

## DOLBY S-TYPE NOISE REDUCTION PROCESSOR

### GENERAL DISCRPTION

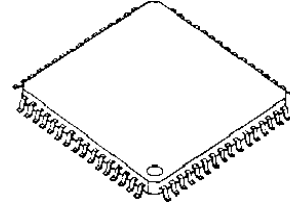
The **NJM2186** is a stereo Dolby S-type noise reduction processor. It applies to stereo system on 1 chip because it includes dual channel circuit.

The **NJM2186** contains all of necessary block for decoding operation, and it also performs encoding operation by connecting two external operational amplifiers.

The feature of minimum operating voltage from  $7.5V(V^+/V^- = \pm 3.75V)$  is most suitable for car audio applications.

(NOTE) Dolby and double-D symbol are trademarks of Dolby Laboratories Licensing Corporation. San Francisco, CA94103-4813. USA.  
This device is available only to licensees of Dolby Lab.  
Licensing and application information may be obtained from Dolby Lab.

### PACKAGE OUTLINE

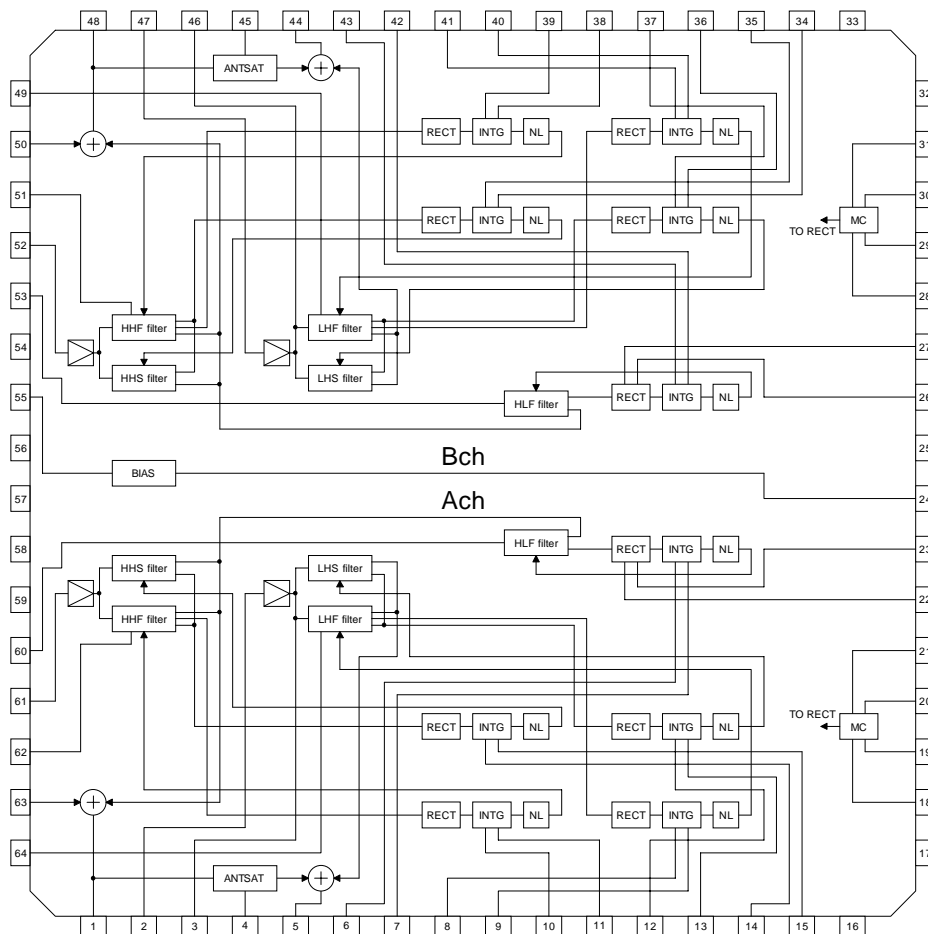


**NJM2186FG1**

### FEATURES

- Operating Voltage ( +7.5 or  $\pm 3.75$  V min )
- Dolby Level (-6dBm=388mVrms)
- Stereo system on 1 chip
- Few external parts
- Bipolar Technology
- Package Outline TQFP64

