

RFM18N08, RFM18N10, RFP18N08, RFP18N10

File Number 1446

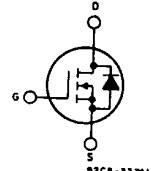
N-Channel Enhancement-Mode Power Field-Effect Transistors

18 A, 80 V — 100 V

$r_{DS(on)}$: 0.1Ω

Features:

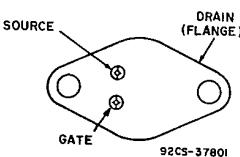
- SOA is power-dissipation limited
- Nanosecond switching speeds
- Linear transfer characteristics
- High input impedance
- Majority carrier device



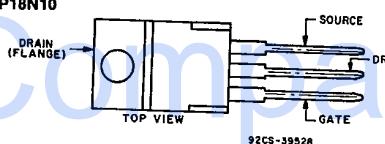
N-Channel Enhancement Mode

RFM18N08
RFM18N10

TERMINAL DESIGNATIONS



RFP18N08
RFP18N10



JEDEC TO-204AA

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 ($T_c=25^\circ\text{C}$):

	RFM18N08		RFM18N10		RFP18N08		RFP18N10		
DRAIN-SOURCE VOLTAGE	V _{DSS}	80	V _{DSS}	100	V _{DSS}	80	V _{DSS}	100	V
DRAIN-GATE VOLTAGE ($R_{DS}=1 \text{ M}\Omega$)	V _{DG}	80	V _{DG}	100	V _{DG}	80	V _{DG}	100	V
GATE-SOURCE VOLTAGE	V _{GSS}					±20			V
DRAIN CURRENT RMS Continuous	I _D					18			V
Pulsed	I _{DM}					45			A
POWER DISSIPATION									A
@ $T_c=25^\circ\text{C}$	P _T	100	P _T	100	P _T	75	P _T	75	W
Derate above $T_c=25^\circ\text{C}$		0.8		0.8		0.6		0.6	W/ $^\circ\text{C}$
OPERATING AND STORAGE TEMPERATURE	T _{op} , T _{stg}					-55 to +150			°C

G E SOLID STATE

01 DE 3875081 0018178 b

3875081 G E SOLID STATE

01E 18178 D T-39-13

Standard Power MOSFETs

RFM18N08, RFM18N10, RFP18N08, RFP18N10

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

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	LIMITS				UNITS	
			RFM18N08 RFP18N08		RFM18N10 RFP18N10			
			MIN.	MAX.	MIN.	MAX.		
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D = 1 \text{ mA}$ $V_{GS} = 0$	80	—	100	—	V	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS} = V_{DS}$ $I_D = 1 \text{ mA}$	2	4	2	4	V	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 65 \text{ V}$ $V_{DS} = 80 \text{ V}$	—	1	—	—	μA	
		$T_c = 125^\circ\text{C}$ $V_{DS} = 65 \text{ V}$ $V_{DS} = 80 \text{ V}$	—	50	—	—		
		—	—	—	—	50		
Gate-Source Leakage Current	I_{GS}	$V_{GS} = \pm 20 \text{ V}$ $V_{DS} = 0$	—	100	—	100	nA	
Drain-Source On Voltage	$V_{DS(on)*}$	$I_D = 9 \text{ A}$ $V_{GS} = 10 \text{ V}$	—	1.08	—	1.08	V	
		$I_D = 18 \text{ A}$ $V_{GS} = 10 \text{ V}$	—	3.0	—	3.0		
Static Drain-Source On Resistance	$r_{DS(on)*}$	$I_D = 9 \text{ A}$ $V_{GS} = 10 \text{ V}$	—	0.10	—	0.10	Ω	
Forward Transconductance	g_{fs}^a	$V_{DS} = 10 \text{ V}$ $I_D = 9 \text{ A}$	5	—	5	—	mho	
Input Capacitance	C_{iss}	$V_{DS} = 25 \text{ V}$	—	1700	—	1700	pF	
	C_{oss}	$V_{GS} = 0 \text{ V}$	—	750	—	750		
	C_{res}	$f = 1 \text{ MHz}$	—	300	—	300		
Turn-On Delay Time	$t_d(\text{on})$	$V_{DD} = 50 \text{ V}$	60(typ.)	90	60(typ.)	90	ns	
Rise Time	t_r	$I_D = 9 \text{ A}$	300(typ.)	450	300(typ.)	450		
Turn-Off Delay Time	$t_d(\text{off})$	$R_{gen} = R_{gs} = 50 \Omega$	150(typ.)	225	150(typ.)	225		
Fall Time	t_f	$V_{GS} = 10 \text{ V}$	150(typ.)	225	150(typ.)	225		
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	RFM18N08, RFM18N10	—	1.25	—	1.25	$^\circ\text{C}/\text{W}$	
		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				UNITS	
			RFM18N08 RFM18N10		RFP18N08 RFP18N10			
			MIN.	MAX.	MIN.	MAX.		
Diode Forward Voltage	V_{SD}	$I_{SD} = 9 \text{ A}$	—	1.4	—	1.4	V	
Reverse Recovery Time	t_{rr}	$I_r = 4 \text{ A}$ $d_{IF}/d_t = 100 \text{ A}/\mu\text{s}$	150(typ)	—	150(typ)	—	ns	

*Pulse Test: Width $\leq 300 \mu\text{s}$, duty cycle $\leq 2\%$.

