15A, 150V, 0.150 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 TA09195.

Ordering Information

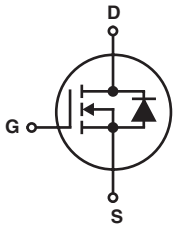
PART NUMBER	PACKAGE	BRAND
RFP15N15	TO-220AB	RFP15N15

NOTE: When ordering, use the entire part number.

Features

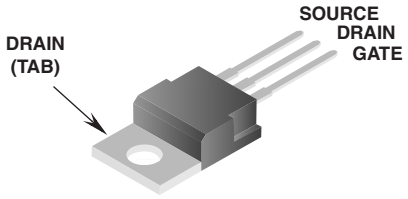
- 15A, 150V
- $r_{DS(ON)} = 0.150\Omega$
- Related Literature
  - TB334 “Guidelines for Soldering Surface Mount Components to PC Boards”

Symbol



Packaging

JEDEC TO-220AB



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Absolute Maximum Ratings $T_C = 25^oC$, Unless Otherwise Specified

		RFP15N15	UNITS
Drain to Source Voltage (Note 1)	V_{DSS}	150	V
Drain to Gate Voltage (R_{GS} = 20kΩ) (Note 1)	V_{DGR}	150	V
Continuous Drain Current	I_D	15	A
Pulsed Drain Current (Note 3)	I_{DM}	40	A
Gate to Source Voltage	V_{GS}	±20	V
Maximum Power Dissipation	P_D	75	W
Linear Derating Factor		0.6	$W/^oC$
Operating and Storage Temperature	T_J, T_{STG}	-55 to 150	^oC
Maximum Temperature for Soldering			
Leads at 0.063in (1.6mm) from Case for 10s	T_L	300	^oC
Package Body for 10s, See Techbrief 334	T_{pkg}	260	^oC

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. $T_J = 25^oC$ to 125^oC.

Electrical Specifications $T_C = 25^oC$, Unless Otherwise Specified

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Drain to Source Breakdown Voltage	BV_{DSS}	I_D = 250μA, V_{GS} = 0V	150	-	-	V
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_D = 250μA	2	-	4	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = Rated BV_{DSS}, V_{GS} = 0V	-	-	1	μA
		V_{DS} = 0.8 x Rated BV_{DSS}, V_{GS} = 0V, $T_C = 125^oC$			25	μA
Gate to Source Leakage Current	I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V	-	-	±100	nA
Drain to Source On Resistance (Note 2)	$r_{DS(ON)}$	I_D = 15A, V_{GS} = 10V (Figures 6, 7)	-	-	0.150	Ω
Drain to Source On Voltage (Note 2)	$V_{DS(ON)}$	I_D = 15A, V_{GS} = 10V	-	-	2.25	V
Input Capacitance	C_{ISS}	V_{DS} = 25V, V_{GS} = 0V, f = 1MHz (Figure 9)	-	-	1700	pF
Output Capacitance	C_{OSS}		-	-	750	pF
Reverse-Transfer Capacitance	C_{RSS}		-	-	350	pF
Turn-On Delay Time	$t_{d(ON)}$	V_{DD} = 75V, $I_D \approx$ 7.5A, R_G = 50Ω, V_{GS} = 10V R_L = 9.9Ω, (Figures 10, 11, 12)	-	50	75	ns
Rise Time	t_r		-	150	225	ns
Turn-Off Delay Time	$t_{d(OFF)}$		-	185	280	ns
Fall Time	t_f		-	125	190	ns
Thermal Resistance Junction-to-Case			-	-	1.67	$^oC/W$

Source to Drain Diode Specifications

PARAMETERS	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Source to Drain Diode Voltage (Note 2)	V_{SD}	I_{SD} = 7.5A	-	-	1.4	V
Reverse Recovery Time	t_{rr}	I_{SD} = 4A, dI_{SD}/dt = 100A/μs	-	200	-	ns

NOTES:

2. Pulse test: width ≤ 300μs, duty cycle ≤ 2%.
3. Repetitive rating: pulse width is limited by maximum junction temperature.