### BLOCK DIAGRAM



# NJM2186

## ■ABSOLUTES MAXIMUM RATINGS(Ta=25°C,unless otherwise specified)

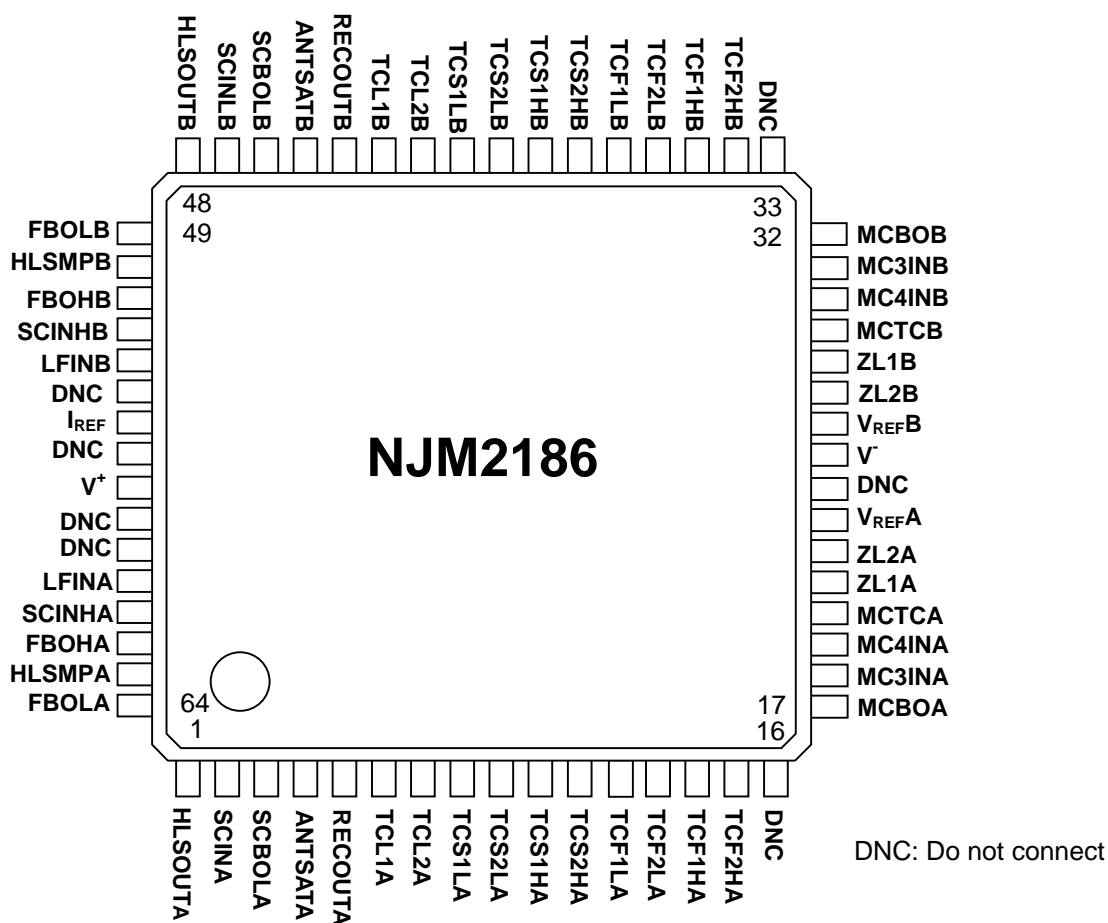
Parameter	Symbol	Rates	Unit
Supply Voltage	V <sup>+</sup> (V <sup>+</sup> /V <sup>-</sup> )	14.0 (±7)	V
Power Dissipation	P <sub>D</sub>	700	mW
Operating Temperature	T <sub>OPR</sub>	-40 to +85	°C
Storage Temperature	T <sub>stg</sub>	-40 to +125	°C

