HARRIS

RFL1P08
RFL1P10

P-Channel Enhancement-Mode Power Field-Effect Transistors

August 1991

Features

- 1A, -80V and -100V
- $r_{DS(ON)}$ = 3.65Ω
- SOA is Power-Dissipation Limited
- Nanosecond Switching Speeds
- Linear Transfer Characteristics
- High Input Impedance
- Majority Carrier Device

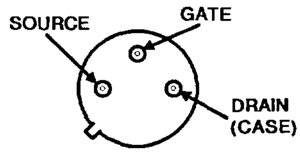
Description

The RFL1P08 and RFL1P10 are P-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-205AF metal package.

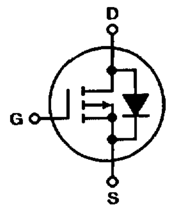
Package

TO-205AF
BOTTOM VIEW



Terminal Diagram

P-CHANNEL ENHANCEMENT MODE



5
P-CHANNEL POWER MOSFETs

Absolute Maximum Ratings (T_C = 25°C) Unless Otherwise Specified

		RFL1P08	RFL1P10	UNITS
Drain-Source Voltage	V_{DS}	-80	-100	V
Drain-Gate Voltage (R_{GS} = 1mΩ)	V_{DGR}	-80	-100	V
Continuous Drain Current				
RMS Continuous	I_D	1	1	A
Pulsed Drain Current	I_{DM}	5	5	A
Gate-Source Voltage	V_{GS}	±20	±20	V
Maximum Power Dissipation				
T_C = +25°C	P_D	8.33	8.33	W
Above T_C = +25°C, Derate Linearly		0.0667	0.0667	W/°C
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-55 to +150	-55 to +150	°C

CAUTION: These devices are sensitive to electrostatic discharge. Proper I.C. handling procedures should be followed.

File Number **1535.1**

Electrical Characteristics (T_C = +25°C), Unless Otherwise Specified

CHARACTERISTIC	SYMBOLS	TEST CONDITIONS	LIMITS				UNITS
			RFL1P08		RFL1P10		
			MIN	MAX	MIN	MAX	
Drain-Source Breakdown Voltage	BV_{DSS}	I_D = 1mA, V_{GS} = 0	-80	-	-100	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS} = V_{DS}, I_D = 1mA	-2	-4	-2	-4	V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS} = -65V	-	-1	-	-	µA
		V_{DS} = -80V	-	-	-	-1	µA
		T_C = +125°C V_{DS} = -65V	-	-50	-	-	µA
		V_{DS} = -80V	-	-	-	-50	mA
Gate-Source Leakage Current	I_{GSS}	V_{GS} = ±20V, V_{DS} = 0	-	±100	-	±100	nA
Drain-Source On-Voltage	$V_{DS(on)}$*	I_D = 1A, V_{GS} = -10V	-	-3.65	-	-3.65	V
		I_D = 2A, V_{GS} = -10V	-	-9.3	-	-9.3	V
Static Drain-Source On Resistance	$r_{DS(on)}$*	I_D = 1A, V_{GS} = -10V	-	3.65	-	3.65	Ω
Forward Transconductance	g_{fs}*	I_D = 1A, V_{DS} = -10V	200	-	200	-	S(℧)
Input Capacitance	C_{ISS}	V_{GS} = 0V, V_{DS} = -25V f = 1MHz	-	150	-	150	pF
Output Capacitance	C_{OSS}		-	80	-	80	pF
Reverse Transfer Capacitance	C_{RSS}		-	30	-	30	pF
Turn-On Delay Time	$t_{d(on)}$	I_D = 1A, V_{DD} = -50V R_{GEN} = R_{GS} = 50Ω V_{GS} = -10V	7 (typ)	25	7 (typ)	25	ns
Rise Time	t_r		15 (typ)	45	15 (typ)	45	ns
Turn-Off Delay Time	$t_{d(off)}$		14 (typ)	45	14 (typ)	45	ns
Fall Time	t_f		11 (typ)	25	11 (typ)	25	ns
Thermal Resistance Junction-to-Case	$R_{\theta JC}$		-	15	-	15	°C/W

