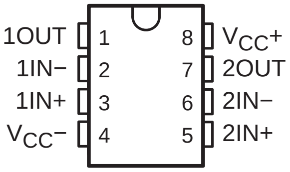
RC4558
DUAL GENERAL-PURPOSE OPERATIONAL AMPLIFIER

- **Continuous Short-Circuit Protection**
- **Wide Common-Mode and Differential Voltage Ranges**
- **No Frequency Compensation Required**
- **Low Power Consumption**
- **No Latch-Up**
- **Unity-Gain Bandwidth . . . 3 MHz Typ**
- **Gain and Phase Match Between Amplifiers**
- **Low Noise . . . 8 nV/$\sqrt{Hz}$ Typ at 1 kHz**

D, DGK, P, PS, OR PW PACKAGE
(TOP VIEW)



description/ordering information

The RC4558 device is a dual general-purpose operational amplifier, with each half electrically similar to the μA741, except that offset null capability is not provided.

The high common-mode input voltage range and the absence of latch-up make this amplifier ideal for voltage-follower applications. The device is short-circuit protected, and the internal frequency compensation ensures stability without external components.

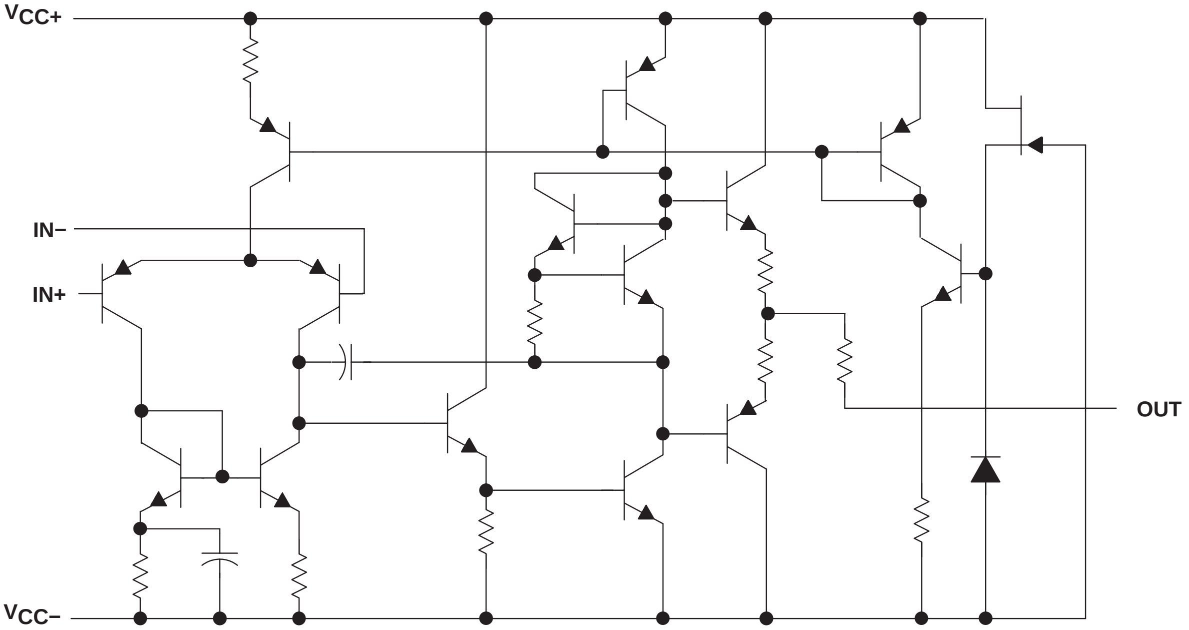
ORDERING INFORMATION

T_A	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING
0°C to 70°C	MSOP/VSSOP (DGK)	Reel of 2500	RC4558DGKR	YR_‡
	PDIP (P)	Tube of 50	RC4558P	RC4558P
	SOIC (D)	Tube of 75	RC4558D	RC4558
		Reel of 2500	RC4558DR	
	SOP (PS)	Reel of 2000	RC4558PSR	R4558
	TSSOP (PW)	Tube of 150	RC4558PW	R4558
		Reel of 2000	RC4558PWR	
−40°C to 85°C	MSOP/VSSOP (DGK)	Reel of 2500	RC4558IDGKR	YS_‡
	PDIP (P)	Tube of 50	RC4558IP	RC4558IP
	SOIC (D)	Tube of 75	RC4558ID	R4558I
		Reel of 2500	RC4558IDR	
	TSSOP (PW)	Tube of 150	RC4558IPW	R4558I
		Reel of 2000	RC4558IPWR	

† Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.

