

### 10A, 150V, 0.300 Ohm, N-Channel Power MOSFETs

These 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.

Formerly developmental type TA09192.

### Ordering Information

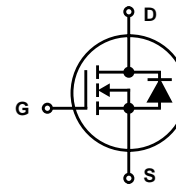
PART NUMBER	PACKAGE	BRAND
RFP10N15	TO-220AB	RFP10N15

NOTE: When ordering, include the entire part number.

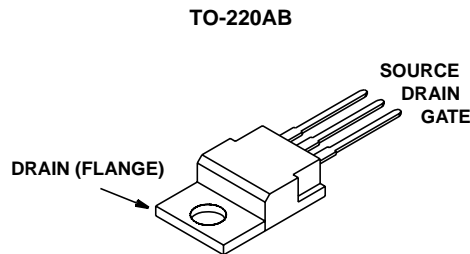
### Features

- 10A, 150V
- $r_{DS(ON)} = 0.300\Omega$
- Related Literature
  - TB334 "Guidelines for Soldering Surface Mount Components to PC Boards"

### Symbol



### Packaging



# RFP10N15

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

	RFP10N15	UNITS
Drain to Source Voltage (Note 1) . . . . .	$V_{DS}$	150 V
Drain to Gate Voltage ( $R_{GS} = 20\text{k}\Omega$ ) (Note 1) . . . . .	$V_{DGR}$	150 V
Continuous Drain Current . . . . .	$I_D$	10 A
Pulsed Drain Current (Note 3) . . . . .	$I_{DM}$	25 A
Gate to Source Voltage . . . . .	$V_{GS}$	$\pm 20$ V
Maximum Power Dissipation . . . . .	$P_D$	60 W
Linear Derating Factor . . . . .		0.48 W/ $^\circ\text{C}$
Operating and Storage Temperature . . . . .	$T_J, T_{STG}$	-55 to 150 $^\circ\text{C}$
Maximum Temperature for Soldering		
Leads at 0.063in (1.6mm) from Case for 10s . . . . .	$T_L$	300 $^\circ\text{C}$
Package Body for 10s, See TB334 . . . . .	$T_{pkg}$	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	$BV_{DSS}$	$I_D = 250\mu\text{A}, V_{GS} = 0$	150	-	-	V
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 250\mu\text{A}$ , (Figure 8)	2	-	4	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = \text{Rated } BV_{DSS}, V_{GS} = 0\text{V}$	-	-	1	$\mu\text{A}$
		$V_{DS} = 0.8 \times \text{Rated } BV_{DSS}, TC = 125^\circ\text{C}$	-	-	25	mA
Gate to Source Leakage Current	$I_{GSS}$	$V_{GS} = \pm 20\text{V}, V_{DS} = 0$	-	-	$\pm 100$	nA
Drain to Source On Resistance(Note 2)	$r_{DS(ON)}$	$I_D = 10\text{A}, V_{GS} = 10\text{V}$ , (Figures 6, 7)	-	-	0.300	$\Omega$
Drain to Source On Voltage (Note 2)	$V_{DS(ON)}$	$I_D = 10\text{A}, V_{GS} = 10\text{V}$	-	-	3.0	V
Turn-On Delay Time	$t_d(ON)$	$I_D \approx 5\text{A}, V_{DD} = 75\text{V}, R_G = 50\Omega,$ $V_{GS} = 10\text{V}, R_L = 14.7\Omega$ (Figures 10, 11, 12)	-	40	60	ns
Rise Time	$t_r$		-	165	250	ns
Turn-Off Delay Time	$t_d(OFF)$		-	90	135	ns
Fall Time	$t_f$		-	90	135	ns
Input Capacitance	$C_{ISS}$	$V_{GS} = 0\text{V}, V_{DS} = 25\text{V},$ $f = 1\text{MHz}$ , (Figure 9)	-	-	850	pF
Output Capacitance	$C_{OSS}$		-	-	230	pF
Reverse Transfer Capacitance	$C_{RSS}$		-	-	100	pF
Thermal Resistance Junction to Case		RFP10N15	-	-	2.083	$^\circ\text{C/W}$

## Source to Drain Diode Specifications

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Source to Drain Diode Voltage (Note 2)	$V_{SD}$	$I_{SD} = 5\text{A}$	-	-	1.4	V
Diode Reverse Recovery Time	$t_{rr}$	$I_{SD} = 4\text{A}, dI_{SD}/dt = 100\text{A}/\mu\text{s}$	-	200	-	ns

