

### 12A, 80V and 100V, 0.300 Ohm, P-Channel Power MOSFETs

The RFP12P08, and RFP12P10 are P-Channel enhancement mode silicon gate power field effect transistors designed for applications such as switching regulators, switching convertors, 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.

Formerly developmental type TA17511.

### Ordering Information

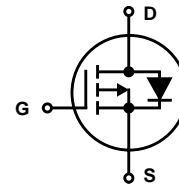
PART NUMBER	PACKAGE	BRAND
RFP12P08	TO-220AB	RFP12P08
RFP12P10	TO-220AB	RFP12P10

NOTE: When ordering, include the entire part number.

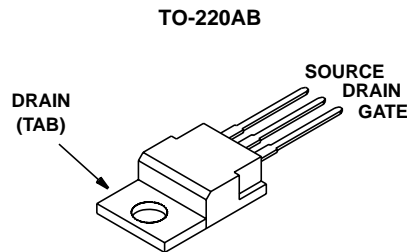
### Features

- 12A, 80V and 100V
- $r_{DS(ON)} = 0.300\Omega$
- SOA is Power Dissipation Limited
- Nanosecond Switching Speeds
- Linear Transfer Characteristics
- High Input Impedance
- Majority Carrier Device
- Related Literature
  - TB334 "Guidelines for Soldering Surface Mount Components to PC Boards"

### Symbol



### Packaging



# RFP12P08, RFP12P10

## Absolute Maximum Ratings $T_C = 25^\circ\text{C}$ , Unless Otherwise Specified

	RFP12P08	RFP12P10	UNITS	
Drain to Source Voltage (Note 1) . . . . .	$V_{DS}$	-80	-100	V
Drain to Gate Voltage ( $R_{GS} = 20\text{K}\Omega$ ) (Note 1) . . . . .	$V_{DGR}$	-80	-100	V
Continuous Drain Current . . . . .				
RMS Continuous . . . . .	$I_D$	12	12	A
Pulsed Drain Current (Note 3) . . . . .	$I_{DM}$	30	30	A
Gate to Source Voltage . . . . .	$V_{GS}$	$\pm 20$	$\pm 20$	V
Maximum Power Dissipation . . . . .	$P_D$	75	75	W
Linear Derating Factor . . . . .		0.6	0.6	W/ $^\circ\text{C}$
Operating and Storage Temperature . . . . .	$T_J, T_{STG}$	-55 to 150	-55 to 150	$^\circ\text{C}$
Maximum Temperature for Soldering				
Leads at 0.063in (1.6mm) from Case for 10s . . . . .	$T_L$	300	300	$^\circ\text{C}$
Package Body for 10s, See Techbrief 334 . . . . .	$T_{pkg}$	260	260	$^\circ\text{C}$

CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

### NOTE:

1.  $T_J = 25^\circ\text{C}$  to  $125^\circ\text{C}$ .

## Electrical Specifications $T_C = 25^\circ\text{C}$ , Unless Otherwise Specified

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Drain to Source Breakdown Voltage RFP12P08	$BV_{DSS}$	$I_D = 250\mu\text{A}, V_{GS} = 0$	-80	-	-	V
			-100	-	-	V
RFP12P10						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 250\mu\text{A}$	-2	-	-4	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = \text{Rated } BV_{DSS}, V_{GS} = 0\text{V}$	-	-	1	$\mu\text{A}$
		$V_{DS} = 0.8 \times \text{Rated } BV_{DSS}, V_{GS} = 0\text{V}, T_C = 125^\circ\text{C}$	-	-	25	$\mu\text{A}$
Gate to Source Leakage Current	$I_{GSS}$	$V_{GS} = \pm 20\text{V}, V_{DS} = 0$	-	-	$\pm 100$	nA
Drain to Source On Voltage (Note 2)	$V_{DS(ON)}$	$I_D = 12\text{A}, V_{GS} = -10\text{V}$	-	-	-3.6	V
Drain to Source On Resistance (Note 2)	$r_{DS(ON)}$	$I_D = 12\text{A}, V_{GS} = -10\text{V}, (\text{Figures 6, 7})$	-	-	0.300	$\Omega$
Turn-On Delay Time	$t_{d(ON)}$	$I_D \approx 12\text{A}, V_{DD} = 50\text{V}, R_G = 50\Omega, R_L = 4.1\Omega, V_{GS} = -10\text{V}$ (Figure 10)	-	18	60	ns
Rise Time	$t_r$		-	90	175	ns
Turn-Off Delay Time	$t_{d(OFF)}$		-	144	275	ns
Fall Time	$t_f$		-	94	175	ns
Input Capacitance	$C_{ISS}$	$V_{GS} = 0\text{V}, V_{DS} = -25\text{V}, f = 1\text{MHz}$ (Figure 9)	-	-	1500	pF
Output Capacitance	$C_{OSS}$		-	-	700	pF
Reverse Transfer Capacitance	$C_{RSS}$		-	-	300	pF
Thermal Resistance, Junction to Case	$R_{\theta JC}$	RFP12P08, RFP12P10	-	-	1.67	$^\circ\text{C/W}$

