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- **Very Low Power Consumption**
– 1 mW Typ at $V_{DD} = 5\text{ V}$
- **Capable of Operation in Astable Mode**
- **CMOS Output Capable of Swinging Rail to Rail**
- **High Output-Current Capability**
– Sink 100 mA Typ
– Source 10 mA Typ
- **Output Fully Compatible With CMOS, TTL, and MOS**
- **Low Supply Current Reduces Spikes During Output Transitions**
- **Single-Supply Operation From 2 V to 15 V**
- **Functionally Interchangeable With the NE555; Has Same Pinout**
- **ESD Protection Exceeds 2000 V Per MIL-STD-883C, Method 3015.2**
- **Available in Q-Temp Automotive High Reliability Automotive Applications Configuration Control/Print Support Qualification to Automotive Standards**

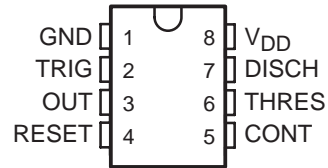
description

The TLC555 is a monolithic timing circuit fabricated using the TI LinCMOS™ process. The timer is fully compatible with CMOS, TTL, and MOS logic and operates at frequencies up to 2 MHz. Because of its high input impedance, this device uses smaller timing capacitors than those used by the NE555. As a result, more accurate time delays and oscillations are possible. Power consumption is low across the full range of power supply voltage.

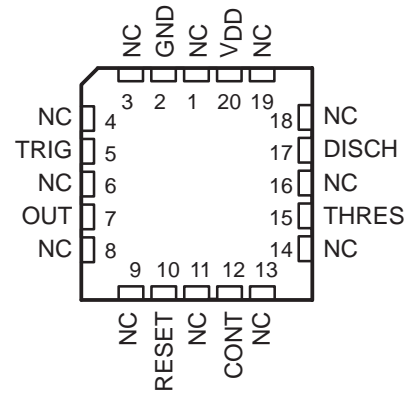
Like the NE555, the TLC555 has a trigger level equal to approximately one-third of the supply voltage and a threshold level equal to approximately two-thirds of the supply voltage. These levels can be altered by use of the control voltage terminal (CONT). When the trigger input (TRIG) falls below the trigger level, the flip-flop is set and the output goes high. If TRIG is above the trigger level and the threshold input (THRES) is above the threshold level, the flip-flop is reset and the output is low. The reset input (RESET) can override all other inputs and can be used to initiate a new timing cycle. If RESET is low, the flip-flop is reset and the output is low. Whenever the output is low, a low-impedance path is provided between the discharge terminal (DISCH) and GND. All unused inputs should be tied to an appropriate logic level to prevent false triggering.

While the CMOS output is capable of sinking over 100 mA and sourcing over 10 mA, the TLC555 exhibits greatly reduced supply-current spikes during output transitions. This minimizes the need for the large decoupling capacitors required by the NE555.

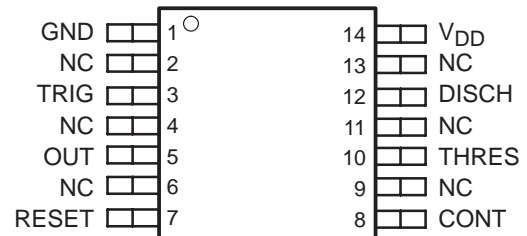
**D, DB, JG, OR P PACKAGE
(TOP VIEW)**



**FK PACKAGE
(TOP VIEW)**



**PW PACKAGE
(TOP VIEW)**



NC – No internal connection



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PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.



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On products compliant to MIL-PRF-38535, all parameters are tested unless otherwise noted. On all other products, production processing does not necessarily include testing of all parameters.

TLC555 LinCMOS™ TIMER

SLFS043F – SEPTEMBER 1983 – REVISED FEBRUARY 2005

description (continued)

The TLC555C is characterized for operation from 0°C to 70°C. The TLC555I is characterized for operation from –40°C to 85°C. The TLC555Q is characterized for operation over the automotive temperature range of –40°C to 125°C. The TLC555M is characterized for operation over the full military temperature range of –55°C to 125°C.

AVAILABLE OPTIONS†

PACKAGED DEVICES							
T _A	V _{DD} RANGE	SMALL OUTLINE (D)‡	SSOP (DB)‡	CHIP CARRIER (FK)	CERAMIC DIP (JG)	PLASTIC DIP (P)	TSSOP (PW)‡
0°C to 70°C	2 V to 15 V	TLC555CD	TLC555CDB	—	—	TLC555CP	TLC555CPW
–40°C to 85°C	3 V to 15 V	TLC555ID	—	—	—	TLC555IP	—
–40°C to 125°C	5 V to 15 V	TLC555QD	—	—	—	—	—
–55°C to 125°C	5 V to 15 V	TLC555MD	—	TLC555MFK	TLC555MJG	TLC555MP	—

† For the most current package and ordering information, see the Package Option Addendum at the end of this document, or see the TI web site at www.ti.com.

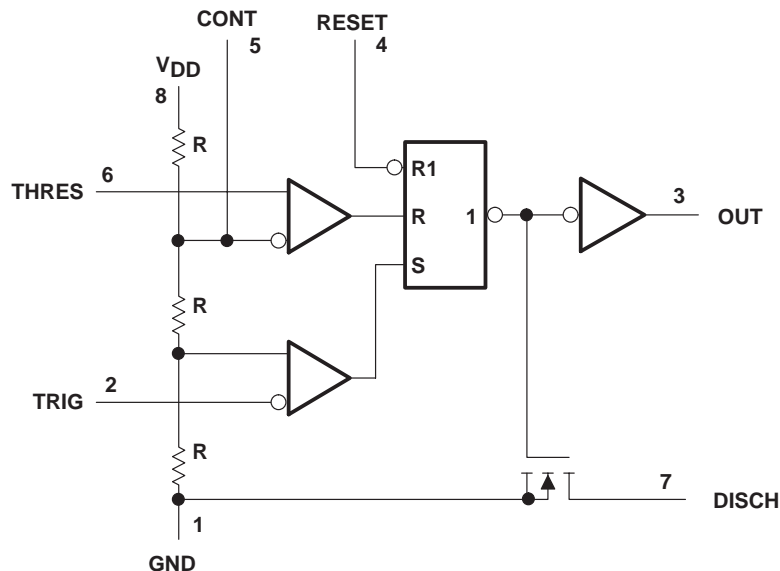
‡ This package is available taped and reeled. Add the R suffix to device type (e.g., TLC555CDR).

FUNCTION TABLE

RESET VOLTAGE‡	TRIGGER VOLTAGE‡	THRESHOLD VOLTAGE‡	OUTPUT	DISCHARGE SWITCH
<MIN	Irrelevant	Irrelevant	L	On
>MAX	<MIN	Irrelevant	H	Off
>MAX	>MAX	>MAX	L	On
>MAX	>MAX	<MIN	As previously established	

