

Standard Power MOSFETs

RFM25N05, RFM25N06, RFP25N05, RFP25N06

Power MOS Field-Effect Transistors

N-Channel Enhancement-Mode Power Field-Effect Transistors

25 A, 50 V - 60 V

$r_{DS(on)} = 0.07\Omega$

Features:

- SOA is power-dissipation limited
- Nanosecond switching speeds
- Linear transfer characteristics
- High input impedance
- Majority carrier device

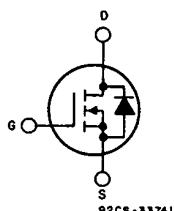
The RFM25N05 and RFM25N06 and the RFP25N05 and RFP25N06^{*} are n-channel enhancement-mode silicon-gate power field-effect transistors designed for applications such as switching regulators, switching converters, motor drivers, relay drivers, and drivers for high-power bipolar switching transistors requiring high speed and low gate-drive power. These types can be operated directly from integrated circuits.

The RFM-types are supplied in the JEDEC TO-204AA steel package and the RFP-types in the JEDEC TO-220AB plastic package.

*The RFM and RFP series were formerly RCA developmental numbers TA9386 and TA9387, respectively.



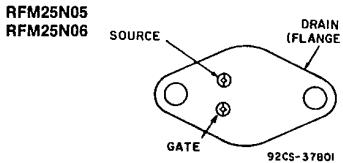
TERMINAL DIAGRAM



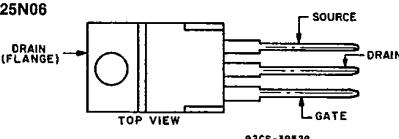
92CS-3374I

N-CHANNEL ENHANCEMENT MODE

TERMINAL DESIGNATIONS



JEDEC TO-204AA



JEDEC TO-220AB

MAXIMUM RATINGS, Absolute-Maximum Values ($T_c=25^\circ C$):

	RFM25N05	RFM25N06	RFP25N05	RFP25N06	
DRAIN-SOURCE VOLTAGE	V_{DSS}	50	60	50	V
DRAIN-GATE VOLTAGE ($R_{GS}=1 M\Omega$)	V_{DGR}	50	60	50	V
GATE-SOURCE VOLTAGE	V_{GS}			20	V
DRAIN CURRENT, RMS Continuous	I_D			25	A
Pulsed	I_{DM}			60	A
POWER DISSIPATION @ $T_c=25^\circ C$	P_f	100	100	75	W
Derate above $T_c=25^\circ C$		0.8	0.8	0.6	W/ $^\circ C$
OPERATING AND STORAGE TEMPERATURE	T_p, T_{sq}		-55 to +150		$^\circ C$

— Standard Power MOSFETs

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ELECTRICAL CHARACTERISTICS, At Case Temperature (T_c)=25°C unless otherwise specified.

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	LIMITS				UNITS	
			RFM25N05 RFP25N05		RFM25N06 RFP25N06			
			MIN.	MAX.	MIN.	MAX.		
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D=1 \text{ mA}$ $V_{GS}=0$	50	—	60	—	V	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}$ $I_D=1 \text{ mA}$	2	4	2	4	V	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=40 \text{ V}$ $V_{DS}=50 \text{ V}$	—	1	—	—	μA	
		$T_c=125^\circ\text{C}$ $V_{DS}=40 \text{ V}$ $V_{DS}=50 \text{ V}$	—	50	—	—		
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20 \text{ V}$ $V_{DS}=0$	—	100	—	100	nA	
Drain-Source On Voltage	$V_{DS(on)}^a$	$I_D=12.5 \text{ A}$ $V_{GS}=10 \text{ V}$	—	1.06	—	1.06	V	
		$I_D=25 \text{ A}$ $V_{GS}=10 \text{ V}$	—	2.5	—	2.5		
Static Drain-Source On Resistance	$r_{DS(on)}^a$	$I_D=12.5 \text{ A}$ $V_{GS}=10 \text{ V}$	—	0.07	—	0.07	Ω	
Forward Transconductance	g_{fs}^a	$V_{DS}=10 \text{ V}$ $I_D=12.5 \text{ A}$	5	—	5	—	mho	
Input Capacitance	C_{iss}	$V_{DS}=25 \text{ V}$	—	1700	—	1700	pF	
Output Capacitance	C_{oss}	$V_{GS}=0 \text{ V}$	—	900	—	900		
Reverse Transfer Capacitance	C_{rss}	$f = 1 \text{ MHz}$	—	400	—	400		
Turn-On Delay Time	$t_d(\text{on})$	$V_{DD}=30 \text{ V}$	18(typ)	60	18(typ)	60	ns	
Rise Time	t_r	$I_D=12.5 \text{ A}$	120(typ)	225	120(typ)	225		
Turn-Off Delay Time	$t_d(\text{off})$	$R_{gen}=R_{gs}=50 \Omega$	123(typ)	225	123(typ)	225		
Fall Time	t_f	$V_{GS}=10 \text{ V}$	123(typ)	200	123(typ)	200		
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	$RFM25N05, RFM25N06$	—	1.25	—	1.25	$^\circ\text{C/W}$	
		$RFP25N05, RFP25N06$	—	1.67	—	1.67		

