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SLOS073F – MARCH 1976–REVISED SEPTEMBER 2010

DUAL GENERAL-PURPOSE OPERATIONAL AMPLIFIER

Check for Samples: RC4558

FEATURES

- 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/ $\sqrt{\text{Hz}}$ Typ at 1 kHz

DESCRIPTION/ORDERING INFORMATION

The RC4558 device is a dual general-purpose operational amplifier, with each half electrically similar to the μ A741, 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.

T _A	PACKA	GE ⁽¹⁾	ORDERABLE PART NUMBER	TOP-SIDE MARKING
	MSOP/VSSOP - DGK	Reel of 2500	RC4558DGKR	YR_ ⁽²⁾
	PDIP – P	Tube of 50	RC4558P	RC4558P
	5010 D	Tube of 75	RC4558D	D04550
0°C to 70°C	SOIC – D	Reel of 2500	RC4558DRG3	- RC4558
	SOP – PS	Reel of 2000	RC4558PSR	R4558
		Tube of 150	RC4558PW	D4550
	TSSOP – PW	Reel of 2000	RC4558PWR	– R4558
	MSOP/VSSOP - DGK	Reel of 2500	RC4558IDGKR	YS_ ⁽²⁾
	PDIP – P	Tube of 50	RC4558IP	RC4558IP
40°C to 05°C	5010 D	Tube of 75	RC4558ID	DAFFOL
–40°C to 85°C	SOIC – D	Reel of 2500	RC4558IDR	– R4558I
		Tube of 150	RC4558IPW	DAFFOL
	TSSOP – PW	Reel of 2000	RC4558IPWR	– R4558I

Table 1. ORDERING INFORMATION

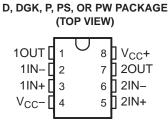
(1) Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.

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



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

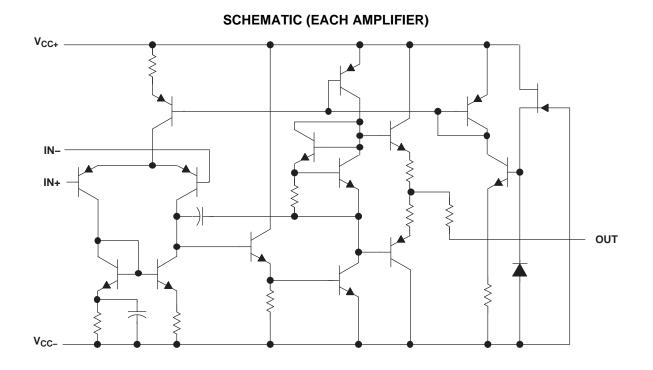
RC4558



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Absolute Maximum Ratings⁽¹⁾

over operating free-air temperature range (unless otherwise noted)

			MIN MAX	UNIT
V_{CC+}	Supply voltage ⁽²⁾		18	3 V
V_{CC-}	Supply Voltage		-18	
VID	Differential input voltage ⁽³⁾		±30) V
VI	Input voltage (any input) ^{(2) (4)}		±15	5 V
	Duration of output short circuit to ground, one amplifier at a time $^{(5)}$	Unlimited	1	
		D package	97	7
		DGK package	172	2
θ_{JA}	Package thermal impedance ⁽⁶⁾ ⁽⁷⁾	P package	85	°C/W
		PS package	95	5
		PW package	149)
TJ	Operating virtual junction temperature		150	O°C
T _{stg}	Storage temperature range		-65 150	°C

(1) 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.

All voltage values, unless otherwise noted, are with respect to the midpoint between V_{CC+} and V_{CC-} . (2)

(3) Differential voltages are at IN+ with respect to IN-.