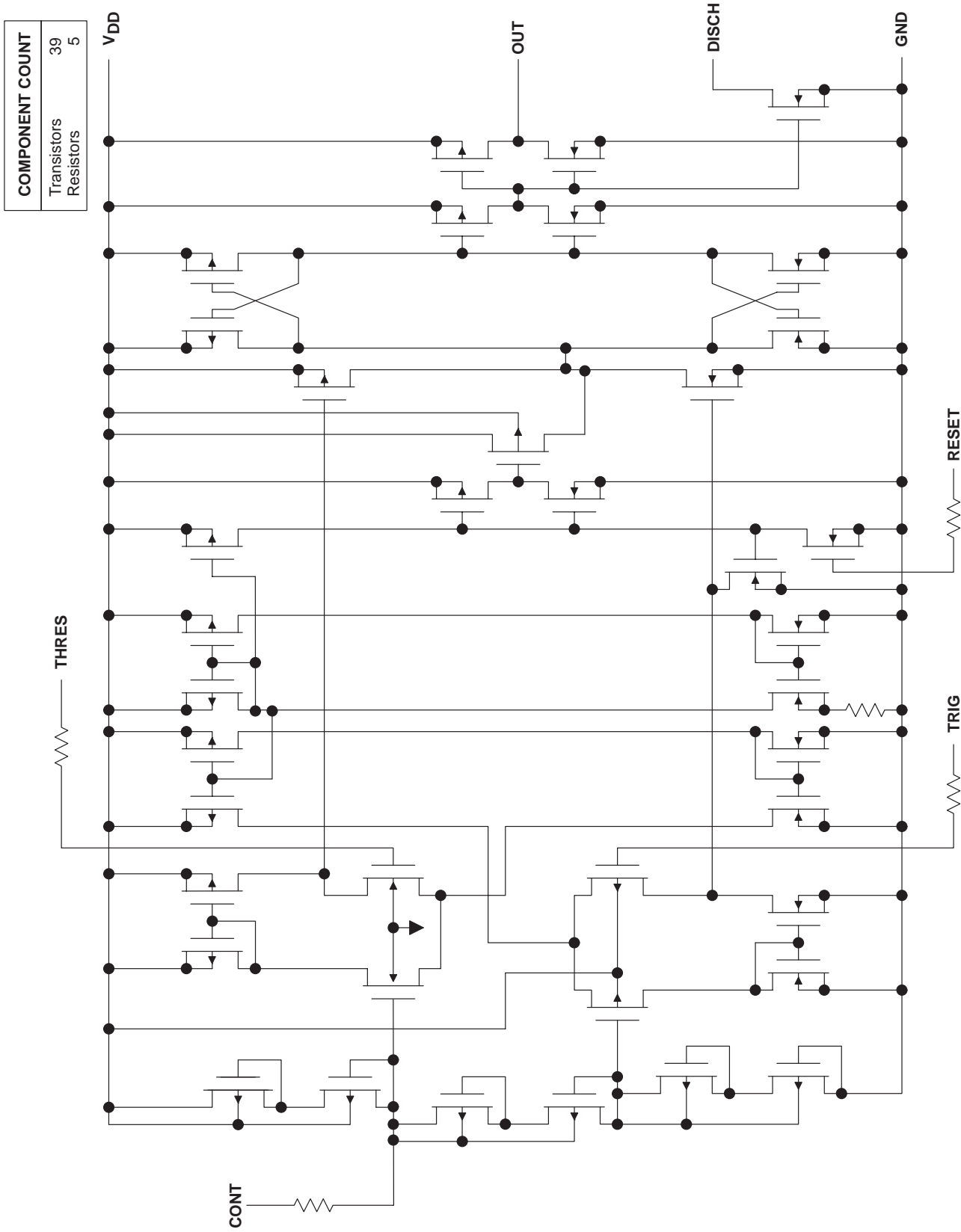
‡ For conditions shown as MIN or MAX, use the appropriate value specified under electrical characteristics.

functional block diagram



Pin numbers are for all packages except the FK package. RESET can override TRIG, which can override THRES.

equivalent schematic (each channel)



electrical characteristics at specified free-air temperature, $V_{DD} = 2\text{ V}$ for TLC555C, $V_{DD} = 3\text{ V}$ for TLC555I

PARAMETER	TEST CONDITIONS	T_A †	TLC555C			TLC555I			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
V_{IT} Threshold voltage		25°C	0.95	1.33	1.65	1.6		2.4	V
		Full range	0.85		1.75	1.5		2.5	
I_{IT} Threshold current		25°C	10			10			pA
		MAX	75			150			
$V_{I(TRIG)}$ Trigger voltage		25°C	0.4	0.67	0.95	0.71	1	1.29	V
		Full range	0.3		1.05	0.61		1.39	
$I_{I(TRIG)}$ Trigger current		25°C	10			10			pA
		MAX	75			150			
$V_{I(RESET)}$ Reset voltage		25°C	0.4	1.1	1.5	0.4	1.1	1.5	V
		Full range	0.3		2	0.3		1.8	
$I_{I(RESET)}$ Reset current		25°C	10			10			pA
		MAX	75			150			
Control voltage (open circuit) as a percentage of supply voltage		MAX	66.7%			66.7%			
Discharge switch on-stage voltage	$I_{OL} = 1\text{ mA}$	25°C	0.03			0.03			V
		Full range	0.25			0.375			
Discharge switch off-stage current		25°C	0.1			0.1			nA
		MAX	0.5			120			
V_{OH} High-level output voltage	$I_{OH} = -300\text{ }\mu\text{A}$	25°C	1.5	1.9		2.5	2.85		V
		Full range	1.5			2.5			
V_{OL} Low-level output voltage	$I_{OL} = 1\text{ mA}$	25°C	0.07			0.07			V
		Full range	0.35			0.4			
I_{DD} Supply current	See Note 2	25°C	250			250			μA
		Full range	400			500			

† Full range is 0°C to 70°C for the TLC555C and -40°C to 85°C for the TLC555I. For conditions shown as MAX, use the appropriate value specified in the recommended operating conditions table.

NOTE 2: These values apply for the expected operating configurations in which THRES is connected directly to DISCH or to TRIG.

TLC555 LinCMOS™ TIMER

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electrical characteristics at specified free-air temperature, $V_{DD} = 5\text{ V}$

PARAMETER	TEST CONDITIONS	T_A †	TLC555C			TLC555I			TLC555Q, TLC555M			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
V_{IT} Threshold voltage		25°C	2.8	3.3	3.8	2.8	3.3	3.8	2.8	3.3	3.8	V
		Full range	2.7		3.9	2.7		3.9	2.7		3.9	
I_{IT} Threshold current		25°C	10			10			10			pA
		MAX	75			150			5000			
$V_{I(TRIG)}$ Trigger voltage		25°C	1.36	1.66	1.96	1.36	1.66	1.96	1.36	1.66	1.96	V
		Full range	1.26		2.06	1.26		2.06	1.26		2.06	
$I_{I(TRIG)}$ Trigger current		25°C	10			10			10			pA
		MAX	75			150			5000			
$V_{I(RESET)}$ Reset voltage		25°C	0.4	1.1	1.5	0.4	1.1	1.5	0.4	1.1	1.5	V
		Full range	0.3		1.8	0.3		1.8	0.3		1.8	
$I_{I(RESET)}$ Reset current		25°C	10			10			10			pA
		MAX	75			150			5000			
Control voltage (open circuit) as a percentage of supply voltage		MAX	66.7%			66.7%			66.7%			
Discharge switch on-state voltage	$I_{OL} = 10\text{ mA}$	25°C	0.14			0.14			0.14			V
		Full range	0.6			0.6			0.6			
Discharge switch off-state current		25°C	0.1			0.1			0.1			nA
		MAX	0.5			120			120			
V_{OH} High-level output voltage	$I_{OH} = -1\text{ mA}$	25°C	4.1	4.8		4.1	4.8		4.1	4.8		V
		Full range	4.1			4.1			4.1			
V_{OL} Low-level output voltage	$I_{OL} = 8\text{ mA}$	25°C	0.21			0.21			0.21			V
		Full range	0.5			0.5			0.6			
	$I_{OL} = 5\text{ mA}$	25°C	0.13			0.13			0.13			
		Full range	0.4			0.4			0.45			
	$I_{OL} = 3.2\text{ mA}$	25°C	0.08			0.08			0.08			
		Full range	0.35			0.35			0.4			
I_{DD} Supply current	See Note 2	25°C	170			170			170			μA
		Full range	500			600			700			

† Full range is 0°C to 70°C the for TLC555C, -40°C to 85°C for the TLC555I, -40°C to 125°C for the TLC555Q, and -55°C to 125°C for the TLC555M. For conditions shown as MAX, use the appropriate value specified in the recommended operating conditions table.

