RFL2N05L, RFL2N06L, RFP4N05L, RFP4N06L File Number **1560**

Power Logic Level MOSFETs

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

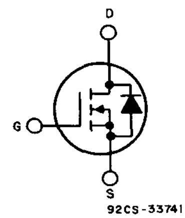
2 and 4 A, 50 V — 60 V

$r_{DS}(on)$: 0.6Ω and 0.75Ω

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*

TERMINAL DIAGRAM



N-CHANNEL ENHANCEMENT MODE

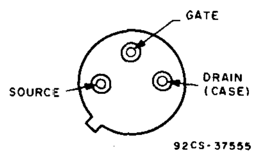
The RFL2N05L and RFL2N06L and the RFP4N05L and RFP4N06L* are N-channel enhancement-mode silicon-gate power field-effect transistors designed for applications such as switching regulators, switching converters, motor drivers, relay drivers, and drivers for high-power bipolar switching transistors requiring high speed and low gate-drive power. These types can be operated directly from integrated circuits.

The 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 TA9520 and TA9521, respectively.

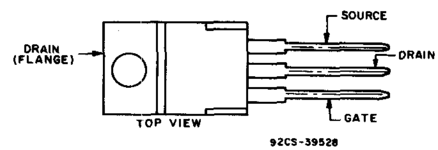
TERMINAL DESIGNATIONS

RFL2N05L
RFL2N06L



JEDEC TO-205AF

RFP4N05L
RFP4N06L



JEDEC TO-220AB

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

	RFL2N05L	RFL2N06L	RFP4N05L	RFP4N06L	
DRAIN-SOURCE VOLTAGE .... V_{DSS}	50	60	50	60	V
DRAIN-GATE VOLTAGE (R_{gs} = 1 MΩ) .... V_{DGR}	50	60	50	60	V
GATE-SOURCE VOLTAGE .... V_{GS}	±10				V
DRAIN CURRENT, RMS Continuous .... I_D	2	2	4	4	A
Pulsed .... I_{DM}	10				A
POWER DISSIPATION @ T_C = 25°C .... P_T	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

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

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	LIMITS RFL2N05L RFP4N05L MIN.	LIMITS RFL2N05L RFP4N05L MAX.	LIMITS RFL2N06L RFP4N06L MIN.	LIMITS RFL2N06L RFP4N06L MAX.	UNITS
Drain-Source Breakdown Voltage	BV_{DSS}	I_D = 1 mA, V_{GS} = 0	50	—	60	—	V
Gate-Threshold Voltage	$V_{GS(th)}$	V_{GS} = V_{DS}, I_D = 2 mA	1	2	1	2	V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS} = 40 V	—	1	—	—	μA
		V_{DS} = 50 V	—	—	—	1	μA
		T_C = 125° C, V_{DS} = 40 V	—	50	—	—	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	—	100	nA
Drain-Source On Voltage	$V_{DS(on)}$[a]	I_D = 1 A, V_{GS} = 5 V	—	.8	—	.8	V
		I_D = 2 A, V_{GS} = 5 V	—	2.0	—	2.0	V
		I_D = 4 A, V_{GS} = 7.5 V	—	4.8	—	4.8	V
Static Drain-Source On Resistance	$r_{DS(on)}$[a]	I_D = 1 A, V_{GS} = 5 V — RFP	—	0.6	—	0.6	Ω
		I_D = 1 A, V_{GS} = 5 V — RFL	—	0.75	—	0.75	Ω
Forward Transconductance	g_{fs}[a]	V_{DS} = 10 V, I_D = 1 A	800	—	800	—	mmho
Input Capacitance	C_{iss}	V_{DS} = 25 V, V_{GS} = 0 V, f = 1MHz	—	225	—	225	pF
Output Capacitance	C_{oss}		—	100	—	100	pF
Reverse-Transfer Capacitance	C_{rss}		—	40	—	40	pF
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 30 V, I_D = 1 A, R_{gen} = ∞, R_{gs} = 6.25 Ω, V_{GS} = 5 V	10(typ)	20	10(typ)	20	ns
Rise Time	t_r		65(typ)	130	65(typ)	130	ns
Turn-Off Delay Time	$t_{d(off)}$		20(typ)	40	20(typ)	40	ns
Fall Time	t_f		30(typ)	60	30(typ)	60	ns
Thermal Resistance Junction-to-Case	$R\theta_{JC}$	RFL2N05L, RFL2N06L	—	15	—	15	°C/W
		RFP4N05L, RFP4N06L	—	5	—	5	°C/W

