Silicon N-MOSFET Transistor

RFL1N08

80V / 1A

DATASHEET

OEM – RCA

Source: RCA Databook MOSFET 1984

Datasheet Rev. 1.0 – 10/20 – data without warranty / liability

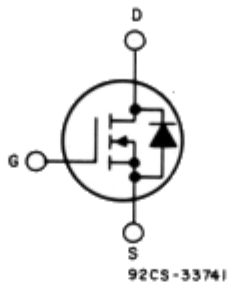
RFL1N08, RFL1N10, RFP2N08, RFP2N10

File Number **1385**

N-Channel Enhancement-Mode Power Field-Effect Transistors

1 and 2 A, 80 and 100 V
$r_{DS(on)}$: 1.25Ω and 1.4Ω

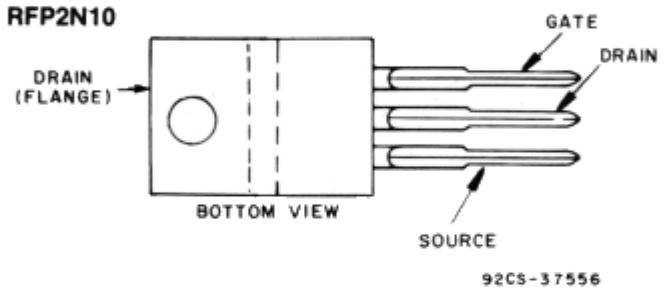
Features:
- *SOA is power-dissipation limited*
- *Nanosecond switching speeds*
- *Linear transfer characteristics*
- *High input impedance*
- *Majority carrier device*



N-CHANNEL ENHANCEMENT MODE

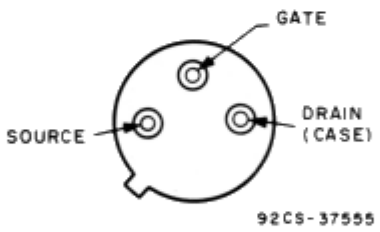
TERMINAL DESIGNATIONS

RFP2N08
RFP2N10



JEDEC TO-220AB

RFL1N08
RFL1N10



JEDEC TO-39

The RFL1N08 and RFL1N10 and the RFP2N08 and RFP2N10 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-39 metal package and the RFP-series types in the JEDEC TO-220AB plastic package.

The RFL and RFP series were formerly RCA developmental numbers TA9282 and TA9283, respectively.

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

		RFL1N08	RFL1N10	RFP2N08	RFP2N10	
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	1	1	2	2	A
Pulsed	I_{DM}	5				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 RFL1N08 RFP2N08 Min.	LIMITS RFL1N08 RFP2N08 Max.	LIMITS RFL1N10 RFP2N10 Min.	LIMITS RFL1N10 RFP2N10 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	μA
		T_C=125° C, V_{DS}=65 V	—	50	—	—	μA
		T_C=125° C, V_{DS}=80 V	—	—	—	50	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20 V, V_{DS}=0	—	100	—	100	nA
Drain-Source On Voltage	$V_{DS}(on)$[a]	I_D=1 A, V_{GS}=10 V	—	1.25	—	1.25	V
		I_D=2 A, V_{GS}=10 V	—	3	—	3	V
Static Drain-Source On Resistance	$r_{DS}(on)$[a]	I_D=1 A, V_{GS}=10 V, RFP	—	1.25	—	1.25	Ω
		I_D=1 A, V_{GS}=10 V, RFL	—	1.4	—	1.4	Ω
Forward Transconductance	g_{fs}[a]	V_{DS}=10 V, I_D=1 A	400	—	400	—	mmho
Input Capacitance	C_{iss}	V_{DS}=25 V, V_{GS}=0 V, f = 0.1 MHz	—	150	—	150	pF
Output Capacitance	C_{oss}	V_{DS}=25 V, V_{GS}=0 V, f = 0.1 MHz	—	80	—	80	pF
Reverse-Transfer Capacitance	C_{rss}	V_{DS}=25 V, V_{GS}=0 V, f = 0.1 MHz	—	20	—	20	pF
Turn-On Delay Time	$t_d(on)$	V_{DD} = 50 V, I_D=1 A, R_{gen}=R_{gs}=50 Ω, V_{GS}=10 V	17(Typ)	25	17(Typ)	25	ns
Rise Time	t_r	V_{DD} = 50 V, I_D=1 A, R_{gen}=R_{gs}=50 Ω, V_{GS}=10 V	30(Typ)	45	30(Typ)	45	ns
Turn-Off Delay Time	$t_d(off)$	V_{DD} = 50 V, I_D=1 A, R_{gen}=R_{gs}=50 Ω, V_{GS}=10 V	30(Typ)	45	30(Typ)	45	ns
Fall Time	t_f	V_{DD} = 50 V, I_D=1 A, R_{gen}=R_{gs}=50 Ω, V_{GS}=10 V	17(Typ)	25	17(Typ)	25	ns
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	RFL1N08, RFL1N10	—	15	—	15	°C/W
		RFP2N08, RFP2N10	—	5	—	5	°C/W