‡ The actual top-side marking has one additional character that designates the assembly/test site.

schematic (each amplifier)



absolute maximum ratings over operating free-air temperature range (unless otherwise noted)†

Supply voltage (see Note 1):	V_{CC+}	18 V
	V_{CC-}	−18 V
Differential input voltage, V_{ID} (see Note 2)		±30 V
Input voltage, V_I (any input, see Notes 1 and 3)		±15 V
Duration of output short circuit to ground, one amplifier at a time (see Note 4)		Unlimited
Package thermal impedance, θ_{JA} (see Notes 5 and 6):	D package	97°C/W
	DGK package	172°C/W
	P package	85°C/W
	PS package	95°C/W
	PW package	149°C/W
Operating virtual junction temperature, T_J		150°C
Storage temperature range, T_{stg}		−65°C to 150°C

† Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTES:
1. All voltage values, unless otherwise noted, are with respect to the midpoint between V_{CC+} and V_{CC-}.
2. Differential voltages are at IN+ with respect to IN−.
3. The magnitude of the input voltage must never exceed the magnitude of the supply voltage or 15 V, whichever is less.
4. Temperature and/or supply voltages must be limited to ensure that the dissipation rating is not exceeded.
5. Maximum power dissipation is a function of T_J(max), θ_{JA}, and T_A. The maximum allowable power dissipation at any allowable ambient temperature is $P_D = (T_J(max) - T_A)/\theta_{JA}$. Operating at the absolute maximum T_J of 150°C can affect reliability.
6. The package thermal impedance is calculated in accordance with JESD 51-7.

recommended operating conditions

			MIN	MAX	UNIT
V_{CC+}	Supply voltage		5	15	V
V_{CC-}			−5	−15	
T_A	Operating free-air temperature	RC4558	0	70	°C
		RC4558I	−40	85	

electrical characteristics at specified free-air temperature, V_{CC+} = 15 V, V_{CC-} = −15 V

PARAMETER			TEST CONDITIONS†		MIN	TYP	MAX	UNIT
V_{IO}	Input offset voltage		V_O = 0	25°C		0.5	6	mV
				Full range			7.5	
I_{IO}	Input offset current		V_O = 0	25°C		5	200	nA
				Full range			300	
I_{IB}	Input bias current		V_O = 0	25°C		150	500	nA
				Full range			800	
V_{ICR}	Common-mode input voltage range			25°C	±12	±14		V
V_{OM}	Maximum output voltage swing		R_L = 10 kΩ	25°C	±12	±14		V
			R_L = 2 kΩ	25°C	±10	±13		
				Full range	±10			
A_{VD}	Large-signal differential voltage amplification		R_L ≥ 2 kΩ, V_O = ±10 V	25°C	20	300		V/mV
				Full range	15			
B_1	Unity-gain bandwith			25°C		3		MHz
r_i	Input resistance			25°C	0.3	5		MΩ
CMRR	Common-mode rejection ratio			25°C	70	90		dB
k_{SVS}	Supply-voltage sensitivity ($\Delta V_{IO}/\Delta V_{CC}$)		V_{CC} = ±15 V to ±9 V	25°C		30	150	μV/V
V_n	Equivalent input noise voltage (closed loop)		A_{VD} = 100, R_S = 100 Ω, f = 1 kHz, BW = 1 Hz	25°C		8		nV/$\sqrt{Hz}$
I_{CC}	Supply current (both amplifiers)		V_O = 0, No load	25°C		2.5	5.6	mA
				$T_{A(min)}$		3	6.6	
				$T_{A(max)}$		2.3	5	
P_D	Total power dissipation (both amplifiers)		V_O = 0, No load	25°C		75	170	mW
				$T_{A(min)}$		90	200	
				$T_{A(max)}$		70	150	
V_{O1}/V_{O2}	Crosstalk attenuation	Open loop	R_S = 1 kΩ, f = 10 kHz	25°C		85		dB
		A_{VD} = 100				105		

