RFL1P08, RFL1P10, RFP2P08, RFP2P10

File Number **1535**

Power MOS Field-Effect Transistors

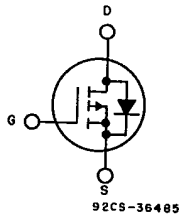
P-Channel Enhancement-Mode Power Field-Effect Transistors

1 and 2 A, -80 V and -100 V
r_{DS}(on): 3.0Ω and 3.15Ω

Features:

- *SOA is power-dissipation limited*
- *Nanosecond switching speeds*
- *Linear transfer characteristics*
- *High input impedance*
- *Majority carrier device*

TERMINAL DIAGRAM



92CS-36485

P-CHANNEL ENHANCEMENT MODE

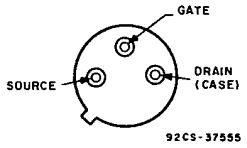
The RFL1P08 and RFL1P10 and the RFP2P08 and RFP2P10 are P-channel enhancement-mode silicon-gate power field-effect transistors designed for applications such as switching regulators, switching converters, motor drivers, relay drivers, and drivers for high-power bipolar switching transistors requiring high speed and low gate-drive power. These types can be operated directly from integrated circuits.

The RFL-series types are supplied in the JEDEC TO-205AF metal package and the RFP-series types in the JEDEC TO-220AB plastic package.

The RFL and RFP series were formerly RCA developmental numbers TA9400 and TA9401, respectively.

TERMINAL DESIGNATIONS

RFL1P08
RFL1P10



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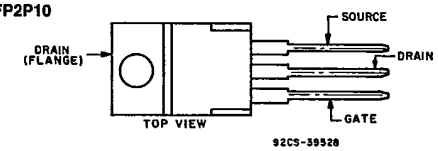
JEDEC TO-205AF

RFP2P08
RFP2P10



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JEDEC TO-220AB

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

		RFL1P08	RFL1P10	RFP2P08	RFP2P10	
DRAIN-SOURCE VOLTAGE	V_{DSS}	-80	-100	-80	-100	V
DRAIN-GATE VOLTAGE (R_{GS}=1 MΩ)	V_{DGR}	-80	-100	-80	-100	V
GATE-SOURCE VOLTAGE	V_{GS}	±20				V
DRAIN CURRENT Rms Continuous	I_D	1	1	2	2	A
Pulsed	I_{DM}	5				A
POWER DISSIPATION	P_T					
@ T_C=25°C		8.33	8.33	25	25	W
Derate above T_C=25°C		0.0667	0.0667	0.2	0.2	W/°C
OPERATING AND STORAGE TEMPERATURE	T_J, T_{stg}	-55 to +150				°C

RFL1P08, RFL1P10, RFP2P08, RFP2P10

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

CHARACTERISTIC	SYMBOL	TEST CONDITIONS		LIMITS RFL1P08 RFP2P08 Min.	LIMITS RFL1P08 RFP2P08 Max.	LIMITS RFL1P10 RFP2P10 Min.	LIMITS RFL1P10 RFP2P10 Max.	UNITS
Drain-Source Breakdown Voltage	BV_{DSS}	I_D = 1 mA, V_{GS} = 0		-80	—	-100	—	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS} = V_{DS}, I_D = 1 mA		-2	-4	-2	-4	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -65 V		—	1	—	—	µA
		V_{DS} = -80 V		—	—	—	1	
		T_C = 125° C, V_{DS} = -65 V		—	50	—	—	
		V_{DS} = -80 V		—	—	—	50	
Gate-Source Leakage Current	I_{GSS}	V_{GS} = ± 20 V, V_{DS} = 0		—	100	—	100	nA
Drain-Source On Voltage	$V_{DS(on)}$[a]	I_D = 1 A, V_{GS} = -10 V	RFP	—	-3.0	—	-3.0	V
			RFL	—	-3.15	—	-3.15	
		I_D = 2 A, V_{GS} = -10 V	RFP	—	-9	—	-9	
			RFL	—	-9.3	—	-9.3	
Static Drain-Source On Resistance	$r_{DS(on)}$[a]	I_D = 1A, V_{GS} = -10 V	RFP	—	3.0	—	3.0	Ω
			RFL	—	3.15	—	3.15	
Forward Transconductance	g_{fs}[a]	V_{DS} = -10 V, I_D = 1 A		200	—	200	—	mho
Input Capacitance	C_{iss}	V_{DS} = -25 V, V_{GS} = 0 V, f=1 MHz		—	150	—	150	pF
Output Capacitance	C_{oss}			—	80	—	80	
Reverse Transfer Capacitance	C_{rss}			—	30	—	30	
Turn-On Delay Time	$t_{d(on)}$	V_{DS} = -50 V, I_D = 1 A, R_{gen}=R_{gs}=50Ω, V_{GS} = -10 V		7(typ)	25	7(typ)	25	ns
Rise Time	t_r			15(typ)	45	15(typ)	45	
Turn-Off Delay Time	$t_{d(off)}$			14(typ)	45	14(typ)	45	
Fall Time	t_f		RFP	11(typ)	25	11(typ)	25	
			RFL	30(typ)	50	30(typ)	50	
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	RFL1P08, RFL1P10		—	15	—	15	°C/W
		RFP2P08, RFP2P10		—	5	—	5	

