DATA SHEET

NE521
High-speed dual-differential comparator/sense amp

Product data
Supersedes data of 1994 Aug 31
File under Integrated Circuits, IC11 Handbook

2001 Aug 03

Philips
Semiconductors

PHILIPS

High-speed dual-differential comparator/sense amp NE521

FEATURES

- 12 ns maximum guaranteed propagation delay
- 20 µA maximum input bias current
- TTL compatible strobes and outputs
- Large common-mode input voltage range
- Operates from standard supply voltages

APPLICATIONS

- MOS memory sense amp
- A-to-D conversion
- High-speed line receiver

PIN CONFIGURATION

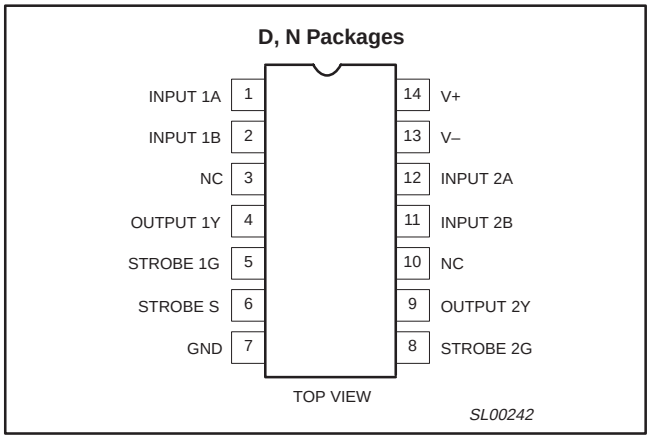


Figure 1. Pin Configuration

ORDERING INFORMATION

DESCRIPTION	TEMPERATURE RANGE	ORDER CODE	DWG #
14-Pin Plastic Dual In-Line Package (DIP)	0 °C to +70 °C	NE521N	SOT27-1
14-Pin SO Package	0 °C to +70 °C	NE521D	SOT108-1