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

Source-Drain Diode Ratings and Characteristics

CHARACTERISTIC	SYMBOLS	TEST CONDITIONS	LIMITS				UNITS
			RFL1P08		RFL1P10		
			MIN	MAX	MIN	MAX	
Diode Forward Voltage	V_{SD}*	I_{SD} = -1A	-	-1.4	-	-1.4	V
Diode Reverse Recovery Time	t_{rr}	I_F = 2A dI_F/dt = 50A/µs	-	135 (typ)	-	135 (typ)	ns

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

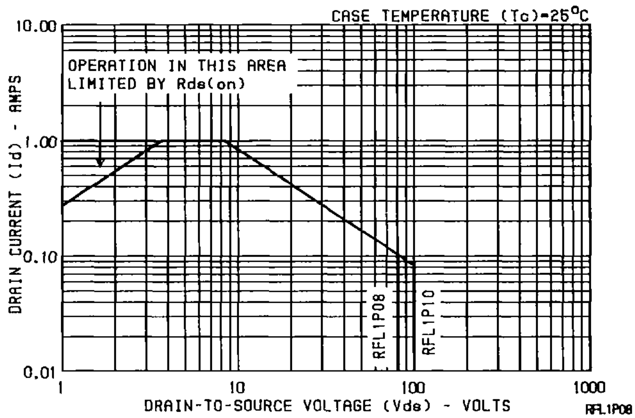


Fig. 1 - Maximum operating areas for all types.

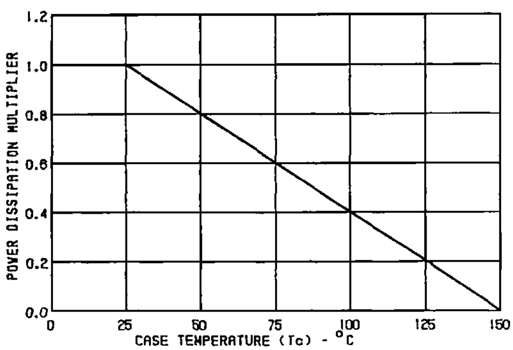


Fig. 2 - Normalized power dissipation vs temperature derating curve.

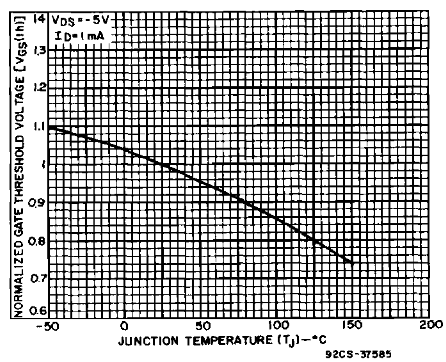


Fig. 3 - Typical normalized gate threshold voltage as a function of junction temperature for all types.

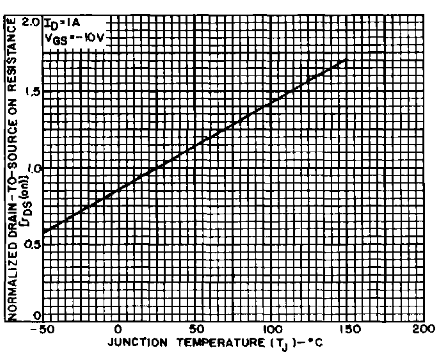


Fig. 4 - Normalized drain-to-source on resistance to junction temperature for all types.