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

CHARACTERISTIC		TEST CONDITIONS	LIMITS RFL1P08 RFP2P08 Min.	LIMITS RFL1P08 RFP2P08 Max.	LIMITS RFL1P10 RFP2P10 Min.	LIMITS RFL1P10 RFP2P10 Max.	UNITS
Diode Forward Voltage	V_{SD}[a]	I_{SD} = 1A	—	1.4	—	1.4	V
Reverse Recovery Time	t_{rr}	I_F = 2A, dI_F/dt = 50 A/µs	135 (typ.)		135 (typ.)		ns

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

RFL1P08, RFL1P10, RFP2P08, RFP2P10

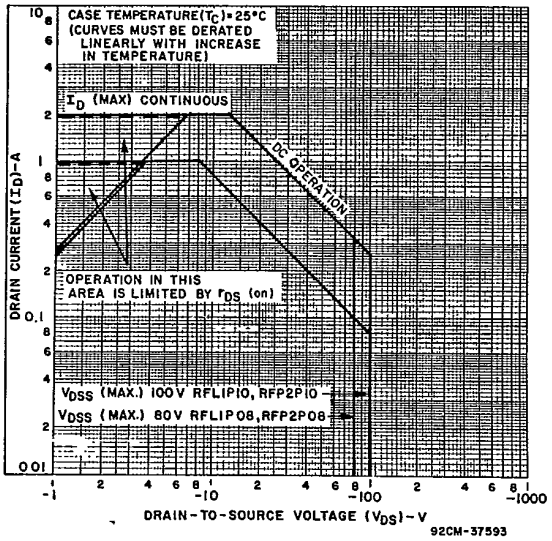

Fig. 1 - Maximum operating areas for all types.

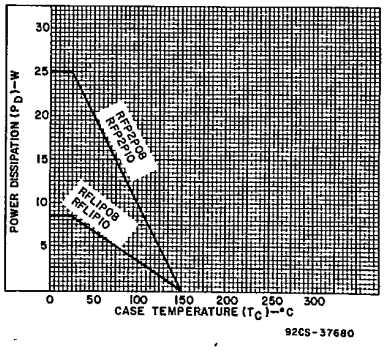

Fig. 2 - Power dissipation vs. temperature derating curve for all types.

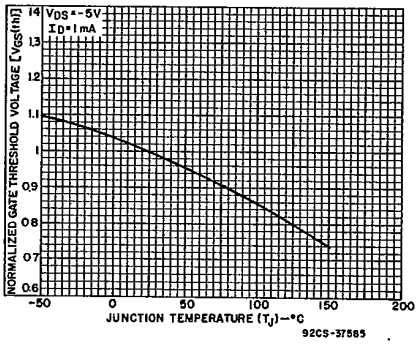

Fig. 3 - Typical normalized gate threshold voltage as a function of junction temperature for all types.