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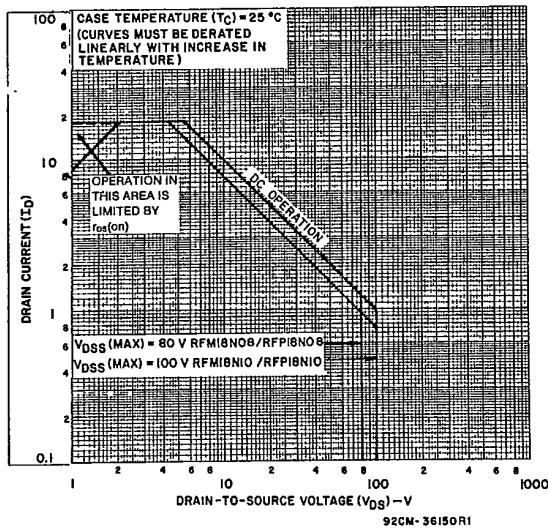


Fig. 1 — Maximum operating areas for all types.

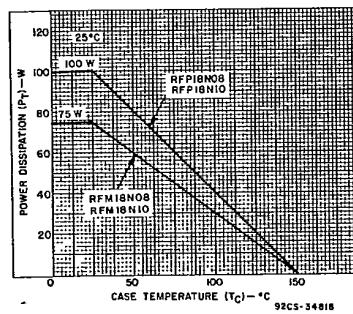


Fig. 2 — Power dissipation vs. case temperature derating curve for all types.

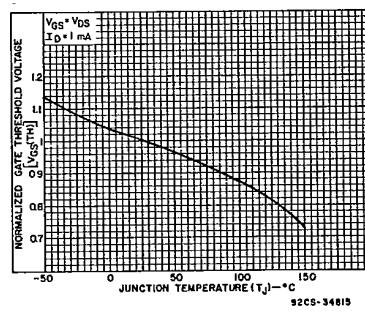


Fig. 3 — Typical normalized gate threshold voltage as a function of junction temperature for all types.

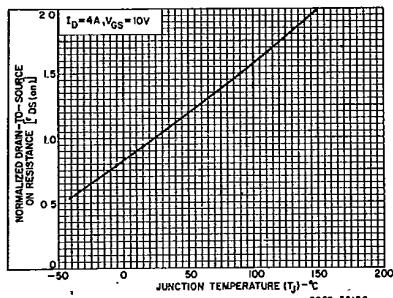


Fig. 4 — Normalized drain-to-source on resistance to junction temperature for all types.

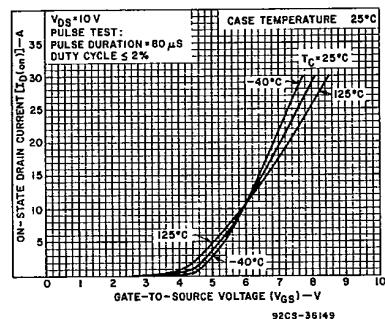


Fig. 5 — Typical transfer characteristics for all types.

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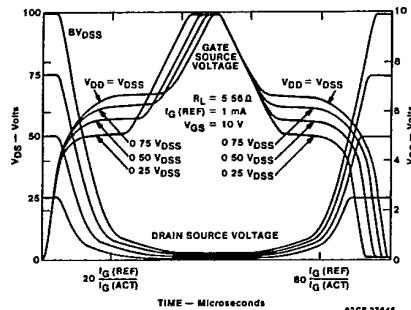


Fig. 6 - Normalized switching waveforms for constant gate-current drive.

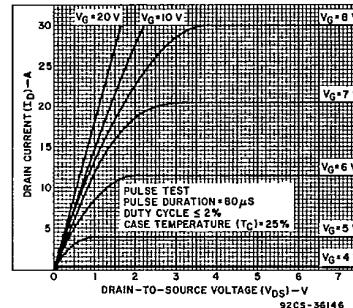


Fig. 7 — Typical saturation characteristics for all types.

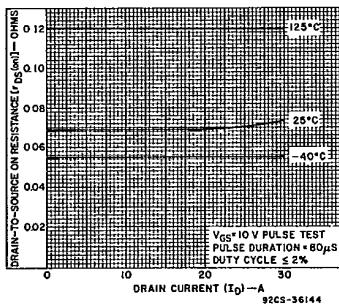


Fig. 8 - Typical drain-to-source on resistance as a function of drain current for all types.

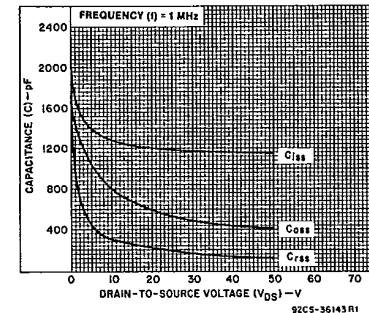


Fig. 9 — Capacitance as a function of drain-to-source voltage for all types.

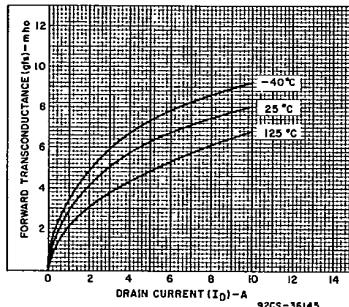


Fig. 10 — Typical forward transconductance as a function of drain current for all types.

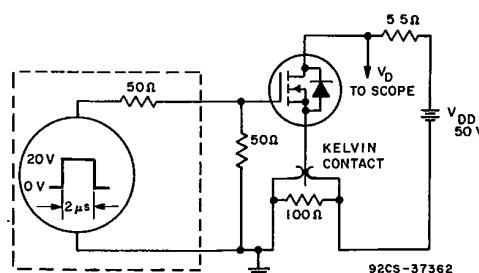


Fig. 11 — Switching Time Test Circuit