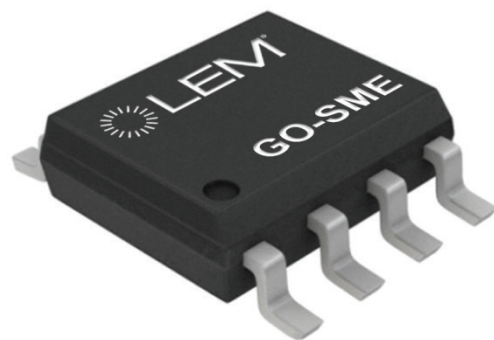


## Current Transducer GO-SME series

$I_{PN} = 10 \dots 20 \text{ A}$

Ref: GO 10-SME, GO 20-SME

For the electronic measurement of current: DC, AC, pulsed..., with galvanic separation between the primary and the secondary circuit.



### Features

- Hall effect measuring principle
- Galvanic separation between primary and secondary circuit
- Insulated test voltage 2500 V RMS
- Low power consumption
- Extremely low profile
- Single power supply +5 V
- Fixed offset & sensitivity
- Delay time 2  $\mu\text{s}$ .

### Advantages

- Small size and space saving
- High immunity to external interference
- High insulation capability
- Low electrical resistance (0.9 m $\Omega$ )
- No magnetic hysteresis
- Robust against external fields.

### Applications

- Small drives
- HVAC
- Appliances
- E-Bikes.

### Standards

- IEC 61800-5-1: 2007
- IEC 62109-1: 2010
- IEC 60950-1: 2005
- UL 1577: 2014.

### Application Domains

- Industrial.

**Absolute maximum ratings**

Parameter	Symbol	Unit	Min	Typ	Max	Conditions
Maximum supply voltage (not destructive)	$U_{C\max}$	V			8	
Maximum supply voltage (not entering non-standard modes)					6.5	
Primary withstand peak current (maximum)	$\hat{I}_{P\max}$	A			±200	$T_A = 25\text{ °C}$ , 1 ms pulse
Maximum electrostatic discharge voltage (HMB-Human Body Model)	$U_{ESD\ HBM}$	V			2000	AEC-Q100-002 REV D
Maximum electrostatic discharge voltage (CDM-Charged Device Model)	$U_{ESD\ CDM}$	V			500	AEC-Q100-011 REV B
Maximum output current source	$I_{out\ max}$	mA			25	
Maximum output current sink		mA			50	
Maximum junction temperature	$T_{J\max}$	°C			150	

**Insulation coordination**

Parameter	Symbol	Unit	Value	Comment
RMS voltage for AC insulation test, 50 Hz, 1 min	$U_d$	V	2500	According to IEC 60664-1
RMS voltage for AC insulation test, 60 Hz, 1 min	$U_d$	V	2500	According to UL 1577
RMS voltage for AC insulation test, 50 Hz, 1 min	$U_d$	V	2500	According to IEC 60950-1
Impulse withstand voltage 1.2/50 $\mu$ s	$U_{Ni}$	V	4000	According to IEC 61800-5-1, IEC 62109-1, IEC 60950-1
Partial discharge RMS test voltage ( $q_m < 5\text{ pC}$ )	$U_t$	V	850	According to IEC 61800-5-1, IEC 62109-1
Clearance (pri. - sec.)	$d_{Cl}$	mm	4	Shortest distance through air
Creepage distance (pri. - sec.)	$d_{Cp}$			Shortest path along body
Comparative tracking index	$CTI$		600	
Application example		V RMS	300	Basic insulation according to IEC 61800-5-1, IEC 62109-1, IEC 60950-1, CAT II, PD2

**UL 1577 Non Optical isolating devices - Component**

File # E486776, Vol 1

Single protection, non-optical isolators, 2500 vac insulation

**Standards**

- UL 1577, Optical Isolators;
- CSA Component Acceptance Service Notice N°. 5 A, Component Acceptance Service for Optocouplers and Related Devices.

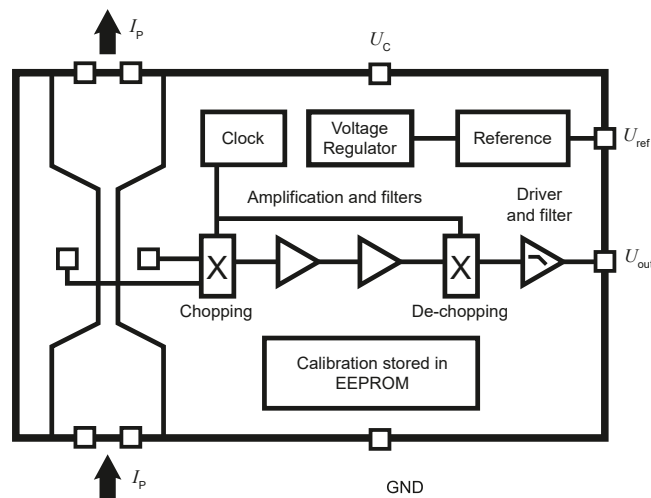
**Marking**

Only those products bearing the UL or UR Mark should be considered to be Listed or Recognized and covered under UL's Follow-Up Service. Always look for the Mark on the product.

