



30A, 60V, 0.065 Ohm, P-Channel Power MOSFETs

These are P-Channel power MOSFETs manufactured using the MegaFET process. This process, which uses feature sizes approaching those of LSI circuits, gives optimum utilization of silicon, resulting in outstanding performance. They are designed for use in applications such as switching regulators, switching converters, motor drivers, and relay drivers. These transistors can be operated directly from integrated circuits.

Formerly developmental type TA09834.

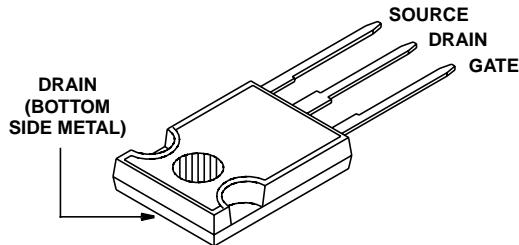
Ordering Information

PART NUMBER	PACKAGE	BRAND
RFG30P06	TO-247	RFG30P06
RFP30P06	TO-220AB	RFP30P06
RF1S30P06SM	TO-263AB	F1S30P06

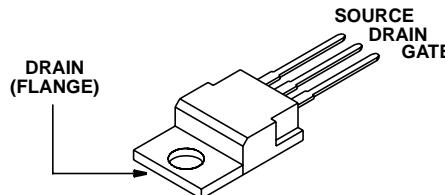
NOTE: When ordering, use the entire part number. Add the suffix 9A to obtain the TO-263AB variant in tape and reel, i.e. RF1S30P06SM9A.

Packaging

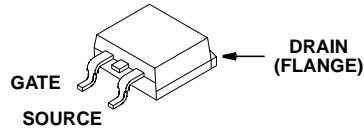
JEDEC STYLE TO-247



JEDEC TO-220AB



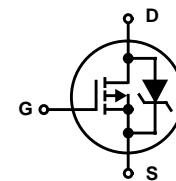
JEDEC TO-263AB



Features

- 30A, 60V
- $r_{DS(ON)} = 0.065\Omega$
- Temperature Compensating PSPICE® Model
- Peak Current vs Pulse Width Curve
- UIS Rating Curve
- 175°C Operating Temperature
- Related Literature
 - TB334 "Guidelines for Soldering Surface Mount Components to PC Boards"

Symbol



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

		RFG30P06, RFP30P06 RF1S30P06SM	UNITS
Drain to Source Voltage (Note 1)	V_{DSS}	-60	V
Drain to Gate Voltage ($R_{GS} = 20\text{k}\Omega$) (Note 1)	V_{DGR}	-60	V
Gate to Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	30	A
Pulsed Drain Current (Note 3) (Figure 5)	I_{DM}	Refer to Peak Current Curve	
Single Pulse Avalanche Rating (Figure 6)	E_{AS}	Refer to UIS Curve	
Power Dissipation	P_D	135	W
Linear Derating Factor		0.9	$W/\text{ }^\circ\text{C}$
Operating and Storage Temperature	T_J, T_{STG}	-55 to 175	$^\circ\text{C}$
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 Techbrief 334	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 150°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}	$I_D = 250\mu\text{A}, V_{GS} = 0\text{V}$		-60	-	-	V
Gate Threshold Voltage	$V_{GS(\text{TH})}$	$V_{GS} = V_{DS}, I_D = 250\mu\text{A}$		-2	-	-4	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -60\text{V}, V_{GS} = 0\text{V}$		-	-	-1	μA
		$V_{DS} = 0.8 \times \text{Rated } BV_{DSS}, T_C = 150^\circ\text{C}$		-	-	-25	μA
Gate to Source Leakage Current	I_{GSS}	$V_{GS} = \pm 20\text{V}$		-	-	± 100	nA
Drain to Source On Resistance (Note 2)	$r_{DS(\text{ON})}$	$I_D = -30\text{A}, V_{GS} = -10\text{V}$ (Figure 9)		-	-	0.065	Ω
Turn-On Time	$t_{(\text{ON})}$	$V_{DD} = -30\text{V}, I_D = 15\text{A}, R_L = 2.00\Omega, V_{GS} = -10\text{V}$		-	-	80	ns
Turn-On Delay Time	$t_{d(\text{ON})}$	$R_G = 6.25\Omega$ (Figure 13)		-	15	-	ns
Rise Time	t_r			-	23	-	ns
Turn-Off Delay Time	$t_{d(\text{OFF})}$			-	28	-	ns
Fall Time	t_f			-	18	-	ns
Turn-Off Time	$t_{(\text{OFF})}$			-	-	100	ns
Total Gate Charge	$Q_g(\text{TOT})$	$V_{GS} = 0 \text{ to } -20\text{V}$	$V_{DD} = -48\text{V}, I_D = 30\text{A}, R_L = 1.6\Omega, I_G(\text{REF}) = 1.6\text{mA}$	-	140	170	nC
Gate Charge at -10V	$Q_g(-10)$	$V_{GS} = 0 \text{ to } -10\text{V}$		-	70	85	nC
Threshold Gate Charge	$Q_g(\text{TH})$	$V_{GS} = 0 \text{ to } -2\text{V}$		-	5.5	6.6	nC
Input Capacitance	C_{ISS}	$V_{DS} = 25\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$		-	3200	-	pF
Output Capacitance	C_{OSS}			-	800	-	pF
Reverse Transfer Capacitance	C_{RSS}			-	175	-	pF
Thermal Resistance, Junction to Case	$R_{\theta JC}$			-	-	1.11	$^\circ\text{C/W}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	TO-220, TO-263		-	-	62	$^\circ\text{C/W}$
		TO-247				30	$^\circ\text{C/W}$

