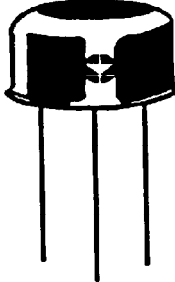


BRITISH STANDARDS INSTITUTION 2 Park Street, London W1A 2BS		BS CECC 50012-028 Issue 2 August 1985 Page 1 of 19 Reprinted February, 1991			
Electronic Components of Assessed Quality in accordance with CECC 50000, Issue 3.					
Specification available from:- As shown in PD 9002, CECC 00200 and INTERNATIONAL RECTIFIER CO (GB) LTD Hurst Green, Oxted, Surrey RH8 9BB.		DETAIL SPECIFICATION FOR:- Single Gate Field Effect Transistor, N Channel, enhanced gate.			
Tel: (0883) 713215. Tlx:95219. Fax: (0883) 714234.		Type Numbers 2N6788 2N6790 2N6792 2N6794		Similar to IRFF120 IRFF220 IRFF320 IRFF420	
1: MECHANICAL DESCRIPTION CAUTION: Static Sensitive. Devices, see Clause 9.		ORDERING INFORMATION:- See Clause 7 of this document			
OUTLINE: 		2: Semiconductor Material : Silicon. Encapsulation : Hermetically Sealed Metal Can. Application : a. Low frequency amplification. : b. Switching. Power : Case rated : 20W @ $T_{case} = 25^{\circ}C$			
For detail dimensions and terminal identification see Appendix III.		3: LEVELS OF QUALITY ASSESSMENT: E, plus additional tests. Screening level A, B, C or D.			
4: LIMITING VALUES (Absolute maximum rating system). These apply over the operating temperature range unless otherwise stated.					
CECC 50012 REFERENCE		SYMBOL	VALUE		
			MIN	MAX	UNIT
4.1	Operating temperature range	T_{amb}	-55	+150	$^{\circ}C$
4.2	Storage temperature range	T_{stg}	-55	+150	$^{\circ}C$
4.3	Drain-source voltage at $V_{GS} = 0$ $T_J = 25^{\circ}C$ to $150^{\circ}C$	V_{DS}	-	100 200 400 500	V V V 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 @ $T_{case} = 25^{\circ}C$	I_D	-	6.0 3.5 2.0 1.5	A A A A
4.71	Pulsed drain current @ $T_{case} = 25^{\circ}C$	I_{DM}	-	15.0 7.5 4.0 3.0	A A A A
4.8	Power dissipation (see derating curve page 15) $T_{case} = 25^{\circ}C$	P_{tot}	-	20	W

See the relevant Qualified Products List for the availability of Components qualified under this detail specification

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5: CHARACTERISTICS

$T_{case} = 25^{\circ}\text{C}$ unless otherwise stated.

+ - Indicates verified in inspection testing Clause 10.

CECC 50012 REFERENCE	PARAMETER AND TEST CONDITIONS	SYMBOL	MIN	MAX	UNITS
SECTION 1					
+ 5.1	Leakage current with drain short circuit to source @ $V_{GSR} = 20\text{V}$	$I_{GSS(1)}$	-	100	nA
+ 5.2	Leakage current with drain short circuit to source @ $V_{GSR} = 15\text{V}$, $T_{case} = 125^{\circ}\text{C}$	$I_{GSS(2)}$	-	200	nA
+ 5.5	Gate-source threshold voltage @ $V_{DS} = 20\text{V}$, $I_D = 250\mu\text{A}$	$V_{GS(TO)(1)}$	2.0	4.0	V
+ 5.5.1	Gate-source threshold voltage @ $T_{case} = 125^{\circ}\text{C}$, $V_{DS} = 20\text{V}$, $I_D = 250\mu\text{A}$	$V_{GS(TO)(2)}$	1.0	-	V
+ 5.5.2	Gate-source threshold voltage @ $T_{case} = -55^{\circ}\text{C}$, $V_{DS} = 20\text{V}$, $I_D = 250\mu\text{A}$	$V_{GS(TO)(3)}$	-	5.0	V
+ 5.6	On-state drain current @ $V_{GS} = 7\text{V}$, $V_{DS} = 10\text{V}$ 2N6788 2N6790 2N6792 2N6794	I_D	2.3 2.3 1.5 1.5	21.0 21.0 14.0 14.0	A A A A
+ 5.7	Input capacitance, $f = 1\text{ MHz}$, $V_{DS} = 25\text{V}$, $V_{GS} = 0\text{V}$ 2N6788 2N6790 2N6792 2N6794	C_{iss}	- - - -	600 600 600 600	pF pF pF pF
+ 5.9	Short circuit forward transconductance $I_D = 3.5\text{A}$ $V_{DS} = 5\text{V}$ 2N6788 $I_D = 2.25\text{A}$ $V_{DS} = 5\text{V}$ 2N6790 $I_D = 1.25\text{A}$ $V_{DS} = 5\text{V}$ 2N6792 $I_D = 1.0\text{A}$ $V_{DS} = 5\text{V}$ 2N6794 Pulse conditions $t_p < 300\mu\text{s}$, duty cycle $< 2\%$. See Appendix II for test circuit.	g_{21s}	1.5 1.5 1.0 1.0	4.5 4.5 3.0 3.0	S S S S

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$T_{case} = 25^{\circ}\text{C}$ unless otherwise stated.