The magnitude of the input voltage must never exceed the magnitude of the supply voltage or 15 V, whichever is less. Temperature and/or supply voltages must be limited to ensure that the dissipation rating is not exceeded. (4)

(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)

(7) 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} -	Supply voltage		-5	-15	v
т	Operating free air temperature	RC4558	0	70	ŝ
IA	Operating free-air temperature	RC4558I	-40	85	°C

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Electrical Characteristics

at specified free-air temperature, $V_{CC+} = 15$ V, $V_{CC-} = -15$ V

	PARAMETER		TEST CONDITIONS ⁽¹⁾	T _A ⁽²⁾	MIN	TYP	МАХ	UNIT
N/	Input offect veltere		N 0	25°C		0.5	6	mV
V _{IO}	Input offset voltage		$V_{O} = 0$	Full range			7.5	mv
	Input offect ourrent		N 0	25°C		5	200	m (
I _{IO}	Input offset current	$V_{O} = 0$	Full range			300	nA	
	Input bias current		V _O = 0	25°C		150	500	nA
I _{IB}	Input bias current		$v_0 = 0$	Full range			800	ΠA
V _{ICR}	Common-mode input voltage rang	ge		25°C	±12	±14		V
			$R_L = 10 \ k\Omega$	25°C	±12	±14		
V _{OM}	Maximum output voltage swing		$R_1 = 2 k\Omega$	25°C	±10	±13		V
			$R_L = 2 R\Omega$	Full range	±10			
٨	Large-signal differential voltage a	molification	$R_{L} \geq 2 k\Omega$,	25°C	20	300		V/mV
A _{VD}	Large-signal differential voltage a	mpilication	$V_{O} = \pm 10 V$	Full range	15			V/IIIV
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})	$V_{CC} = \pm 15 V$ to $\pm 9 V$	25°C		30	150	μV/V
V _n	Equivalent input noise voltage (cl	osed loop)	A_{VD} = 100, R_{S} = 100 Ω, f = 1 kHz, BW = 1 Hz	25°C		8		nV/√Hz
				25°C		2.5	5.6	
I _{CC}	Supply current (both amplifiers)		V _O = 0, No load	T _A min		3	6.6	mA
			i to loud	T _A max		2.3	5	
				25°C		75	170	
P _D	Total power dissipation (both amp	olifiers)	V _O = 0, No load	T _A min		90	200	mW
		140 1000	T _A max		70	150		
		Open loop	$R_{S} = 1 k\Omega$,	05%0		85		٦D
V ₀₁ /V ₀₂	Crosstalk attenuation	A _{VD} = 100	f = 10 kHz	25°C		105		dB

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

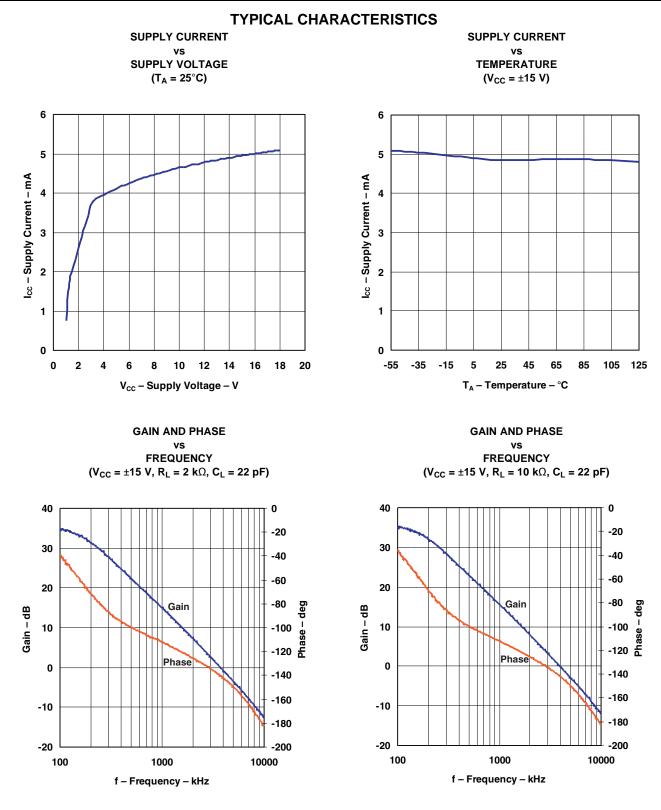
 $V_{CC+} = 15 \text{ V}, V_{CC-} = -15 \text{ V}, T_A = 25^{\circ}\text{C}$