### NOTES:

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

Typical Performance Curves

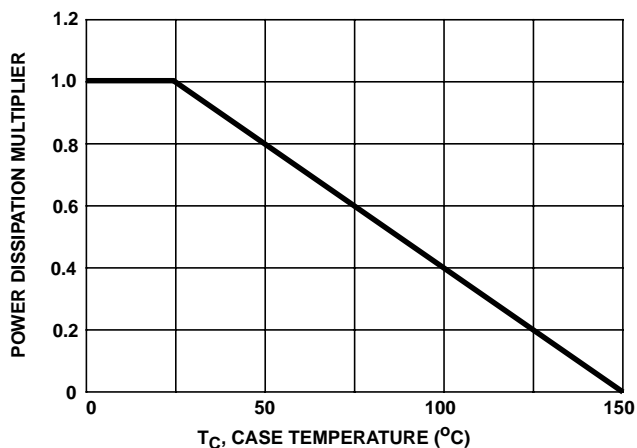


FIGURE 1. NORMALIZED POWER DISSIPATION vs CASE TEMPERATURE

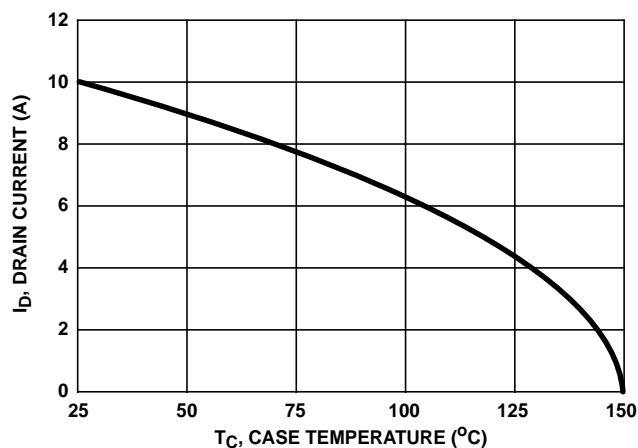


FIGURE 2. MAXIMUM CONTINUOUS DRAIN CURRENT vs CASE TEMPERATURE

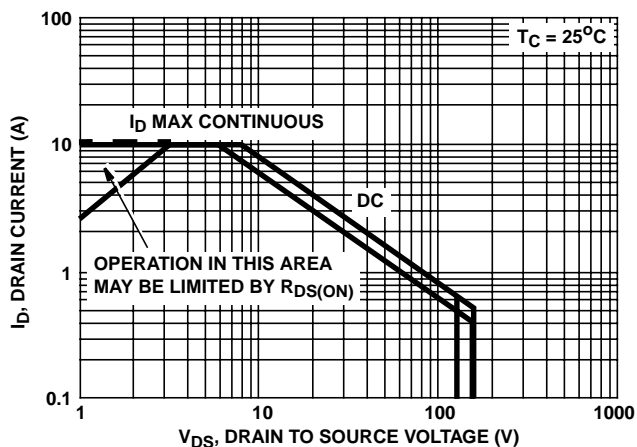


FIGURE 3. FORWARD BIAS SAFE OPERATING AREA

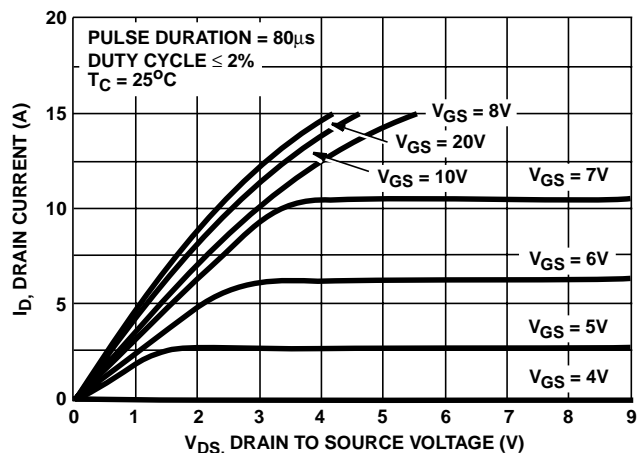


FIGURE 4. SATURATION CHARACTERISTICS

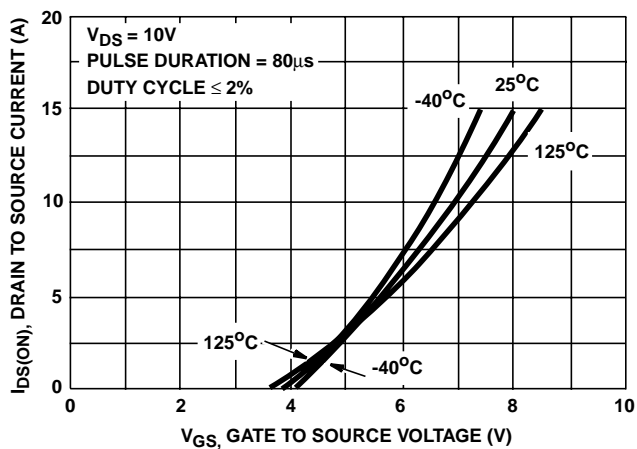