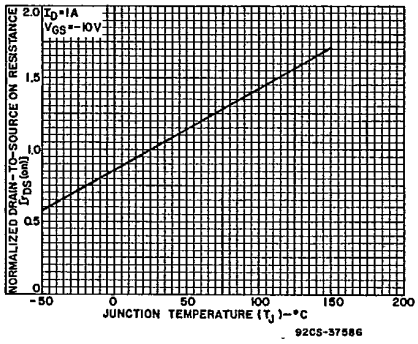

Fig. 4 - Normalized drain-to-source on resistance to junction temperature for all types.

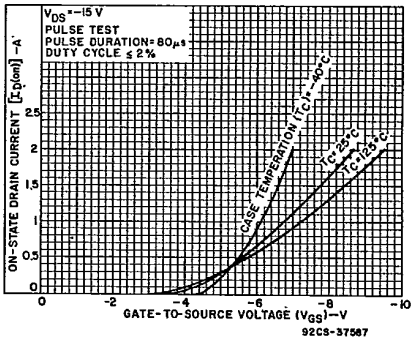

Fig. 5 - Typical transfer characteristics for all types.

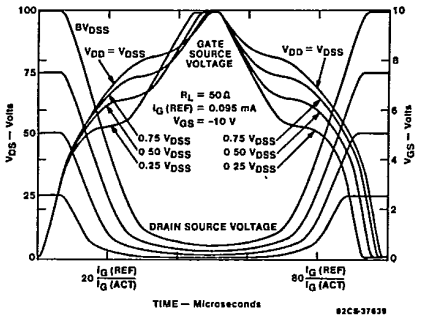

Fig. 6 - Normalized switching waveforms for constant gate-current drive. Refer to RCA Power MOSFETs PMP411A.

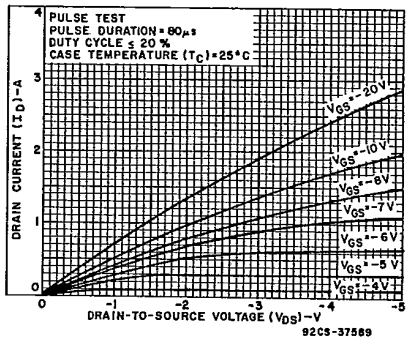

Fig. 7 - Typical saturation characteristics for all types.

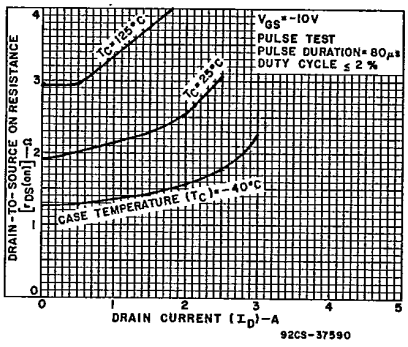

Fig. 8 - Typical drain-to-source on resistance as a function of drain current for all types.

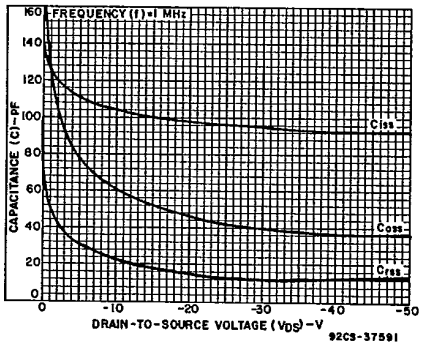

Fig. 9 - Capacitance as a function of drain-to-source voltage for all types.

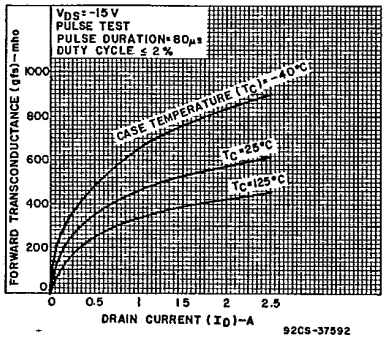

Fig. 10 - Typical forward transconductance as a function of drain current for all types.

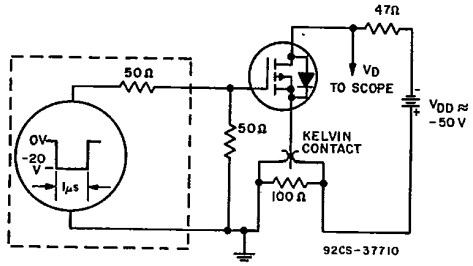

Fig. 11 - Switching time test circuit.