	PARAMETER		TEST CONDITIO	MIN	TYP	MAX	UNIT	
t _r	Rise time	V _I = 20 mV,	$R_L = 2 k\Omega$,	C _L = 100 pF		0.13		ns
	Overshoot	V _I = 20 mV,	$R_L = 2 k\Omega$,	$C_{L} = 100 \text{ pF}$		5		%
SR	Slew rate at unity gain	V _I = 10 V,	$R_L = 2 k\Omega$,	$C_{L} = 100 \text{ pF}$	1.1	1.7		V/µs



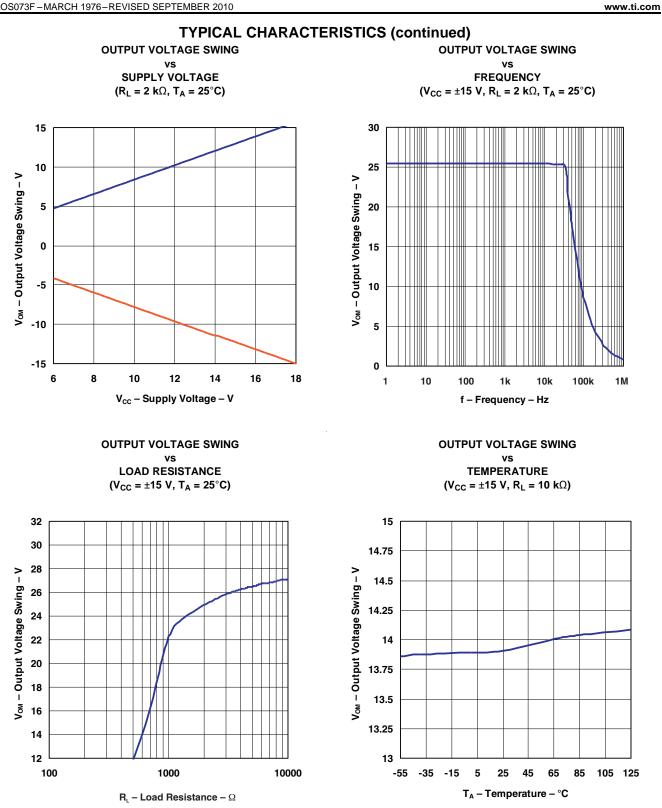


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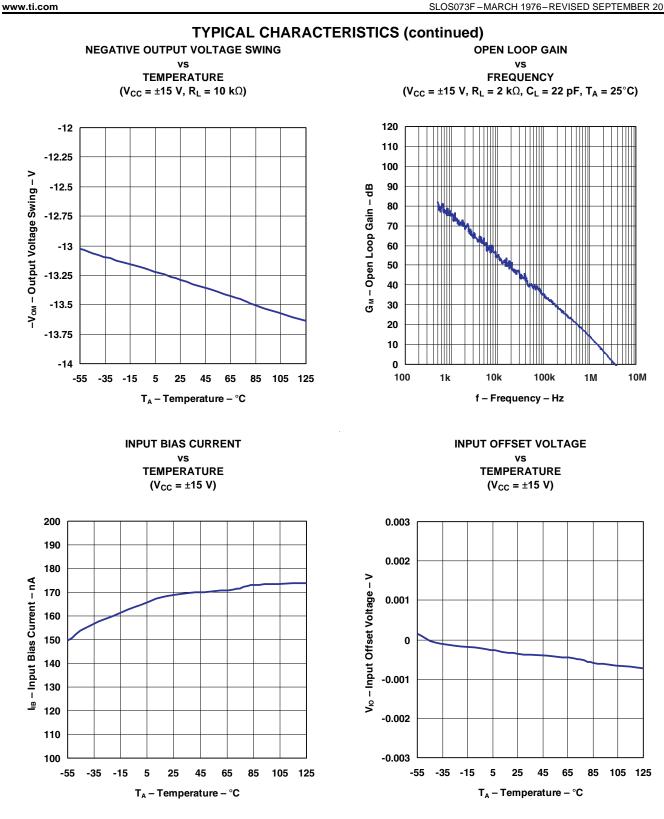
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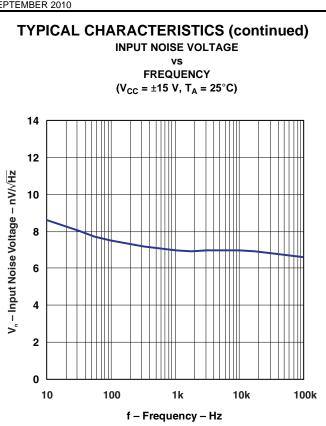
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24-Jan-2013

