

BRITISH STANDARDS INSTITUTION
2 PARK STREET
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BS CECC 50 012 - 015

Page 1 of 17 Issue 3 January, 1990

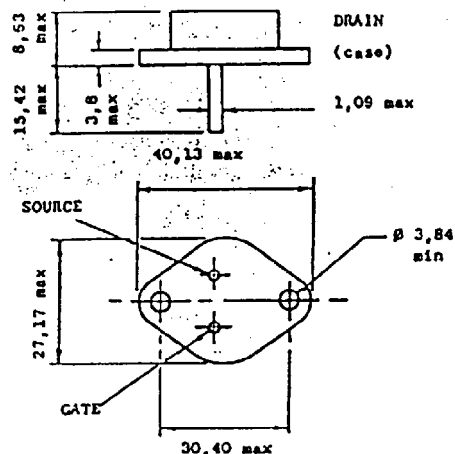


Specification available from:
AS SHOWN IN PD 9002, CECC 00200
AND
INTERNATIONAL RECTIFIER CO (GB) LTD
HURST GREEN, OXTED,
SURREY RH8 9BB.
TEL: 08833 - 3215 TELEX: 95219

ELECTRONIC COMPONENTS OF ASSESSED
QUALITY IN ACCORDANCE WITH:
BS CECC 50 000 - 1981 ISSUE 3

1. MECHANICAL DESCRIPTION

All Dimensions in millimeters



OUTLINES

BS 3934 - 50 127D with SD2 - 2 base

IEC 151-2 - Clad with B18 base

TERMINAL CONNECTIONS - As outline above

MARKING - As per Type Numbers above

DETAIL SPECIFICATION FOR:

SINGLE GATE FIELD EFFECT TRANSISTORS
P CHANNEL - ENHANCED GATE
TYPE NUMBERS

IRF9130

IRF9133

IRF9230

ORDERING INFORMATION

See Clause 7 of this Document

2. SHORT DESCRIPTION

Semiconductor material: Silicon

Encapsulation: Glass/Metal Hermetic

Application: a) Low frequency
amplification
b) Switching

Power: Case rated: 75W @ $T_C = 25^\circ\text{C}$

For Concise Data see Page 2 of this
Document

3. LEVEL OF QUALITY ASSESSMENT

LEVEL E Plus additional tests

WARNING: THESE DEVICES ARE STATIC SENSITIVE



4. LIMITING VALUES (Absolute maximum rating system)

These apply over the operating temperature range unless otherwise stated.

BS CECC 50 012		Symbol	Value		Unit
			min.	max	
4.1	Operating case temperature	T_{case}	-55	+150	$^{\circ}C$
4.2	Storage temperature	T_{stg}	-55	+150	$^{\circ}C$
4.3	Drain - Source voltage at $V_{GS} = 0$	V_{DSS}	-	Table 1	V
4.4	Reverse gate-source voltage at $V_{DS} = 0$	V_{GSR}	-	20	V
4.5	Gate-drain voltage with source open circuit	V_{GDO}	-	+ 20	V
4.7	Continuous Drain current at temperature from -55 to + 90 $^{\circ}C$, then derate linearly to + 150 $^{\circ}C$	I_D	-	Table 1	A
4.7.1	Pulsed drain current	I_{DM}	-	Table 1	A
4.8	Power dissipation (See Power V_S Temperature Curve Clause 9)	P_{tot}	-	75	W

Table 1 LIMITING VALUES

TYPE IRF.....	9130	9133	9230
$-V_{DSS}$ max (V)	100	60	200
$-I_D$ max (A)	12	10	6.5
$-I_{DM}$ max (A)	48	40	26

See relevant Qualified Product List for the availability of components qualified under this detail Specification



Documents

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CONCISE DATA

Part Numbers	V_{DS} Drain Source Voltage (Volts)	$r_{DS(ON)}$ On-State Resistance (Ohm)	I_D Continuous Drain Current (Amps) @ 25°C Case	I_{DM} Pulsed Drain Current (Amps)	P_{tot} Max. Power Dissipation (Watts)	g_{21s} minimum Transconductance (Siemens)	C_{iss} Typical Input Capacitance (pf)
IRF9130	100	0.3	12.0	48	75	2.0	500
IRF9133	6.0	0.4	10.0	40		2.0	550
IRF9230	200	0.8	6.5	26		2.2	550

5. ELECTRICAL CHARACTERISTICS (See clause 8 of this document for Inspection Requirements - Group A to C)

In the following table characteristics marked + in the "Measured" column, are measured in Group A or Subgroup C2.

