RFM15N05L, RFM15N06L, RFP15N05L, RFP15N06L

File Number **1558**

Power Logic Level MOSFETs

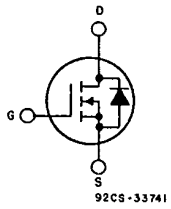
N-Channel Logic Level Power Field-Effect Transistors (L^2 FET)

15 A, 50 and 60 V
$r_{DS}(on)$: 0.14 Ω

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 RFM15N05L and RFM15N06L and the RFP15N05L and RFP15N06L* 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.

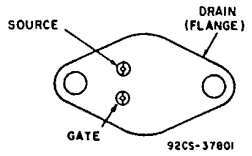
The RFM-series types are supplied in the JEDEC TO-204AA steel package and the RFP-series types in the JEDEC TO-220AB plastic package.

Because of space limitations branding (marking) on type RFP15N05L is F15NO5L and on type RFP15N06L is F15N06L.

*The RFM and RFP series were formerly RCA developmental numbers TA9522 and TA9523, respectively.

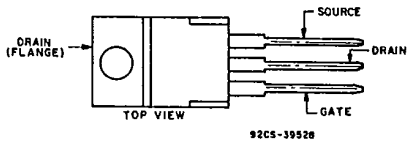
TERMINAL DESIGNATIONS

RFM15N05L
RFM15N06L



RFP15N05L
RFP15N06L

JEDEC TO-204AA



JEDEC TO-220AB

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

	RFM15N05L	RFM15N06L	RFP15N05L	RFP15N06L	
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	15				A
Pulsed ..... I_{DM}	40				A
POWER DISSIPATION @ T_C = 25°C ..... P_T	75	75	60	60	W
Derate above T_C = 25°C	0.6	0.6	0.48	0.48	W/°C
OPERATING AND STORAGE TEMPERATURE ..... T_J, T_{stg}	-55 to +150				°C

RFM15N05L, RFM15N06L, RFP15N05L, RFP15N06L

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

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	LIMITS				UNITS
			RFM15N05L RFP15N05L		RFM15N06L RFP15N06L		
			MIN.	MAX.	MIN.	MAX.	
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 = 1 mA	1	2	1	2	V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS} = 40 V	—	1	—	—	μA
		V_{DS} = 50 V	—	—	—	1	
		T_C = 125° C V_{DS} = 40 V	—	50	—	—	
		V_{DS} = 50 V	—	—	—	50	
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 = 7.5 A V_{GS} = 5 V	—	1.125	—	1.125	V
		I_D = 15 A V_{GS} = 5 V	—	3.0	—	3.0	
Static Drain-Source On Resistance	$r_{DS(on)}$[a]	I_D = 7.5 A V_{GS} = 5 V	—	0.14	—	0.14	Ω
Forward Transconductance	g_{fs}[a]	V_{DS} = 10 V I_D = 7.5 A	4.0	—	4.0	—	mho
Input Capacitance	C_{iss}	V_{DS} = 25 V	—	900	—	900	pF
Output Capacitance	C_{oss}	V_{GS} = 0 V	—	450	—	450	
Reverse-Transfer Capacitance	C_{rss}	f = 1 MHz	—	180	—	180	
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 30 V	16(typ)	40	16(typ)	40	ns
Rise Time	t_r	I_D = 7.5 A	250(typ)	325	250(typ)	325	
Turn-Off Delay Time	$t_{d(off)}$	R_{gen} = ∞ R_{gs} = 6.25 Ω	200(typ)	325	200(typ)	325	
Fall Time	t_f	V_{GS} = 5 V	225(typ)	325	225(typ)	325	
Thermal Resistance Junction-to-Case	$R\theta_{JC}$	RFM15N05L, RFM15N06L	—	1.67	—	1.67	°C/W
		RFP15N05L, RFP15N06L	—	2.083	—	2.083	

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	LIMITS				UNITS
			RFM15N05L RFP15N05L		RFM15N06L RFP15N06L		
			MIN.	MAX.	MIN.	MAX.	
Diode Forward Voltage	V_{SD}[a]	I_{SD} = 7.5A	—	1.4	—	1.4	V
Reverse Recovery Time	t_{rr}	I_F = 4A, d_{IF}/d_t = 100A/μs	225 (typ.)		225 (typ.)		ns

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

RFM15N05L, RFM15N06L, RFP15N05L, RFP15N06L

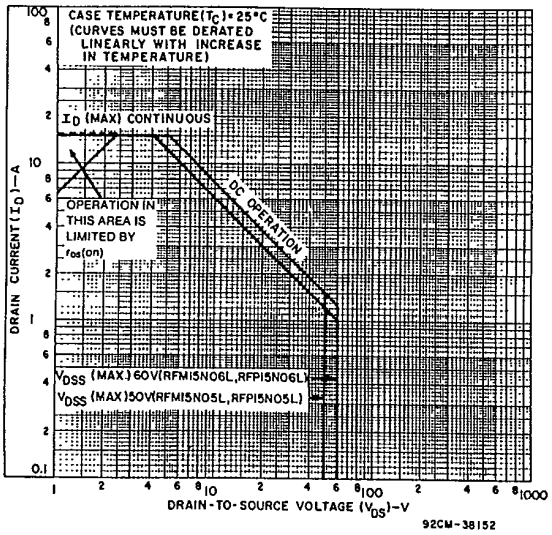


Fig. 1 - Maximum safe operating areas for all types.