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	LIMITS RFL2N05L RFP4N05L MIN.	LIMITS RFL2N05L RFP4N05L MAX.	LIMITS RFL2N06L RFP4N06L MIN.	LIMITS RFL2N06L RFP4N06L MAX.	UNITS
Diode Forward Voltage	V_{SD}[a]	I_{SD} = 1 A	—	1.4	—	1.4	V
Reverse Recovery Time	t_{rr}	I_F = 2 A, d_{IF}/d_t = 100 A/μs	150 (typ.)		150 (typ.)		ns

[a] Pulse Test: Width ≤ 300 μs, Duty cycle ≤ 2%.

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RFL2N05L, RFL2N06L, RFP4N05L, RFP4N06L

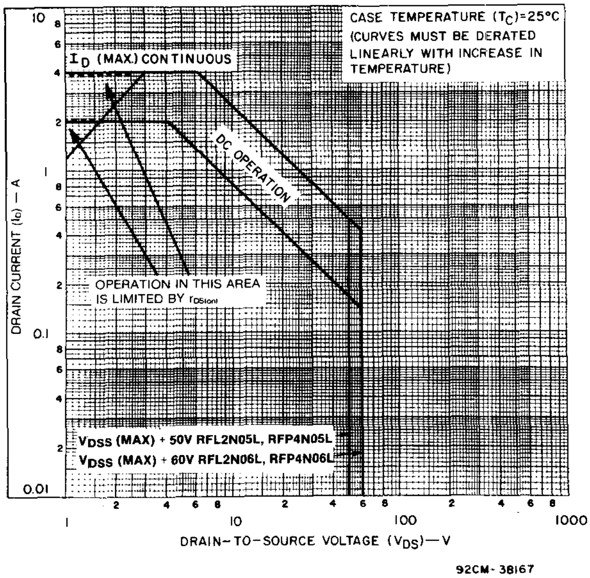

Fig. 1 - Maximum operating areas for all types.

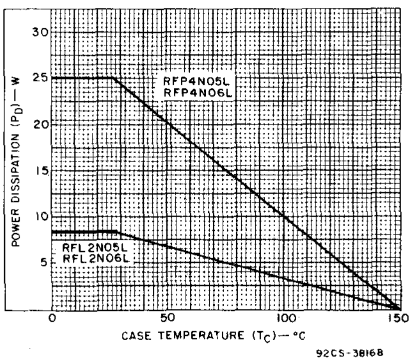

Fig. 2 - Power dissipation vs. case temperature derating curve for all types.

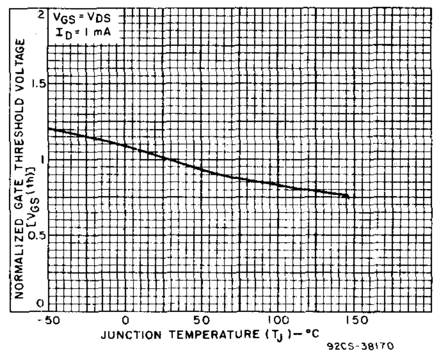

Fig. 3 - Typical normalized gate threshold voltage as a function of junction temperature for all types.

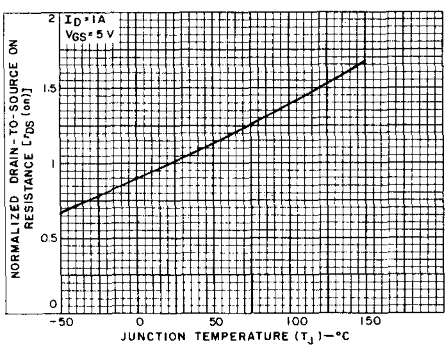

Fig. 4 - Normalized drain-to-source on resistance vs. junction temperature for all types.

