HARRIS

RFP25N06L

N-Channel Logic Level Enhancement-Mode Power Field-Effect Transistor (L^2FET)

August 1991

Features

- 25A, 60V
- $r_{DS(ON)} = 0.085\Omega$
- Design Optimized for 5V Gate Drives
- Can be Driven Directly from QMOS, NMOS, TTL Circuits
- Compatible with Automotive Drive Requirements
- SOA is Power-Dissipation Limited
- Nanoscecond Switching Speeds
- Linear Transfer Characteristics
- High Input Impedance
- Majority Carrier Device

Description

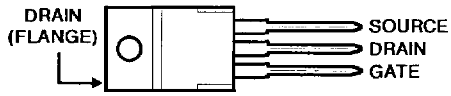
The RFP25N06L is an N-Channel enhancement-mode silicon-gate power field-effect transistor specifically designed for use with logic level (5V) driving sources in applications such as programmable controllers, automotive switching and solenoid drivers. This performance is accomplished through a special gate oxide design which provides full rated conductance at gate biases in the 3V - 5V range, thereby facilitating true on-off power control directly from logic circuit supply voltages.

The RFP25N06L is supplied in the JEDEC TO-220AB plastic package.

Because of space limitations branding (marking) on type RFP25N06L is F25N06L.

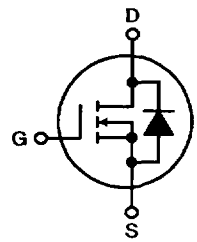
Package

TO-220AB
TOP VIEW



Terminal Diagram

N-CHANNEL ENHANCEMENT MODE



Absolute Maximum Ratings (T_C = +25°C) Unless Otherwise Specified

			UNITS
Drain-Source Voltage	V_{DS}	60	V
Drain-Gate Voltage (R_{GS} = 1MΩ)	V_{DGR}	60	V
Continuous Drain Current			
RMS Continuous	I_D	25	A
RMS Continuous @ T_C = +85°C		18	A
Pulsed Drain Current	I_{DM}	60	A
Gate-Source Voltage	V_{GS}	±10	V
Maximum Power Dissipation			
T_C = +25°C	P_D	75	W
Above T_C = +25°C Derate Linearly		0.6	W/°C
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-55 to +150	°C

CAUTION: These devices are sensitive to electrostatic discharge. Proper I.C. handling procedures should be followed.

File Number 2044.1

ELECTRICAL CHARACTERISTICS *At Case Temperature (T_C) = 25° C Unless Otherwise Specified*

CHARACTERISTICS		TEST CONDITIONS	LIMITS RFP25N06L MIN.	LIMITS RFP25N06L MAX.	UNITS
Drain-Source Breakdown Voltage	BV_{DSS}	I_D = 1 mA, V_{GS} = 0	60	—	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} = 40 V	—	—	μA
		V_{DS} = 50 V	—	1	μA
		T_c = 125 °C, V_{DS} = 40 V	—	—	μA
		T_c = 125 °C, V_{DS} = 50 V	—	50	μA
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 = 12.5 A, V_{GS} = 5 V	—	1.06	V
		I_D = 25 A, V_{GS} = 5 V	—	2.5	V
Static Drain-Source On Resistance	$r_{DS(on)}$[a]	I_D = 12.5 A, V_{GS} = 5 V	—	0.085	Ω
Forward Transconductance	g_{fs}[a]	V_{DS} = 5 V, I_D = 12.5 A	5	—	mho
Input Capacitance	C_{iss}	V_{DS} = 25 V, V_{GS} = 0 V, f = 1 MHz	—	2000	pF
Output Capacitance	C_{oss}		—	900	pF
Reverse Transfer Capacitance	C_{rss}		—	400	pF
Turn-On Delay Time	$t_{d(on)}$	V_{DS} = 30 V, I_D = 12.5 A, $R_{gen} = \infty$, R_{gs} = 6.25 Ω, V_{GS} = 5 V	18 (typ.)	60	ns
Rise Time	t_r		120 (typ.)	225	ns
Turn-Off Delay Time	$t_{d(off)}$		123 (typ.)	225	ns
Fall Time	t_f		123 (typ.)	200	ns
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	RFP25N06L	—	1.67	°C/W