FIGURE 5. TRANSFER CHARACTERISTICS

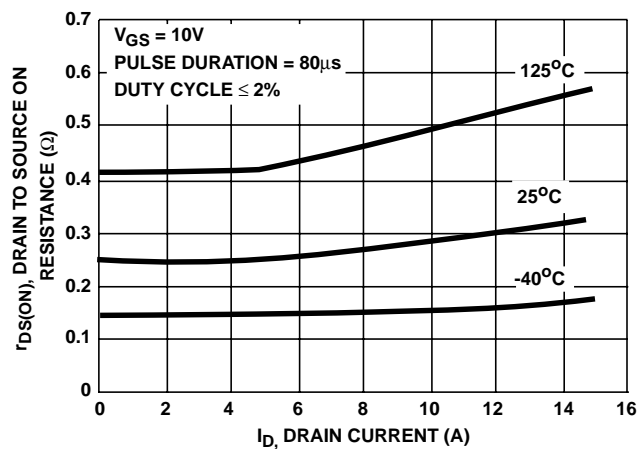


FIGURE 6. DRAIN TO SOURCE ON RESISTANCE vs DRAIN CURRENT

Typical Performance Curves (Continued)

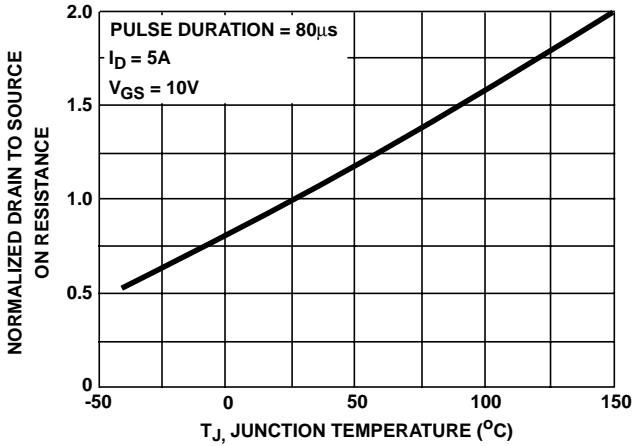


FIGURE 7. NORMALIZED DRAIN TO SOURCE ON RESISTANCE vs JUNCTION TEMPERATURE

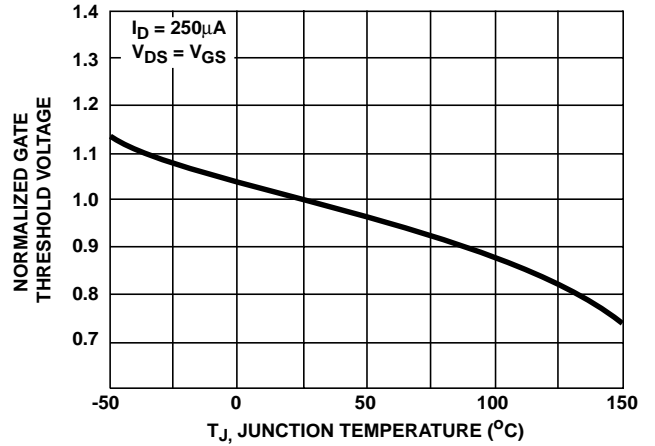


FIGURE 8. NORMALIZED GATE THRESHOLD VOLTAGE vs JUNCTION TEMPERATURE

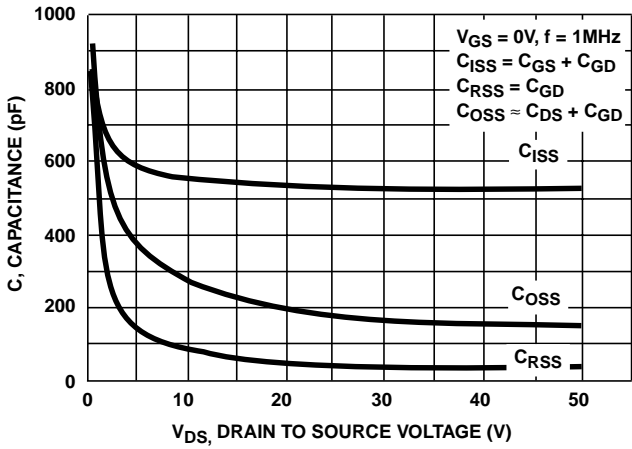
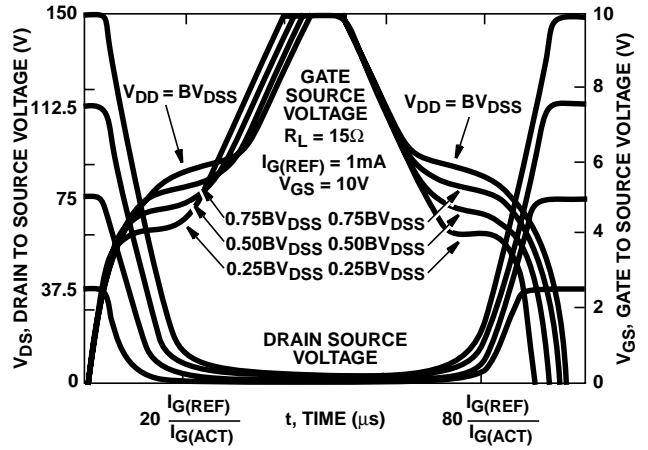


