

Data Sheet October 1998 File Number 2870.1

# -2A, -80V and -100V, 3.500 Ohm, P-Channel Power MOSFETs

These 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.

Formerly developmental type TA\_\_\_\_\_

## **Ordering Information**

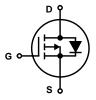
PART NUMBER	PACKAGE	BRAND
RFP2P08	TO-220AB	RFP2P08
RFP2P10	TO-220AB	RFP2P10

NOTE: When ordering, use entire part number.

#### Features

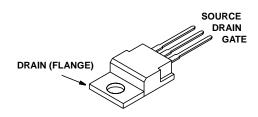
- -2A, -80V and -100V
- $r_{DS(ON)} = 3.500\Omega$
- · Related Literature
  - TB334 "Guidelines for Soldering Surface Mount Components to PC Boards

## Symbol



## **Packaging**

#### TO-220AB



### RFP2P08, RFP2P10

	RFP2P08	RFP2P10	UNITS
Drain to Source Voltage (Note 1)V <sub>DSS</sub>	-80	-100	V
Drain to Gate Voltage ( $R_{GS} = 20k\Omega$ ) (Note 1) $V_{DGR}$	-80	-100	V
Continuous Drain Current	2 5	2 5	A A
Gate to Source Voltage	±20	±20	V
Maximum Power Dissipation	25 0.2	25 0.2	W W/ <sup>o</sup> Caaa
Operating and Storage Temperature	-55 to 150	-55 to 150	°C
Maximum Temperature for Soldering  Leads at 0.063in (1.6mm) from Case for 10s	300 260	300 260	°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.  $T_J = 25^{\circ}C$  to  $125^{\circ}C$ .

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

PARAMETER	SYMBOL	TEST CONDITIONS		TYP	MAX	UNITS
Drain to Source Breakdown Voltage	BV <sub>DSS</sub>	ID = -250μA, VGS = 0				
RFP2P08			-80	-	-	V
RFP2P10			-100	-	-	V
Gate Threshold Voltage	V <sub>GS(TH)</sub>	$V_{GS} = V_{DS}$ , $I_D = -250\mu A$	-2	-	-4	V
Zero-Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = Rated BV <sub>DSS</sub> , V <sub>GS</sub> = 0V	-	-	-1	μА
		$V_{DS} = 0.8 \text{ x Rated BV}_{DSS}, V_{GS} = 0 \text{V}, T_{C} = 125^{\circ}\text{C}$	-	-	-25	μА
Gate to Source Leakage Current	I <sub>GSS</sub>	$V_{GS} = \pm 20V$ , $V_{DS} = 0V$	-	-	±100	nA
Drain to Source On Resistance (Note 2)	r <sub>DS(ON)</sub>	I <sub>D</sub> = -2A, V <sub>GS</sub> = -10V (Figures 6, 7)	-	-	3.500	Ω
Drain to Source On Voltage (Note 2)	V <sub>DS(ON)</sub>	I <sub>D</sub> = -2A, V <sub>GS</sub> = -10V	-	-	-7.0	٧
Turn-On Delay Time	t <sub>d</sub> (ON)	$I_D$ = ≈ 1A, $V_{DD}$ = -50V, $R_G$ = 50Ω, $V_{GS}$ = -10V, $R_L$ = 46.5Ω (Figures 10, 11, 12)	-	7	25	ns
Rise Time	t <sub>r</sub>		-	15	45	ns
Turn-Off Delay Time	t <sub>d(OFF)</sub>			14	45	ns
Fall Time	t <sub>f</sub>			11	25	ns
Input Capacitance	C <sub>ISS</sub>	V <sub>GS</sub> = 0V, V <sub>DS</sub> = -25V, f =1MHz	-	-	150	pF
Output Capacitance	C <sub>OSS</sub>	(Figure 9)		-	80	pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			-	30	pF
Thermal Resistance Junction to Case	$R_{\theta JC}$		-	-	5	°C/W

### **Source to Drain Diode Specifications**

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Source to Drain Diode Voltage (Note 2)	V <sub>SD</sub>	I <sub>SD</sub> = -1A	-	-	-1.4	V
Diode Reverse Recovery Time	t <sub>rr</sub>	$I_{SD} = -2A$ , $dI_{SD}/dt = 50A/\mu s$	-	135	1	ns

#### NOTES:

- 2. Pulse Test: Pulse width  $\leq 300 \mu s,$  duty cycle  $\leq 2\%.$
- 3. Repetitive rating: pulse width is limited by maximum junction temperature.

