HARRIS

RFP2N08
RFP2N10

N-Channel Enhancement-Mode Power Field-Effect Transistors

August 1991

Features

- 2A, 80V and 100V
- $r_{DS}(on) = 1.05\Omega$
- SOA is Power-Dissipation Limited
- Nanosecond Switching Speeds
- Linear Transfer Characteristics
- High Input Impedance
- Majority Carrier Device

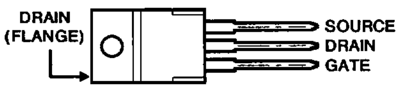
Description

The RFP2N08 and RFP2N10 are n-channel enhancement-mode silicon-gate power field-effect transistors designed for applications such as switching regulators, switching converters, motor drivers, relay drivers, and drivers for high-power bipolar switching transistors requiring high speed and low gate-drive power. These types can be operated directly from integrated circuits.

The RFP-types are supplied in the JEDEC TO-220AB plastic package.

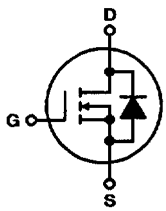
Package

TO-220AB
TOP VIEW



Terminal Diagram

N-CHANNEL ENHANCEMENT MODE



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N-CHANNEL POWER MOSFETs

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

		RFP2N08	RFP2N10	UNITS
Drain-Source Voltage	V_{DSS}	80	100	V
Drain-Gate Voltage (R_{GS} = 1MΩ)	V_{DGR}	80	100	V
RMS Continuous Drain Current				
T_C = +25°C	I_D	2	2	A
Pulsed Drain Current	I_{DM}	5	5	A
Gate-to-Source Voltage	V_{GS}	±20	±20	V
Maximum Power Dissipation				
T_C = +25°C	P_D	25	25	W
T_C > +25°C		0.2	0.2	W/°C
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-55 to +150	-55 to +150	°C

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

File Number 2883

Electrical Characteristics (T_C = +25°C), Unless Otherwise Specified

CHARACTERISTIC	SYMBOLS	TEST CONDITIONS	LIMITS				UNITS
			RFP2N08		RFP2N10		
			MIN	MAX	MIN	MAX	
Drain-Source Breakdown Voltage	BV_{DSS}	I_D = 1mA, V_{GS} = 0	80	-	100	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS} = V_{DS}$, I_D = 250μA	2	4	2	4	V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS} = 65V	-	1	-	-	μA
		V_{DS} = 80V	-	-	-	1	μA
		T_C = +125°C V_{DS} = 65V	-	50	-	-	μA
		V_{DS} = 80V	-	-	-	50	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS} = ±20V, V_{DS} = 0	-	100	-	100	nA
Drain-Source On-Voltage	$V_{DS(on)}$*	I_D = 1A, V_{GS} = 10V	-	1.05	-	1.05	V
		I_D = 2A, V_{GS} = 10V	-	3.0	-	3.0	V
Static Drain-Source On Resistance	$r_{DS(on)}$*	I_D = 1A, V_{GS} = 10V	-	1.05	-	1.05	Ω
Forward Transconductance	g_{fs}*	I_D = 1A, V_{DS} = 10V	400	-	400	-	S (℧)
Input Capacitance	C_{ISS}	V_{GS} = 0V, V_{DS} = 25V f = 1MHz	-	200	-	200	pF
Output Capacitance	C_{OSS}		-	80	-	80	pF
Reverse Transfer Capacitance	C_{RSS}		-	25	-	25	pF
Turn-On Delay Time	$t_{d(on)}$	I_D = 1A, V_{DD} = 50V $R_{GEN} = R_{GS}$ = 50Ω V_{GS} = 10V	17 (typ)	25	17 (typ)	25	ns
Rise Time	t_r		30 (typ)	45	30 (typ)	45	ns
Turn-Off Delay Time	$t_{d(off)}$		30 (typ)	45	30 (typ)	45	ns
Fall Time	t_f		17 (typ)	25	17 (typ)	25	ns
Thermal Resistance Junction-to-Case	$R_{\theta JC}$		-	5	-	5	°C/W

Source-Drain Diode Ratings and Characteristics

CHARACTERISTIC	SYMBOLS	TEST CONDITIONS	LIMITS				UNITS
			RFP2N08		RFP2N10		
			MIN	MAX	MIN	MAX	
Diode Forward Voltage	V_{SD}*	I_{SD} = -1A	-	1.4	-	1.4	V
Diode Reverse Recovery Time	t_{rr}	I_F = 2A dI_F/dt = 50A/μs	100 (typ)	100 (typ)	100 (typ)	100 (typ)	ns

* Pulsed: Pulse duration = 300μs max., duty cycle = 2%.

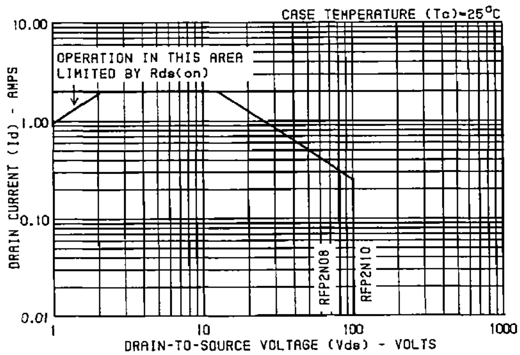

Fig. 1 - Maximum operating areas for all types.