^aPulsed: Pulse duration = 300 μs max., duty cycle = 2%.

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	LIMITS				UNITS	
			RFM25N05 RFP25N05		RFM25N06 RFP25N06			
			MIN.	MAX.	MIN.	MAX.		
Diode Forward Voltage	V_{SD}	$I_{SD}=12.5 \text{ A}$	—	1.4	—	1.4	V	
Reverse Recovery Time	t_r	$I_F=4 \text{ A}$ $d_I/d_t=100 \text{ A}/\mu\text{s}$	150(typ)		150(typ)		ns	

*Pulse Test: Width $\leq 300 \mu\text{s}$, duty cycle $\leq 2\%$.

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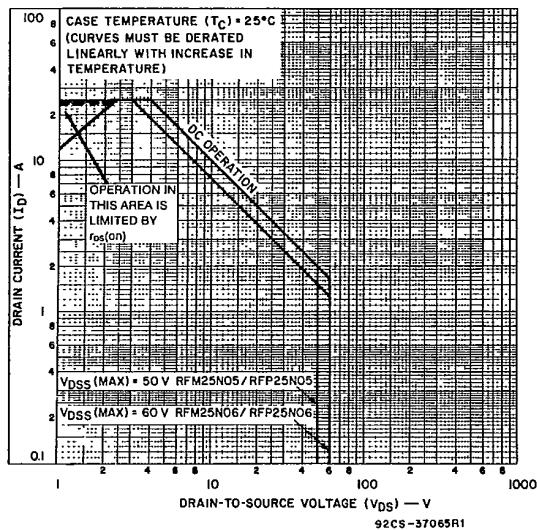


Fig. 1 — Maximum operating areas for all types.

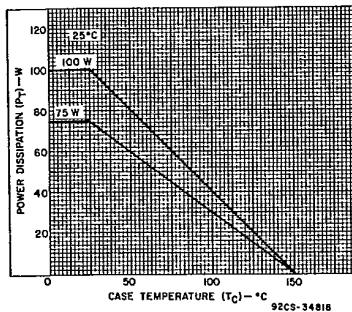


Fig. 2 — Power dissipation vs. case temperature derating curve for all types.

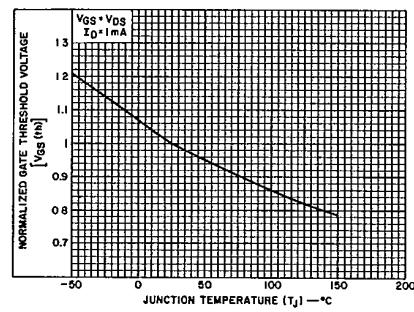


Fig. 3 — Typical normalized gate threshold voltage as a function of junction temperature for all types.

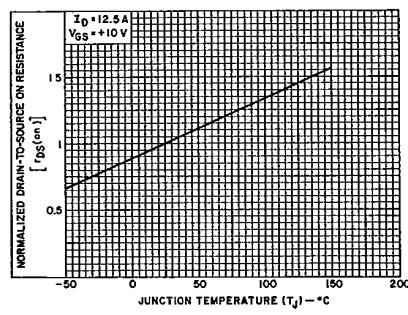


Fig. 4 — Normalized drain-to-source on resistance to junction temperature for all types.

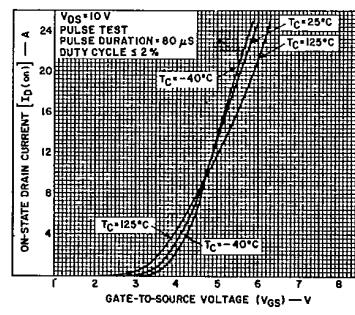


Fig. 5 — Typical transfer characteristics for all types.