† All characteristics are measured under open-loop conditions with zero common-mode input voltage, unless otherwise specified. Full range is 0°C to 70°C for RC4558 and −40°C to 85°C for RC4558I.

operating characteristics, V_{CC+} = 15 V, V_{CC-} = −15 V, T_A = 25°C

PARAMETER		TEST CONDITIONS			MIN	TYP	MAX	UNIT
t_r	Rise time	V_I = 20 mV,	R_L = 2 kΩ,	C_L = 100 pF		0.13		ns
	Overshoot	V_I = 20 mV,	R_L = 2 kΩ,	C_L = 100 pF		5		%
SR	Slew rate at unity gain	V_I = 10 V,	R_L = 2 kΩ,	C_L = 100 pF	1.1	1.7		V/μs

PACKAGING INFORMATION

Orderable Device	Status [1]	Package Type	Package Drawing	Pins	Package Qty	Eco Plan [2]	Lead/Ball Finish	MSL Peak Temp [3]
RC4558D	ACTIVE	SOIC	D	8	75	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
RC4558DGKR	ACTIVE	MSOP	DGK	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1YEAR
RC4558DR	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
RC4558ID	ACTIVE	SOIC	D	8	75	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
RC4558IDGKR	ACTIVE	MSOP	DGK	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1YEAR
RC4558IDR	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
RC4558IP	ACTIVE	PDIP	P	8	50	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
RC4558IPW	ACTIVE	TSSOP	PW	8	150	Pb-Free (RoHS)	CU NIPDAU	Level-1-250C-UNLIM
RC4558IPWR	ACTIVE	TSSOP	PW	8	2000	Pb-Free (RoHS)	CU NIPDAU	Level-1-250C-UNLIM
RC4558P	ACTIVE	PDIP	P	8	50	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
RC4558PSLE	OBSOLETE	SO	PS	8		None	Call TI	Call TI
RC4558PSR	ACTIVE	SO	PS	8	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
RC4558PW	ACTIVE	TSSOP	PW	8	150	Pb-Free (RoHS)	CU NIPDAU	Level-1-250C-UNLIM
RC4558PWLE	OBSOLETE	TSSOP	PW	8		None	Call TI	Call TI
RC4558PWR	ACTIVE	TSSOP	PW	8	2000	Pb-Free (RoHS)	CU NIPDAU	Level-1-250C-UNLIM
RC4558Y	OBSOLETE	XCEPT	Y	0		None	Call TI	Call TI

[1] The marketing status values are defined as follows:
ACTIVE: Product device recommended for new designs.
LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.
NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.
PREVIEW: Device has been announced but is not in production. Samples may or may not be available.
OBSOLETE: TI has discontinued the production of the device.

[2] Eco Plan - May not be currently available - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.
None: Not yet available Lead (Pb-Free).
Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.
Green (RoHS & no Sb/Br): TI defines "Green" to mean "Pb-Free" and in addition, uses package materials that do not contain halogens, including bromine (Br) or antimony (Sb) above 0.1% of total product weight.

[3] MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDECindustry standard classifications, and peak solder temperature.