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	LIMITS RFL1N08 RFP2N08 Min.	LIMITS RFL1N08 RFP2N08 Max.	LIMITS RFL1N10 RFP2N10 Min.	LIMITS RFL1N10 RFP2N10 Max.	UNITS
Diode Forward Voltage	V_{SD}[a]	I_{SD} = 1A	—	1.4	—	1.4	V
Reverse Recovery Time	t_{rr}	I_F = 2A, d_{IF}/d_t = 50A/μs	100(typ.)		100(typ.)		ns

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

RFL1N08, RFL1N10, RFP2N08, RFP2N10

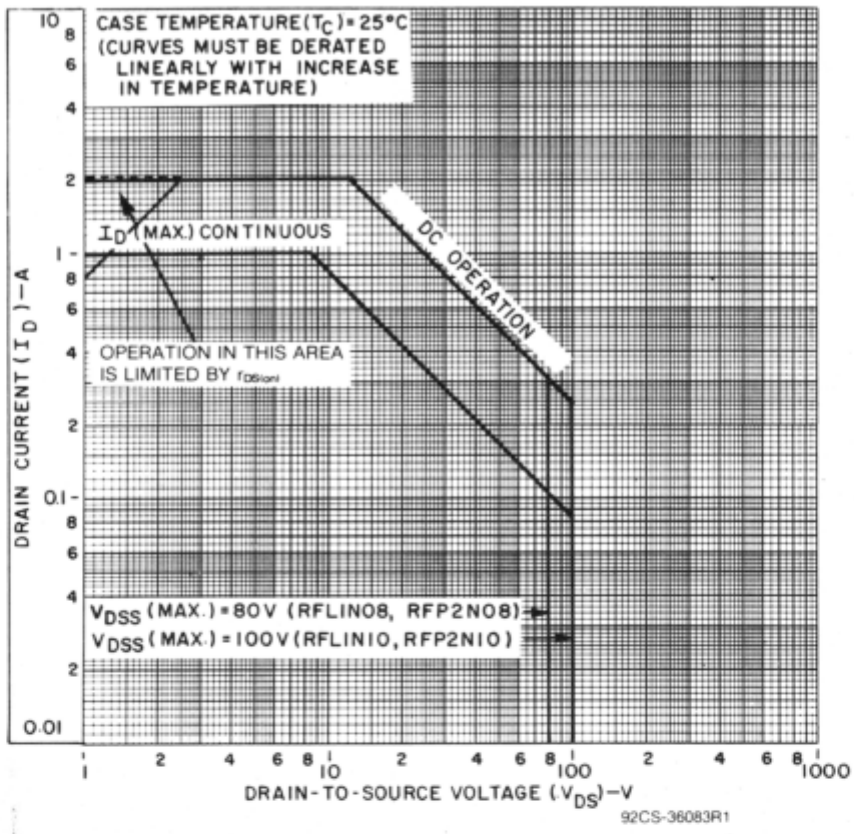


Fig. 1 - Maximum operating areas for all types.

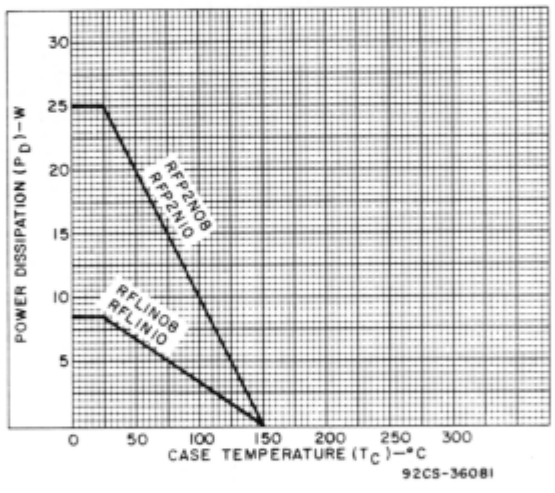


Fig. 2 - Power dissipation vs. temperature derating curve for all types.