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

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LOGIC LEVEL POWER MOSFETs

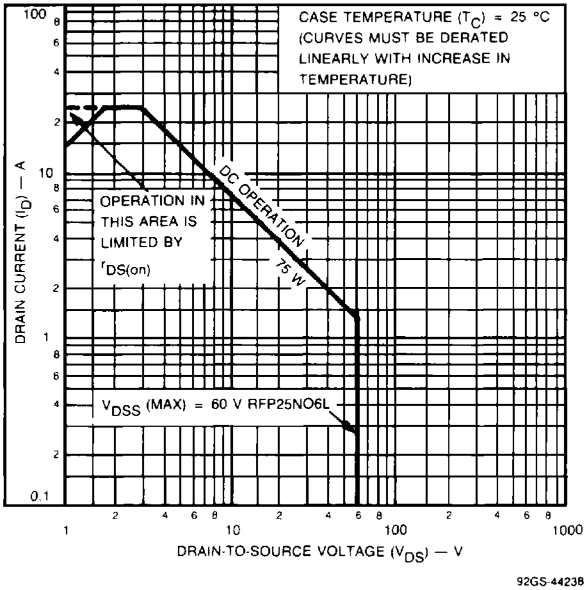

Fig. 1 - Maximum operating areas for all types.

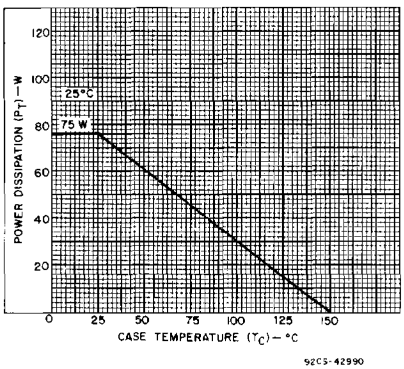

Fig. 2 - Power dissipation vs. case temperature derating curve for all types.

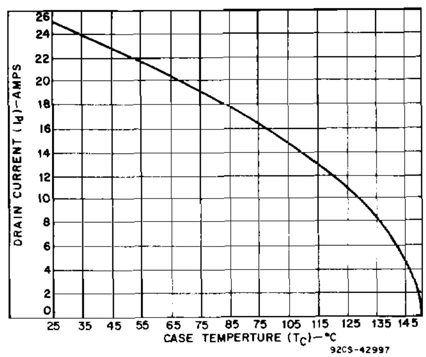

Fig. 3 - Maximum continuous drain current vs. case temperature.

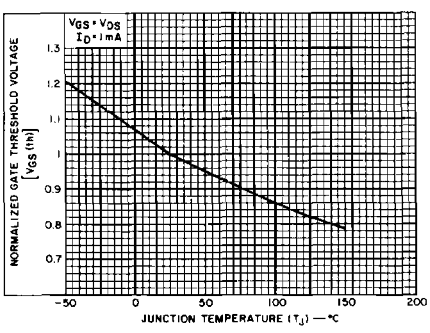

Fig. 4 - Typical normalized gate threshold voltage as a function of junction temperature for all types.

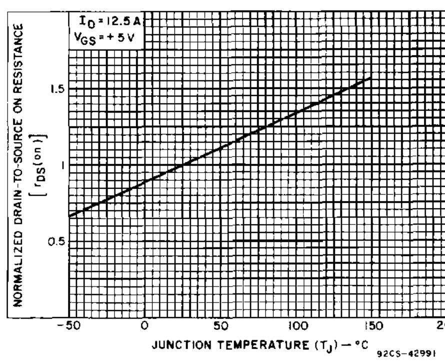

Fig. 5 - Normalized drain-to-source on resistance to junction temperature for all types.