## Source to Drain Diode Specifications

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Source to Drain Diode Voltage (Note 2)	$V_{SD}$	$I_{SD} = -12\text{A}$	-	-	1.4	V
Diode Reverse Recovery Time	$t_{rr}$	$I_{SD} = -12\text{A}, dI_{SD}/dt = 100\text{A}/\mu\text{s}$	-	200	-	ns

### NOTES:

2. Pulse Test: Pulse Width =  $\leq 300\mu\text{s}$  Max, Duty Cycle  $\leq 2\%$
3. Repetitive rating: pulse width limited by maximum junction temperature.

Typical Performance Curves

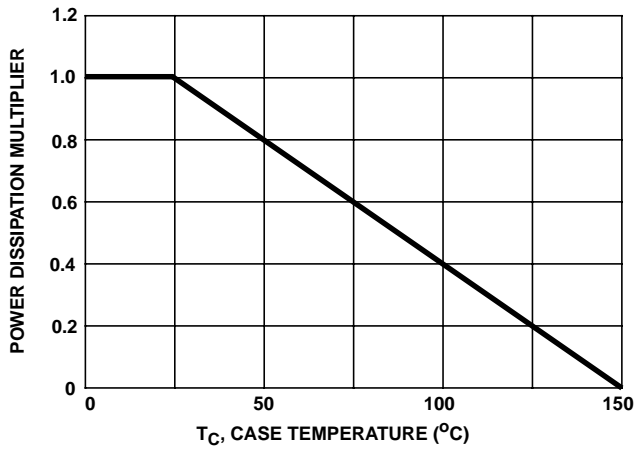