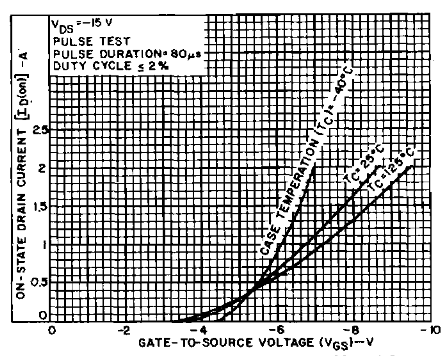


Fig. 5 - Typical transfer characteristics for all types.

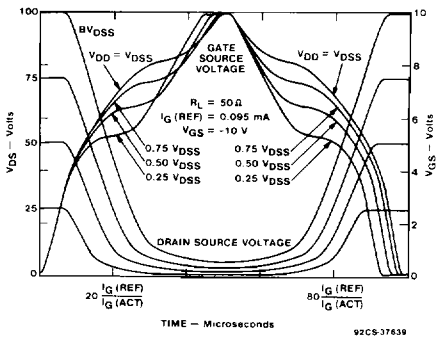


Fig. 6 - Normalized switching waveforms for constant gate-current drive.

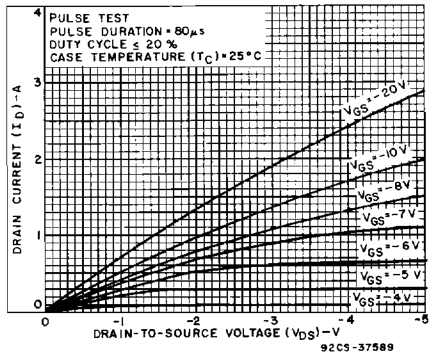


Fig. 7 - Typical saturation characteristics for all types.

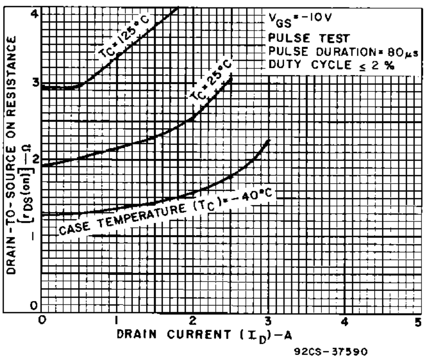


Fig. 8 - Typical drain-to-source on resistance as a function of drain current for all types.

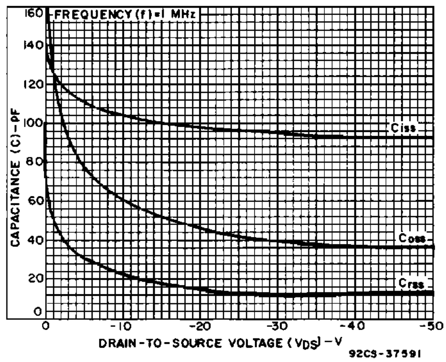


Fig. 9 - Capacitance as a function of drain-to-source voltage for all types.

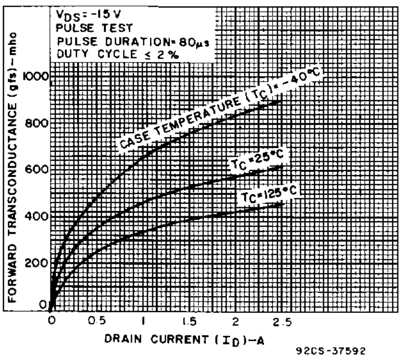


Fig. 10 - Typical forward transconductance as a function of drain current for all types.

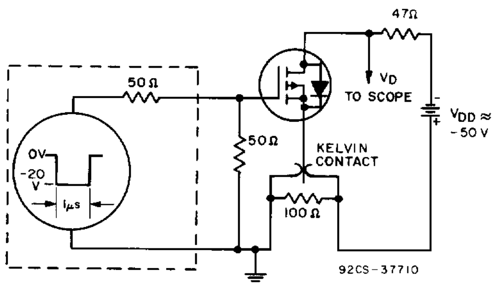


Fig. 11 - Switching time test circuit.