PACKAGING INFORMATION

Orderable Device	Status	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)	Op Temp (°C)	Top-Side Markings	Sample
RC4558D	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	RC4558	Sampl
RC4558DE4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	RC4558	Sampl
RC4558DG4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	RC4558	Sampl
RC4558DGKR	ACTIVE	VSSOP	DGK	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	(YRP, YRS, YRU)	Samp
RC4558DGKRG4	ACTIVE	VSSOP	DGK	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	(YRP, YRS, YRU)	Samp
RC4558DR	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	RC4558	Samp
RC4558DRE4	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	RC4558	Samp
RC4558DRG3	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU SN	Level-1-260C-UNLIM	0 to 70	RC4558	Samp
RC4558DRG4	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	RC4558	Samp
RC4558ID	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	R4558I	Samp
RC4558IDE4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	R4558I	Samp
RC4558IDG4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	R4558I	Samp
RC4558IDGKR	ACTIVE	VSSOP	DGK	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	(YSP, YSS, YSU)	Samp
RC4558IDGKRG4	ACTIVE	VSSOP	DGK	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	(YSP, YSS, YSU)	Samp
RC4558IDR	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	R4558I	Samp
RC4558IDRE4	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	R4558I	Samp
RC4558IDRG4	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	R4558I	Samp



PACKAGE OPTION ADDENDUM

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Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)	Op Temp (°C)	Top-Side Markings	Sample
RC4558IP	ACTIVE	PDIP	Р	8	50	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	-40 to 85	RC4558IP	Sample
RC4558IPE4	ACTIVE	PDIP	Р	8	50	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	-40 to 85	RC4558IP	Sample
RC4558IPW	ACTIVE	TSSOP	PW	8	150	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	R4558I	Sample
RC4558IPWE4	ACTIVE	TSSOP	PW	8	150	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	R4558I	Sample
RC4558IPWG4	ACTIVE	TSSOP	PW	8	150	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	R4558I	Sample
RC4558IPWR	ACTIVE	TSSOP	PW	8	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	R4558I	Sample
RC4558IPWRE4	ACTIVE	TSSOP	PW	8		TBD	Call TI	Call TI	-40 to 85	R4558I	Sample
RC4558IPWRG4	OBSOLETE	TSSOP	PW	8		TBD	Call TI	Call TI	-40 to 85	R4558I	
RC4558P	ACTIVE	PDIP	Ρ	8	50	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	0 to 70	RC4558P	Sample
RC4558PE4	ACTIVE	PDIP	Ρ	8	50	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	0 to 70	RC4558P	Sample
RC4558PSLE	OBSOLETE	SO	PS	8		TBD	Call TI	Call TI	0 to 70		
RC4558PSR	ACTIVE	SO	PS	8	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	R4558	Sample
RC4558PSRE4	ACTIVE	SO	PS	8	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	R4558	Sample
RC4558PSRG4	ACTIVE	SO	PS	8	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	R4558	Sample
RC4558PW	ACTIVE	TSSOP	PW	8	150	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	R4558	Sample
RC4558PWE4	ACTIVE	TSSOP	PW	8	150	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	R4558	Sample
RC4558PWG4	ACTIVE	TSSOP	PW	8	150	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	R4558	Sample
RC4558PWLE	OBSOLETE	TSSOP	PW	8		TBD	Call TI	Call TI	0 to 70		
RC4558PWR	ACTIVE	TSSOP	PW	8	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	R4558	Sample



Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp	Op Temp (°C)	Top-Side Markings	Samples
RC4558PWRE4	ACTIVE	TSSOP	PW	8		TBD	Call TI	Call TI	0 to 70	R4558	Samples
RC4558PWRG4	OBSOLETE	TSSOP	PW	8		TBD	Call TI	Call TI	0 to 70	R4558	
RC4558Y	OBSOLETE	DIESALE	Y	0		TBD	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 - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

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.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

⁽³⁾ MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

⁽⁴⁾ Only one of markings shown within the brackets will appear on the physical device.