## ■ELECTRICAL CHARACTERISTICS

(Ta=25°C V<sup>+</sup>/V<sup>-</sup>=±6,0dBd Reference is 388mVrms/400Hz,unless otherwise specified)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit	
Supply Voltage Range	V <sup>+</sup> (V <sup>+</sup> /V <sup>-</sup> )		7.5 (±3.75)	12.0 (±6)	13.0 (±6.5)	V	
Supply Current	I <sub>CC</sub>	No Signal	-	20	30	mA	
Encode Response1	ENC-1	f=2kHz, Vin=-60dBd	21.8	23.3	24.8	dB	
	2	ENC-2	f=50Hz, Vin=-40dBd	5.8	7.3		8.8
	3	ENC-3	f=400Hz, Vin=-40dBd	15.1	16.6		18.1
	4	ENC-4	f=15kHz, Vin=-40dBd	11.3	12.8		14.3
	5	ENC-5	f=400Hz, Vin=-20dBd	6.0	7.5		9.0
	6	ENC-6	f=2kHz, Vin=-20dBd	4.2	5.7		7.2
	7	ENC-7	f=50Hz, Vin=0dBd	-3.1	-1.6		-0.1
	8	ENC-8	f=15kHz, Vin=0dBd	-8.3	-6.8		-5.3
Signal Handling	SH1	f=1kHz, THD=1%, V <sup>+</sup> =7.5V	12.0	13.0	-	dB	
	SH2	f=1kHz, THD=1%, V <sup>+</sup> =9.5V	15.0	16.0	-		
Total Harmonic Distortion	THD	f=1kHz, Vin=0dBd	-	0.05	0.15	%	
S/N Ratio	S/N	Rg=600Ω, CCIR/ARM	62.0	65.0	-	dB	
Separation	SEP	Vin=0dBd	60.0	72.0	-	dB	

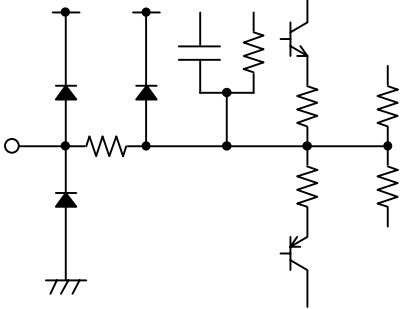
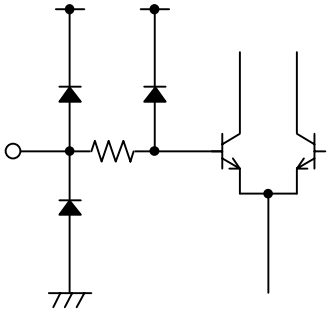
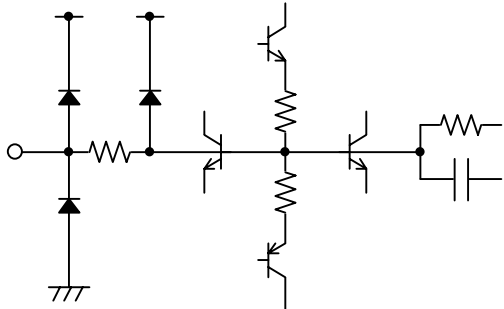
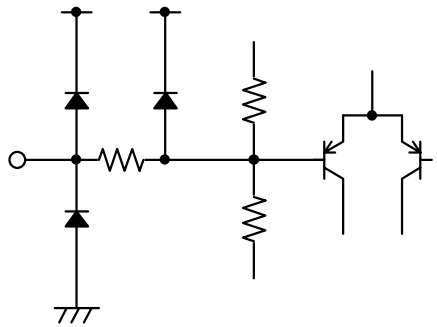
## PIN FUNCTION