NOTE 2: These values apply for the expected operating configurations in which THRES is connected directly to DISCH or TRIG.



electrical characteristics at specified free-air temperature, $V_{DD} = 15\text{ V}$

PARAMETER	TEST CONDITIONS	T_A †	TLC555C			TLC555I			TLC555Q, TLC555M			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
V_{IT} Threshold voltage		25°C	9.45	10	10.55	9.45	10	10.55	9.45	10	10.55	V
		Full range	9.35		10.65	9.35		10.65	9.35		10.65	
I_{IT} Threshold current		25°C		10			10			10		pA
		MAX		75			150			5000		
$V_{I(TRIG)}$ Trigger voltage		25°C	4.65	5	5.35	4.65	5	5.35	4.65	5	5.35	V
		Full range	4.55		5.45	4.55		5.45	4.55		5.45	
$I_{I(TRIG)}$ Trigger current		25°C		10			10			10		pA
		MAX		75			150			5000		
$V_{I(RESET)}$ Reset voltage		25°C	0.4	1.1	1.5	0.4	1.1	1.5	0.4	1.1	1.5	V
		Full range	0.3		1.8	0.3		1.8	0.3		1.8	
$I_{I(RESET)}$ Reset current		25°C		10			10			10		pA
		MAX		75			150			5000		
Control voltage (open circuit) as a percentage of supply voltage		MAX		66.7%			66.7%			66.7%		
Discharge switch on-state voltage	$I_{OL} = 100\text{ mA}$	25°C		0.77	1.7		0.77	1.7		0.77	1.7	V
		Full range			1.8			1.8			1.8	
Discharge switch off-state current		25°C		0.1			0.1			0.1		nA
		MAX		0.5			120			120		
V_{OH} High-level output voltage	$I_{OH} = -10\text{ mA}$	25°C	12.5	14.2		12.5	14.2		12.5	14.2		V
		Full range	12.5			12.5			12.5			
	$I_{OH} = -5\text{ mA}$	25°C	13.5	14.6		13.5	14.6		13.5	14.6		
		Full range	13.5			13.5			13.5			
	$I_{OH} = -1\text{ mA}$	25°C	14.2	14.9		14.2	14.9		14.2	14.9		
		Full range	14.2			14.2			14.2			
V_{OL} Low-level output voltage	$I_{OL} = 100\text{ mA}$	25°C		1.28	3.2		1.28	3.2		1.28	3.2	V
		Full range			3.6			3.7			3.8	
	$I_{OL} = 50\text{ mA}$	25°C		0.63	1		0.63	1		0.63	1	
		Full range			1.3			1.4			1.5	
	$I_{OL} = 10\text{ mA}$	25°C		0.12	0.3		0.12	0.3		0.12	0.3	
		Full range			0.4			0.4			0.45	
I_{DD} Supply current	See Note 2	25°C		360	600		360	600		360	600	μA
		Full range			800			900			1000	

† Full range is 0°C to 70°C for TLC555C, -40°C to 85°C for TLC555I, -40°C to 125°C for the TLC555Q, and -55°C to 125°C for TLC555M. For conditions shown as MAX, use the appropriate value specified in the recommended operating conditions table.

NOTE 2: These values apply for the expected operating configurations in which THRES is connected directly to DISCH or TRIG.

TLC555 LinCMOS™ TIMER

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operating characteristics, $V_{DD} = 5\text{ V}$, $T_A = 25^\circ\text{C}$ (unless otherwise noted)

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Initial error of timing interval‡	$V_{DD} = 5\text{ V to }15\text{ V}$, $R_A = R_B = 1\text{ k}\Omega\text{ to }100\text{ k}\Omega$, $C_T = 0.1\text{ }\mu\text{F}$, See Note 3		1%	3%	
Supply voltage sensitivity of timing interval			0.1	0.5	%/V
t_r Output pulse rise time	$R_L = 10\text{ M}\Omega$, $C_L = 10\text{ pF}$		20	75	ns
t_f Output pulse fall time			15	60	
f_{max} Maximum frequency in astable mode	$R_A = 470\text{ }\Omega$, $C_T = 200\text{ pF}$, $R_B = 200\text{ }\Omega$, See Note 3	1.2	2.1		MHz

‡ Timing interval error is defined as the difference between the measured value and the average value of a random sample from each process run.

NOTE 3: R_A , R_B , and C_T are as defined in Figure 1.

electrical characteristics at $V_{DD} = 5\text{ V}$, $T_A = 25^\circ\text{C}$

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
V_{IT} Threshold voltage		2.8	3.3	3.8	V
I_{IT} Threshold current			10		pA
$V_{I(TRIG)}$ Trigger voltage		1.36	1.66	1.96	V
$I_{I(TRIG)}$ Trigger current			10		pA
$V_{I(RESET)}$ Reset voltage		0.4	1.1	1.5	V
$I_{I(RESET)}$ Reset current			10		pA
Control voltage (open circuit) as a percentage of supply voltage			66.7%		
Discharge switch on-state voltage	$I_{OL} = 10\text{ mA}$		0.14	0.5	V
Discharge switch off-state current			0.1		nA
V_{OH} High-level output voltage	$I_{OH} = -1\text{ mA}$	4.1	4.8		V
V_{OL} Low-level output voltage	$I_{OL} = 8\text{ mA}$		0.21	0.4	V
	$I_{OL} = 5\text{ mA}$		0.13	0.3	
	$I_{OL} = 3.2\text{ mA}$		0.08	0.3	
I_{DD} Supply current	See Note 2		170	350	μA

NOTE 2: These values apply for the expected operating configurations in which THRES is connected directly to DISCH or TRIG.

TYPICAL CHARACTERISTICS

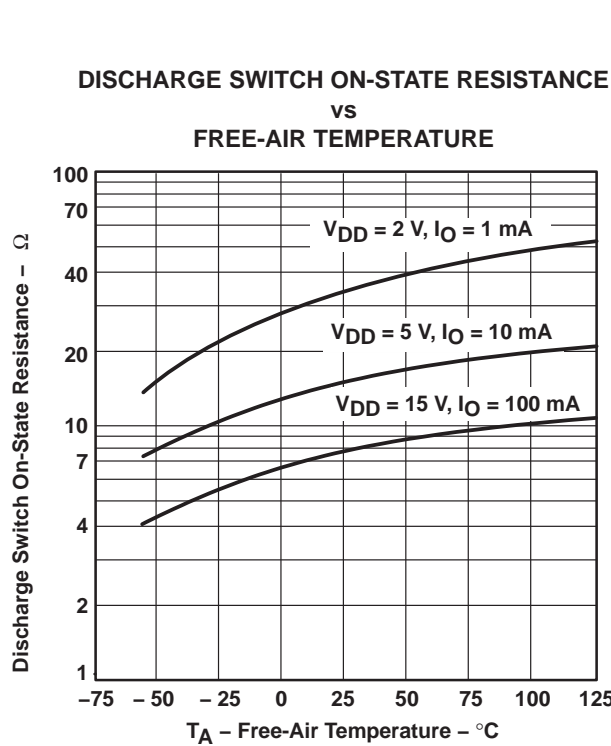
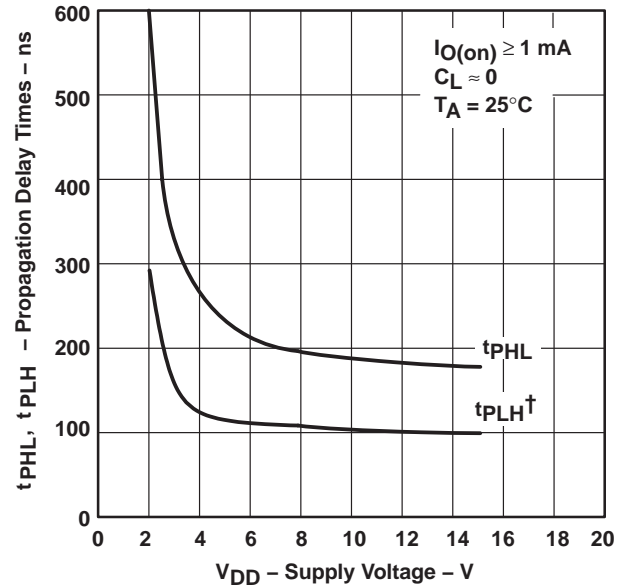