FIGURE 9. CAPACITANCE vs DRAIN TO SOURCE VOLTAGE



NOTE: Refer to Intersil Applications Notes AN7254 and AN7260

FIGURE 10. NORMALIZED SWITCHING WAVEFORMS FOR CONSTANT GATE CURRENT

Test Circuits and Waveforms

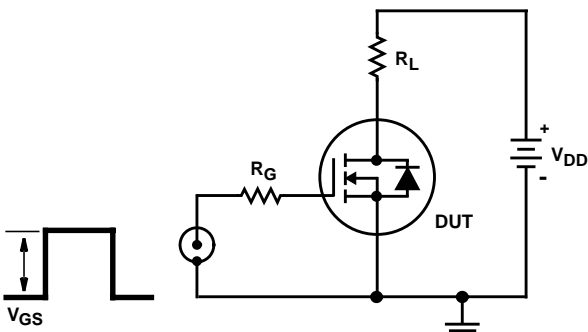


FIGURE 11. SWITCHING TIME TEST CIRCUIT

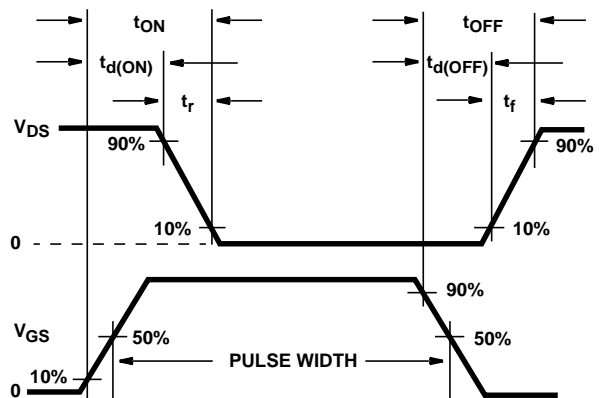


FIGURE 12. RESISTIVE SWITCHING WAVEFORMS

## Test Circuits and Waveforms (Continued)

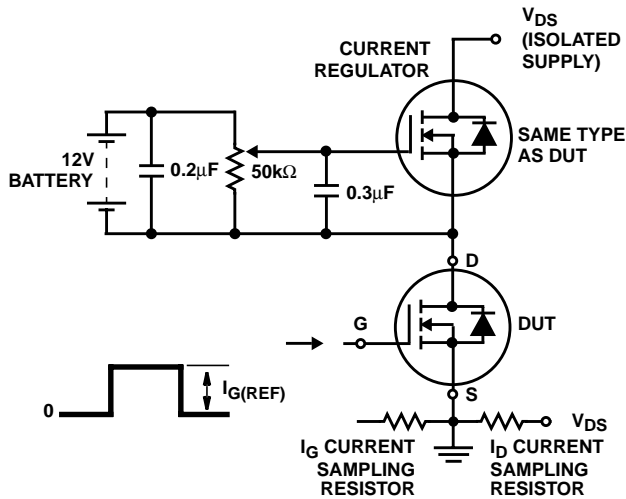


FIGURE 13. GATE CHARGE TEST CIRCUIT

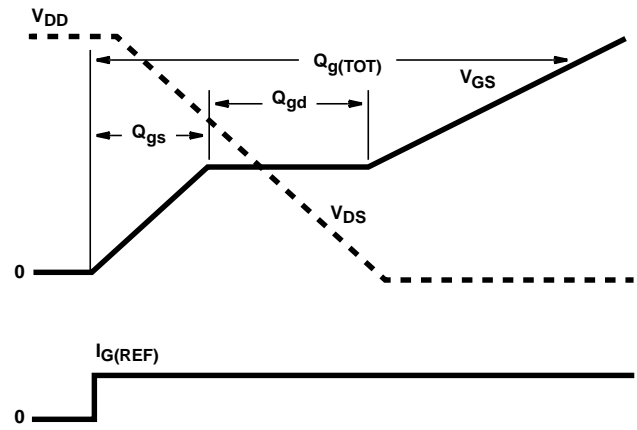


FIGURE 14. GATE CHARGE WAVEFORMS

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