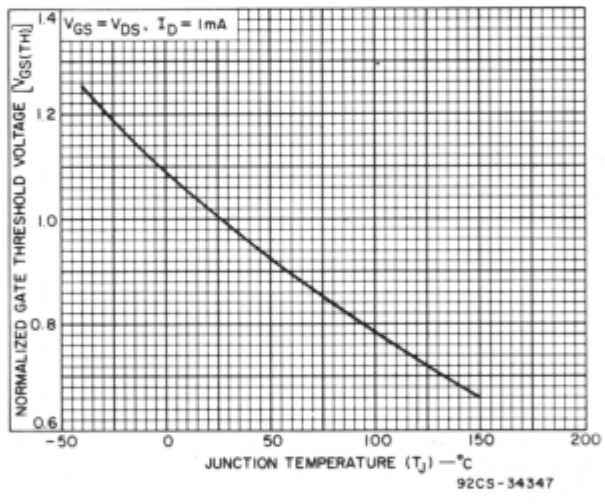


Fig. 3 - Typical normalized gate threshold voltage as a function of junction temperature for all types.

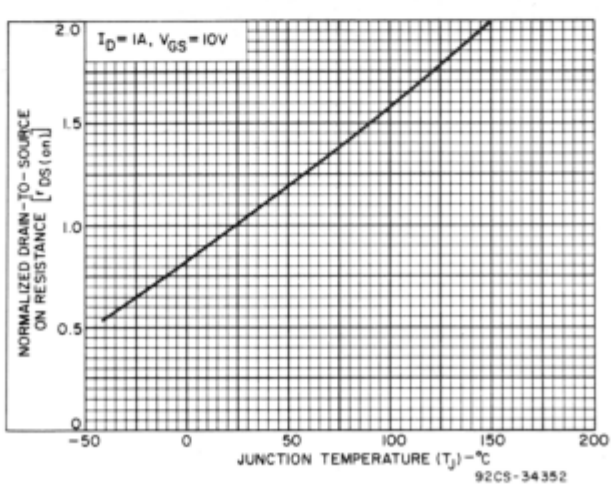


Fig. 4 - Normalized drain-to-source on resistance to junction temperature for all types.

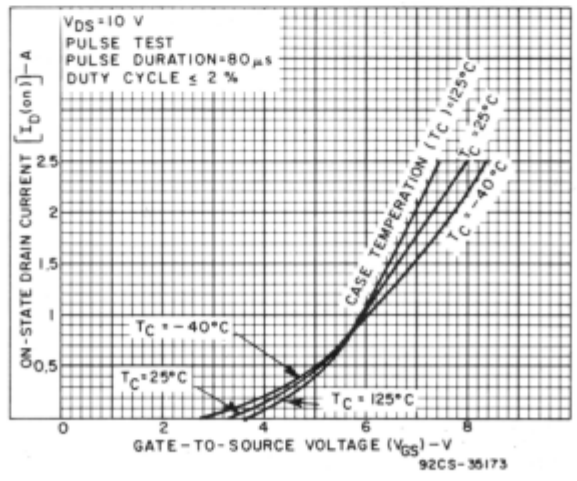


Fig. 5 - Typical transfer characteristics for all types.

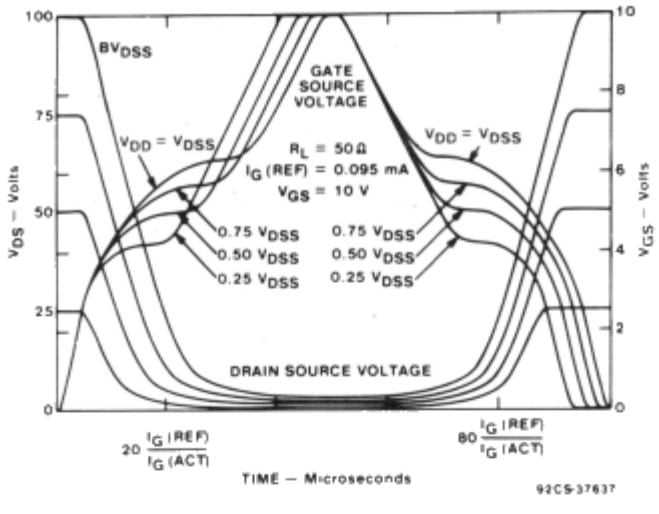


Fig. 6 - Normalized switching waveforms for constant gate-current drive.

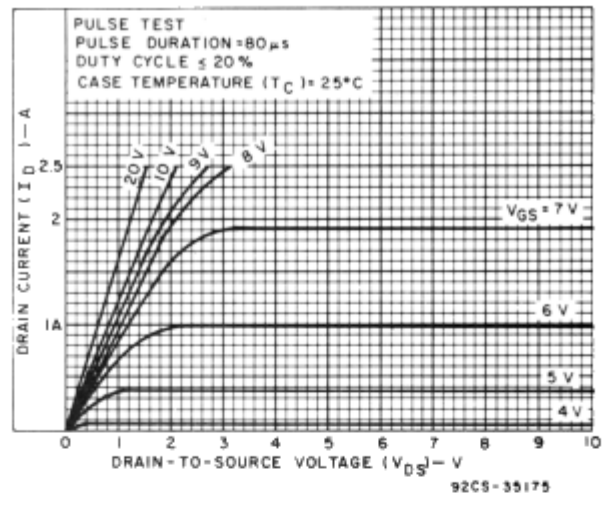


Fig. 7 - Typical saturation characteristics for all types.