EQUIVALENT SCHEMATIC

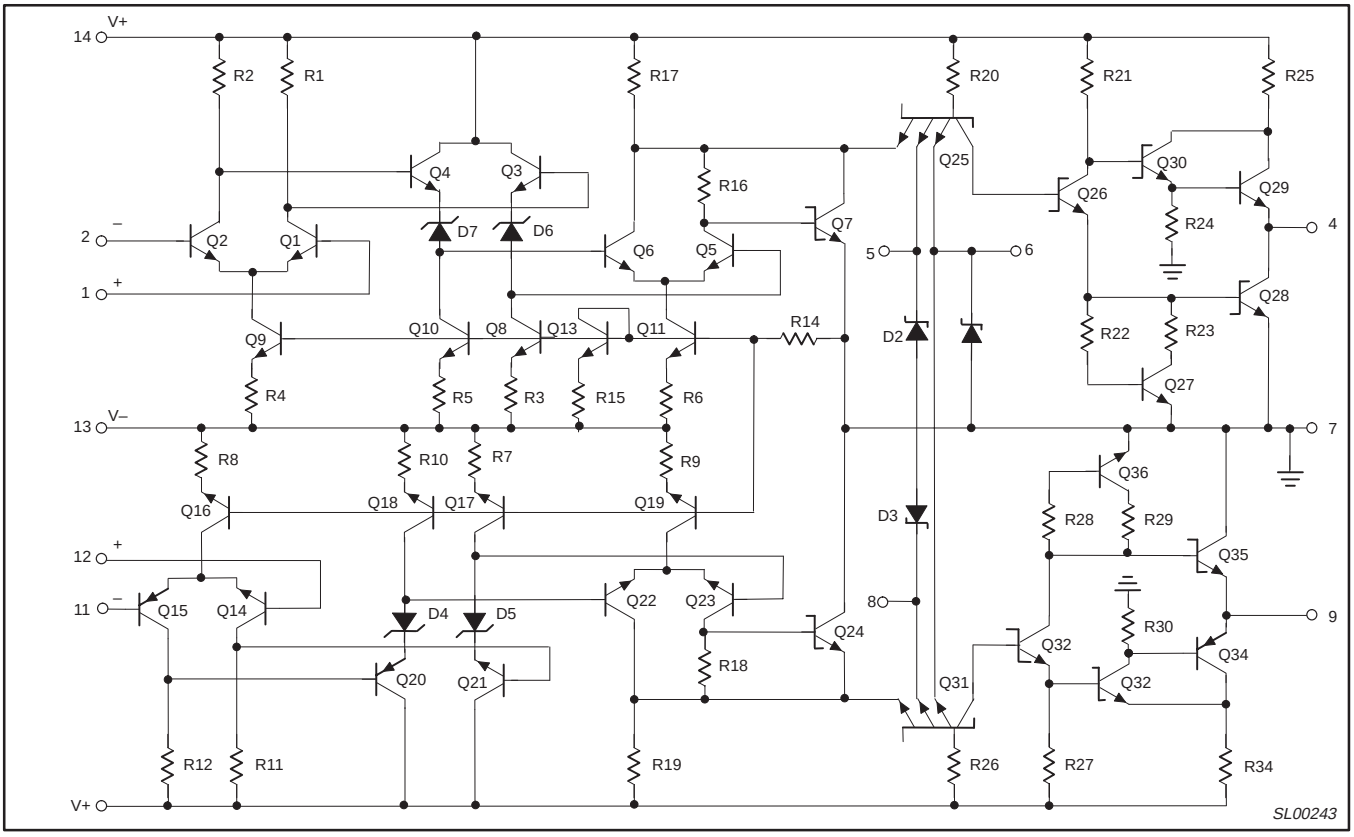


Figure 2. Equivalent Schematic

BLOCK DIAGRAM

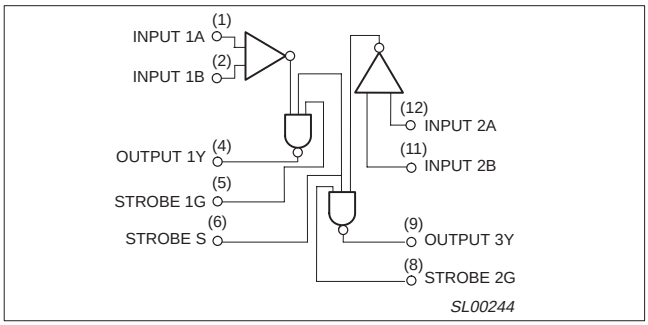


Figure 3. Block Diagram

LOGIC FUNCTIONS

V_{ID} A^+, B^-	STROBE S	STROBE G	OUTPUT (Y)
$V_{ID} \leq -V_{OS}$	H	H	L
$-V_{OS} < V_{ID} < V_{OS}$	H	H	Undefined
$V_{ID} \geq V_{OS}$	H	H	H
X	L	X	H
X	X	L	H

ABSOLUTE MAXIMUM RATINGS

SYMBOL	PARAMETER	RATING	UNIT
	Supply voltage		
V+	Positive	+7	V
V–	Negative	-7	V
V_{IDR}	Differential input voltage	±6	V
V_{IN}	Input voltage		
	Common mode	±5	V
	Strobe/gate	+5.25	V
P_D	Maximum power dissipation[1] T_{amb} = 25 °C (still-air)		
	N package	1420	mW
	D package	1040	mW
T_{amb}	Operating temperature range	0 to 70	°C
T_{stg}	Storage temperature range	–65 to +150	°C
T_{sld}	Lead soldering temperature (10 sec. max)	+230	°C

NOTES:
1. Derate above 25 °C at the following rates:
   N package at 11.4 mW/°C
   D package at 8.3 mW/°C

DC ELECTRICAL CHARACTERISTICS

V+ = +5 V; V– = –5 V, T_{amb} = 0 °C to +70 °C, unless otherwise specified.

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS			UNIT
			Min	Typ	Max	
V_{OS}	Input offset voltage	V+ = +4.75 V; V– = –4.75 V				
	At 25 °C			6	7.5	mV
	Over temperature range				10	mV
I_{BIAS}	Input bias current	V+ = +5.25 V, V– = –5.25 V				
	At 25 °C			7.5	20	µA
	Over temperature range				40	µA
I_{OS}	Input offset current	V+ = +5.25 V, V– = –5.25 V				
	At 25 °C			1.0	5	µA
	Over temperature range				12	µA
V_{CM}	Common-mode voltage range	V+ = +4.75 V, V– = –4.75 V	–3		+3	V
	Input current	V+ = +5.25 V, V– = –5.25 V				
I_{IH}	High	V_{IH} = 2.7 V				
		1G or 2G strobe			50	µA
		Common strobe S			100	µA
	Input Current					
I_{IL}	Low	V_{IL} = 0.5 V				
		1G or 2G strobe			–2.0	mA
		Common strobe S			–4.0	mA
	Output voltage	$V_{I(S)}$ = 2.0 V				
V_{OH}	High	V+ = +4.75 V; V– = –4.75 V; I_{LOAD} = –1 mA	2.7	3.4		V
V_{OL}	Low	V+ = +5.25 V; V– = –5.25 V; I_{LOAD} = 20 mA			0.5	V
	Supply voltage					
V+	Positive		4.75	5.0	5.25	V
V–	Negative		–4.75	–5.0	–5.25	V
	Supply current	V+ = 5.25 V; V– = –5.25 V; T_{amb} = 25 °C				
I_{CC+}	Positive			27	35	mA
$I_{CC–}$	Negative			–15	–28	
I_{SC}	Short-circuit output current		-40		–100	mA