BS CECC 50 012	Measured	Characteristics and conditions at $T_{\text{case}} = 25^{\circ}\text{C}$, unless otherwise stated.	Symbol	Value		Unit
				min	max	
<u>SECT 1</u>						
5.1	+	Leakage current with drain. short circuit to source at $V_{\text{GSR}} = 20\text{v}$	$-I_{\text{GSS}}(1)$	-	100	nA
5.2	+	Leakage current with drain short circuited to source at $V_{\text{GSR}} = 15\text{V}$ $T_{\text{case}} = 125^{\circ}\text{C}$	$-I_{\text{GSS}}(2)$	-	200	nA
5.5	+	Gate - source threshold voltage at $-V_{\text{DS}} = 20\text{V}$ $-I_{\text{D}} = 250\mu\text{A}$	$-V_{\text{GS}}(\text{TO})$	2.0	4.0	v
5.6	+	On state Drain Current at $-V_{\text{GS}} = 7\text{V}$ IRF9130, IRF9133 $-V_{\text{DS}} = 10\text{V}$ IRF9230	$-I_{\text{D}}$	4 3	29.4 25.0	A A
5.7	+	Input Capacitance IRF9130, IRF9133 See below. Sect 3 Clause 5.9 IRF9230	C_{ISS}	- -	700 650	pF pF
5.9	+	Short circuit forward transconductance at $-V_{\text{DS}} = 10\text{V}$ IRF9130, IRF9133 $-I_{\text{D}} = 6.5\text{A}$ IRF9230 $-I_{\text{D}} = 3.5\text{A}$ Using circuit shown in Appendix I or Automatic Test Equipment e.g.	g_{21s}	3.0 2.0	9.0 6.0	S S
			IMPACT	II System		

5. ELECTRICAL CHARACTERISTICS (Continued)

BS CECC 50 012	Measured	Characteristics and conditions at $T_{case} = 25^{\circ}C$, unless otherwise stated.	Symbol	Value		Unit
				min	max	
<u>SECT 3</u>						
5.7	+	Drain cut-off current at $V_{DSS} = \text{See Table I}$ $V_{GS} = 0V$	$-I_{DSX}$		250	μA
5.8	+	Drain-source on-state voltage at $-V_{GS} = 10V$ IRF9130 $-I_D = 11A$ IRF9133 $-I_D = 11A$ IRF9230 $-I_D = 6.5A$	$-V_{DS(on)}$		4 4 5.2	V V V
5.9	+	Small signal, common source, capacitance at $-V_{DS} = 25v$ $V_{GS} = 0V$				
		Input Capacitance IRF9130, IRF9133 IRF9230	C_{11ss}	-	700 650	pF pF
		Output Capacitance IRF9130, IRF9133 IRF9230	C_{22ss}	-	450 300	pF pF
		Reverse Transfer IRF9130, IRF9133 Capacitance IRF9230	C_{12ss}	-	200 90	pF pF
5.10	+	Switching times at $-V_{GS(ON)} = 10V$ IRF9130 $-I_D = 6.5A$ IRF9230 $-I_D = 3.5A$ Using the circuit shown in Appendix II				
		Turn on delay time IRF9130, IRF9133 IRF9230	$t_{d(on)}$	-	60 50	ns ns
		Rise time IRF9130, IRF9133 IRF9230	t_r	-	140 100	ns ns
		Fall time IRF9130, IRF9133 IRF9230	t_f	-	140 80	ns ns
		Turn off delay time IRF9130, IRF9133 IRF9230	$t_{d(off)}$	-	140 100	ns ns

5. ELECTRICAL CHARACTERISTICS (continued)

BS CECC 50 012	Measured	Characteristics and conditions at $T_{\text{case}} = 25^{\circ}\text{C}$, unless otherwise stated.	Symbol	Value		Unit
				min	max	
SECT 1 & 3 5.11		Thermal resistance, junction to case (all types)	$R_{\text{th(j-case)}}$	-	1.67	W/W
SECT 4 5.6	+	Drain-source on-state resistance IRF 9130 - $I_{\text{D}} = 6.5\text{A}$ - $V_{\text{GS}} = 10\text{V}$ IRF 9133 - $I_{\text{D}} = 6.5\text{A}$ - $V_{\text{GS}} = 10\text{V}$ IRF9230 - $I_{\text{D}} = 3.5\text{A}$ - $V_{\text{GS}} = 10\text{V}$	$r_{\text{DS(on)}}$ $r_{\text{DS(on)}}$ $r_{\text{DS(on)}}$	- - -	0.30 0.40 0.60	Ω Ω Ω

6. MARKING

Each device shall be marked as follows:

- 1: Type designation eg IRF9130
- 2: Date Code/Factory identification eg 83 45B/IR0
- 3: Screening Level (if required) eg E/A (i.e. Level A)
- 4: Mark of conformity unless a Certificate of Conformity is used.

In addition, each primary pack shall bear the above marking, plus

- 5: BS CECC 50 012 - 015/E
- 6: "Static sensitive" Warning label.

7. ORDERING INFORMATION

The following minimum information is necessary to order a specific device

- i Precise Type Number eg IRF9130
- ii This Specification Number
Issue Number and Date
- iii If required, the appropriate Screening sequence from Appendix VI
of CECC 50 000 eg Screening Sequence A