RFM18N08, RFM18N10, RFP18N08, RFP18N10

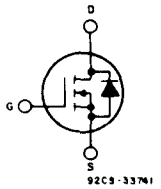
File Number **1446**

N-Channel Enhancment-Mode Power Field-Effect Transistors

18 A, 80 V — 100 V
$r_{DS}(on)$: 0.1Ω

Features:

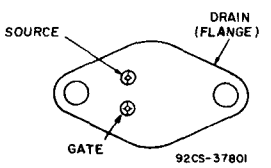
- *SOA is power-dissipation limited*
- *Nanosecond switching speeds*
- *Linear transfer characteristics*
- *High input impedance*
- *Majority carrier device*



N-Channel Enhancement Mode

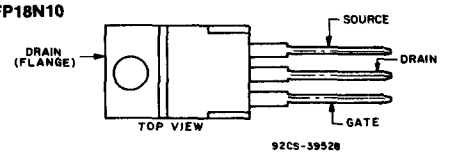
TERMINAL DESIGNATIONS

RFM18N08
RFM18N10



JEDEC TO-204AA

RFP18N08
RFP18N10



JEDEC TO-220AB

The RFM18N08 and RFM18N10 and the RFP18N08 and RFP18N10* 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.

*The RFM and RFP series were formerly RCA developmental numbers TA9286 and TA9287, respectively.

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

		RFM18N08	RFM18N10	RFP18N08	RFP18N10	
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	18				A
Pulsed	I_{DM}	45				A
POWER DISSIPATION						
@ T_C=25°C	P_T	100	100	75	75	W
Derate above T_C=25°C		0.8	0.8	0.6	0.6	W/°C
OPERATING AND STORAGE TEMPERATURE	T_j, T_{stg}	−55 to +150				°C

RFM18N08, RFM18N10, RFP18N08, RFP18N10

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

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	LIMITS RFM18N08 RFP18N08 MIN.	LIMITS RFM18N08 RFP18N08 MAX.	LIMITS RFM18N10 RFP18N10 MIN.	LIMITS RFM18N10 RFP18N10 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	—	—	
		T_C = 125° C, 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	$V_{DS}(on)$*	I_D = 9 A, V_{GS} = 10 V	—	1.08	—	1.08	V
		I_D = 18 A, V_{GS} = 10 V	—	3.0	—	3.0	
Static Drain-Source On Resistance	$r_{DS}(on)$*	I_D = 9 A, V_{GS} = 10 V	—	0.10	—	0.10	Ω
Forward Transconductance	g_{fs}*	V_{DS} = 10 V, I_D = 9 A	5	—	5	—	mho
Input Capacitance	C_{iss}	V_{DS} = 25 V, V_{GS} = 0 V, f = 1MHz	—	1700	—	1700	pF
Output Capacitance	C_{oss}		—	750	—	750	
Reverse Transfer Capacitance	C_{rss}		—	300	—	300	
Turn-On Delay Time	$t_d(on)$	V_{DD}=50 V, I_D = 9 A, R_{gen} = R_{gs} = 50 Ω, V_{GS} = 10 V	60(typ.)	90	60(typ.)	90	ns
Rise Time	t_r		300(typ.)	450	300(typ.)	450	
Turn-Off Delay Time	$t_d(off)$		150(typ.)	225	150(typ.)	225	
Fall Time	t_f		150(typ.)	225	150(typ.)	225	
Thermal Resistance Junction-to-Case	RθJC	RFM18N08, RFM18N10	—	1.25	—	1.25	°C/W
		RFP18N08, RFP18N10	—	1.67	—	1.67	

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

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	LIMITS RFM18N08 RFM18N10 MIN.	LIMITS RFM18N08 RFM18N10 MAX.	LIMITS RFP18N08 RFP18N10 MIN.	LIMITS RFP18N08 RFP18N10 MAX.	UNITS
Diode Forward Voltage	V_{SD}	I_{SD}=9 A	—	1.4	—	1.4	V
Reverse Recovery Time	t_{rr}	I_F=4 A, d_{IF}/d_t=100 A/μs	150(typ)		150(typ)		ns

*Pulse Test: Width ≤ 300 μs, duty cycle ≤ 2%

RFM18N08, RFM18N10, RFP18N08, RFP18N10

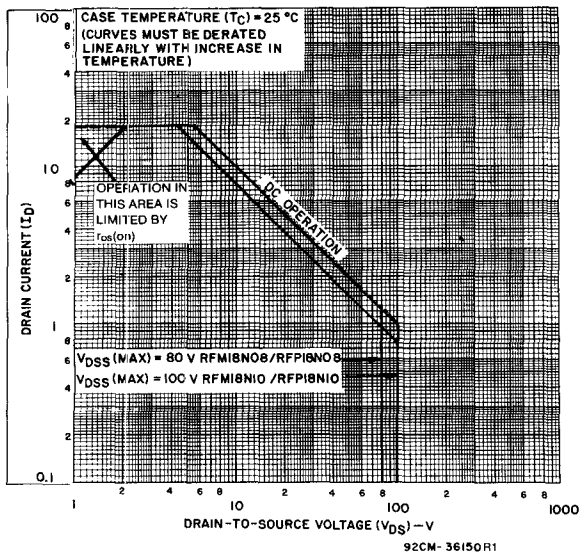


Fig. 1 — Maximum operating areas for all types.

