

IRF530

14A, 100V, 0.160 Ohm, N-Channel Power MOSFETs

These are N-Channel enhancement mode silicon gate power field effect transistors. They are advanced power MOSFETs designed, tested, and guaranteed to withstand a specified level of energy in the breakdown avalanche mode of operation. All of these power MOSFETs are designed for applications such as switching regulators, switching convertors, 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.

Features

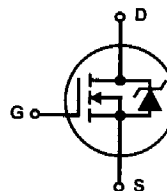
- 14A, 100V
- $r_{DS(ON)} = 0.160\Omega$
- Single Pulse Avalanche Energy Rated
- SOA is Power Dissipation Limited
- Nanosecond Switching Speeds
- Linear Transfer Characteristics
- High Input Impedance

Ordering Information

PART NUMBER	PACKAGE	BRAND
IRF530	TO-220AB	IRF530

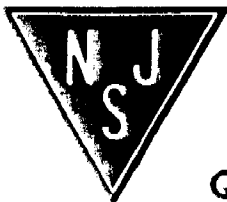
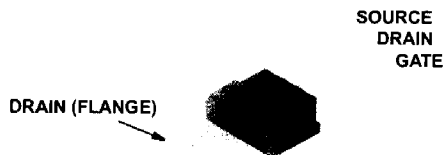
NOTE: When ordering, use the entire part number.

Symbol



Packaging

JEDEC TO-220AB



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Quality Semi-Conductors

IRF530

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

	IRF530	UNITS
Drain to Source Breakdown Voltage (Note 1)	100	V
Drain to Gate Voltage ($R_{GS} = 20k\Omega$) (Note 1)	100	V
Continuous Drain Current	14	A
$T_C = 100^\circ\text{C}$	10	A
Pulsed Drain Current (Note 3)	56	A
Gate to Source Voltage	± 20	V
Maximum Power Dissipation	79	W
Dissipation Derating Factor	0.53	W/ $^\circ\text{C}$
Single Pulse Avalanche Energy Rating (Note 4)	69	mJ
Operating and Storage Temperature	-55 to 175	$^\circ\text{C}$
Maximum Temperature for Soldering		$^\circ\text{C}$
Leads at 0.063in (1.6mm) from Case for 10s.	300	$^\circ\text{C}$
Package Body for 10s, See Techbrief 334	260	$^\circ\text{C}$

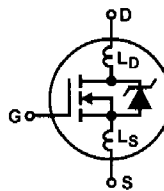
CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

NOTE:

1. $T_J = 25^\circ\text{C}$ to 150°C .

Electrical Specifications $T_C = 25^\circ\text{C}$, Unless Otherwise Specified

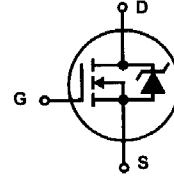
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Drain to Source Breakdown Voltage	BV_{DSS}	$I_D = 250\mu\text{A}$, $V_{GS} = 0\text{V}$ (Figure 10)	100	-	-	V
Gate to Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}$, $I_D = 250\mu\text{A}$	2	-	4.0	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 95\text{V}$, $V_{GS} = 0\text{V}$	-	-	25	μA
		$V_{DS} = 0.8 \times \text{Rated } BV_{DSS}$, $V_{GS} = 0\text{V}$, $T_J = 150^\circ\text{C}$	-	-	250	μA
On-State Drain Current (Note 2)	$I_{D(ON)}$	$V_{DS} > I_{D(ON)} \times r_{DS(ON)}$ MAX, $V_{GS} = 10\text{V}$	14	-	-	A
Gate to Source Leakage Current	I_{GSS}	$V_{GS} = \pm 20\text{V}$	-	-	± 500	nA
Drain to Source On Resistance (Note 2)	$r_{DS(ON)}$	$I_D = 8.3\text{A}$, $V_{GS} = 10\text{V}$ (Figures 8, 9)	-	0.14	0.16	Ω
Forward Transconductance (Note 2)	g_{fs}	$V_{DS} \geq 50\text{V}$, $I_D = 8.3\text{A}$ (Figure 12)	5.1	7.6	-	S
Turn-On Delay Time	$t_{d(ON)}$	$V_{DD} = 50\text{V}$, $I_D = 14\text{A}$, $R_G = 12\Omega$, $R_L = 3.4\Omega$ MOSFET Switching Times are Essentially Independent of Operating Temperature	-	12	15	ns
Rise Time	t_r		-	35	65	ns
Turn-Off Delay Time	$t_{d(OFF)}$		-	25	70	ns
Fall Time	t_f		-	25	59	ns
Total Gate Charge (Gate to Source + Gate to Drain)	$Q_{g(TOT)}$	$V_{GS} = 10\text{V}$, $I_D = 14\text{A}$, $V_{DS} = 0.8 \times \text{Rated } BV_{DSS}$ $I_{g(REF)} = 1.5\text{mA}$ (Figure 14)	-	18	30	nC
Gate to Source Charge	Q_{gs}	Gate Charge is Essentially Independent of Operating Temperature	-	4	-	nC
Gate to Drain "Miller" Charge	Q_{gd}		-	7	-	nC
Input Capacitance	C_{ISS}		$V_{DS} = 25\text{V}$, $V_{GS} = 0\text{V}$, $f = 1\text{MHz}$ (Figure 11)	-	600	-
Output Capacitance	C_{OSS}		-	250	-	pF
Reverse Transfer Capacitance	C_{RSS}		-	50	-	pF
Internal Drain Inductance	L_D	Measured from the Contact Screw on Tab To Center of Die	-	3.5	-	nH
		Measured from the Drain Lead, 6mm (0.25in) from Package to Center of Die	-	4.5	-	nH
Internal Source Inductance	L_S	Measured from the Source Lead, 6mm (0.25in) From Header to Source Bonding Pad	-	7.5	-	nH
Thermal Resistance Junction to Case	$R_{\theta JC}$		-	-	1.9	$^\circ\text{C/W}$
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	Free Air Operation	-	-	62.5	$^\circ\text{C/W}$
			-	-	-	-