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Typical Performance Curves Unless Otherwise Specified

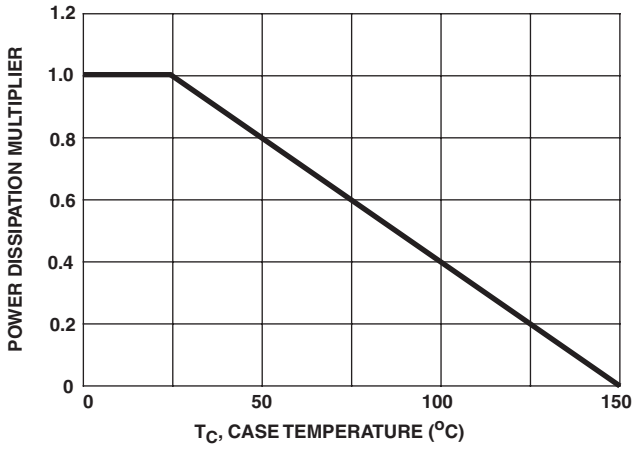

FIGURE 1. NORMALIZED POWER DISSIPATION vs CASE TEMPERATURE

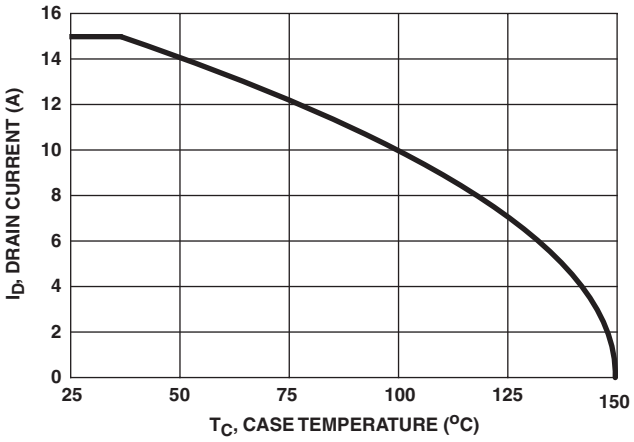

FIGURE 2. MAXIMUM CONTINUOUS DRAIN CURRENT vs CASE TEMPERATURE

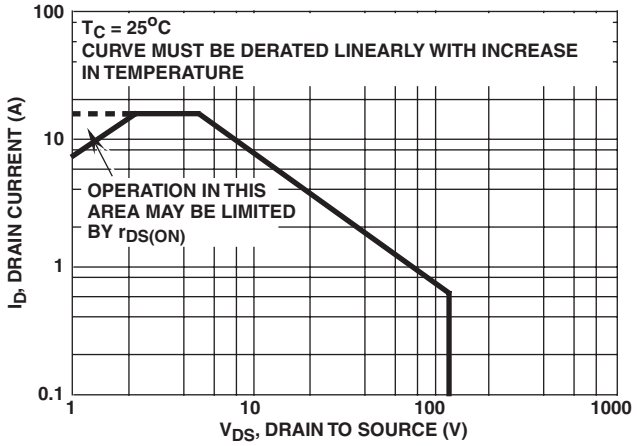

FIGURE 3. FORWARD BIAS SAFE OPERATING AREA

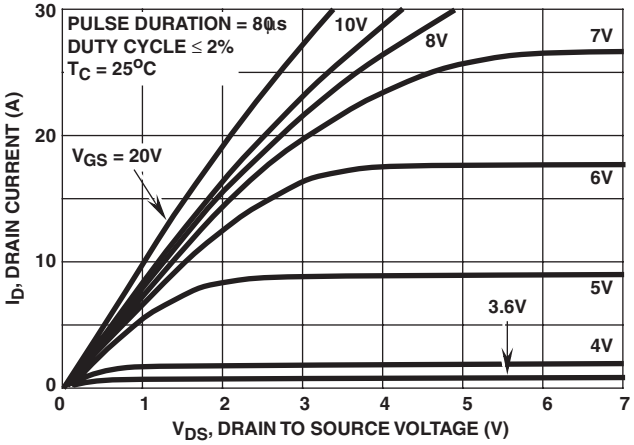

FIGURE 4. SATURATION CHARACTERISTICS

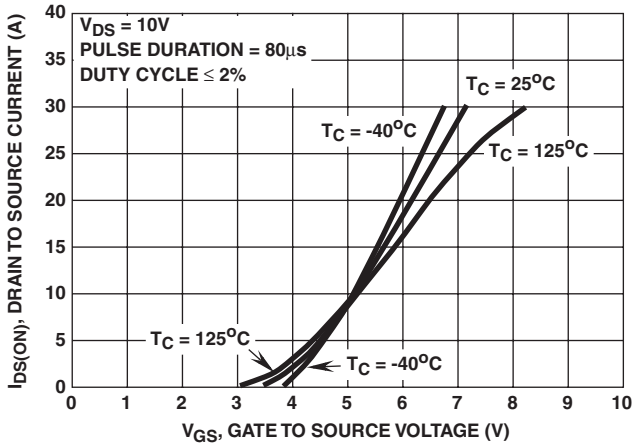

FIGURE 5. TRANSFER CHARACTERISTICS

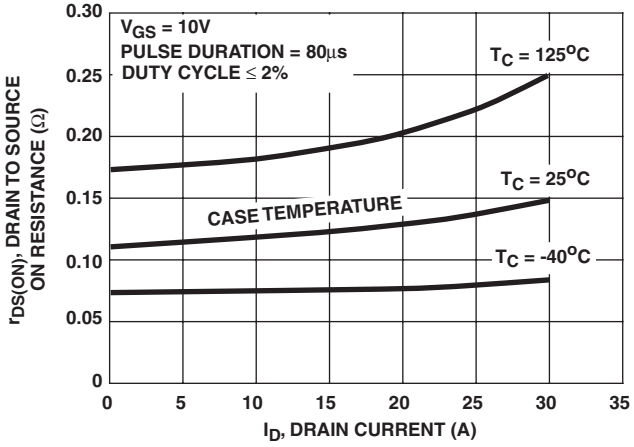

FIGURE 6. DRAIN TO SOURCE ON RESISTANCE vs DRAIN CURRENT

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Typical Performance Curves Unless Otherwise Specified (Continued)