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CECC 50012 REFERENCE	PARAMETER AND TEST CONDITIONS	SYMBOL	MIN	MAX	UNITS
SECTION 3					
+ 5.7	Drain cut-off current @ $V_{GS} = 0\text{V}$ $V_{DS} = 100\text{V}$ 2N6788 $V_{DS} = 200\text{V}$ 2N6790 $V_{DS} = 400\text{V}$ 2N6792 $V_{DS} = 500\text{V}$ 2N6794	$I_{DSX(1)}$	- - - -	250 250 250 250	μA μA μA μA
+ 5.7.1	Drain cut-off current @ $V_{GS} = 0\text{V}$, $T_C = 125^{\circ}\text{C}$ $V_{DS} = 80\text{V}$ 2N6788 $V_{DS} = 160\text{V}$ 2N6790 $V_{DS} = 320\text{V}$ 2N6792 $V_{DS} = 400\text{V}$ 2N6794	$I_{DSX(2)}$	- - - -	1.0 1.0 1.0 1.0	mA mA mA mA
+ 5.8	Drain-source on-state voltage @ $V_{GS} = 10\text{V}$ $I_D = 3.5\text{A}$ 2N6788 $I_D = 2.25\text{A}$ 2N6790 $I_D = 1.25\text{A}$ 2N6792 $I_D = 1.0\text{A}$ 2N6794	$V_{DS(on)}$	- - - -	1.05 1.80 2.25 3.00	V V V V
+ 5.9	Small signal common source, capacitance @ $f = 1\text{MHz}$, $V_{DS} = 25\text{V}$, $V_{GS} = 0\text{V}$	C_{22ss}	-	400 300 200 100	pF pF pF pF
+ 5.9.2	Output capacitance 2N6788 2N6790 2N6792 2N6794				
+ 5.9.3	Reverse transfer capacitance 2N6788 2N6790 2N6792 2N6794	C_{12ss}	-	100 80 40 40	pF pF pF pF
+ 5.10	Switching times @ $V_{GS(on)} = 10\text{V}$ Turn-on delay time $I_D = 3.5\text{A}$, $V_{DD} = 35\text{V}$ 2N6788 $I_D = 2.25\text{A}$, $V_{DD} = 74\text{V}$ 2N6790 $I_D = 1.25\text{A}$, $V_{DD} = 175\text{V}$ 2N6792 $I_D = 1.0\text{A}$, $V_{DD} = 225\text{V}$ 2N6794	$t_{d(on)}$	-	40 40 40 40	ns ns ns ns
	Rise time $I_D = 3.5\text{A}$, $V_{DD} = 35\text{V}$ 2N6788 $I_D = 2.25\text{A}$, $V_{DD} = 74\text{V}$ 2N6790 $I_D = 1.25\text{A}$, $V_{DD} = 175\text{V}$ 2N6792 $I_D = 1.0\text{A}$, $V_{DD} = 225\text{V}$ 2N6794	t_r	-	70 50 35 30	ns ns ns ns



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5: CHARACTERISTICS

 $T_{case} = 25^{\circ}\text{C}$ unless otherwise stated.

+ - Indicates verified in inspection testing Clause 10.