FIGURE 1. NORMALIZED POWER DISSIPATION vs CASE TEMPERATURE

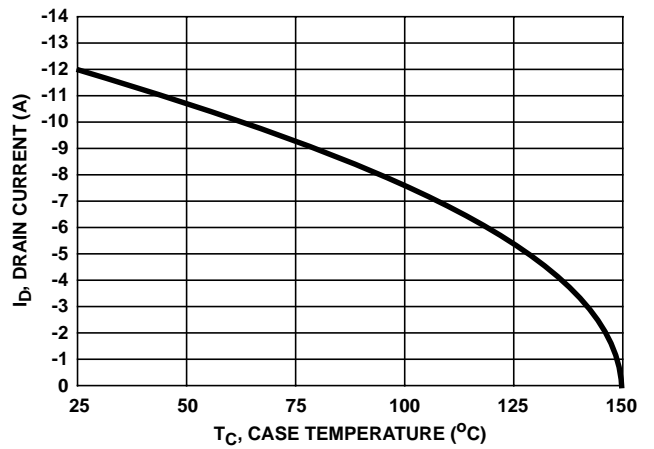


FIGURE 2. MAXIMUM CONTINUOUS DRAIN CURRENT vs CASE TEMPERATURE

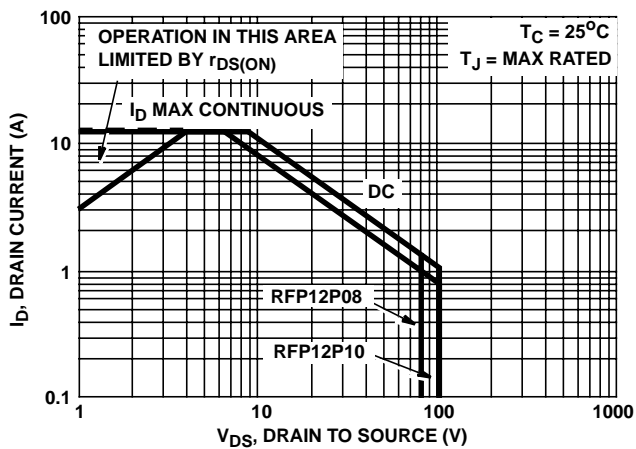


FIGURE 3. FORWARD BIAS SAFE OPERATING AREA

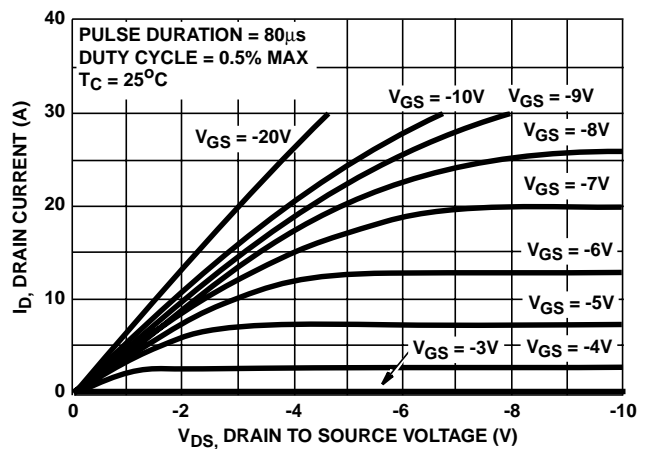


FIGURE 4. SATURATION CHARACTERISTICS

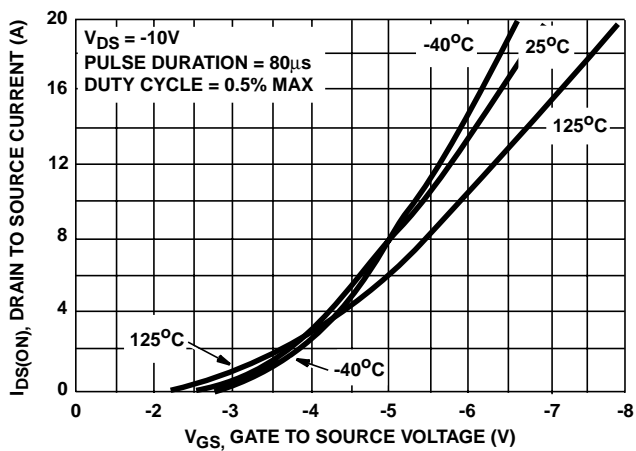


FIGURE 5. TRANSFER CHARACTERISTICS

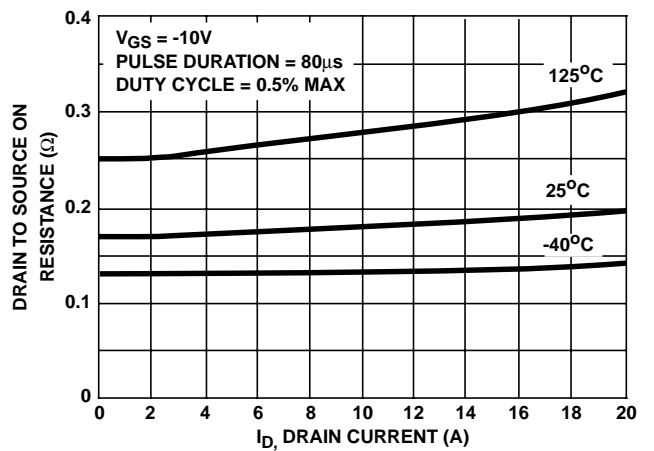


FIGURE 6. DRAIN TO SOURCE ON RESISTANCE vs GATE VOLTAGE AND DRAIN CURRENT

Typical Performance Curves (Continued)