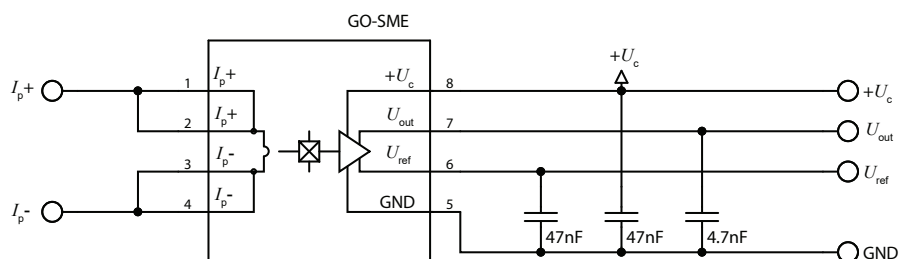
**Environmental and mechanical characteristics**

Parameter	Symbol	Unit	Min	Typ	Max	Conditions
Ambient operating temperature	$T_A$	°C	-40		125	
Ambient storage temperature	$T_{A\text{st}}$	°C	-55		165	
Resistance of the primary @ $T_A = 25\text{ °C}$	$R_P$	mΩ		0.9		
Thermal resistance junction to board <sup>1)</sup>	$R_{\text{thJB}}$	K/W		15		
Time constant	$t$	s		1		To reach steady state

**Note:** <sup>1)</sup> Done on LEM evaluation board PCB 2320.

**Block diagram**

**Connection diagram**

Pin#	Name	Function
From 1 to 2	$I_{p+}$	Input of the primary current
From 3 to 4	$I_{p-}$	Output of the primary current
5	GND	Ground
6	$U_{\text{ref}}$	Reference voltage (output)
7	$U_{\text{out}}$	Output voltage
8	$U_c$	Supply voltage



**Electrical data GO 10-SME**

At  $T_A = -40\text{ °C} \dots 125\text{ °C}$ ,  $U_C = +5\text{ V}$ ,  $R_L = 10\text{ k}\Omega$  unless otherwise noted (see Definition of typical, minimum and maximum values paragraph in page 6).

Parameter	Symbol	Unit	Min	Typ	Max	Conditions
Primary nominal RMS current	$I_{PN}$	A		10		
Primary current, measuring range	$I_{PM}$	A	-25		25	
Supply voltage	$U_C$	V	4.5	5	5.5	
Current consumption	$I_C$	mA		20	26	
Reference voltage (output)	$U_{ref}$	V		2.5		@ 25 °C, Internal ref.
Reference voltage (input)	$U_{ref}$	V	0.5		2.6	External reference
Output voltage range @ $I_{PM}$	$U_{out} - U_{ref}$	V	-2		2	
Output internal resistance	$R_{out}$	$\Omega$			5	Up to 10 kHz
Reference internal resistance	$R_{ref}$	$\Omega$	120	200	333	
Load capacitance	$C_L$	nF	0		6	
Nominal sensitivity	$S_N$	mV/A		80		
Electrical offset voltage @ $I_{PN} = 0$	$U_{OE}$	mV	-5		5	$T_A = 25\text{ °C}$ , $U_{out} - U_{ref}$ @ $U_{ref} = 2.5\text{ V}$
Electrical offset current referred to $I_{PN}$	$I_{OE}$	mA	-62.5		62.5	$T_A = 25\text{ °C}$
Temperature coefficient of $U_{ref}$	$TCU_{ref}$	ppm/K	-170		170	$U_{ref} = 2.5\text{ V}$
Temperature coefficient of $U_{OE}$	$TCU_{OE}$	mV/K	-0.075		0.075	
Temperature coefficient of $I_{OE}$	$TCI_{OE}$	mA/K	-0.94		0.94	
Temperature coefficient of $S$	$TCS$	ppm/K	-150		150	
Delay time to 90 % of the final output value for $I_{PN}$ step	$t_{D90}$	$\mu\text{s}$			2	
Delay time to 10 % of the final output value for $I_{PN}$ step	$t_{D10}$	$\mu\text{s}$			1.5	
Frequency bandwidth -3 dB, $T_A = 25\text{ °C}$	$BW$	KHz		300		
Noise voltage spectral density	$u_{no}$	$\mu\text{V}/\text{Hz}^{1/2}$		14.5		NBW = 1 kHz ... 100 kHz
Sensitivity error	$\varepsilon_S$	%	-1		1	Factory adjustment, @ 25 °C
Linearity error 0 ... $I_{PN}$	$\varepsilon_L$	% of $I_{PN}$	-0.3		0.3	
Linearity error 0 ... $I_{PM}$	$\varepsilon_L$	% of $I_{PM}$	-0.6		0.6	
Sum of sensitivity and linearity @ $I_{PN}$ , @ $T_A = 25\text{ °C}$	$\varepsilon_{SL}$	% of $I_{PN}$	-1.3		1.3	$T_A = 25\text{ °C}$
Sum of sensitivity and linearity @ $I_{PN}$ @ $T_A = 85\text{ °C}$ <sup>1)</sup>	$\varepsilon_{SL}$	% of $I_{PN}$	-2.76		2.76	
Sum of sensitivity and linearity @ $I_{PN}$ @ $T_A = 105\text{ °C}$ <sup>1)</sup>	$\varepsilon_{SL}$	% of $I_{PN}$	-3.25		3.25	
Sum of sensitivity and linearity @ $I_{PN}$ @ $T_A = 125\text{ °C}$ <sup>1)</sup>	$\varepsilon_{SL}$	% of $I_{PN}$	-3.74		3.74	