CECC 50012 REFERENCE	PARAMETER AND TEST CONDITIONS	SYMBOL	MIN	MAX	UNITS
SECTION 3					
+ 5.10(cont)	Fall time $I_D = 3.5\text{A}, V_{DD} = 35\text{V}$ 2N6788 $I_D = 2.25\text{A}, V_{DD} = 74\text{V}$ 2N6790 $I_D = 1.25\text{A}, V_{DD} = 175\text{V}$ 2N6792 $I_D = 1.0\text{A}, V_{DD} = 225\text{V}$ 2N6794	t_f	-	70 50 35 30	ns ns ns ns
	Turn-off delay time $I_D = 3.5\text{A}, V_{DD} = 35\text{V}$ 2N6788 $I_D = 2.25\text{A}, V_{DD} = 74\text{V}$ 2N6790 $I_D = 1.25\text{A}, V_{DD} = 175\text{V}$ 2N6792 $I_D = 1.0\text{A}, V_{DD} = 225\text{V}$ 2N6794 See Appendix II for test circuit	$t_{d(off)}$	-	40 50 60 60	ns ns ns ns
SECTION 1 AND 3					
+ 5.11	Thermal resistance, junction to ambient Thermal resistance, junction to case	$R_{th(j-amb)}$ $R_{th(j-case)}$	-	175 6.25	K/W K/W
+ 5.6	Drain-source on-state resistance @ $V_{GS} = 10\text{V}$ $I_D = 3.5\text{A}$ 2N6788 $I_D = 2.25\text{A}$ 2N6790 $I_D = 1.25\text{A}$ 2N6792 $I_D = 1.0\text{A}$ 2N6794	$r_{DS(on)(1)}$	-	0.30 0.80 1.80 3.00	Ω Ω Ω Ω
+ 5.6.1	Drain-source on-state resistance @ $T_C = 125^{\circ}\text{C}$ $I_D = 3.5\text{A}$ 2N6788 $I_D = 2.25\text{A}$ 2N6790 $I_D = 1.25\text{A}$ 2N6792 $I_D = 1.0\text{A}$ 2N6794	$r_{DS(on)(2)}$	-	0.54 1.50 3.42 6.60	Ω Ω Ω Ω



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6: MARKING

The following shall be marked on the device, in the following order of precedence, as space permits.
All the information shall appear on the primary pack used as initial protection or wrapping for delivery:-

1. The manufacturer's type number.
2. Date Code.
3. Factory Identification code.
4. Level of quality assessment and screening level (if required).
Mark of conformity unless a certificate of conformity is used.

Each package containing one or more of these transistors shall contain all the above markings and in addition:-

5. This detail specification number (CECC 50012-028) followed by the letter defining the level of assessment and, if applicable the letter identifying the screening sequence.
6. A 'STATIC SENSITIVE' warning label.

7: ORDERING INFORMATION

The following minimum information is necessary to order a specific device.

1. Precise type number.
2. This detail specification number, issue number and date.
3. Level of quality assessment and screening level (if required).

Example:-

to CECC 50012-028 Issue 2 Level E/B

8: RELATED DOCUMENTS

- | | |
|------------|--|
| CECC 50000 | Generic Specification for discrete semiconductors. |
| CECC 00007 | Basic Specification. Sampling plans and procedures for inspection by attributes. |
| IEC 68-2 | Environmental testing of electronic components and electronic equipment. |
| IEC 191-2 | Mechanical standardization of semiconductor devices dimensions. |

9: RECOMMENDED HANDLING PRECAUTIONS: STATIC SENSITIVE DEVICES

To prevent damage by static discharge to these devices during handling, the procedures specified in BS 5783 'Handling procedures for static sensitive devices' should be followed.

10: TEST CONDITIONS AND INSPECTION REQUIREMENTS

These are given in the following tables, where the values and exact test conditions to be used should be specified as required for a given type in line with the indications given in CECC 50000 for the relevant test.

11: E_{AS} TESTING

The testing of E_{AS} shown in section 5 is part of 100% testing carried out in production.

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GROUP A Lot by Lot			AQL given in %				
All tests are non-destructive (3.5.6 of CECC 50000) Clause numbers are made with respect to CECC 50000 unless otherwise stated Pulse tests: $t_p < 300\mu s$, duty cycle $< 2\%$ where indicated.							
EXAMINATION OR TEST	REF	CONDITIONS $@T_{case} = 25^{\circ}C$ UNLESS OTHERWISE STATED	INSPECTION REQUIREMENTS				
			LIMITS			LEVEL E	
			MIN	MAX	UNIT	IL	AQL
SUBGROUP A1 Visual inspection	 4.2.1					I	0.65
SUBGROUP A2a Non-operative $I_{GSS(1)}$ $V_{GS(TOI)(1)}$	 4.3.4 T-071 4.3.4 T-075	Short or open circuit $V_{GSR} = 20V$ $V_{DS} = 20V$	 - 0.2	 1.0 12	 μA V	II	0.15
SUBGROUP A2b Leakage current $I_{GSS(1)}$ Drain out off current $I_{DSX(1)}$ Gate source threshold voltage $V_{GS(TOI)(1)}$ Drain current I_D	 4.3.4 T-071 4.3.4 T-073 4.3.4 T-075 4.3.4 T-072	$V_{GSR} = 20V$ $V_{DS} = 0V$ $V_{GS} = 0V$ $V_{DS} = 100V$ 2N6788 $V_{DS} = 200V$ 2N6790 $V_{DS} = 400V$ 2N6792 $V_{DS} = 500V$ 2N6794 $V_{DS} = 20V$ $I_D = 250\mu A$ $V_{GS} = 7V$ $V_{DS} = 10V$	 - 2.0 2.3 2.3 1.5 1.5	 100 250 250 250 250 4.0 21.0 21.0 14.0 14.0	 nA μA μA μA μA V A A A A	II	0.4