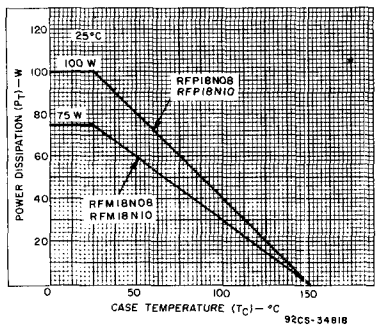


Fig. 2 — Power dissipation vs. case temperature derating curve for all types.

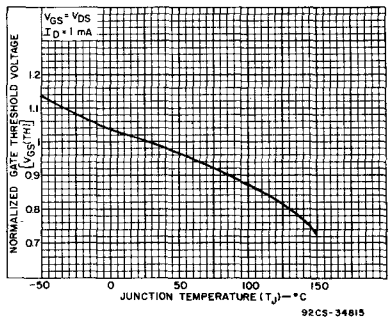


Fig. 3 — Typical normalized gate threshold voltage as a function of junction temperature for all types.

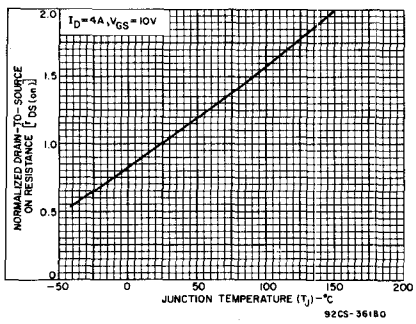


Fig. 4 - Normalized drain-to-source on resistance to junction temperature for all types.

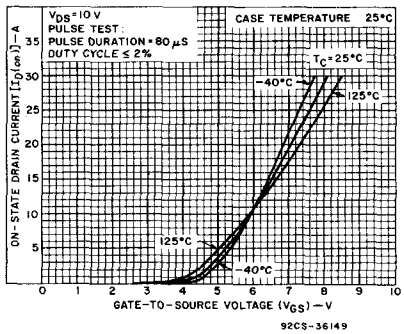


Fig. 5 — Typical transfer characteristics for all types.

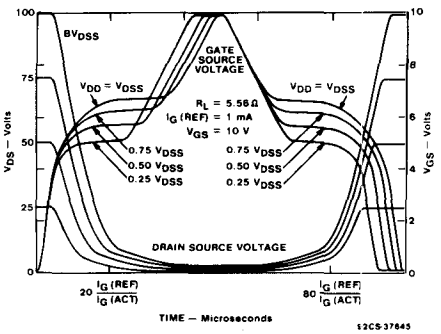


Fig. 6 - Normalized switching waveforms for constant gate-current. Refer to RCA application notes AN-7254 and AN-7260.

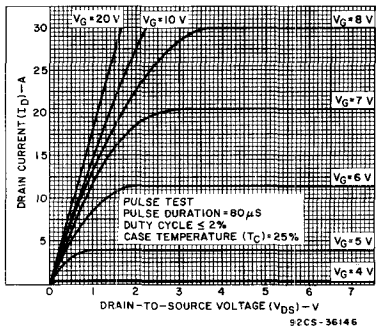


Fig. 7 — Typical saturation characteristics for all types.

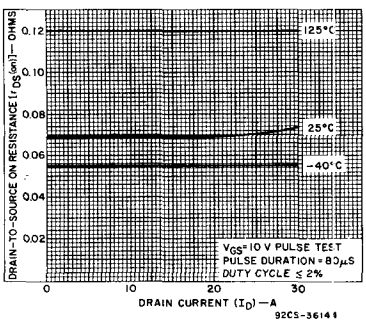


Fig. 8 - Typical drain-to-source on resistance as a function of drain current for all types.

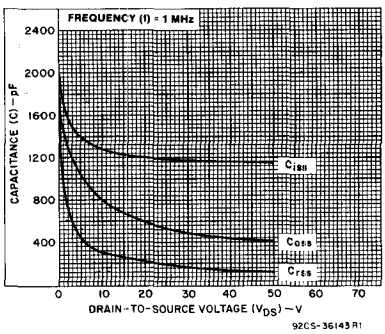


Fig. 9 — Capacitance as a function of drain-to-source voltage for all types.

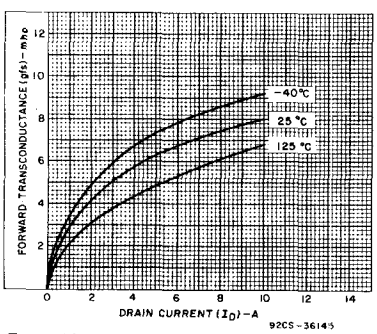


Fig. 10 — Typical forward transconductance as a function of drain current for all types.

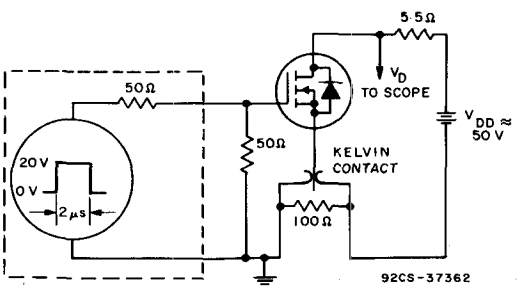


Fig. 11 — Switching Time Test Circuit