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PACKAGE MATERIALS INFORMATION

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TAPE AND REEL INFORMATION





QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



Device	Package Type	Package Drawing		SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
RC4558DGKR	VSSOP	DGK	8	2500	330.0	12.4	5.3	3.4	1.4	8.0	12.0	Q1
RC4558DR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
RC4558DRG4	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
RC4558DRG4	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
RC4558IDGKR	VSSOP	DGK	8	2500	330.0	12.4	5.3	3.4	1.4	8.0	12.0	Q1
RC4558IDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
RC4558IPWR	TSSOP	PW	8	2000	330.0	12.4	7.0	3.6	1.6	8.0	12.0	Q1
RC4558IPWR	TSSOP	PW	8	2000	330.0	12.4	7.0	3.6	1.6	8.0	12.0	Q1
RC4558PSR	SO	PS	8	2000	330.0	16.4	8.2	6.6	2.5	12.0	16.0	Q1
RC4558PWR	TSSOP	PW	8	2000	330.0	12.4	7.0	3.6	1.6	8.0	12.0	Q1
RC4558PWR	TSSOP	PW	8	2000	330.0	12.4	7.0	3.6	1.6	8.0	12.0	Q1

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PACKAGE MATERIALS INFORMATION

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*All dimensions are nominal							
Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
RC4558DGKR	VSSOP	DGK	8	2500	364.0	364.0	27.0
RC4558DR	SOIC	D	8	2500	367.0	367.0	35.0
RC4558DRG4	SOIC	D	8	2500	340.5	338.1	20.6
RC4558DRG4	SOIC	D	8	2500	367.0	367.0	35.0
RC4558IDGKR	VSSOP	DGK	8	2500	364.0	364.0	27.0
RC4558IDR	SOIC	D	8	2500	340.5	338.1	20.6
RC4558IPWR	TSSOP	PW	8	2000	364.0	364.0	27.0
RC4558IPWR	TSSOP	PW	8	2000	367.0	367.0	35.0
RC4558PSR	SO	PS	8	2000	367.0	367.0	38.0
RC4558PWR	TSSOP	PW	8	2000	367.0	367.0	35.0
RC4558PWR	TSSOP	PW	8	2000	364.0	364.0	27.0

P(R-PDIP-T8)

PLASTIC DUAL-IN-LINE PACKAGE



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



DGK (S-PDSO-G8)

PLASTIC SMALL-OUTLINE PACKAGE



NOTES: A. All linear dimensions are in millimeters.

B. This drawing is subject to change without notice.

Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 per end.

- D Body width does not include interlead flash. Interlead flash shall not exceed 0.50 per side.
- E. Falls within JEDEC MO-187 variation AA, except interlead flash.



D (R-PDSO-G8)

PLASTIC SMALL OUTLINE



NOTES: A. All linear dimensions are in inches (millimeters).

- B. This drawing is subject to change without notice.
- Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.006 (0,15) each side.
- Body width does not include interlead flash. Interlead flash shall not exceed 0.017 (0,43) each side.
- E. Reference JEDEC MS-012 variation AA.





NOTES: A. All linear dimensions are in millimeters.

- B. This drawing is subject to change without notice.
- C. Publication IPC-7351 is recommended for alternate designs.
- D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC-7525 for other stencil recommendations.
 E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.



MECHANICAL DATA

PS (R-PDSO-G8)

PLASTIC SMALL-OUTLINE PACKAGE



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.





NOTES:

- A. All linear dimensions are in millimeters.
- B. This drawing is subject to change without notice.
- C. Publication IPC-7351 is recommended for alternate designs.
- D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC-7525 for other stencil recommendations.
 E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.



PW (R-PDSO-G8)

PLASTIC SMALL OUTLINE



Α. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M-1994. Ŗ. This drawing is subject to change without notice.

🖄 Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0,15 each side.

Body width does not include interlead flash. Interlead flash shall not exceed 0,25 each side.

E. Falls within JEDEC MO-153



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