Figure 1

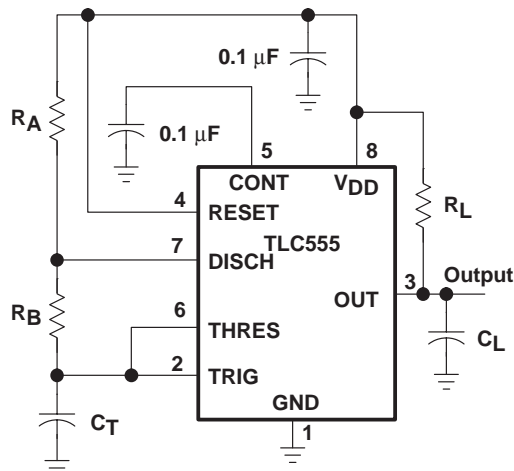
PROPAGATION DELAY TIMES TO DISCHARGE
OUTPUT FROM TRIGGER AND THRESHOLD
SHORTED TOGETHER
vs
SUPPLY VOLTAGE



† The effects of the load resistance on these values must be taken into account separately.

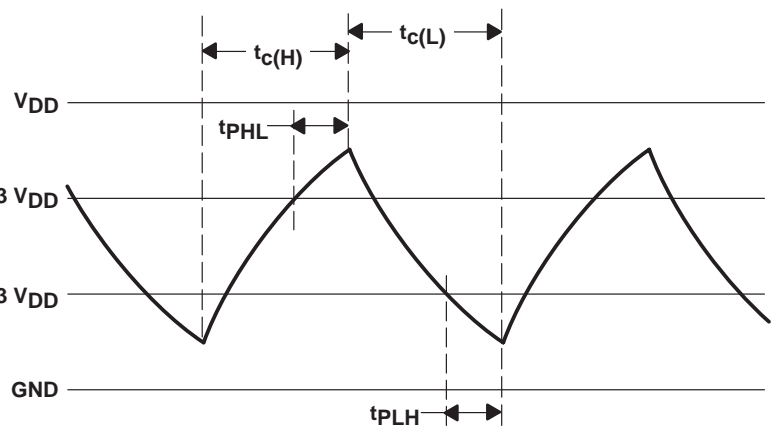
Figure 2

APPLICATION INFORMATION



Pin numbers shown are for all packages except the FK package.

CIRCUIT



TRIGGER AND THRESHOLD VOLTAGE WAVEFORM

Figure 3. Astable Operation

APPLICATION INFORMATION

Connecting TRIG to THRES, as shown in Figure 3, causes the timer to run as a multivibrator. The capacitor C_T charges through R_A and R_B to the threshold voltage level (approximately $0.67 V_{DD}$) and then discharges through R_B only to the value of the trigger voltage level (approximately $0.33 V_{DD}$). The output is high during the charging cycle ($t_{c(H)}$) and low during the discharge cycle ($t_{c(L)}$). The duty cycle is controlled by the values of R_A , R_B , and C_T as shown in the equations below.

$$t_{c(H)} \approx C_T (R_A + R_B) \ln 2 \quad (\ln 2 = 0.693)$$

$$t_{c(L)} \approx C_T R_B \ln 2$$

$$\text{Period} = t_{c(H)} + t_{c(L)} \approx C_T (R_A + 2R_B) \ln 2$$

$$\text{Output driver duty cycle} = \frac{t_{c(L)}}{t_{c(H)} + t_{c(L)}} \approx 1 - \frac{R_B}{R_A + 2R_B}$$

$$\text{Output waveform duty cycle} = \frac{t_{c(H)}}{t_{c(H)} + t_{c(L)}} \approx \frac{R_B}{R_A + 2R_B}$$

The 0.1- μF capacitor at CONT in Figure 3 decreases the period by about 10%.

The formulas shown above do not allow for any propagation delay times from the TRIG and THRES inputs to DISCH. These delay times add directly to the period and create differences between calculated and actual values that increase with frequency. In addition, the internal on-state resistance r_{on} during discharge adds to R_B to provide another source of timing error in the calculation when R_B is very low or r_{on} is very high.

The equations below provide better agreement with measured values.

$$t_{c(H)} = C_T (R_A + R_B) \ln \left[3 - \exp \left(\frac{-t_{PLH}}{C_T (R_B + r_{on})} \right) \right] + t_{PHL}$$

$$t_{c(L)} = C_T (R_B + r_{on}) \ln \left[3 - \exp \left(\frac{-t_{PHL}}{C_T (R_A + R_B)} \right) \right] + t_{PLH}$$

These equations and those given earlier are similar in that a time constant is multiplied by the logarithm of a number or function. The limit values of the logarithmic terms must be between $\ln 2$ at low frequencies and $\ln 3$ at extremely high frequencies. For a duty cycle close to 50%, an appropriate constant for the logarithmic terms can be substituted

with good results. Duty cycles less than 50% $\frac{t_{c(H)}}{t_{c(H)} + t_{c(L)}}$ require that $\frac{t_{c(H)}}{t_{c(L)}} < 1$ and possibly $R_A \leq r_{on}$. These

conditions can be difficult to obtain.

In monostable applications, the trip point on TRIG can be set by a voltage applied to CONT. An input voltage between 10% and 80% of the supply voltage from a resistor divider with at least 500- μA bias provides good results.

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
5962-89503012A	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type	-55 to 125	5962- 89503012A TLC555MFKB	Samples
5962-8950301PA	ACTIVE	CDIP	JG	8	1	TBD	A42	N / A for Pkg Type	-55 to 125	8950301PA TLC555M	Samples
TLC555CD	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	TL555C	Samples
TLC555CDG4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	TL555C	Samples
TLC555CDR	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	TL555C	Samples
TLC555CDRG4	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	TL555C	Samples
TLC555CP	ACTIVE	PDIP	P	8	50	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	0 to 70	TLC555CP	Samples
TLC555CPE4	ACTIVE	PDIP	P	8	50	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	0 to 70	TLC555CP	Samples
TLC555CPSR	ACTIVE	SO	PS	8	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	P555	Samples
TLC555CPW	ACTIVE	TSSOP	PW	14	90	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	P555	Samples
TLC555CPWR	ACTIVE	TSSOP	PW	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	P555	Samples
TLC555CPWRG4	ACTIVE	TSSOP	PW	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	P555	Samples
TLC555ID	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	TL555I	Samples
TLC555IDG4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	TL555I	Samples
TLC555IDR	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	TL555I	Samples
TLC555IDRG4	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	TL555I	Samples