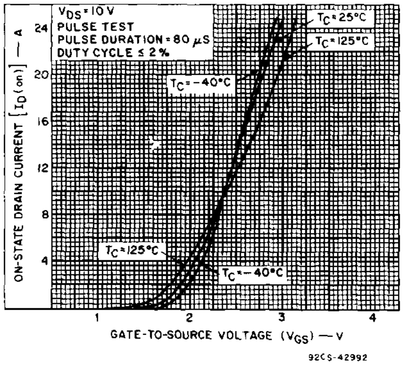

Fig. 6 - Typical transfer characteristics for all types.

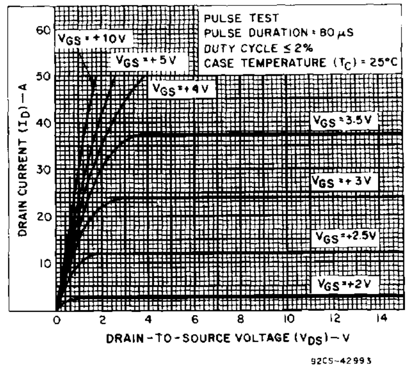

Fig. 7 - Typical output characteristics for all types.

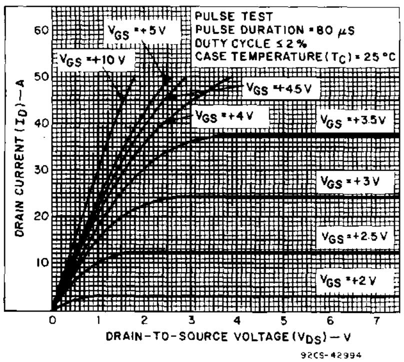

Fig. 8 - Typical saturation characteristics for all types.

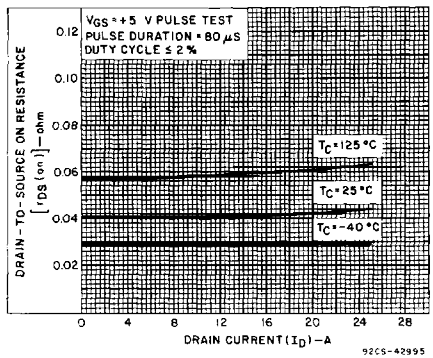

Fig. 9 - Typical drain-to-source on resistance as a function of drain current for all types.

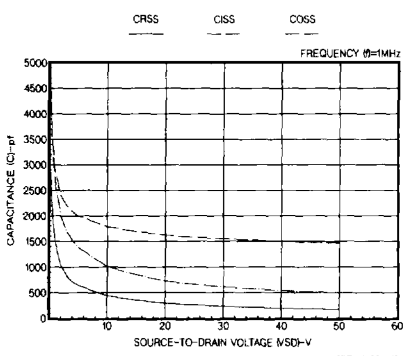

Fig. 10 - Typical capacitance vs. voltage.

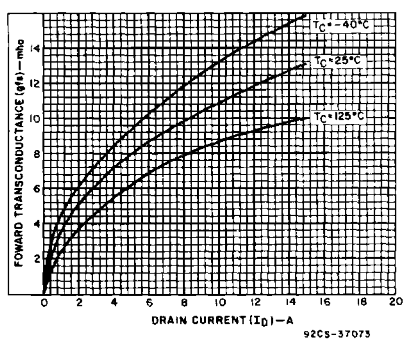

Fig. 11 - Typical forward transconductance as a function of drain current for all types.

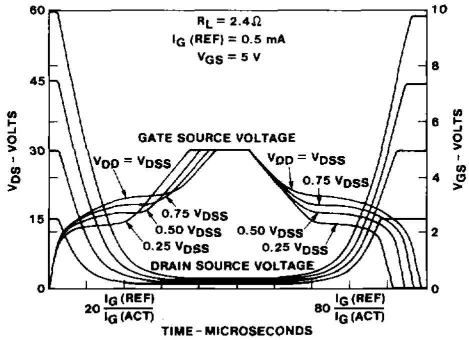

Fig. 12 - Normalized switching waveforms for constant gate-current. Refer to Harris application notes AN7254 and AN-7260.