AC ELECTRICAL CHARACTERISTICS

T_{amb} = 25 °C; R_L = 280Ω ; C_L=15 pF; V+ = 5 V; V– = 5 V

SYMBOL	PARAMETER	FROM INPUT	TO OUTPUT	LIMITS			UNIT
				Min	Typ	Max	
Large-signal switching speed							
	Propagation delay						
$t_{PLH(D)}$	Low to high[1]	Amp	Output		8	12	
$t_{PHL(D)}$	High to low[1]	Amp	Output		6	9	ns
$t_{PLH(S)}$	Low to high[2]	Strobe	Output		4.5	10	
$t_{PHL(S)}$	High to low[2]	Strobe	Output		3.0	6	
f_{MAX}	Max. operating frequency			40	55		MHz

NOTES:
1. Response time measured from 0 V point of ±100 mV_{P-P} 10 MHz square wave to the 1.5 V point of the output.
2. Response time measured from 1.5 V point of input to 1.5 V point of the output.

TYPICAL PERFORMANCE CHARACTERISTICS

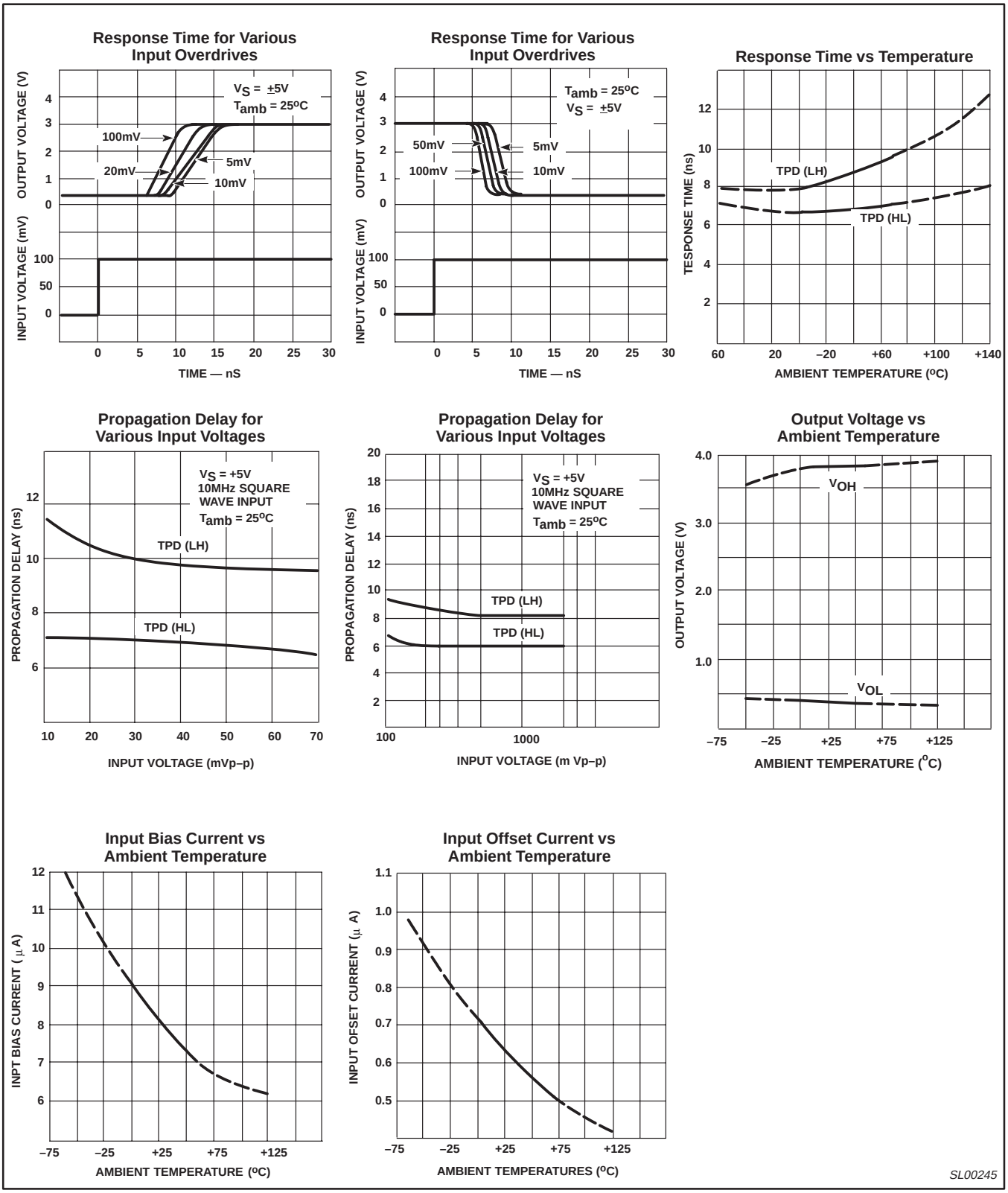
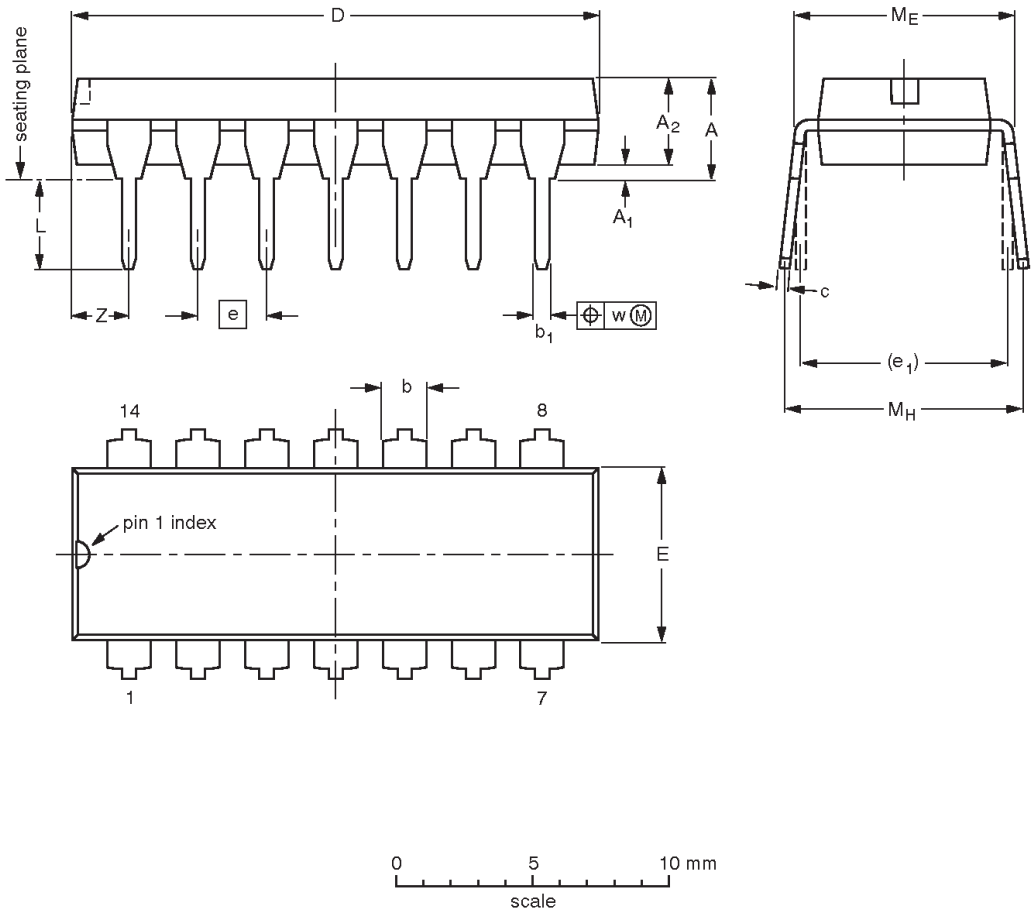