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
TLC555IP	ACTIVE	PDIP	P	8	50	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	-40 to 85	TLC555IP	Samples
TLC555IPE4	ACTIVE	PDIP	P	8	50	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	-40 to 85	TLC555IP	Samples
TLC555MFKB	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type	-55 to 125	5962-89503012A TLC555MFKB	Samples
TLC555MJG	ACTIVE	CDIP	JG	8	1	TBD	A42	N / A for Pkg Type	-55 to 125	TLC555MJG	Samples
TLC555MJGB	ACTIVE	CDIP	JG	8	1	TBD	A42	N / A for Pkg Type	-55 to 125	8950301PA TLC555M	Samples
TLC555MP	OBSOLETE	PDIP	P	8		TBD	Call TI	Call TI	-55 to 125		
TLC555QDR	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	TL555Q	Samples
TLC555QDRG4	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		TL555Q	Samples

(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) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

⁽⁵⁾ Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "-" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

⁽⁶⁾ Lead/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

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OTHER QUALIFIED VERSIONS OF TLC555, TLC555M :

- Catalog: [TLC555](#)

- Automotive: [TLC555-Q1](#), [TLC555-Q1](#)

- Military: [TLC555M](#)

NOTE: Qualified Version Definitions:

- Catalog - TI's standard catalog product

- Automotive - Q100 devices qualified for high-reliability automotive applications targeting zero defects

- Military - QML certified for Military and Defense Applications

TAPE AND REEL INFORMATION

QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE


*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
TLC555CDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
TLC555CPWR	TSSOP	PW	14	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
TLC555IDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
TLC555QDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
TLC555QDRG4	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1

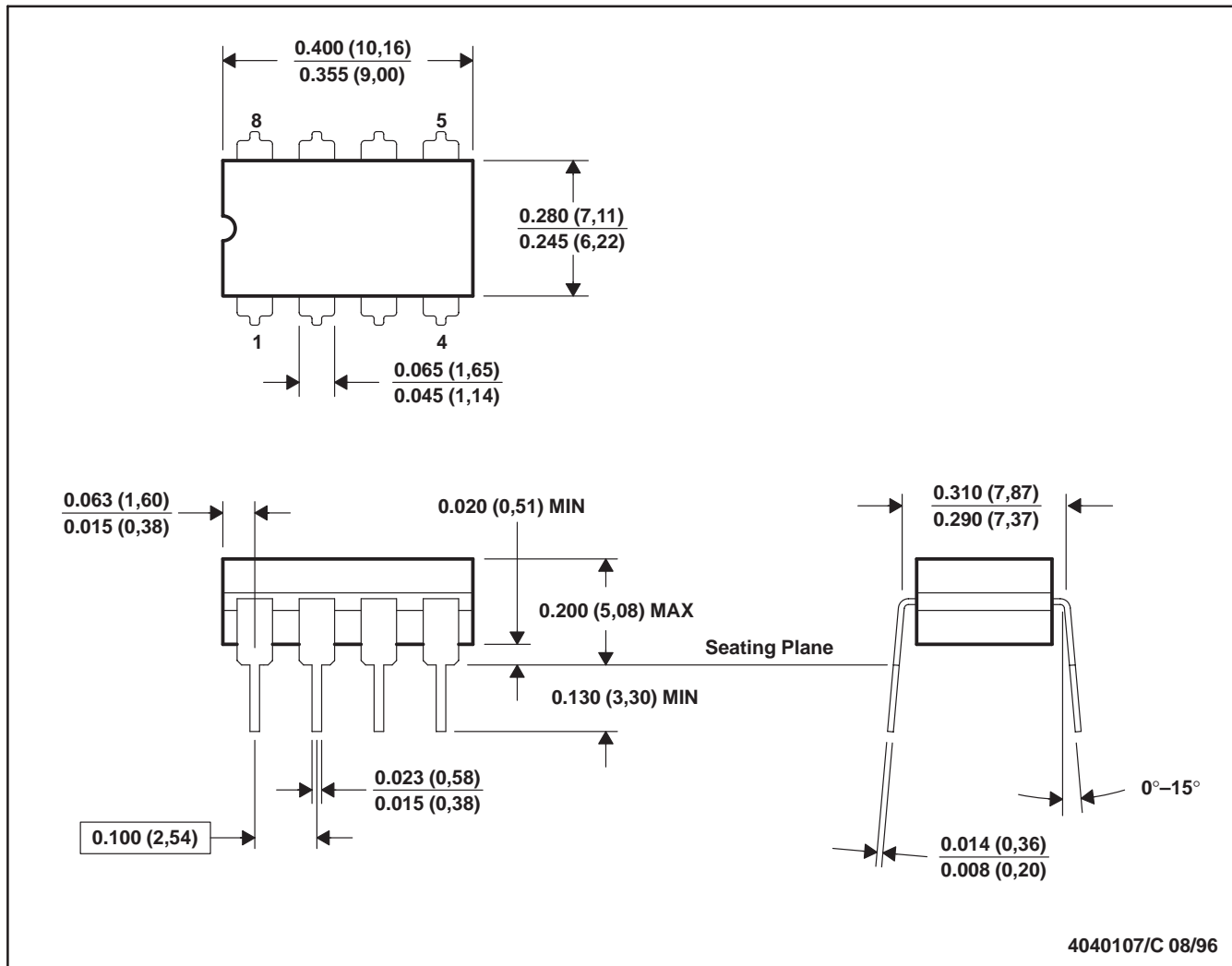
TAPE AND REEL BOX DIMENSIONS


*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
TLC555CDR	SOIC	D	8	2500	340.5	338.1	20.6
TLC555CPWR	TSSOP	PW	14	2000	367.0	367.0	35.0
TLC555IDR	SOIC	D	8	2500	340.5	338.1	20.6
TLC555QDR	SOIC	D	8	2500	367.0	367.0	35.0
TLC555QDRG4	SOIC	D	8	2500	367.0	367.0	35.0

JG (R-GDIP-T8)

CERAMIC DUAL-IN-LINE

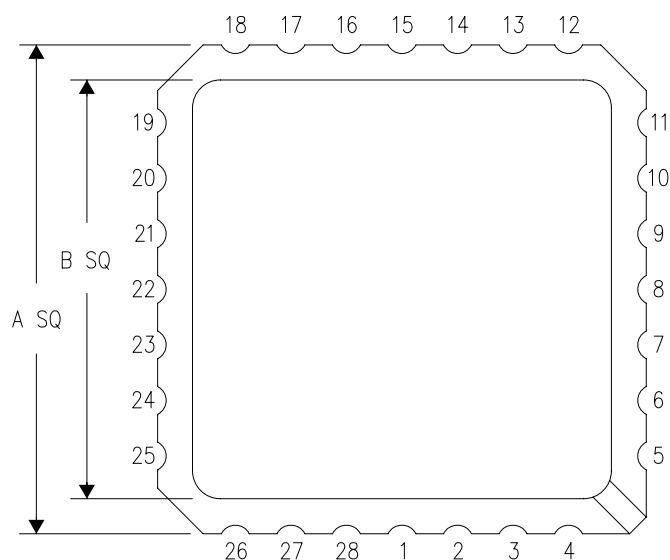


- NOTES: A. All linear dimensions are in inches (millimeters).
 B. This drawing is subject to change without notice.
 C. This package can be hermetically sealed with a ceramic lid using glass frit.
 D. Index point is provided on cap for terminal identification.
 E. Falls within MIL STD 1835 GDIP1-T8

