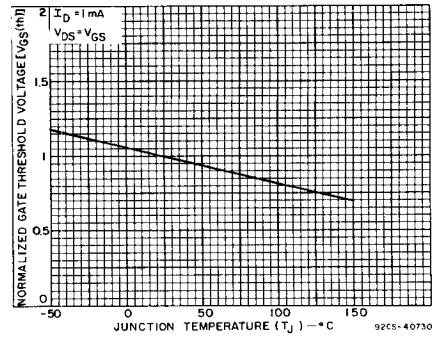


Fig. 3 - Typical normalized gate threshold voltage as a function of junction temperature.

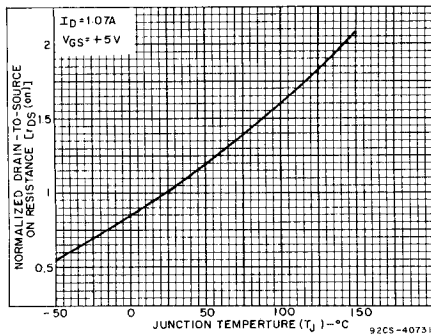


Fig. 4 - Typical normalized drain-to-source on resistance to junction temperature.

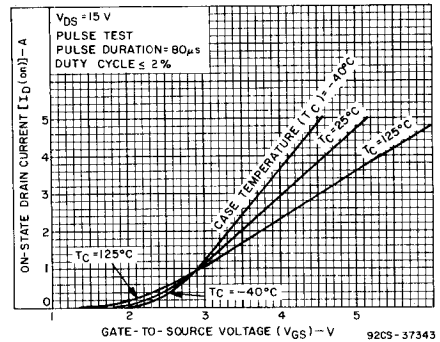


Fig. 5 - Typical transfer characteristics.

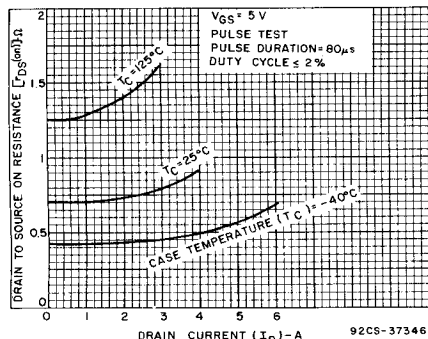


Fig. 6 - Typical drain-to-source on resistance as a function of drain current.

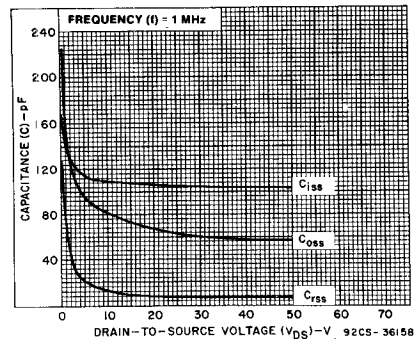


Fig. 7 - Capacitance as a function of drain-to-source voltage.

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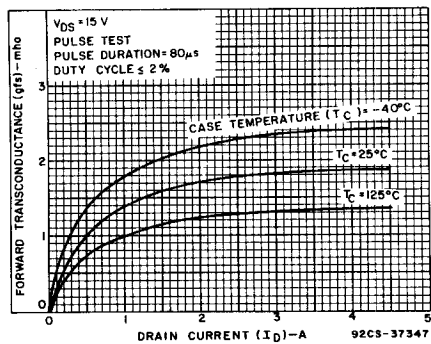


Fig. 8 - Typical forward transconductance as a function of drain current.

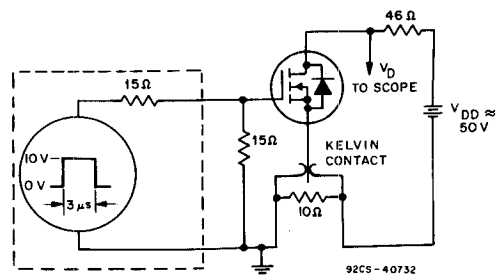


Fig. 9 - Switching time test circuit.