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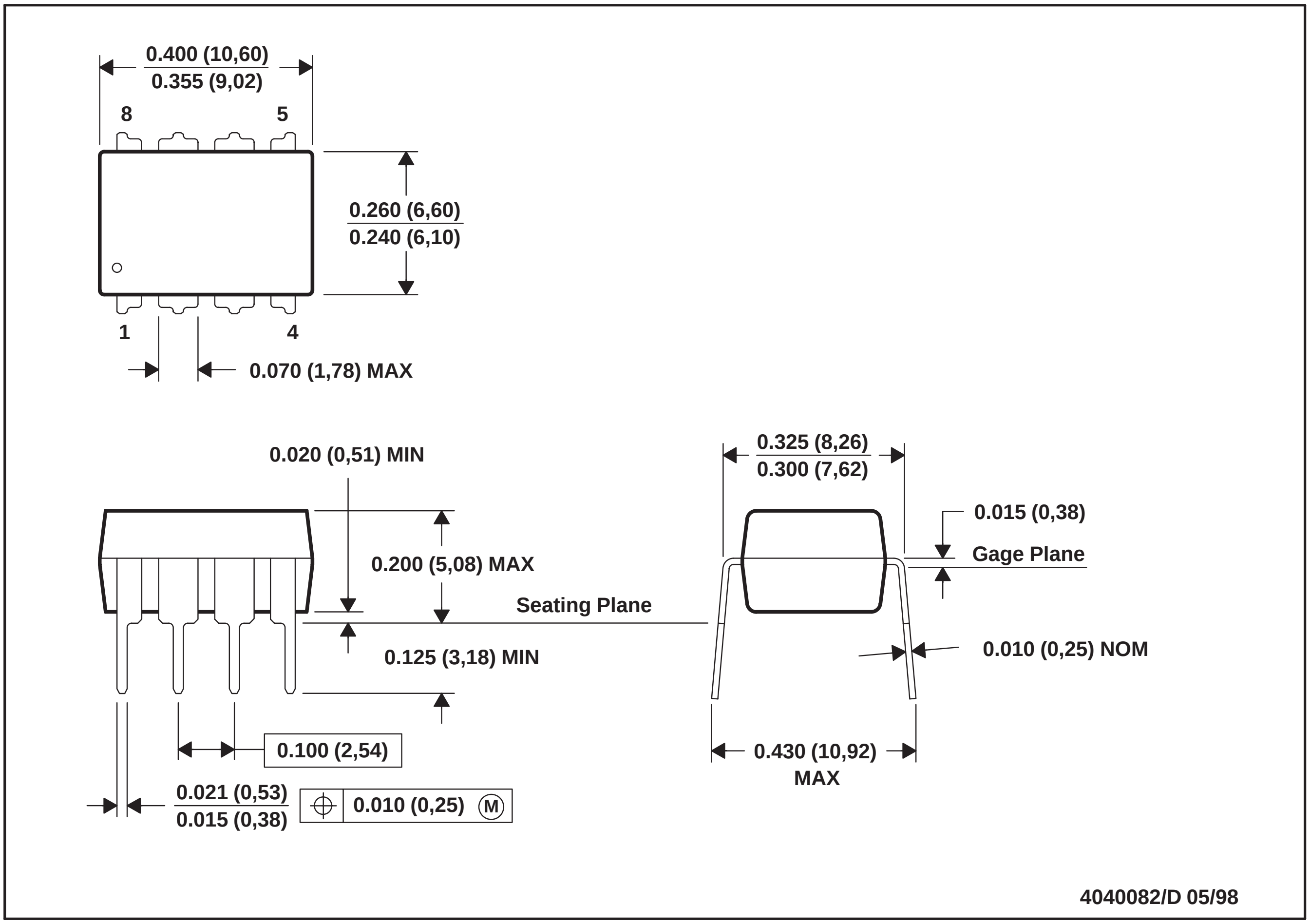
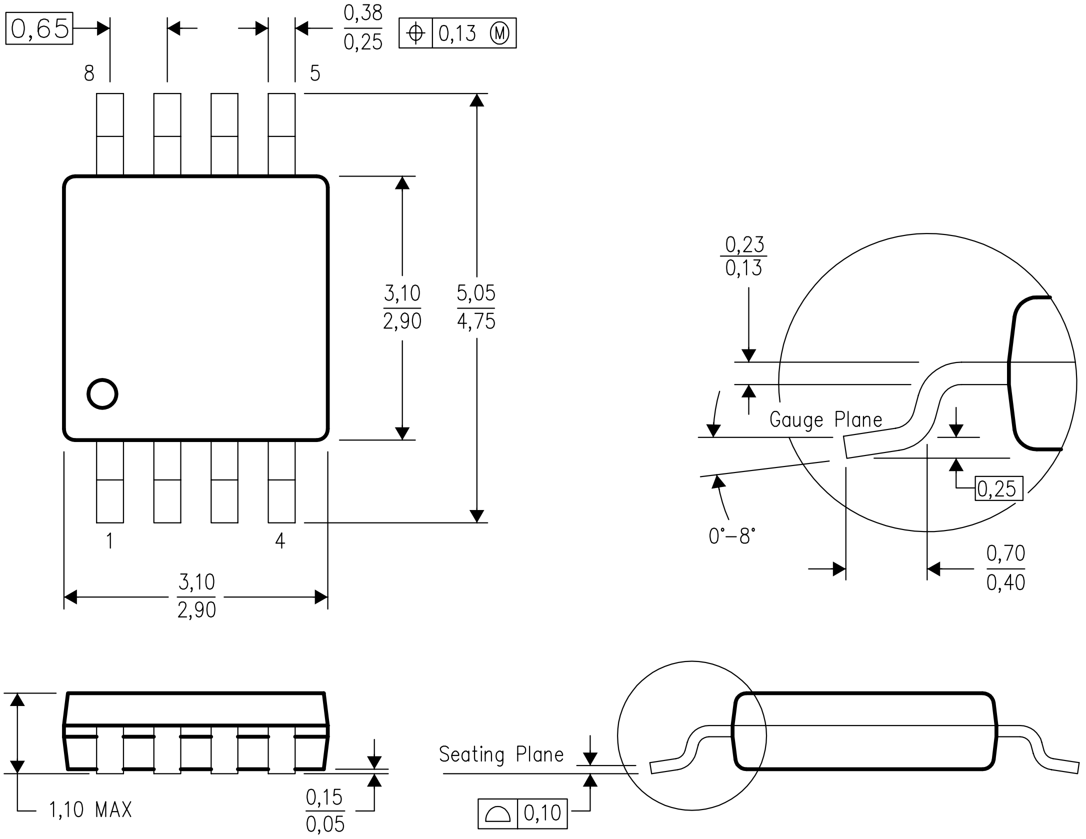
P (R-PDIP-T8) PLASTIC DUAL-IN-LINE