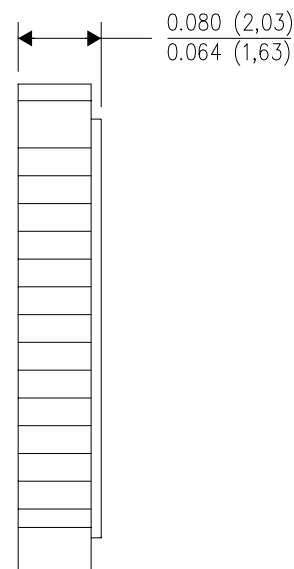
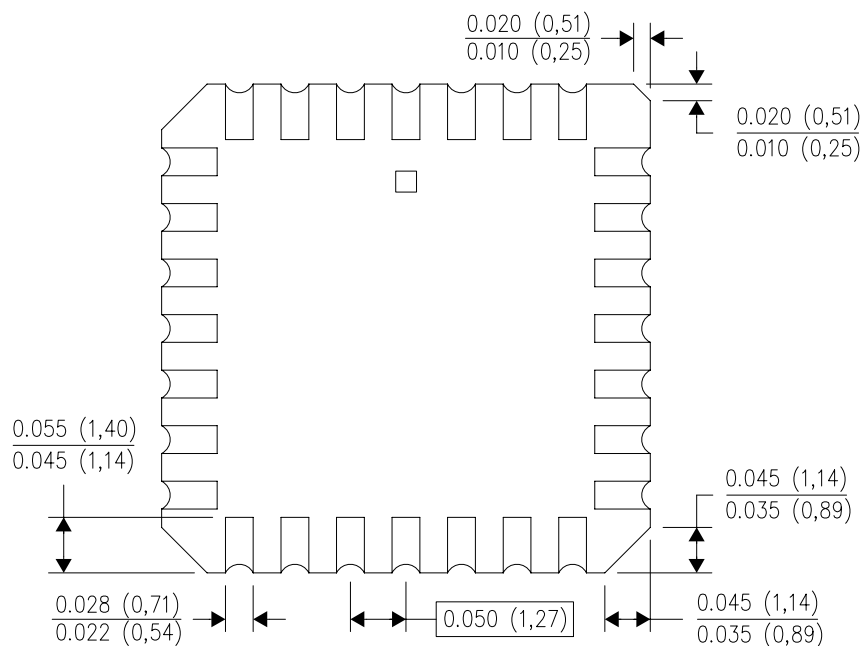
FK (S-CQCC-N**)

LEADLESS CERAMIC CHIP CARRIER

28 TERMINAL SHOWN



NO. OF TERMINALS **	A		B	
	MIN	MAX	MIN	MAX
20	0.342 (8,69)	0.358 (9,09)	0.307 (7,80)	0.358 (9,09)
28	0.442 (11,23)	0.458 (11,63)	0.406 (10,31)	0.458 (11,63)
44	0.640 (16,26)	0.660 (16,76)	0.495 (12,58)	0.560 (14,22)
52	0.740 (18,78)	0.761 (19,32)	0.495 (12,58)	0.560 (14,22)
68	0.938 (23,83)	0.962 (24,43)	0.850 (21,6)	0.858 (21,8)
84	1.141 (28,99)	1.165 (29,59)	1.047 (26,6)	1.063 (27,0)

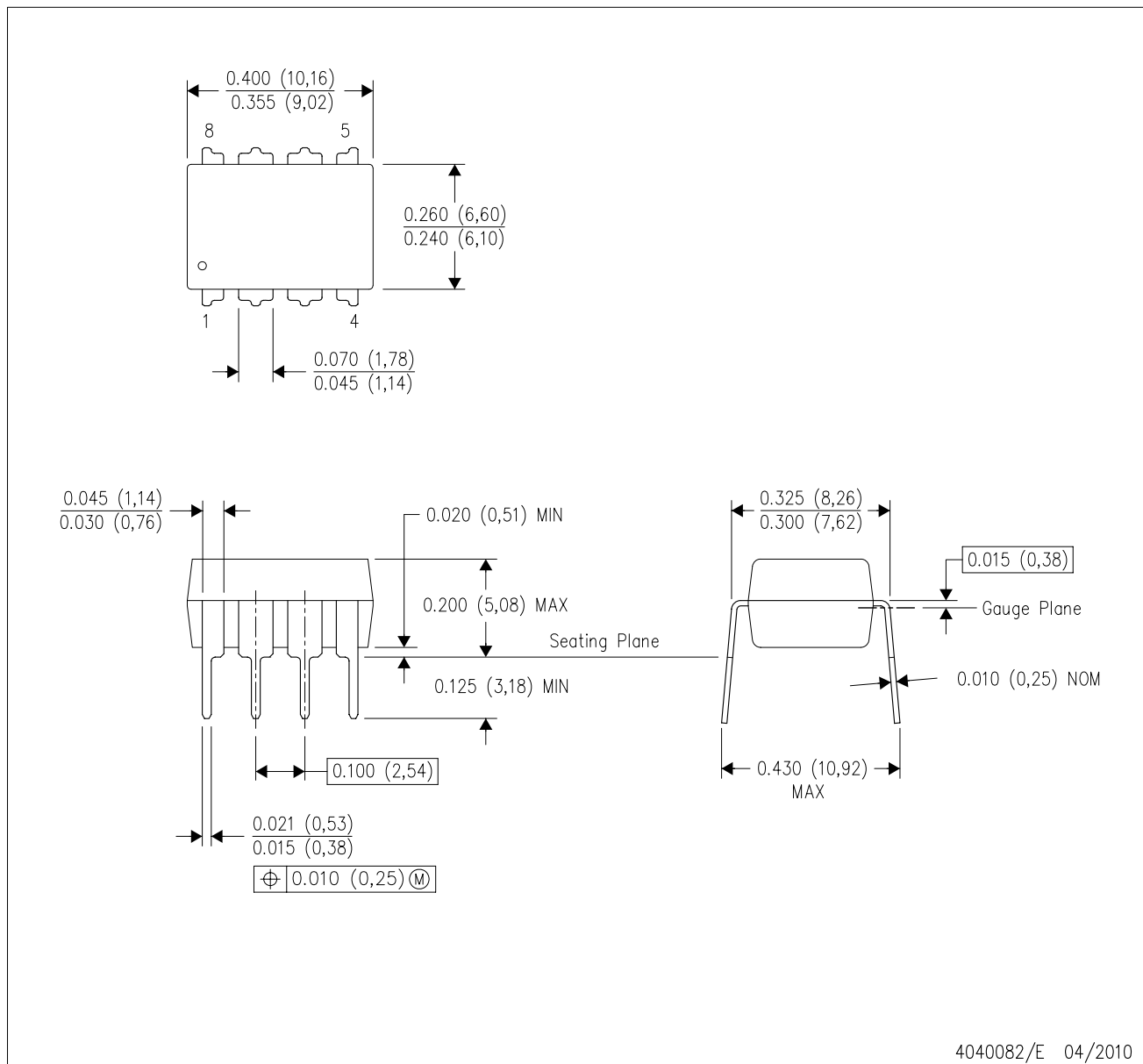


4040140/D 01/11

- NOTES:
- All linear dimensions are in inches (millimeters).
 - This drawing is subject to change without notice.
 - This package can be hermetically sealed with a metal lid.
 - Falls within JEDEC MS-004

P (R-PDIP-T8)