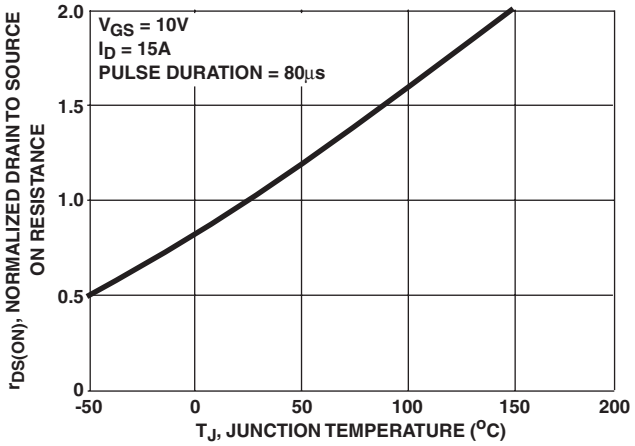


FIGURE 7. NORMALIZED DRAIN TO SOURCE ON RESISTANCE vs JUNCTION TEMPERATURE

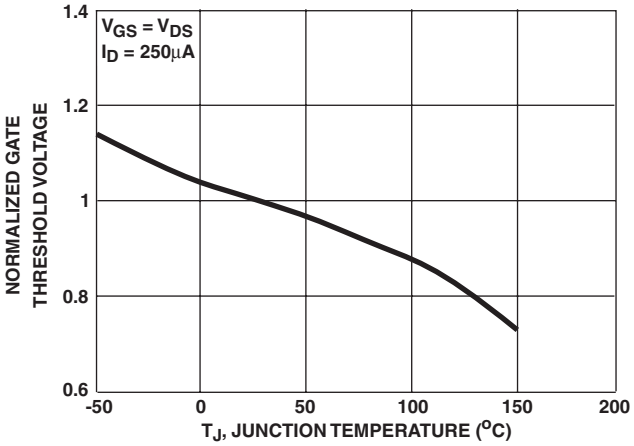


FIGURE 8. NORMALIZED GATE THRESHOLD VOLTAGE vs JUNCTION TEMPERATURE

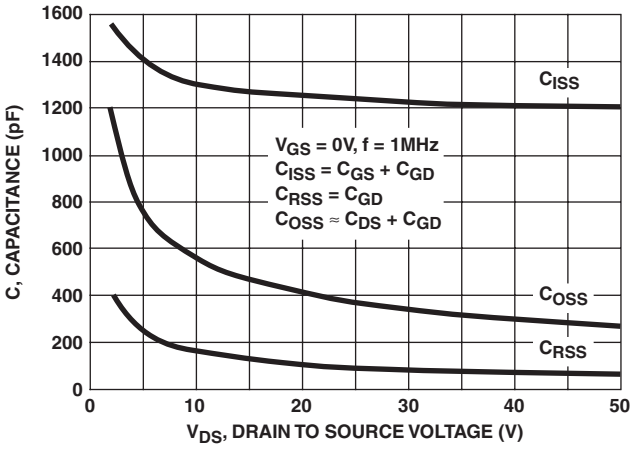
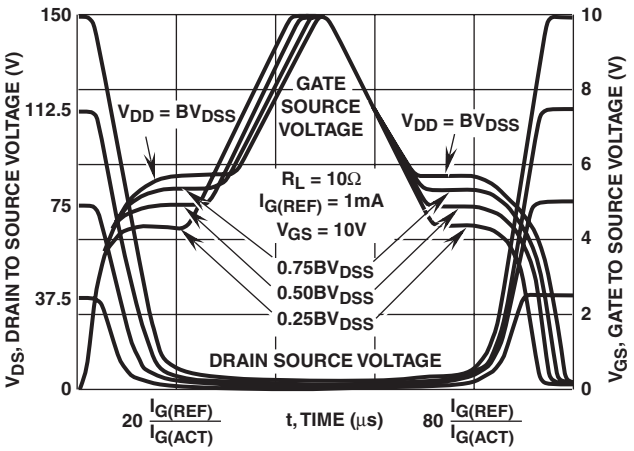


FIGURE 9. CAPACITANCE vs DRAIN TO SOURCE VOLTAGE



NOTE: Refer to Fairchild Application Notes AN7254 and AN7260.

FIGURE 10. NORMALIZED SWITCHING WAVEFORMS FOR CONSTANT GATE CURRENT

