

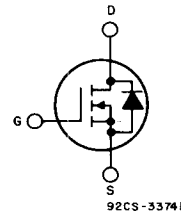
Power Logic Level MOSFETs

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**

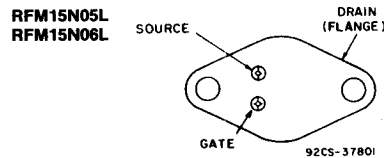
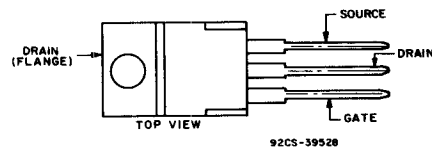
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The RFM15N05L and RFM15N06L and the RFP15N05L and RFP15N06L* are N-channel enhancement-mode silicon-gate power field-effect transistors designed for applications such as switching regulators, switching converters, motor drivers, relay drivers, and 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 F15N05L and on type RFP15N06L is F15N06L.

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

TERMINAL DESIGNATIONSRFM15N05L
RFM15N06L**JEDEC TO-204AA****JEDEC TO-220AB****MAXIMUM RATINGS, Absolute-Maximum Values ($T_C = 25^\circ\text{C}$):**

	RFM15N05L	RFM15N06L	RFP15N05L	RFP15N06L		
DRAIN-SOURCE VOLTAGE	V_{DS}	50	60	50	60	V
DRAIN-GATE VOLTAGE ($R_{gs} = 1\text{ M}\Omega$)	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 @ $T_C = 25^\circ\text{C}$	P_T	75	75	60	60	W
Derate above $T_C = 25^\circ\text{C}$		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 ($T_C = 25^\circ\text{C}$) 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 _{OSS}	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	—	1.05	—	1.05	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	—	200	—	200	
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 R _{gen} = ∞	250(typ)	325	250(typ)	325	
Turn-Off Delay Time	t _{d(off)}	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	Rθ _{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}	$I_F = 4A, dI_F/dt = 100A/\mu s$	225 (typ.)		225 (typ.)		ns

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

RFM15N05L, RFM15N06L, RFP15N05L, RFP15N06L

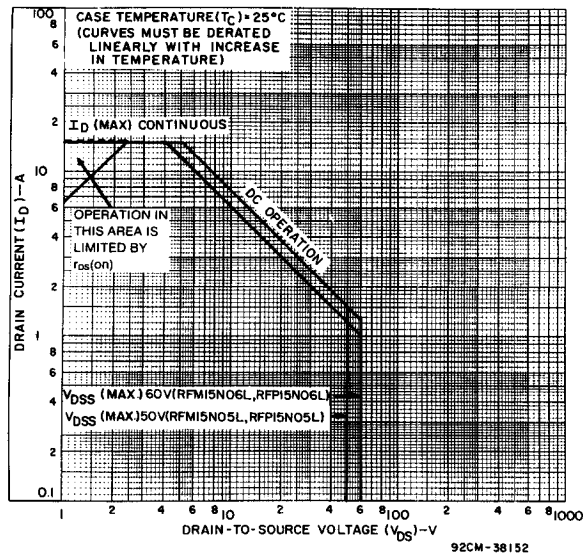


Fig. 1 - Maximum safe operating areas for all types.

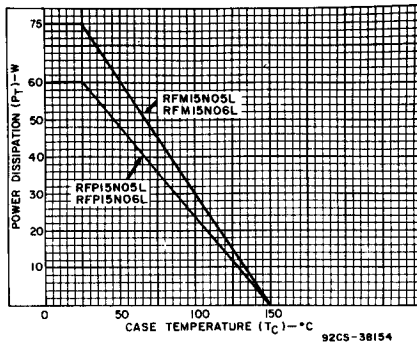


Fig. 2 - Power dissipation vs. case temperature derating curve for all types.

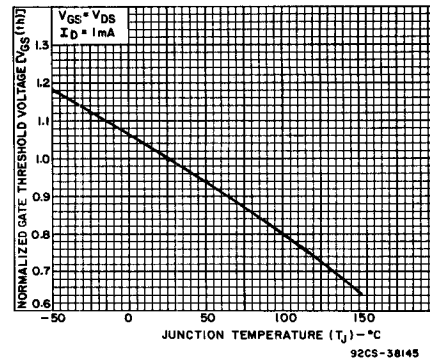


Fig. 3 - Typical normalized gate threshold voltage as a function of junction temperature for all types.