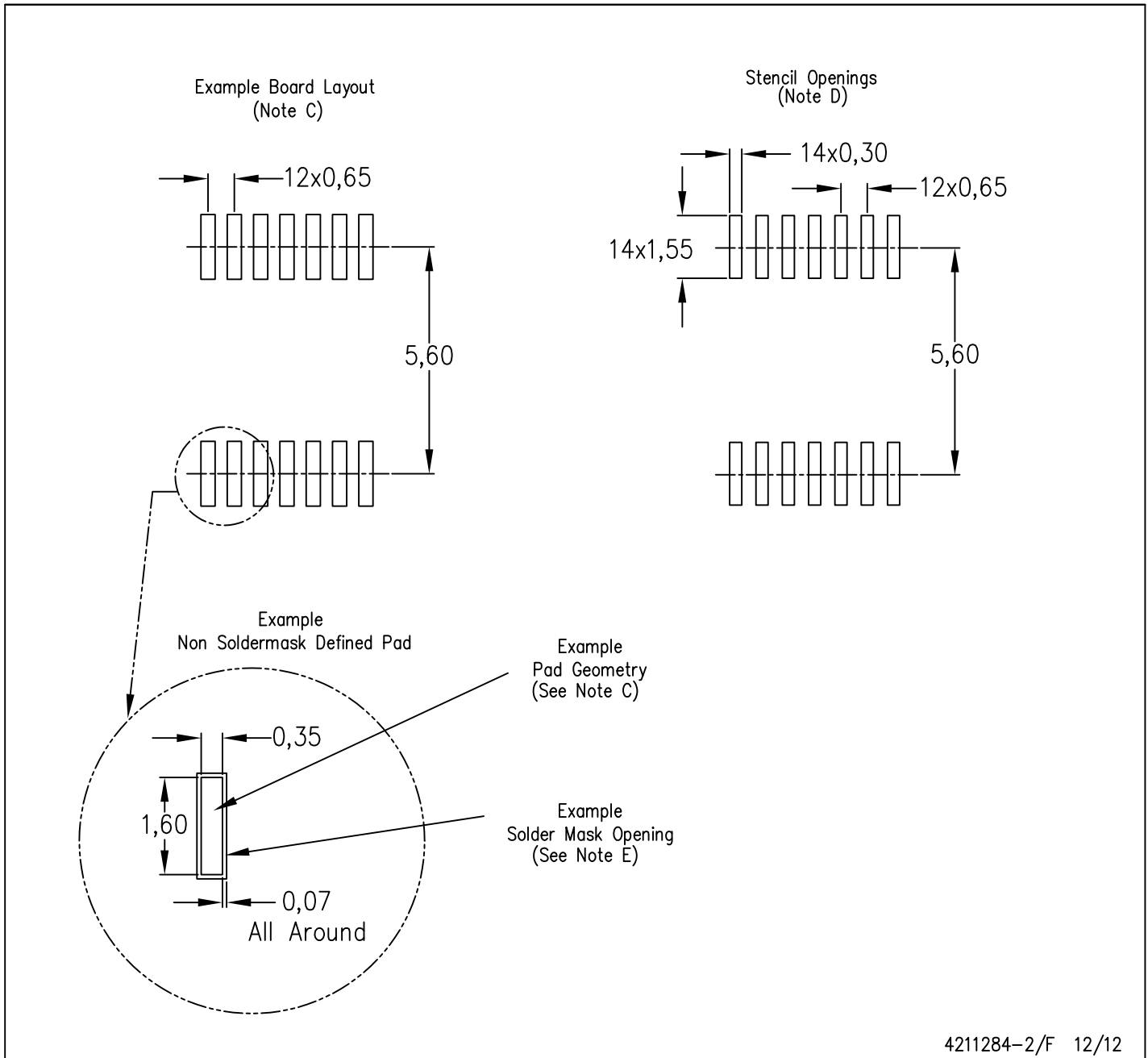
PLASTIC DUAL-IN-LINE PACKAGE



- NOTES:
- 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.

PW (R-PDSO-G14)

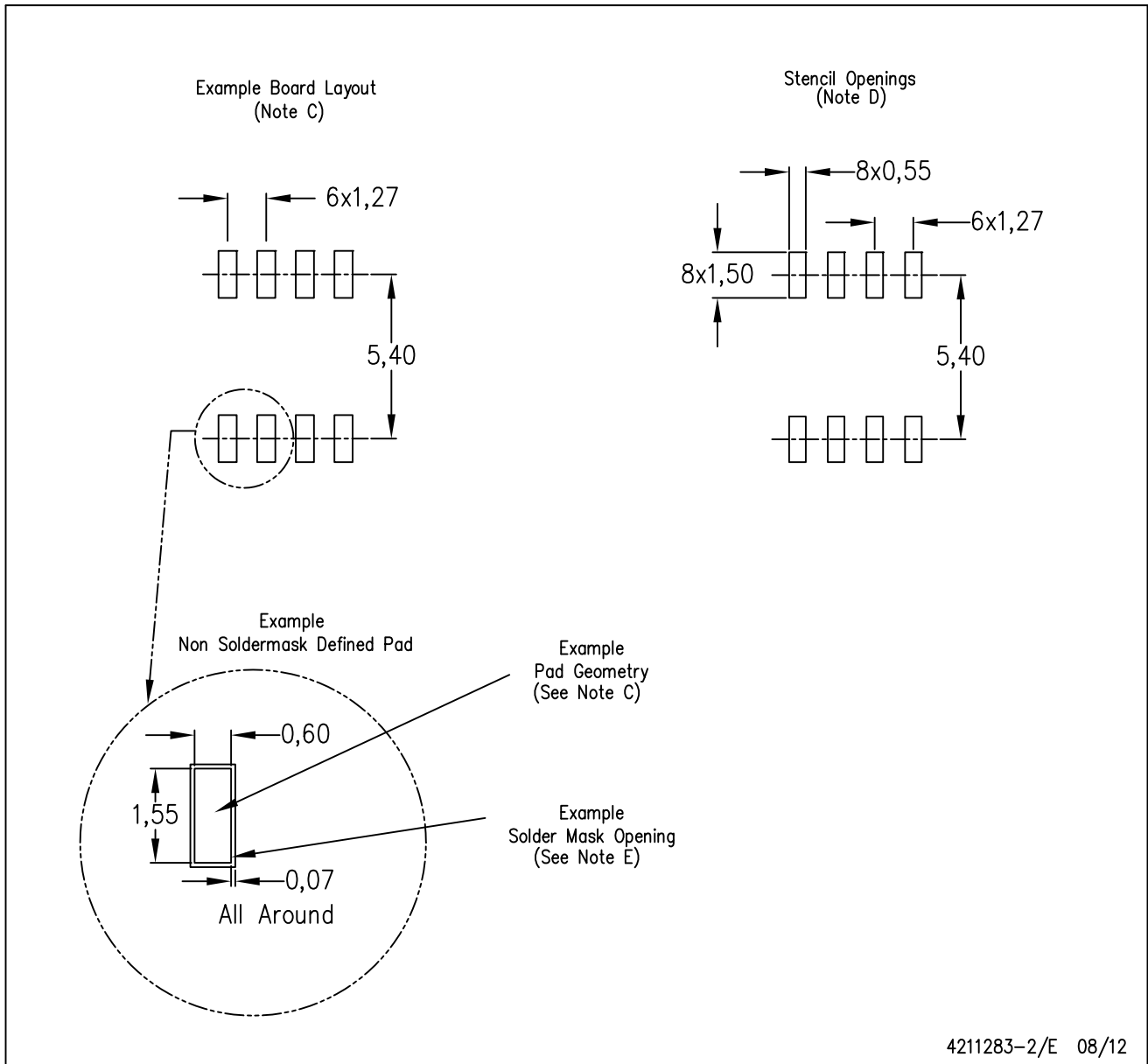
PLASTIC SMALL OUTLINE



- NOTES:
- All linear dimensions are in millimeters.
 - This drawing is subject to change without notice.
 - Publication IPC-7351 is recommended for alternate designs.
 - 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.
 - Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.