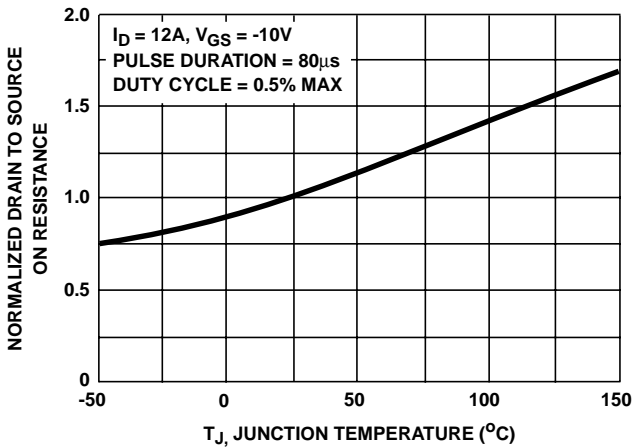


FIGURE 7. NORMALIZED DRAIN TO SOURCE ON RESISTANCE vs JUNCTION TEMPERATURE

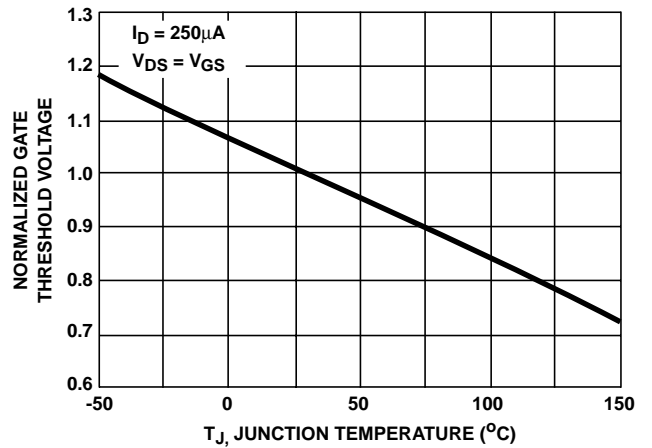


FIGURE 8. NORMALIZED GATE THRESHOLD VOLTAGE vs JUNCTION TEMPERATURE

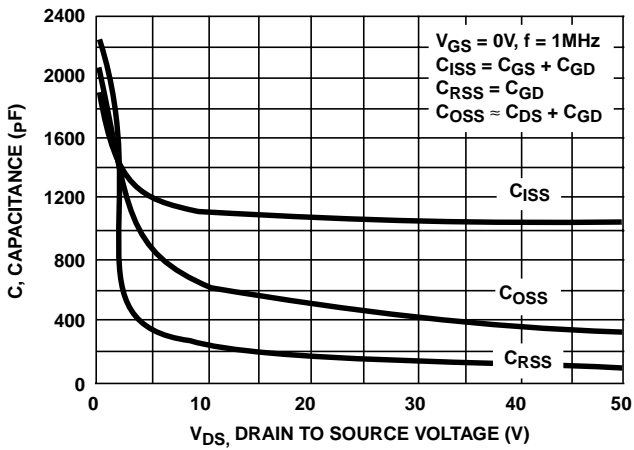
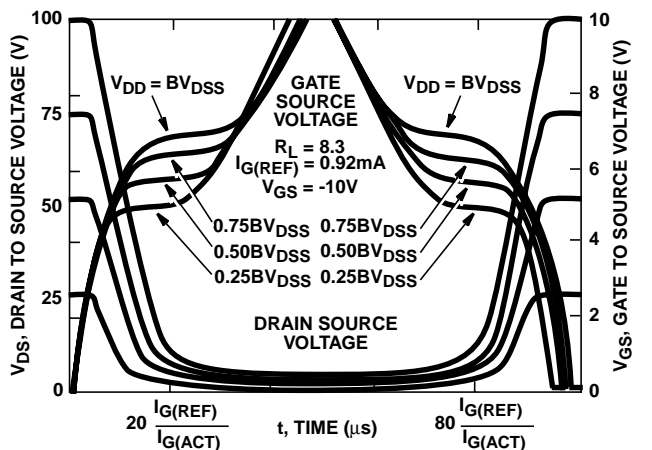


FIGURE 9. CAPACITANCE vs DRAIN TO SOURCE VOLTAGE



NOTE: Refer to Intersil Application Notes AN7254 and AN7260  
FIGURE 10. NORMALIZED SWITCHING WAVEFORMS FOR CONSTANT GATE CURRENT

Test Circuits and Waveforms

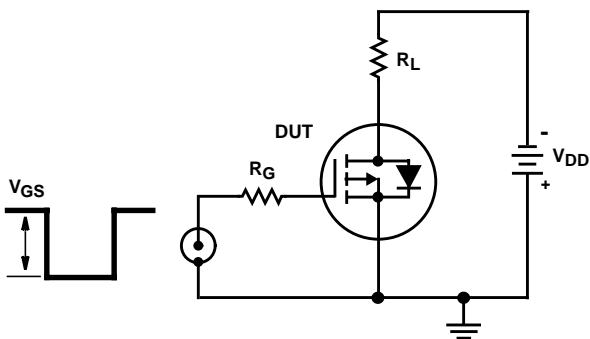


FIGURE 11. SWITCHING TIME TEST CIRCUIT

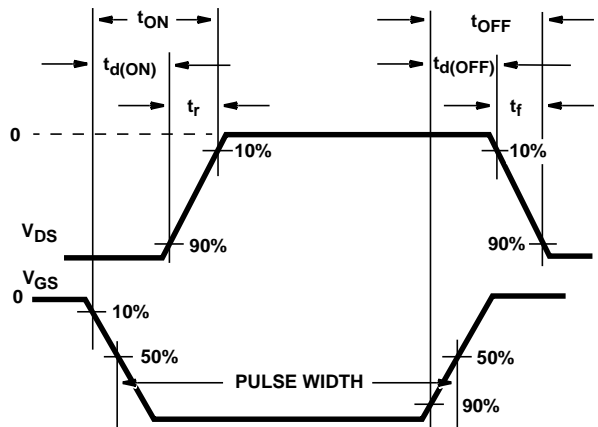


FIGURE 12. RESISTIVE SWITCHING WAVEFORMS

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