Source to Drain Diode Specifications

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	MAX
Source to Drain Diode Voltage (Note 2)	V_{SD}	$I_{SD} = -30\text{A}$	-	-	-1.5	V
Diode Reverse Recovery Time	t_{RR}	$I_{SD} = -30\text{A}, dI_{SD}/dt = -100\text{A}/\mu\text{s}$	-	-	150	ns

NOTE:

2. Pulse test: pulse width $\leq 300\mu\text{s}$ maximum, duty cycle $\leq 2\%$.
3. Repetitive rating: pulse width limited by maximum junction temperature. See Transient Thermal Impedance curve (Figure 3).

Typical Performance Curves Unless Otherwise Specified

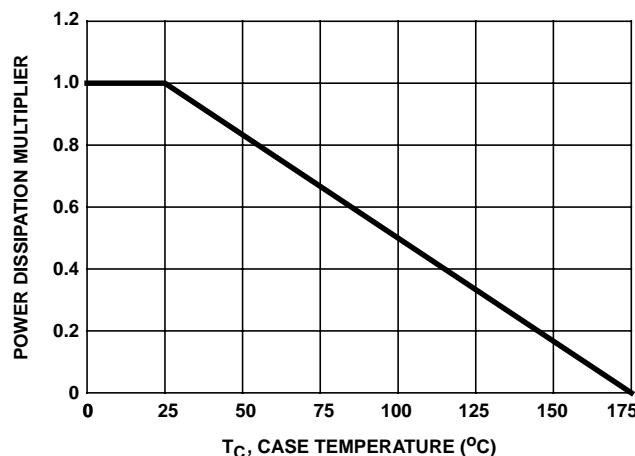


FIGURE 1. NORMALIZED POWER DISSIPATION vs CASE TEMPERATURE

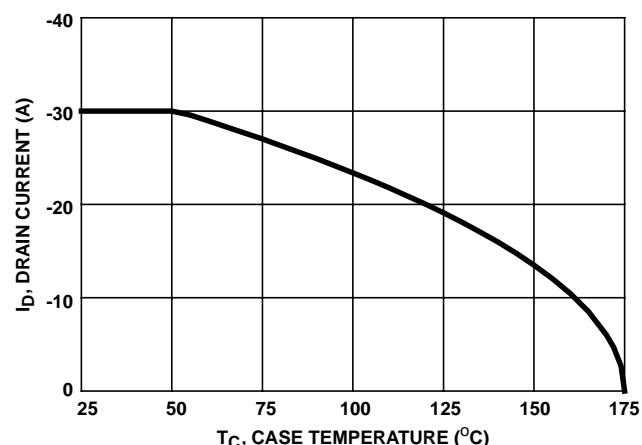


FIGURE 2. MAXIMUM CONTINUOUS DRAIN CURRENT vs CASE TEMPERATURE

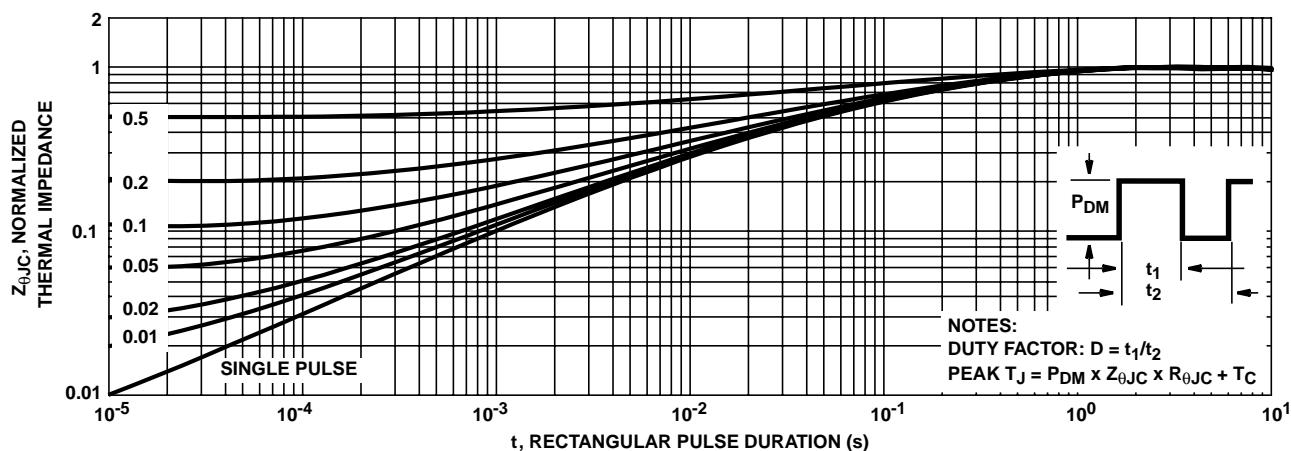


FIGURE 3. NORMALIZED MAXIMUM TRANSIENT THERMAL IMPEDANCE

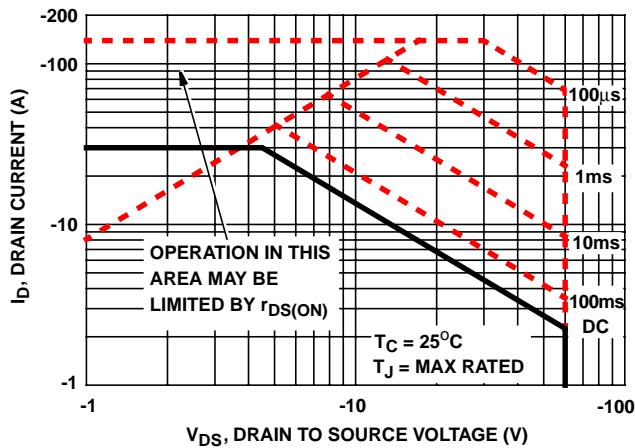


FIGURE 4. FORWARD BIAS SAFE OPERATING AREA

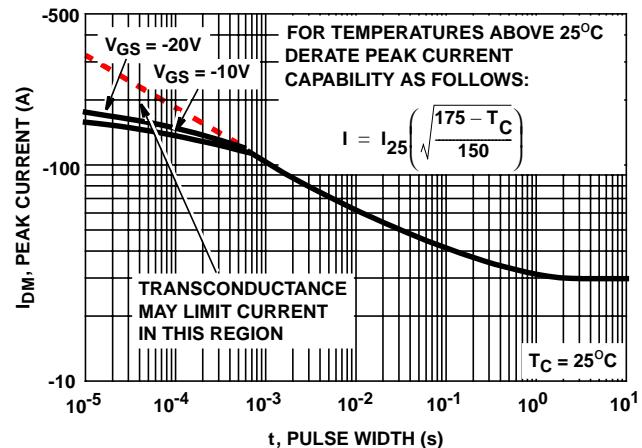


FIGURE 5. PEAK CURRENT CAPABILITY