### Typical Performance Curves Unless otherwise Specified

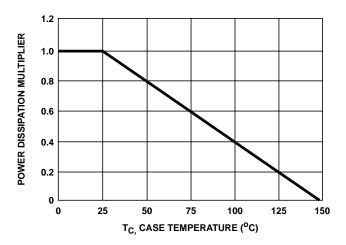


FIGURE 1. NORMALIZED POWER DISSIPATION vs CASE TEMPERATURE

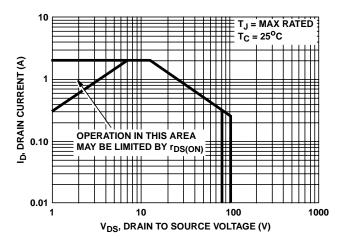


FIGURE 3. FORWARD BIAS SAFE OPERATING AREA

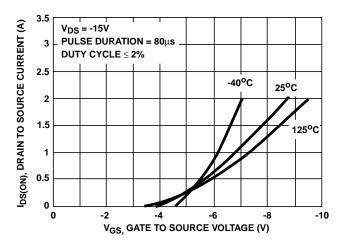


FIGURE 5. TRANSER CHARACTERISTICS

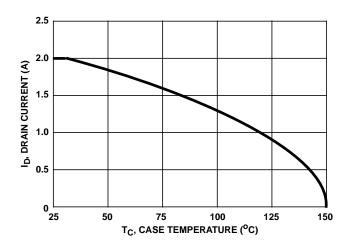


FIGURE 2. MAXIMUM CONTINUOUS DRAIN CURRENT vs CASE TEMPERATURE

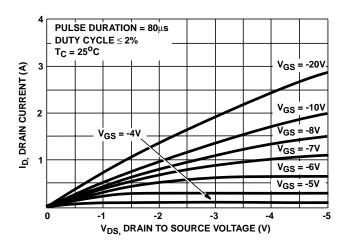


FIGURE 4. SATURATION CHARACTERISTICS

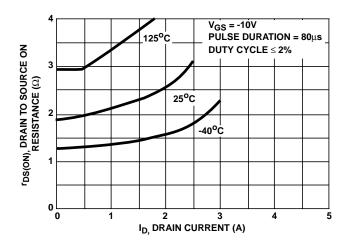


FIGURE 6. DRAIN TO SOURCE ON RESISTANCE VS DRAIN CURRENT

# Typical Performance Curves Unless otherwise Specified (Continued)

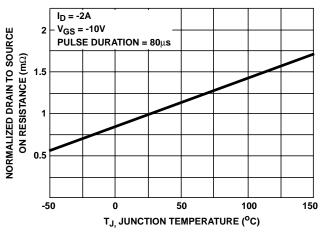


FIGURE 7. NORMALIZED DRAIN TO SOURCE ON RESISTANCE vs JUNCTION TEMPERATURE

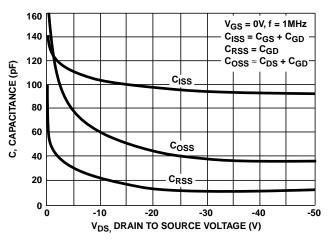


FIGURE 9. CAPACITANCE vs DRAIN TO SOURCE VOLTAGE

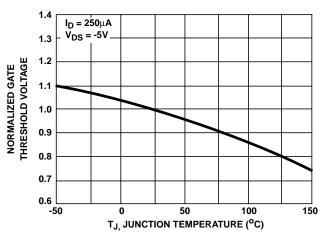


FIGURE 8. NORMALIZED GATE THRESHOLD VOLTAGE vs JUNCTION TEMPERATURE

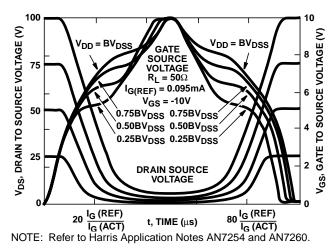


FIGURE 10. NORMALIZED SWITCHING WAVEFORMS FOR CONSTANT GATE CURRENT

#### Test Circuit and Waveforms

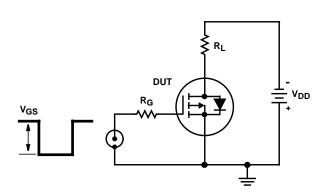


FIGURE 11. SWITCHING TIME TEST CIRCUIT

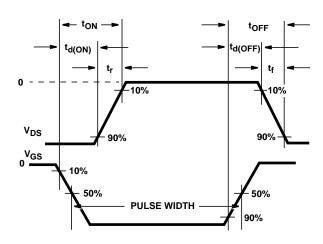


FIGURE 12. RESISTIVE SWITCHING WAVEFORMS

# Test Circuit and Waveforms

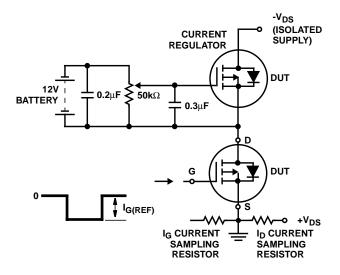


FIGURE 13. GATE CHARGE TEST CIRCUIT

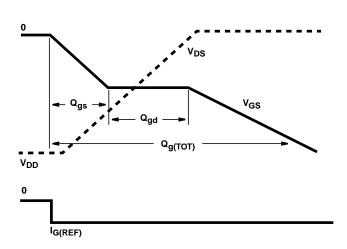


FIGURE 14. GATE CHARGE WAVEFORMS