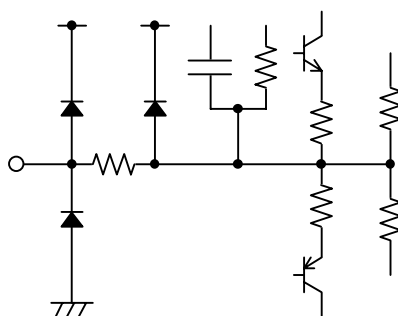
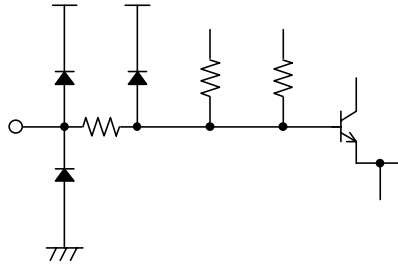
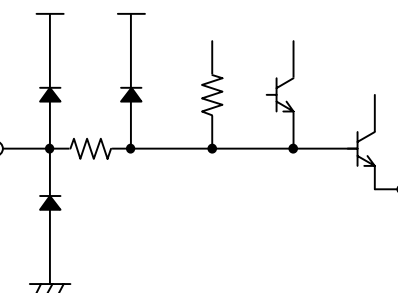
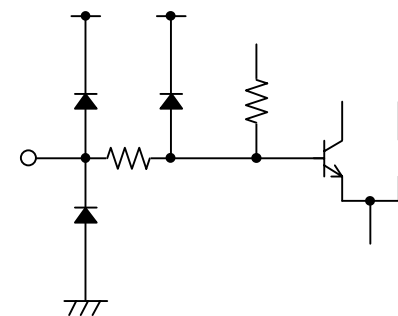
No.	Symbol	No.	Symbol	No.	Symbol	No.	Symbol
1	HLSOUTA	17	MCBOA	33	DNC	49	FBOLB
2	SCINA	18	MC3INA	34	TCF2HB	50	HLSMPB
3	SCBOLA	19	MC4INA	35	TCF1HB	51	FBOHB
4	ANTSATA	20	MCTCA	36	TCF2LB	52	SCINHB
5	RECOUTA	21	ZL1A	37	TCF1LB	53	LFINB
6	TCL1A	22	ZL2A	38	TCS2HB	54	DNC
7	TCL2A	23	V <sub>REFA</sub>	39	TCS1HB	55	I <sub>REF</sub>
8	TCS1LA	24	DNC	40	TCS2LB	56	DNC
9	TCS2LA	25	V <sup>-</sup>	41	TCS1LB	57	V <sup>+</sup>
10	TCS1HA	26	V <sub>REFB</sub>	42	TCL2B	58	DNC
11	TCS2HA	27	ZL2B	43	TCL1B	59	DNC
12	TCF1LA	28	ZL1B	44	RECOUTB	60	LFINA
13	TCF2LA	29	MCTCB	45	ANTSATA	61	SCINHA
14	TCF1HA	30	MC4INB	46	SCBOLB	62	FBOHA
15	TCF2HA	31	MC3INB	47	SCINLB	63	HLSMPA
16	DNC	32	MCBOB	48	HLSOUTB	64	FBOLA

# NJM2186

## ■PIN FUNCTION

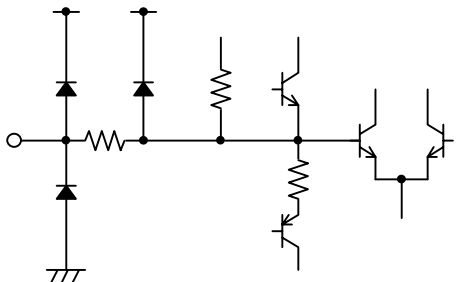
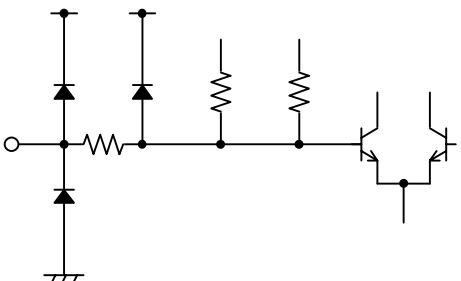
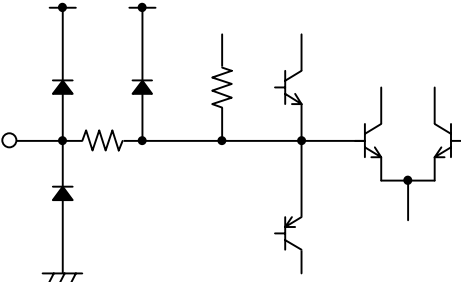
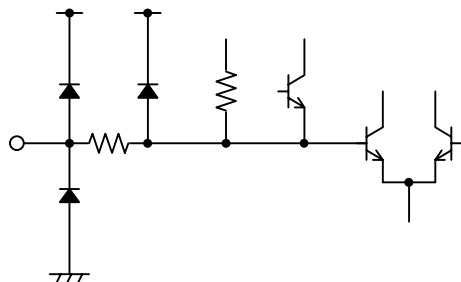
No.	SYMBOL	FUNCTION	EQUIVALENT CURCUIT
1 48	HLSOUTA HLSOUTB	H Stage Out Ach H Stage Out Bch	
2 47 61 52	SCINLA SCINLB SCINHA SCINHB	L Side Chane In Ach L Side Chane In Bch HH Side Chane Ach HH Side Chane Bch	
3 46	SCBOLA SCBOLB	L Side Chane Buffer Out Ach L Side Chane Buffer Out Bch	
4 45	ANTSATA ANTSATB	Anti-Saturation Ach Anti-Saturation Bch	