Test Circuits and Waveforms

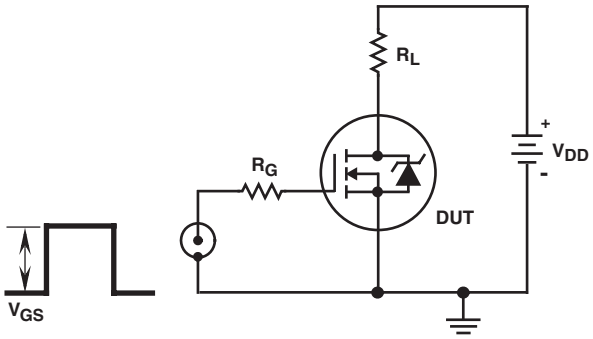


FIGURE 11. SWITCHING TIME TEST CIRCUIT

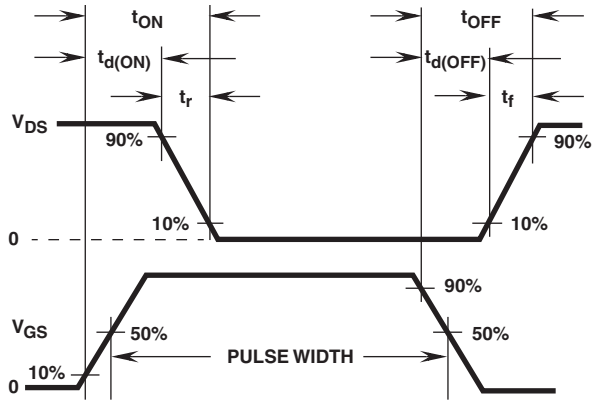


FIGURE 12. RESISTIVE SWITCHING WAVEFORMS

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DOME™	HiSeC™	PowerTrench®	SuperSOT™-8	
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E^2CMOS™	LittleFET™	QS™	TinyLogic™	
EnSigna™	MicroFET™	QT Optoelectronics™	TruTranslation™	
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