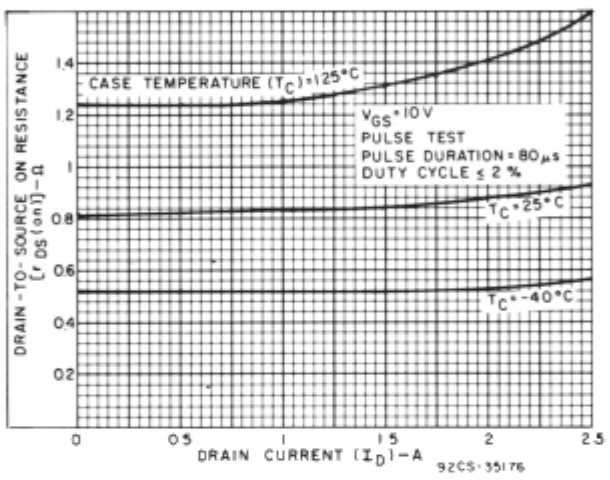


Fig. 8 - Typical drain-to-source on resistance as a function of drain current for all types.

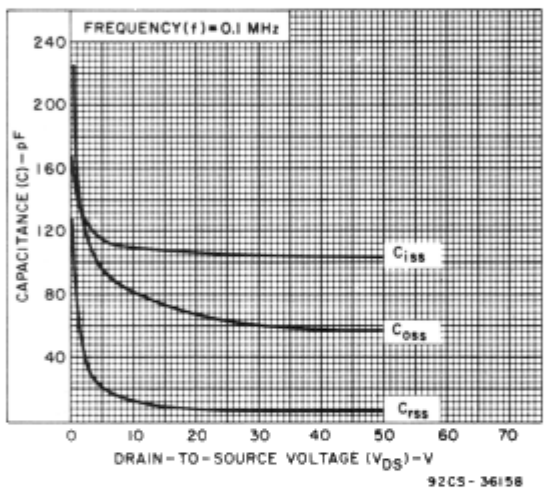


Fig. 9 - Capacitance as a function of drain-to-source voltage for all types.

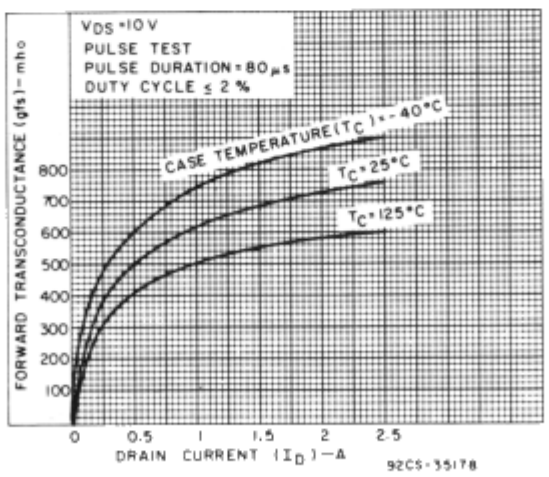


Fig. 10 - Typical forward transconductance as a function of drain current for all types.

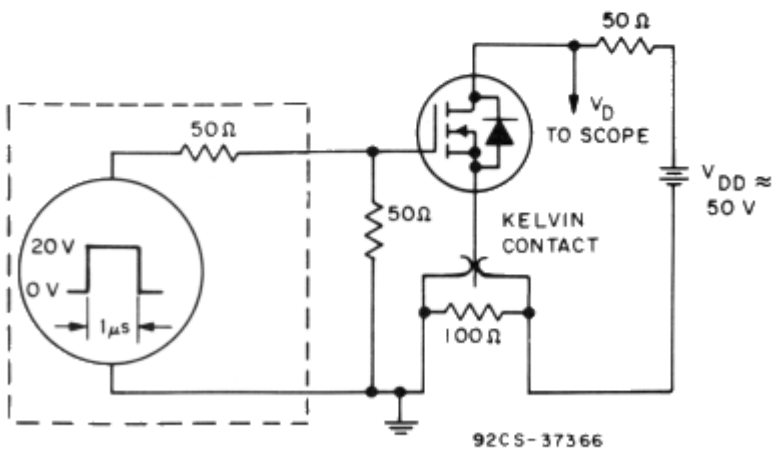


Fig. 11 - Switching Time Test Circuit.