JAN, JANTX, and JANTXV

JAN, JANTX, and JANTXV Solid-State Power Devices

The major military specification used for the procurement of standard solid-state devices by the military is MIL-S-19500, which covers the devices such as discrete transistors, thyristors, and diodes.

MIL-S-19500 is the specification for the familiar "JAN" type solid state devices. Detailed electrical specifications are prepared as needed by the three military services and coordinated by the Defense Electronic Supply Center (DESC).

Levels of reliability are defined by MIL-S-19500. JAN types receive Group A, Group B, and Group C lot sampling only, and are the least expensive. JANTX types receive 100

percent process conditioning, and power conditioning, and are subjected to lot rejection based on delta parameter criteria in addition to Group A, Group B, and Group C lot sampling. JANTXV types are subjected to 100 percent (JTXV) internal visual inspection in addition to all of the JANTX tests in accordance with MIL-STD-750 test methods and MIL-S-19500.

DESC publishes "QPL-19500", a Qualified Products List of all types and suppliers approved to produce and brand devices in accordance with MIL-S-19500.

The following tables list approved "QPL" types and types that are process of testing preliminary to QPL approval by DESC, respectively.

Custom high-reliability selections of Harris Power MOSFETs can also be supplied with similar process and power conditioning tests and delta criteria.

QPL Approved Types

Harris is presently qualified on the following devices. Prices and delivery quotations may be obtained from your local sales representative.

JAN and JANTX Power MOSFETs

N-Channel Types	MIL-S-19500/	Package	Channel	P _r (W)	I _D (A)	BV _{DSS} (V)	r _{DS(on)} Ω
2N6756	542	TO-204AA	N	75	14	100	0.18
2N6758	542	TO-204AA	N	75	9	200	0.4
2N6760	542	TO-204AA	N	75	5.5	400	1
2N6762	542	TO-204AA	N	75	4.5	500	1.5
2N6764	543	TO-204AE	N	150	38	100	0.055
2N6766	543	TO-204AE	N	150	30	200	0.085
2N6768	543	TO-204AA	N	150	14	400	0.3
2N6770	543	TO-204AA	N	150	12	500	0.4
2N6782	556	TO-205AF	N	15	3.5	100	0.6
2N6784	556	TO-205AF	N	15	2.25	200	1.5
2N6788	555	TO-205AF	N	20	6	100	0.3
2N6790	555	TO-205AF	N	20	3.5	200	0.8
2N6792	555	TO-205AF	N	20	2	400	1.8
2N6794	555	TO-205AF	N	20	1.5	500	3
2N6796	557	TO-205AF	N	25	8	100	0.18
2N6798	557	TO-205AF	N	25	5.5	100	0.4
2N6800	557	TO-205AF	N	25	3	400	1
2N6802	557	TO-205AF	N	25	2.5	500	1.5
P-Channel Types	MIL-S-19500/	Package	Channel	P _r (W)	I _D (A)	BV _{DSS} (V)	r _{DS(on)} Ω
2N6895	565	TO-205AF	P	8.33	-1.5	-100	3.65
2N6896	565	TO-204AA	P	60	-6	-100	0.6
2N6897	565	TO-204AA	P	100	-12	-100	0.3
2N6898	565	TO-204AA	P	150	-25	-100	0.2
2N6849	564	TO-205AF	P	25	-6.5	-100	0.3
2N6851	564	TO-205AF	P	25	-4.0	-200	0.8
N-Channel Logic-Level Types	MIL-S-19500/	Package	Channel	P _r (W)	I _D (A)	BV _{DSS} (V)	r _{DS(on)} Ω
2N6901	566	TO-205AF	N	8.33	1.5	100	1.4
2N6902	566	TO-204AA	N	75	12	100	0.2
2N6903	566	TO-205AF	N	8.33	1.5	200	3.65
2N6904	566	TO-204AA	N	75	8	200	0.65