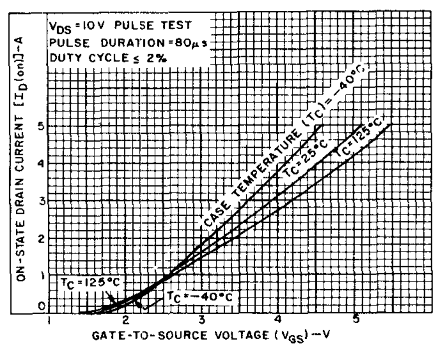

Fig. 5 - Typical transfer characteristics for all types.

RFL2N05L, RFL2N06L, RFP4N05L, RFP4N06L

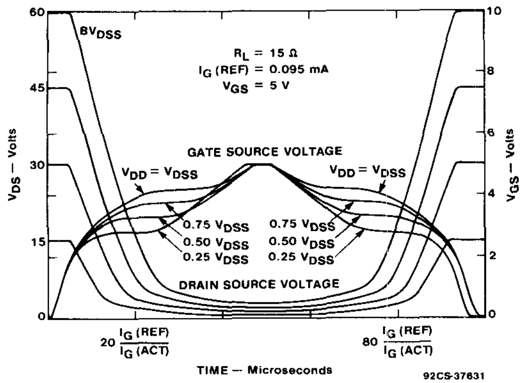

Fig. 6 - Normalized switching waveforms for constant gate-current. Refer to RCA application notes AN-7254 and AN-7260.

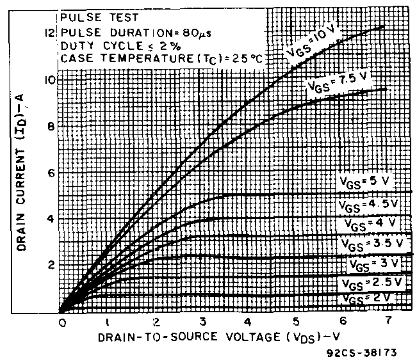

Fig. 7 - Typical saturation characteristics for all types.

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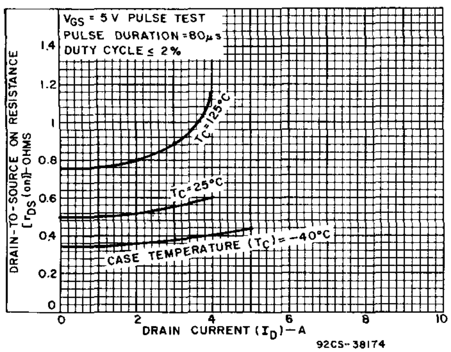

Fig. 8 - Typical drain-to-source on resistance as a function of drain current for all types.

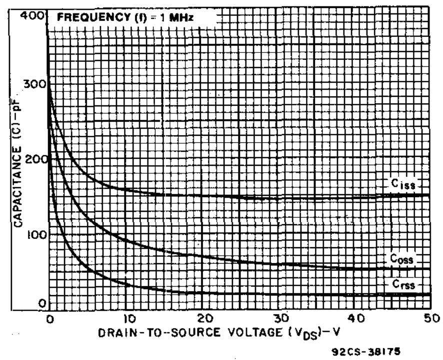

Fig. 9 - Capacitance as a function of drain-to-source voltage for all types.

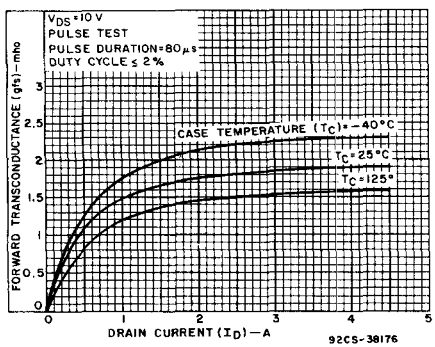

Fig. 10 - Typical forward transconductance as a function of drain current for all types.

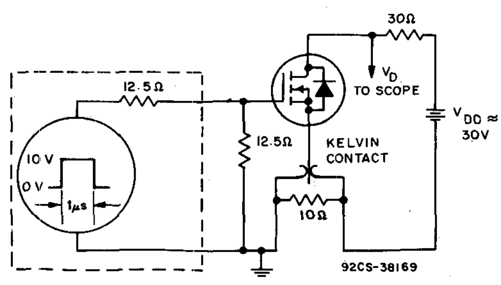

Fig. 11 - Switching Time Test Circuit.