NOTES:
- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- C. Falls within JEDEC MS-001

For the latest package information, go to http://www.ti.com/sc/docs/package/pkg_info.htm

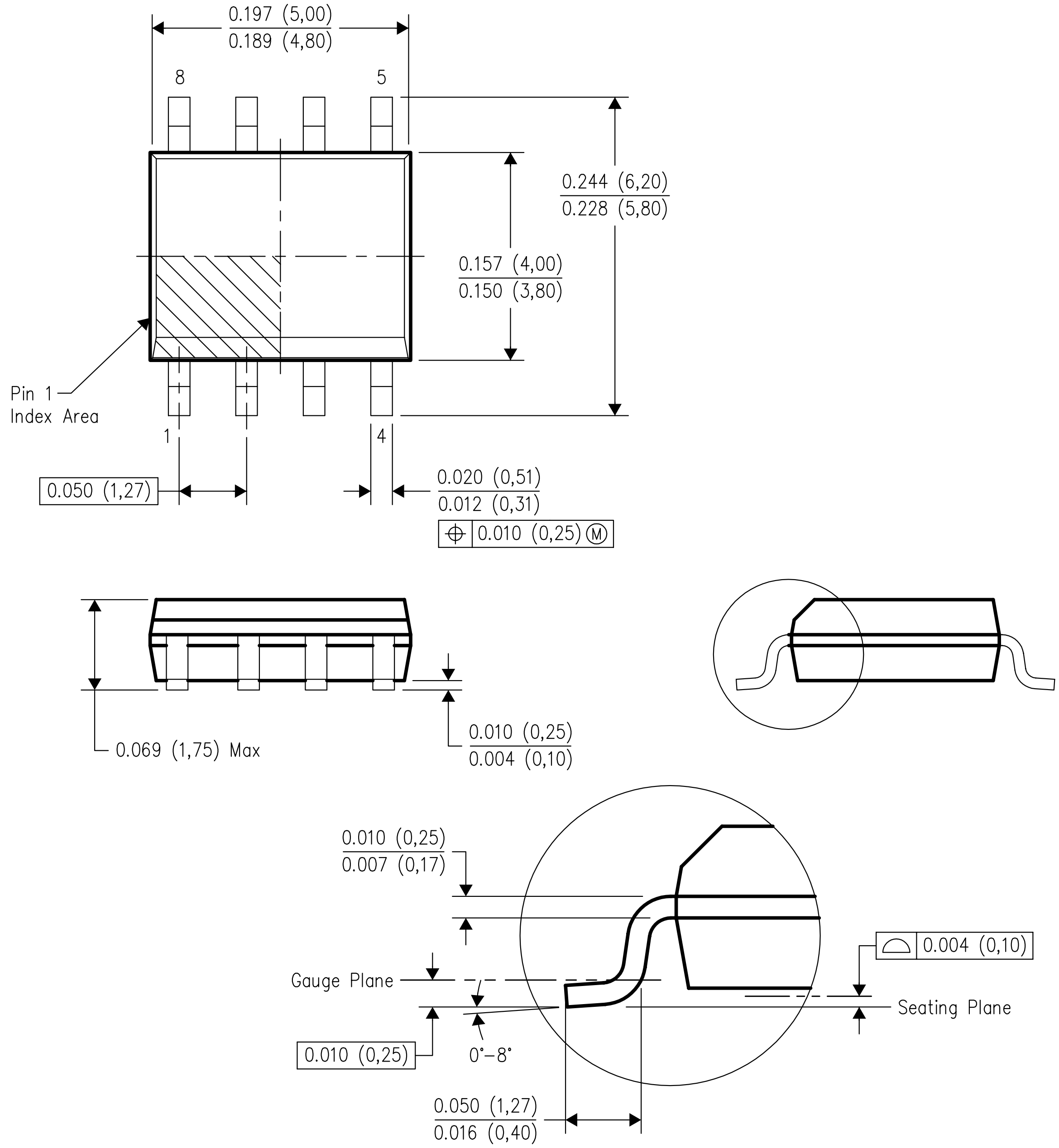
DGK (S-PDSO-G8) PLASTIC SMALL-OUTLINE PACKAGE