D (R-PDSO-G8)

PLASTIC SMALL OUTLINE

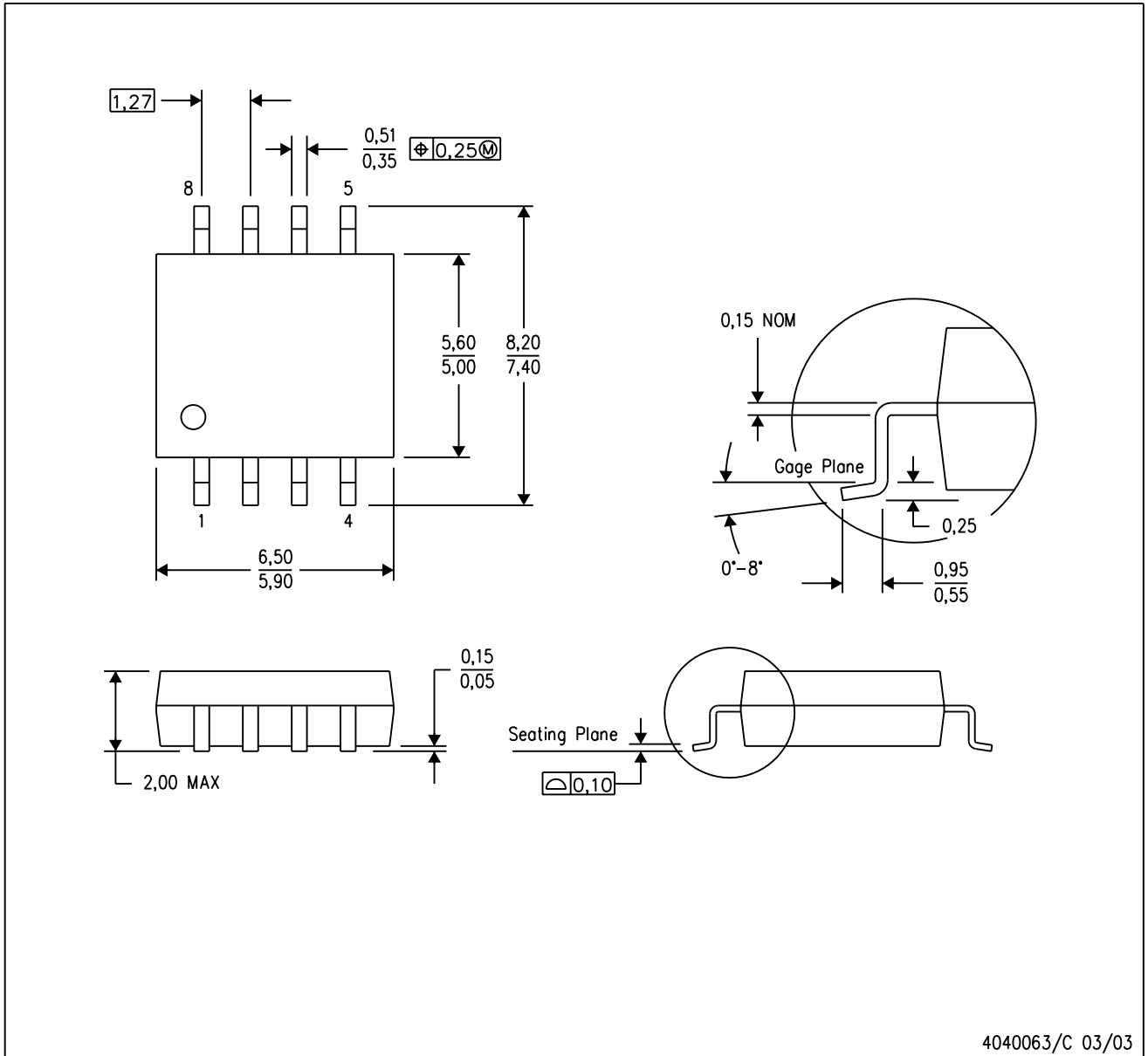


- NOTES:
- All linear dimensions are in millimeters.
 - This drawing is subject to change without notice.
 - Publication IPC-7351 is recommended for alternate designs.
 - Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact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

MECHANICAL DATA

PS (R-PDSO-G8)

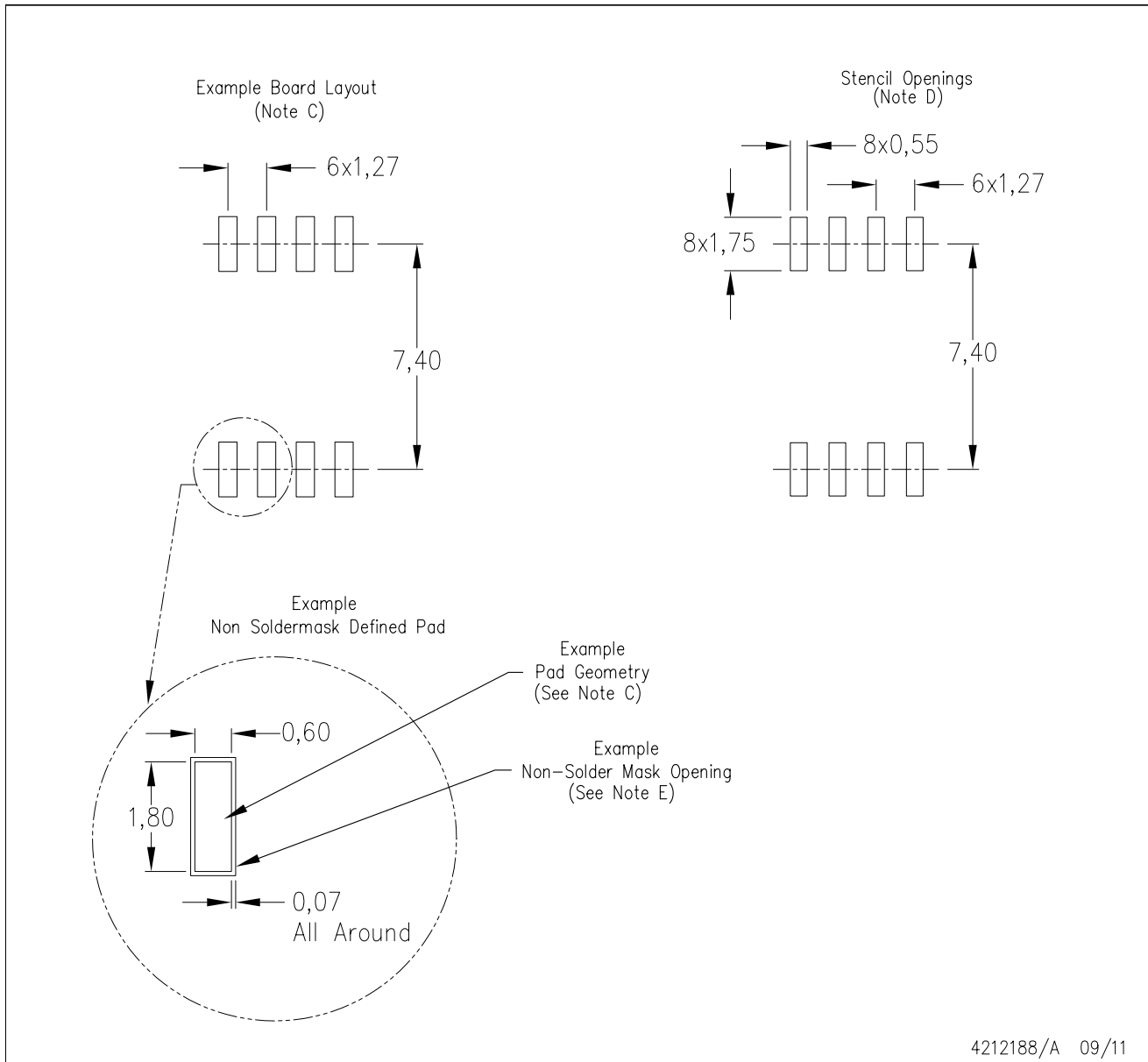
PLASTIC SMALL-OUTLINE PACKAGE



- 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.

PS (R-PDSO-G8)

PLASTIC SMALL OUTLINE



- NOTES:
- All linear dimensions are in millimeters.
 - This drawing is subject to change without notice.
 - Publication IPC-7351 is recommended for alternate designs.
 - 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.
 - Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.

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