## ■PIN FUNCTION

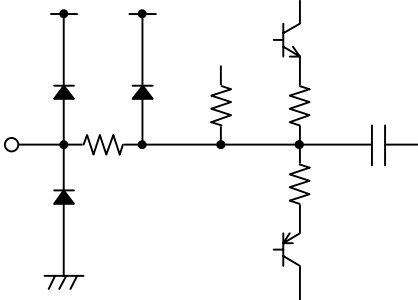
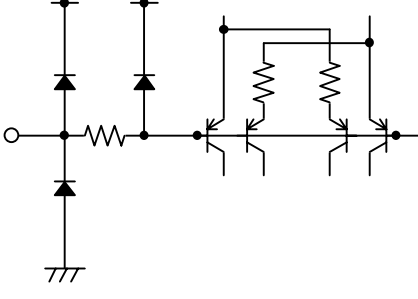
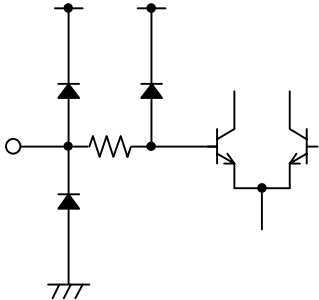
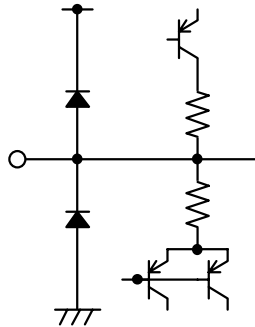
No.	SYMBOL	FUNCTION	EQUIVALENT CURCUIT
5 44	RECOUTA RECOUTB	Encoder Out Ach Encoder Out Bch	
6 43	TCL1A TCL1B	HL Time Constant 1 Ach HLF Time Constant 1 Bch	
7 42	TCL2A TCL2B	HL Time Constant 2 Ach HLF Time Constant 2 Bch	
8 41 10 39	TCS1LA TCS1LB TCS1HA TCS1HB	LHS Time Constant 1 Ach LHS Time Constant 1 Bch HHS Time Constant 1 Ach HHS Time Constant 1 Bch	

# NJM2186

## PIN FUNCTION

No.	SYMBOL	FUNCTION	EQUIVALENT CURCUIT
9 40 11 38	TCS2LA TCS2LB TCS2HA TCS2HB	LHS Time Constant 2 Ach LHS Time Constant 2 Bch HHS Time Constant 2 Ach HHS Time Constant 2 Bch	
12 37 14 35	TCS1LA TCS1LB TCS1HA TCS1HB	LHF Time Constant 1 Ach LHF Time Constant 1 Bch HHF Time Constant 1 Ach HHF Time Constant 1 Bch	
13 36	TCF2LA TCF2LB	LHF Time Constant 2 Ach LHF Time Constant 2 Bch	
15 34	TCF2HA TCF2HB	HHF Time Constant 2 Ach HHF Time Constant 2 Bch	

## ■PIN FUNCTION

No.	SYMBOL	FUNCTION	EQUIVALENT CURCUIT
17 32	MCBOA MCBOB	MC Buffer OUT Ach MC Buffer OUT Bch	
18 31	MC3INA MC3INB	MC3 In Ach MC3 In Bch	
19 30	MC4INA MC4INB	MC4 In Ach MC4 In Bch	
20 29	MCTCA MCTCB	MC Time Constant MC Time Constant	

# NJM2186

## PIN FUNCTION

No.	SYMBOL	FUNCTION	EQUIVALENT CURCUIT
21 28	ZL1A ZL1B	HLF LPF 1 Ach HLF LPF 1 Bch	
22 27	ZL2A ZL2B	HLF LPF 2 Ach HLF LPF 2 Bch	
23 26	VREFA VREFB	VREF Ach VREF Bch	
55	IREF	Iref	