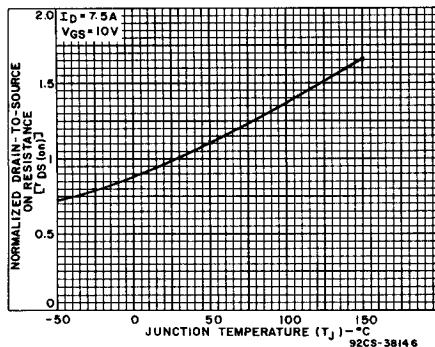


Fig. 4 - Normalized drain-to-source on resistance vs. junction temperature for all types.

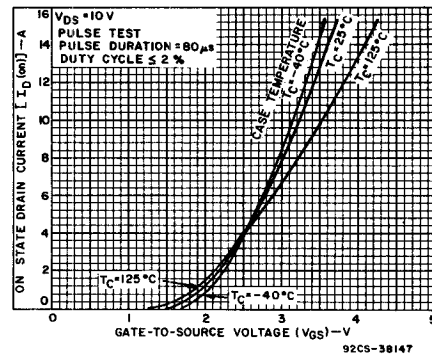


Fig. 5 - Typical transfer characteristics for all types.

RFM15N05L, RFM15N06L, RFP15N05L, RFP15N06L

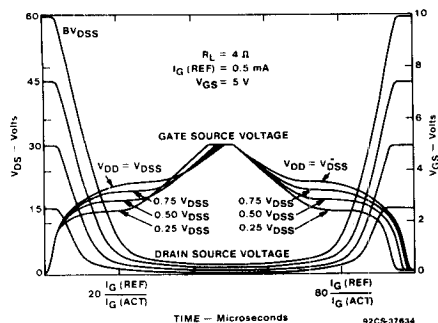


Fig. 6 - Normalized switching waveforms for constant gate-current. Refer to RCA application notes AN-7254 and AN-7260.

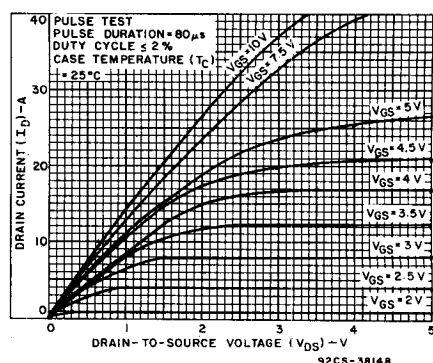


Fig. 7 - Typical saturation characteristics for all types.

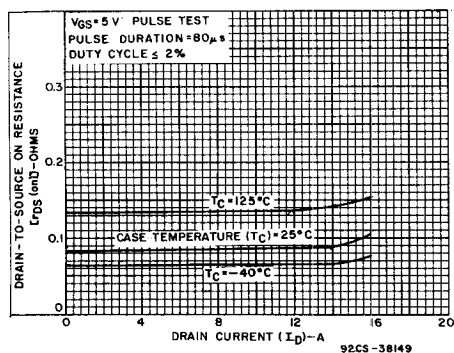


Fig. 8 - Typical drain-to-source on resistance as a function of drain current for all types.

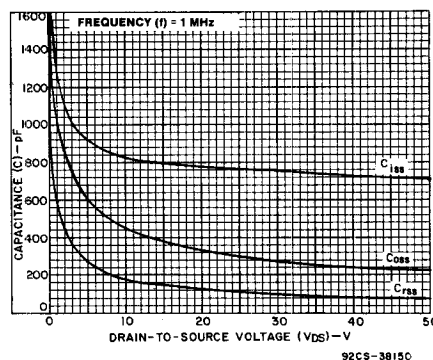


Fig. 9 - Capacitance as a function of drain-to-source voltage for all types.

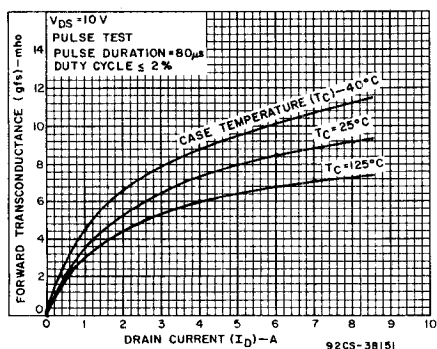


Fig. 10 - Typical forward transconductance as a function of drain current for all types.

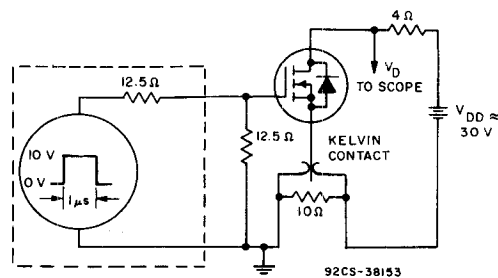


Fig. 11 - Switching Time Test Circuit.