Figure 4. Typical Performance Characteristics

DIP14: plastic dual in-line package; 14 leads (300 mil) **SOT27-1**



DIMENSIONS (inch dimensions are derived from the original mm dimensions)

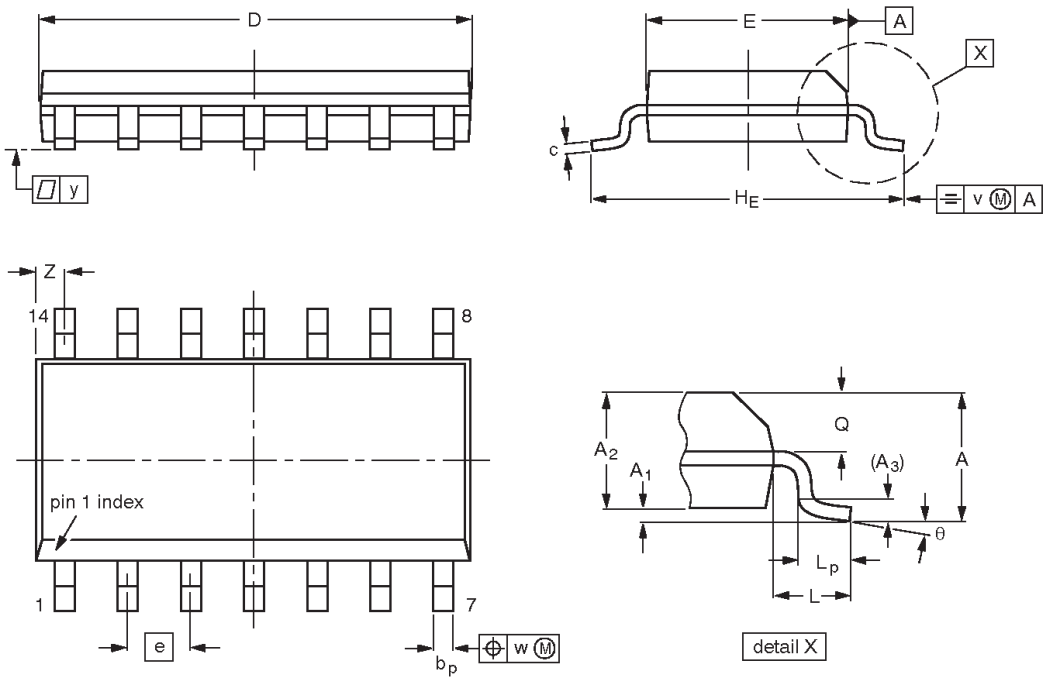
UNIT	A max.	A_1 min.	A_2 max.	b	b_1	c	D (1)	E (1)	e	e_1	L	M_E	M_H	w	Z (1) max.
mm	4.2	0.51	3.2	1.73 1.13	0.53 0.38	0.36 0.23	19.50 18.55	6.48 6.20	2.54	7.62	3.60 3.05	8.25 7.80	10.0 8.3	0.254	2.2
inches	0.17	0.020	0.13	0.068 0.044	0.021 0.015	0.014 0.009	0.77 0.73	0.26 0.24	0.10	0.30	0.14 0.12	0.32 0.31	0.39 0.33	0.01	0.087

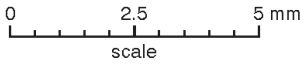
Note

1. Plastic or metal protrusions of 0.25 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT27-1	050G04	MO-001	SC-501-14			~~95-03-11~~ 99-12-27

SO14: plastic small outline package; 14 leads; body width 3.9 mm **SOT108-1**





DIMENSIONS (inch dimensions are derived from the original mm dimensions)

UNIT	A max.	A_1	A_2	A_3	b_p	c	$D^{(1)}$	$E^{(1)}$	e	H_E	L	L_p	Q	v	w	y	$Z^{(1)}$	θ
mm	1.75	0.25 0.10	1.45 1.25	0.25	0.49 0.36	0.25 0.19	8.75 8.55	4.0 3.8	1.27	6.2 5.8	1.05	1.0 0.4	0.7 0.6	0.25	0.25	0.1	0.7 0.3	8^o 0^o
inches	0.069	0.010 0.004	0.057 0.049	0.01	0.019 0.014	0.0100 0.0075	0.35 0.34	0.16 0.15	0.050	0.244 0.228	0.041	0.039 0.016	0.028 0.024	0.01	0.01	0.004	0.028 0.012	

Note

1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT108-1	076E06	MS-012				~~97-05-22~~ 99-12-27