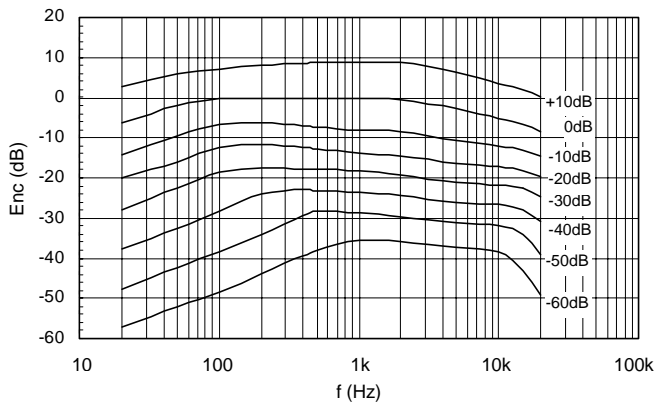
## ■PIN FUNCTION

No.	SYMBOL	FUNCTION	EQUIVALENT CURCUIT
60 53	LFINA LFINB	HL Side Chane Ach HL Side Chane Bch	
63 50	HLSMPA HLSMPB	H Stage Ach H Stage Bch	
64 49 62 51	FBOLA FBOLB FBOHA FBOHB	LHF VCR LPF Ach LHF VCR LPF Bch HHF VCR LPF Ach HHF VCR LPF Bch	

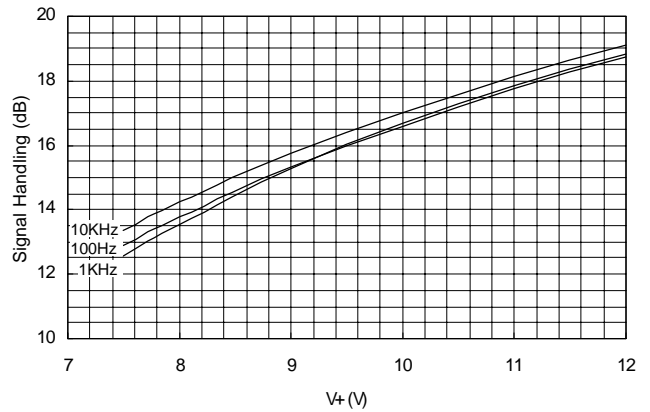


## CHARACTERISTICS

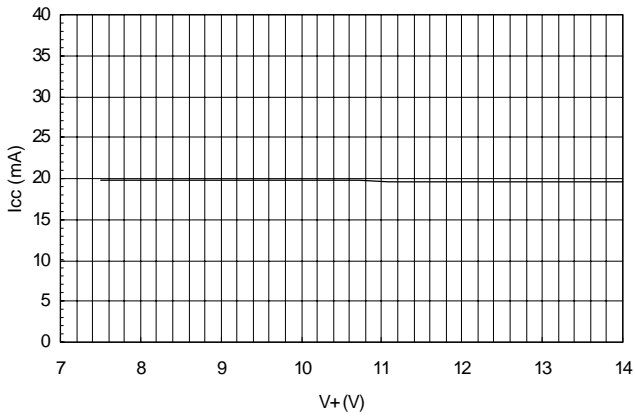
### Encode Response



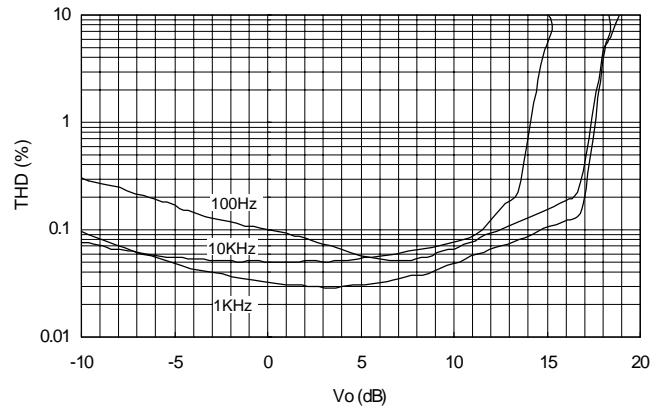
### Signal Handling



### Operating Current vs. Operating Voltage



### Total Harmonic Distortion



**[CAUTION]**  
 The specifications on this databook are only given for information, without any guarantee as regards either mistakes or omissions. The application circuits in this databook are described only to show representative usages of the product and not intended for the guarantee or permission of any right including the industrial rights.