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Source to Drain Diode Specifications

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Continuous Source to Drain Current	I_{SD}	Modified MOSFET Symbol Showing the Integral Reverse P-N Junction Diode	-	-	14	A
Pulse Source to Drain Current (Note 2)	I_{SDM}		-	-	56	A
Source to Drain Diode Voltage (Note 2)	V_{SD}	$T_J = 25^\circ\text{C}$, $I_{SD} = 14\text{A}$, $V_{GS} = 0\text{V}$ (Figure 13)	-	-	2.5	V
Reverse Recovery Time	t_{rr}	$T_J = 25^\circ\text{C}$, $I_{SD} = 14\text{A}$, $di_{SD}/dt = 100\text{A}/\mu\text{s}$	5.5	120	250	ns
Reverse Recovery Charge	Q_{RR}	$T_J = 25^\circ\text{C}$, $I_{SD} = 14\text{A}$, $di_{SD}/dt = 100\text{A}/\mu\text{s}$	0.17	0.6	1.3	μC



NOTES:

2. Pulse test: pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
3. Repetitive rating: pulse width limited by Max junction temperature. See Transient Thermal Impedance curve (Figure 3).
4. $V_{DD} = 25\text{V}$, starting $T_J = 25^\circ\text{C}$, $L = 530\mu\text{H}$, $R_G = 25\Omega$, peak $I_{AS} = 14\text{A}$ (Figures 15, 16).

Typical Performance Curves Unless Otherwise Specified

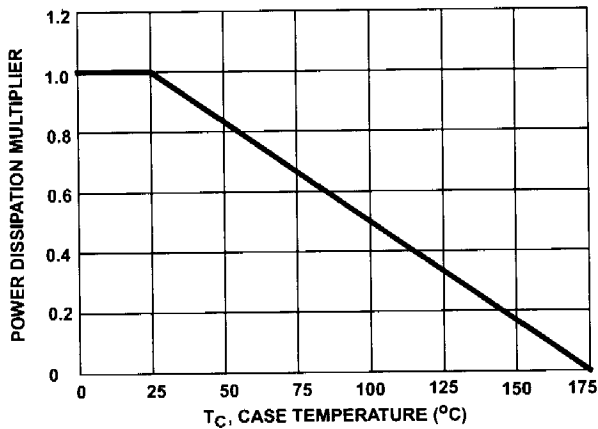


FIGURE 1. NORMALIZED POWER DISSIPATION vs CASE TEMPERATURE

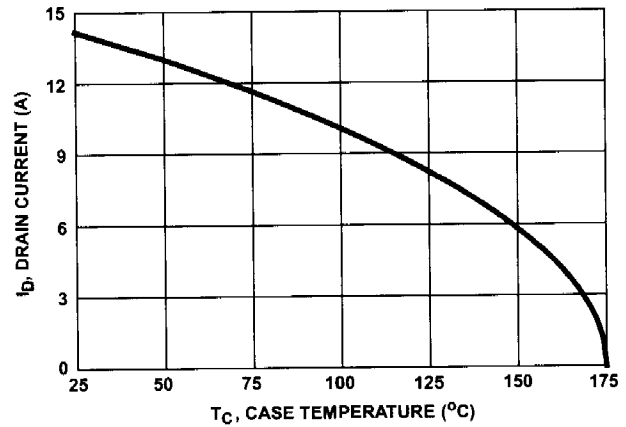


FIGURE 2. MAXIMUM CONTINUOUS DRAIN CURRENT vs CASE TEMPERATURE

