

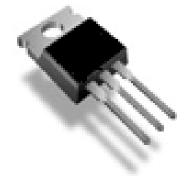
POWER MOSFET

IRF820 Advance Information

Description

The Bay Linear MOSFET's provide the designers with the best combination of fast switching, ruggedized device design, low 0n-resistance and low cost-effectiveness.

The TO-220 is offered in a 3-pin is universally preferred for all commercial-industrial applications at power dissipation level to approximately to 50 Watts. Also, available in a D^2 surface mount power package with a power dissipation up to 2 Watts.



Features

- Dynamic dv/dt Rating
- Repetitive Avalanche Rated
- Fast Switching
- Ease of Paralleling
- Simple Drive Requirements

 $V_{DSS} = 500V$ $R_{DS(ON)} = 3.0 \Omega$ $I_{D} = 2.5A$

Ordering Information

Device	Package	Temp.
IRL820T	TO-220	0 to 150°C
IRL820S	$TO-263 (D^2)$	0 to 150°C

Absolute Maximum Rating

	Parameter	Max	Unit	
$I_{\rm D}@~T_{\rm C}=25^{\circ}{\rm C}$	Continuous Drain Current, V _{GS} @10V	2.5		
$I_{\rm D}@~T_{\rm C} = 100^{\circ}{\rm C}$	Continuous Drain Current, V _{GS} @10V	Current, V _{GS} @10V 1.6		
I _{DM}	Pulsed Drain Current (1)	8.0		
$P_{\rm D} @ T_{\rm C} = 25^{\circ}{\rm C}$	Power Dissipation	50	W	
	Linear Derating Factor	0.40		
	Linear Derating Factor (PCB Mount, D ²)	0.025	W/°C	
V _{GS}	Gate-to- Source Voltage ±20		V	
E _{AS}	Single Pulse Avalanche Energy	210	mJ	
I _{AR}	Avalanche Current (1) 2.5		Α	
E _{AR} Repetitive Avalanche Energy (1)		5.0	mJ	
dv/dt	Peak Diode Recovery dv/dt (3)	3.5	V/ns	
T _J , T _{STG}	Junction & Storage Temperature Range	-55 to +150	- °C	
	Soldering Temperature, for 10 seconds	300 (1.6mm from case)	- 1	

Thermal Resistance

	Parameter	Min	Тур	Max	Units
R _{ejc}	Junction-to Case	-	-	2.5	
R _{ecs}	Case-to-Sink, Flat, Greased Surface (TO-220)	-	0.50		°C/W
R _{0JA}	Junction-to Ambient (PCB Mount, D^2)	-	-	40	C/ W
R _{θJA}	Junction-to Ambient	-	-	62	

IRF820

Symbol	Parameter	Conditions	Min	Тур	Max	Units
V _{(BR)DSS}	Drain-to-source Breakdown Voltage	$V_{GS} = 0V, I_D = 250 \mu A$	500			V
$\frac{V_{(BR)DSS}}{\Delta T_J}/$	Breakdown Voltage Temperature Coefficient	Reference to 25°C, $I_D = 250 \mu A$	-	0.59	-	V/°C
I _{D(ON)}	On-State Drain Current (note 2)	$V_{GS} > I_{D(ON)} \ge R_{DS(ON)}Max$			2.5	Α
R _{DS(ON)}	Static Drain-to-Source On-Resistance	$V_{GS} = 10V, I_D = 1.5A$ (note 4)			3.0	Ω
V _{GS(TH)}	Gate Threshold Voltage	$V_{DS} = V_{GS}$, $I_D = 250 \mu A$	2.0	-	4.0	V
g _{fs}	Forward Transconductance	$V_{DS} = 50V, I_D = 1.5A$	1.5	-	-	S
I _{DSS}	Drain-to-Source Leakage Current	$\frac{V_{DS} = 500V, V_{GS} = 0V}{V_{DS} = 400V, V_{GS} = 0V, T_{C} = 125^{\circ}C}$	-	-	25 250	μA
I _{GSS}	Gate-to-Source Forward Leakage	$V_{GS} = 20V$		_	100	nA
IGSS	Gate-to-Source Reverse Leakage	$V_G = -20V$			-100	
$\mathbf{Q}_{\mathbf{g}}$	Total Gate Charge	$I_{D} = 2.1 A$	-	-	24	nC
$\mathbf{Q}_{\mathbf{qs}}$	Gate-to-Source Charge	$V_{DS} = 400V$	-	-	3.3	пс
$\mathbf{Q}_{\mathbf{gd}}$	Gate-to-Drain ("Miller") Charge	$V_{GS} = 10V$ (note 4)			13	nC
t _{d (on)}	Turn-On Delay Time	$V_{DD} = 250V$	-	8.0	-	
Tr	Rise Time	$I_D = 2.1A$	-	8.6	-	ns
t _{d (off)}	Turn -Off Delay Time	$R_G = 18\Omega$	-	33	-	115
T _f	Fall Time	$R_{\rm D} = 100\Omega \text{ (note 4)}$	-	16	-	
L _D	Internal Drain Inductance	Between lead 6mm (0.25in.)	-	4.5	-	
Ls	Internal Source Inductance	from package and center or die contact	-	7.5	-	nH
C _{iss}	Input Capacitance	$V_{GS} = 0V$	-	360	-	
Coss	Output Capacitance	$V_{DS} = 25V$	-	92	-	pF
C _{rss}	Reverse Transfer Capacitance	F = 1.0MHZ	-	37	-	

Electrical Characteristics ($T_c = 25$ °C unless otherwise specified)

Source-Drain Rating Characteristics

Symbol	Parameter	Conditions	Min	Тур	Max	Units
Is	Continuous Source Current (Body Diode)	MOSFET symbol showing the integral reverse p-n junction diode.	-	-	2.5	Α
I _{SM}	Pulsed Source Current (Body Diode) (Note 1)		-	-	8.0	A
V _{SD}	Diode Forward Voltage (4)	$T_J=25^{\circ}C_JI_S=2.5A, V_{GS}=DV$	-	-	1.6	V
t _{rr}	Reverse Recovery Time	$T_{J}=25^{\circ}C, I_{F}=2.1A$	-	-	520	ns
Q _{rr}	Reverse Recovery Charge	di/dt=100A/µs (Note 4)	-	0.70	1.4	μC
ton	Forward Turn-On Time	Intrinsic turn-on time is negligible	(turn-on	is domir	nated by	(L_S+L_D)

Notes: 1. Repetitive Rating; pulse width limited by max. junction temperature.

2a. $V_{DD} = 50V$, starting Tj = 25°C, L = 440µH R_G = 25Ω, I_{AS} = 28A

3. $I_{SD} \le 2.5 \text{A}$, di/dt $\le 50 \text{A}/\mu \text{s}$, $V_{DD} \le V_{(BR)DSS}$, $T_j \le 150^{\circ}\text{C}$ 4. Pulse with $\le 300 \mu \text{s}$; duty cycle $\le 2\%$

Advance Information- These data sheets contain descriptions of products that are in development. The specifications are based on the engineering calculations, computer simulations and/ or initial prototype evaluation.

Preliminary Information- These data sheets contain minimum and maximum specifications that are based on the initial device characterizations. These limits are subject to change upon the completion of the full characterization over the specified temperature and supply voltage ranges.

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