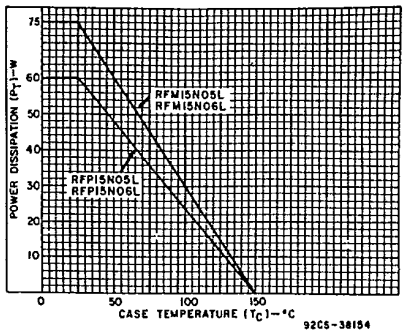


Fig. 2 - Power dissipation vs. case temperature derating curve for all types.

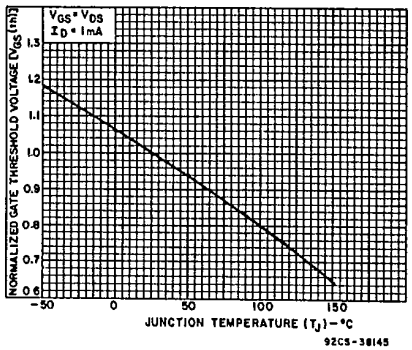


Fig. 3 - Typical normalized gate threshold voltage as a function of junction temperature for all types.

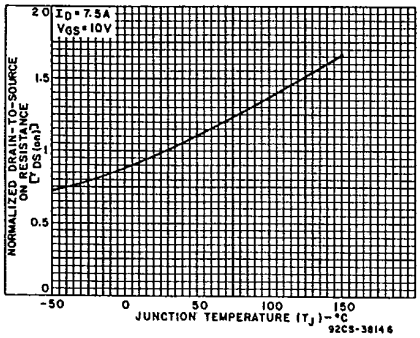


Fig. 4 - Normalized drain-to-source on resistance vs. junction temperature for all types.

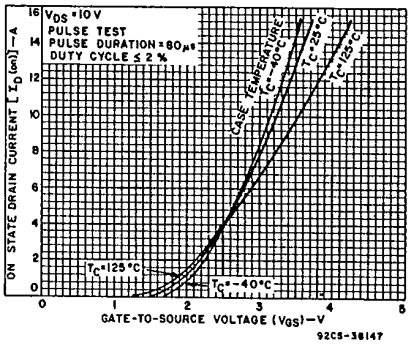


Fig. 5 - Typical transfer characteristics for all types.

RFM15N05L, RFM15N06L, RFP15N05L, RFP15N06L

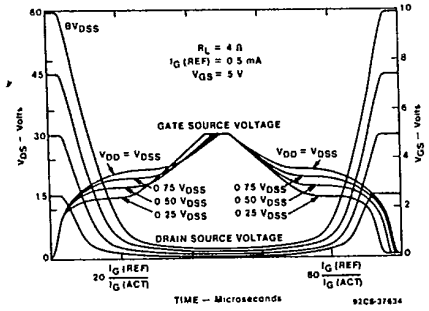


Fig. 6 - Normalized switching waveforms for constant gate-current drive. Refer to RCA Power MOSFETs PMP411A.

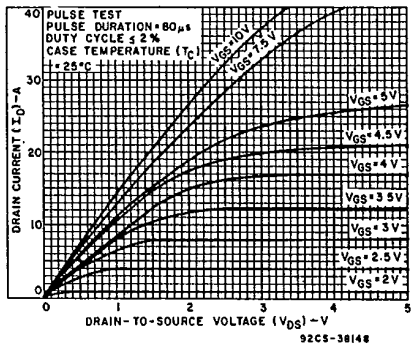


Fig. 7 - Typical saturation characteristics for all types.

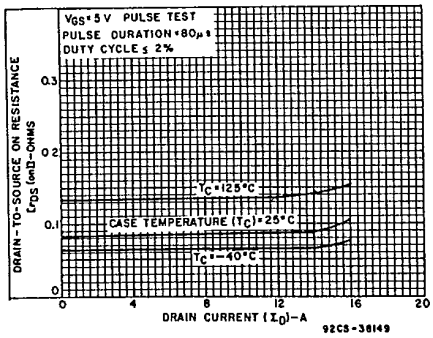


Fig. 8 - Typical drain-to-source on resistance as a function drain current for all types.

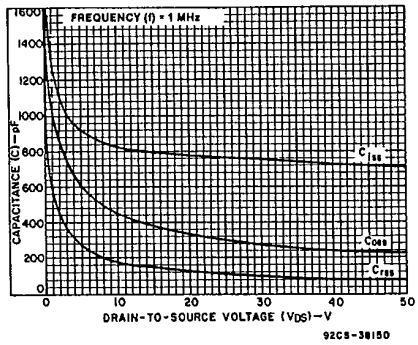


Fig. 9 - Capacitance as a function of drain-to-source voltage for all types.

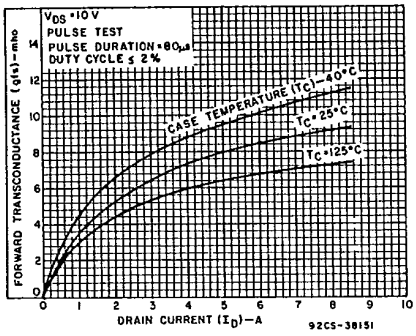


Fig. 10 - Typical forward transconductance as a function of drain current for all types.

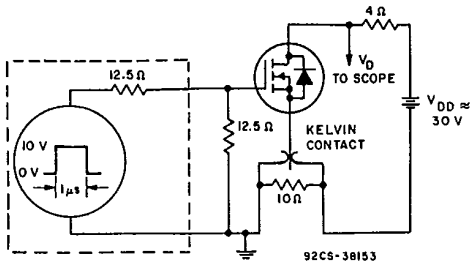


Fig. 11 - Switching Time Test Circuit.