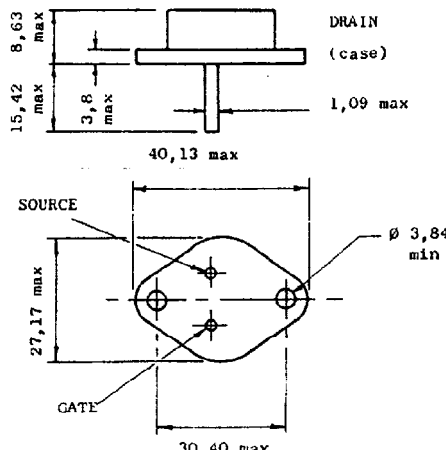


BRITISH STANDARDS INSTITUTION 2 PARK STREET LONDON W1A 2SB	BS CECC 50 012 - 012 Page 1 of 19 ISSUE 2 JUNE 1983
Specification available from: AS SHOWN IN PD 9002, CECC 00200 AND INTERNATIONAL RECTIFIER CO (GB) LTD HURST GREEN, OXTEAD, SURREY RH8 9BB. TEL: 08833 - 3215 TELEX: 95219	DETAIL SPECIFICATION FOR: SINGLE GATE FIELD EFFECT TRANSISTORS N CHANNEL - ENHANCED GATE TYPE NUMBERS IRF 120, 123 IRF 220, 223 IRF 320, 323 IRF 420, 423
ELECTRONIC COMPONENTS OF ASSESSED QUALITY IN ACCORDANCE WITH: BS CECC 50 000 - 1981 ISSUE 3	ORDERING INFORMATION See Clause 7 of this Document
1. MECHANICAL DESCRIPTION All Dimensions in millimeters  OUTLINES BS 3934 - SO 127B with SB2 - 2 base IRF 120-2 - 127B with B18 base TERMINAL CONNECTIONS - As outline above MARKING - As per Type Numbers above	2. SHORT DESCRIPTION Semiconductor material: Silicon Encapsulation: Glass/Metal Hermetic Application: a) Low frequency amplification b) Switching Power: Case rated: 40W @ $T_C = 25^\circ\text{C}$ 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	$^\circ\text{C}$
4.2	Storage temperature	T_{stg}	-55	+150	$^\circ\text{C}$
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 $+90^\circ\text{C}$, then derate linearly to $+150^\circ\text{C}$	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}	-	40	W

Table 1 LIMITING VALUES									
TYPE IRF.....	120	123	220	223	320	323	420	423	
V_{DSS} max (V)	100	60	200	150	400	350	500	450	
I_D max (A)	9	7	5	5	3	2.5	2.5	2.0	
I_{DM} max (A)	32	28	20	16	12	10	10	8	

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

CONCISE DATA

Part Numbers	V _{DSS} Drain Source Voltage (Volts)	r _{DS(ON)} On-State Resistance (Ohms)	I _D Continuous Drain Current (Amps) @ 25°C Case	I _{DM} Pulsed Drain Current (Amps)	P _{tot} Max. Power Dissipation (Watts)	f _{21s} minimum Transconductance (Siemens)	C _{iss} Typical Input Capacitance (pf)
IRF120	100	0,3	8,0	32,0	40	1,5	450
IRF123	60	0,4	7,0	28,0			
IRF220	200	0,8	5,0	20,0	40	1,3	450
IRF223	150	1,2	4,0	16,0			
IRF320	400	1,8	3,0	12,0	40	1,0	450
IRF323	350	2,5	2,5	10,0			
IRF420	500	3,0	2,5	10,0	40	1,0	300
IRF423	450	4,0	2,0	8,0			

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		Symbol	Value		Unit
				min	max	
<u>SECT 1</u>						
5.1	-	Leakage current with drain short circuit to source at $V_{GSR} = 20v$	$I_{GSS(1)}$	-	100	nA
5.2	+	Leakage current with drain short circuited to source at $V_{GSR} = 15v$ $T_{case} = 125^{\circ}C$	$I_{GSS(2)}$	-	200	nA
5.5	+	Gate - source threshold voltage at $V_{DS} = 20$ $I_D = 250\mu A$	$V_{GS(TO)}$	2,0	4,0	v
5.6	+	Drain Current at $V_{GS} = 7V$ $V_{DS} = 10v$	I_D	See Table II		A
5.7	+	Input Capacitance See below. Sect 3 Clause 5,9	C_{11SS}	See Table III		pF
5.9	+	Short circuit forward transconductance at $V_{DS} = \left. \begin{array}{l} \\ I_D = \end{array} \right\} \text{See Table IV}$	g_{21s}	See Table IV		S
Using circuit shown in Appendix I Automatic Test Equipment. e.g IMPACT II System						

5. ELECTRICAL CHARACTERISTICS (continued)

BS CECC 50 012	Measured		Symbol	Value		Unit
				min	max	
SECT 3						
5.7	+	For all devices except IRF420 $V_{DSS} = \text{See Table I}$ $V_{GS} = 0v$	I_{DSX}	-	250	μA
5.8	+	Drain-source on-state voltage at $I_D = \text{See Table VI}$ $V_{GS} = 10v$	$V_{DS(on)}$	-	See Table V VI	
5.9	+	Small signal, common source, capacitance at $V_{DS} = 25v$ $V_{GS} = 0v$ Input Capacitance Output Capacitance Reverse Transfer Capacitance	C_{11ss} C_{22ss} C_{12ss}	See Table III		pF
5.10	+	Switching times at $V_{GS(ON)} = 10V$ $I_D = \text{See Table IV}$ Using the circuit shown in Appendix II Turn on delay time Rise time Fall time Turn off delay time	$t_{d(on)}$ t_r t_f $t_{d(off)}$	See Table V		ns

5. ELECTRICAL CHARACTERISTICS (continued)

BS CECC 50 012	Measured		Symbol	Value		Unit
				min	max	
<u>SECT</u> 1 & 3		Thermal resistance, junction to case (all types)	$R_{th(j-case)}$		3,12	K/W
<u>SECT 4</u> 5.6	+	Drain source on-state resistance at $I_D = \text{See Table VI}$ $V_{GS} = 10V$	$r_{DS(on)}$	See Table VI		

TABLE II - ON STATE DRAIN CURRENT

TYPE IRF..		120	123	220	223	320	323	420	423
I_D (A)	min	3,0		2,6		2,0		2,0	
	* max	25,0		24,4		24,0		18,4	

All at $V_{GS} = 7V$ $V_{DS} = 10V$

TABLE III - MAXIMUM CAPACITANCES

TYPE IRF..	120	123	220	223	320	323	420	423
C_{11ss} (pF)	600		600		600		400	
C_{22ss} (pF)	400		300		200		150	
C_{12ss} (pF)	100		80		40		40	

All at $V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1MHz$

TABLE IV - SHORT CIRCUIT FORWARD TRANSDUCTANCE

TYPE IRF..	120	123	220	223	320	323	420	423
g_{21s} min (S)	1,5		1,3		1		1	
max	6,25		6,1		6		4,6	
I_D (A)	3		2		1,5		1	

All at $V_{DS} = 10V$

Using the circuit shown in Appendix I and pulsed conditions of
 $t_p = 300 \mu s$ and a duty cycle = 3%. Or A.T.E such as an IMPACT II System