4073329/D 12/03

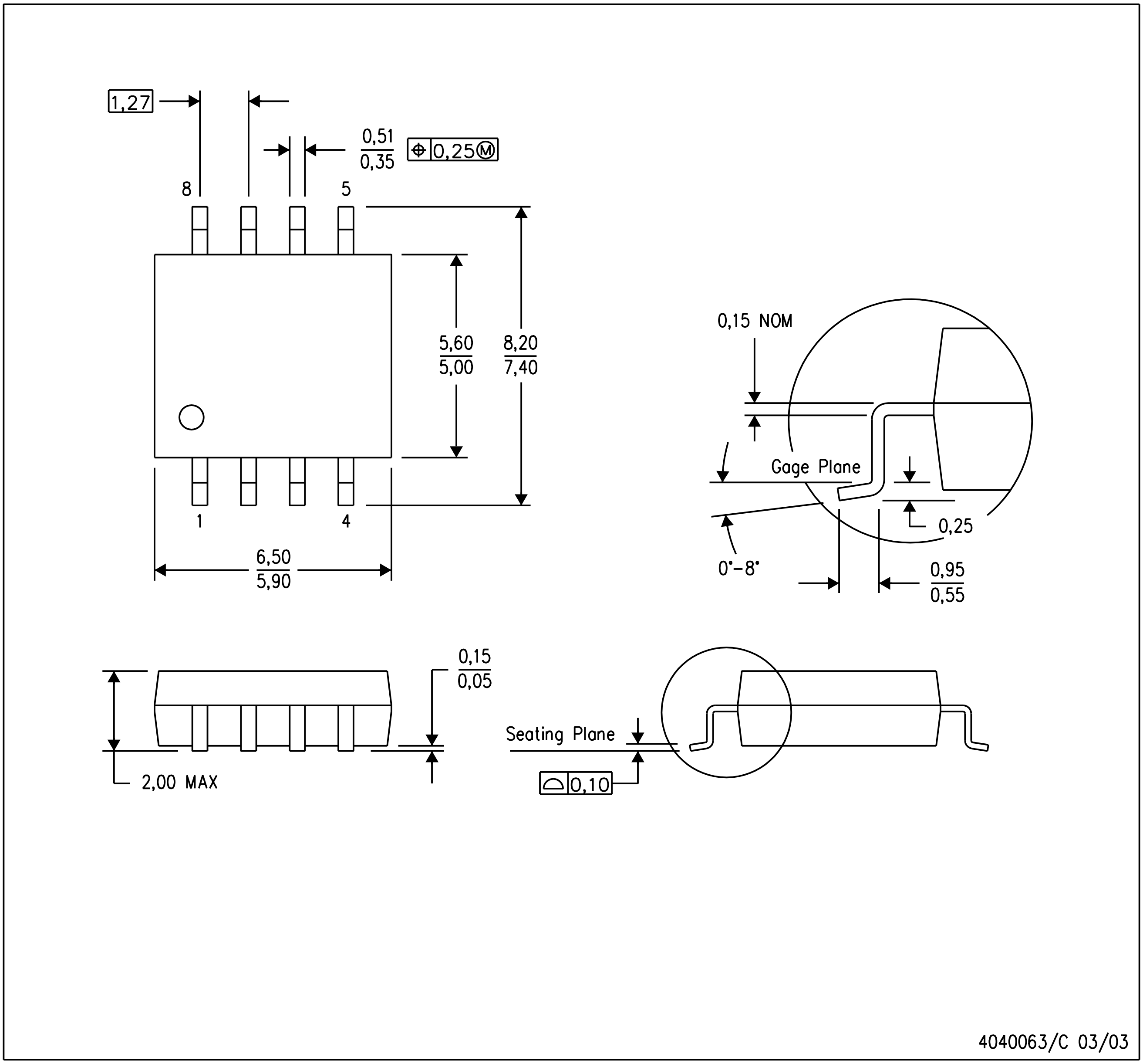
NOTES:
- A. All linear dimensions are in millimeters.
- B. This drawing is subject to change without notice.
- C. Body dimensions do not include mold flash or protrusion.
- D. Falls within JEDEC MO-187 variation AA.