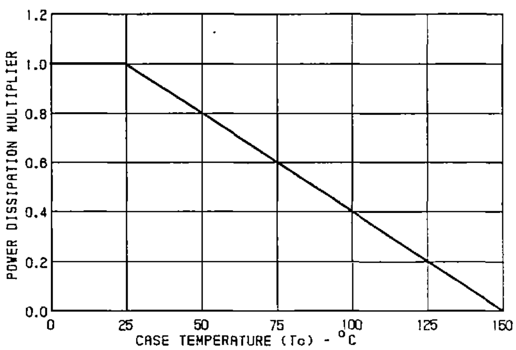

Fig. 2 - Normalized power dissipation vs. temperature derating curve

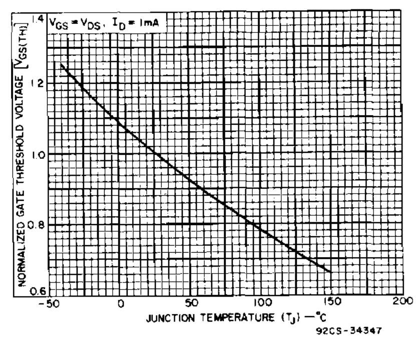

Fig. 3 - Typical normalized gate threshold voltage as a function of junction temperature for all types.

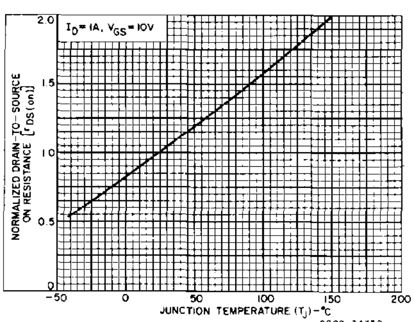

Fig. 4 - Normalized drain-to-source on resistance to junction temperature for all types.

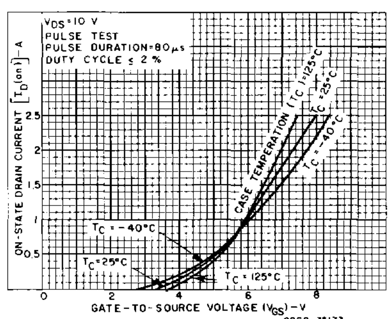

Fig. 5 - Typical transfer characteristics for all types.

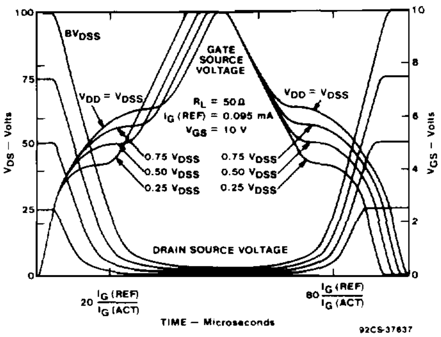

Fig. 6 - Normalized switching waveforms for constant gate-current. Refer to Harris application notes AN-7254 and AN-7260.

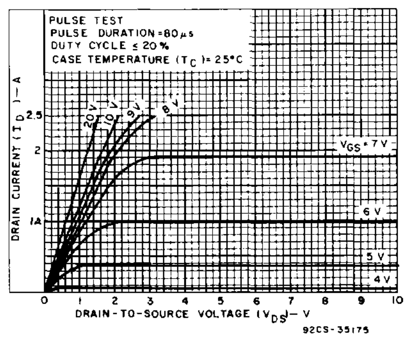

Fig. 7 - Typical saturation characteristics for all types.

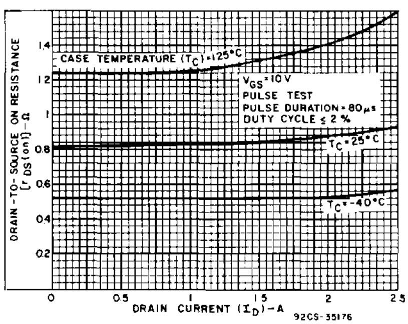

Fig. 8 - Typical drain-to-source on resistance as a function of drain current for all types.

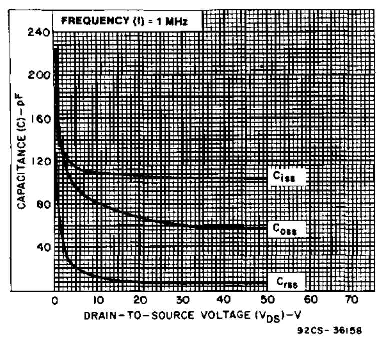

Fig. 9 - Capacitance as a function of drain-to-source voltage for all types.

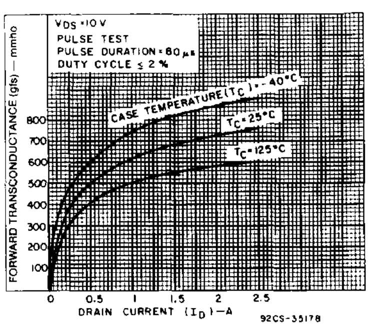

Fig. 10 - Typical forward transconductance as a function of drain current for all types.

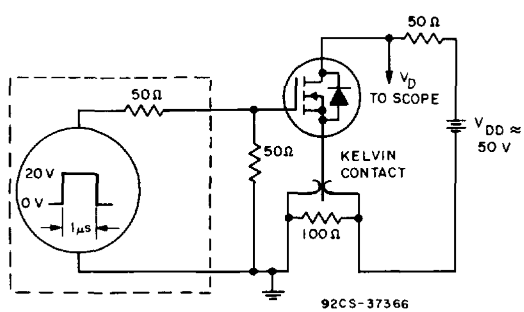

Fig. 11 - Switching Time Test Circuit.