D (R–PDSO–G8) PLASTIC SMALL–OUTLINE PACKAGE



4040047–2/F 07/2004

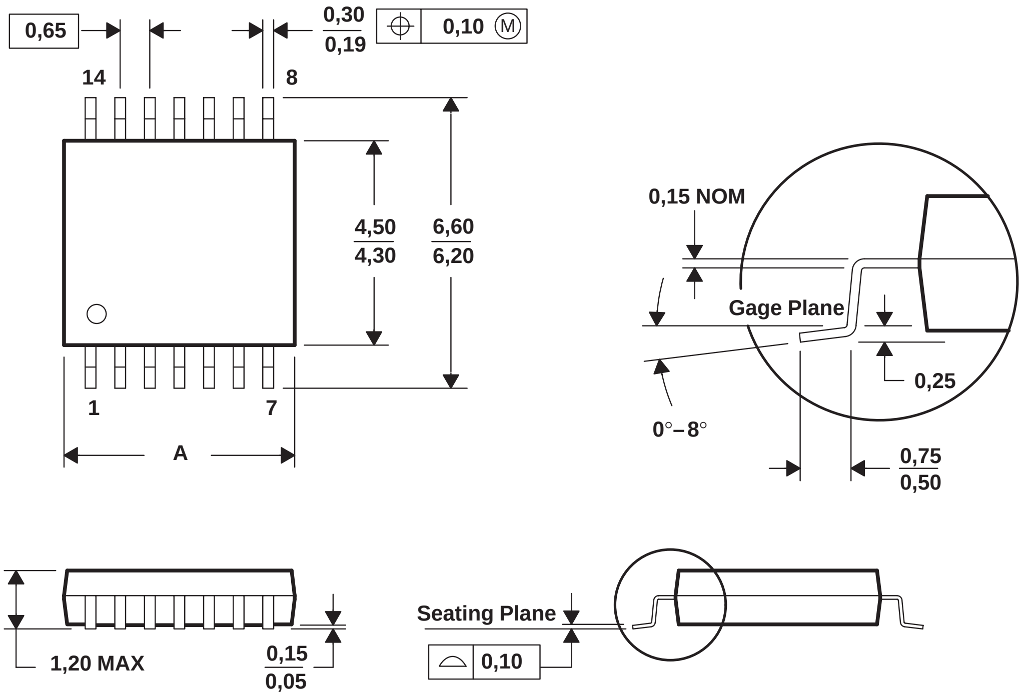
NOTES:
- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- C. Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).
- D. Falls within JEDEC MS–012 variation AA.



NOTES:
A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15.

PW (R-PDSO-G**) PLASTIC SMALL-OUTLINE PACKAGE

14 PINS SHOWN



PINS ** / DIM	8	14	16	20	24	28
A MAX	3,10	5,10	5,10	6,60	7,90	9,80
A MIN	2,90	4,90	4,90	6,40	7,70	9,60

4040064/F 01/97

NOTES:
- A. All linear dimensions are in millimeters.
- B. This drawing is subject to change without notice.
- C. Body dimensions do not include mold flash or protrusion not to exceed 0,15.
- D. Falls within JEDEC MO-153

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