**Note:** <sup>1)</sup> Sum of sensitivity and linearity @  $T$ :

$$\varepsilon_{SL}(T_A) = \varepsilon_{SL25} + \left( TCS + \frac{TCI_{OE}}{I_{PN}} \right) \times [T_A - 25]$$

**Electrical data GO 20-SME**

At  $T_A = -40\text{ °C} \dots 125\text{ °C}$ ,  $U_C = +5\text{ V}$ ,  $R_L = 10\text{ k}\Omega$  unless otherwise noted (see Definition of typical, minimum and maximum values paragraph in page 6).

Parameter	Symbol	Unit	Min	Typ	Max	Conditions
Primary nominal RMS current	$I_{PN}$	A		20		
Primary current, measuring range	$I_{PM}$	A	-50		50	
Supply voltage	$U_C$	V	4.5	5	5.5	
Current consumption	$I_C$	mA		20	26	
Reference voltage (output)	$U_{ref}$	V		2.5		@ 25 °C, Internal ref.
Reference voltage (input)	$U_{ref}$	V	0.5		2.6	External reference
Output voltage range @ $I_{PM}$	$U_{out} - U_{ref}$	V	-2		2	
Output internal resistance	$R_{out}$	$\Omega$			5	Up to 10 kHz
Reference internal resistance	$R_{ref}$	$\Omega$	120	200	333	
Load capacitance	$C_L$	nF	0		6	
Nominal sensitivity	$S_N$	mV/A		40		
Electrical offset voltage @ $I_{PN} = 0$	$U_{OE}$	mV	-5		5	$T_A = 25\text{ °C}$ , $U_{out} - U_{ref}$ @ $U_{ref} = 2.5\text{ V}$
Electrical offset current referred to $I_{PN}$	$I_{OE}$	mA	-62.5		62.5	$T_A = 25\text{ °C}$
Temperature coefficient of $U_{ref}$	$TCU_{ref}$	ppm/K	-170		170	$U_{ref} = 2.5\text{ V}$
Temperature coefficient of $U_{OE}$	$TCU_{OE}$	mV/K	-0.075		0.075	
Temperature coefficient of $I_{OE}$	$TCl_{OE}$	mA/K	-1.88		1.88	
Temperature coefficient of $S$	$TCS$	ppm/K	-150		150	
Delay time to 90 % of the final output value for $I_{PN}$ step	$t_{D90}$	$\mu\text{s}$			2	
Delay time to 10 % of the final output value for $I_{PN}$ step	$t_{D10}$	$\mu\text{s}$			1.5	
Frequency bandwidth -3 dB, $T_A = 25\text{ °C}$	$BW$	KHz		300		
Noise voltage spectral density	$u_{no}$	$\mu\text{V}/\text{Hz}^{1/2}$		7		NBW = 1 kHz ... 100 kHz
Sensitivity error	$\varepsilon_S$	%	-1		1	Factory adjustment, @ 25 °C
Linearity error 0 ... $I_{PN}$	$\varepsilon_L$	% of $I_{PN}$	-0.3		0.3	
Linearity error 0 ... $I_{PM}$	$\varepsilon_L$	% of $I_{PM}$	-0.6		0.6	
Sum of sensitivity and linearity @ $I_{PN}$ , @ $T_A = 25\text{ °C}$	$\varepsilon_{SL}$	% of $I_{PN}$	-1.5		1.5	$T_A = 25\text{ °C}$
Sum of sensitivity and linearity @ $I_{PN}$ @ $T_A = 85\text{ °C}$ <sup>1)</sup>	$\varepsilon_{SL}$	% of $I_{PN}$	-3.26		3.26	
Sum of sensitivity and linearity @ $I_{PN}$ @ $T_A = 105\text{ °C}$ <sup>1)</sup>	$\varepsilon_{SL}$	% of $I_{PN}$	-3.85		3.85	
Sum of sensitivity and linearity @ $I_{PN}$ @ $T_A = 125\text{ °C}$ <sup>1)</sup>	$\varepsilon_{SL}$	% of $I_{PN}$	-4.44		4.44	

**Note:** <sup>1)</sup> Sum of sensitivity and linearity @  $T$ :

$$\varepsilon_{SL}(T_A) = \varepsilon_{SL25} + \left( TCS + \frac{TCl_{OE}}{I_{PN}} \right) \times |T_A - 25|$$

### Definition of typical, minimum and maximum values

Minimum and maximum values for specified limiting and safety conditions have to be understood as such as well as values shown in “typical” graphs.

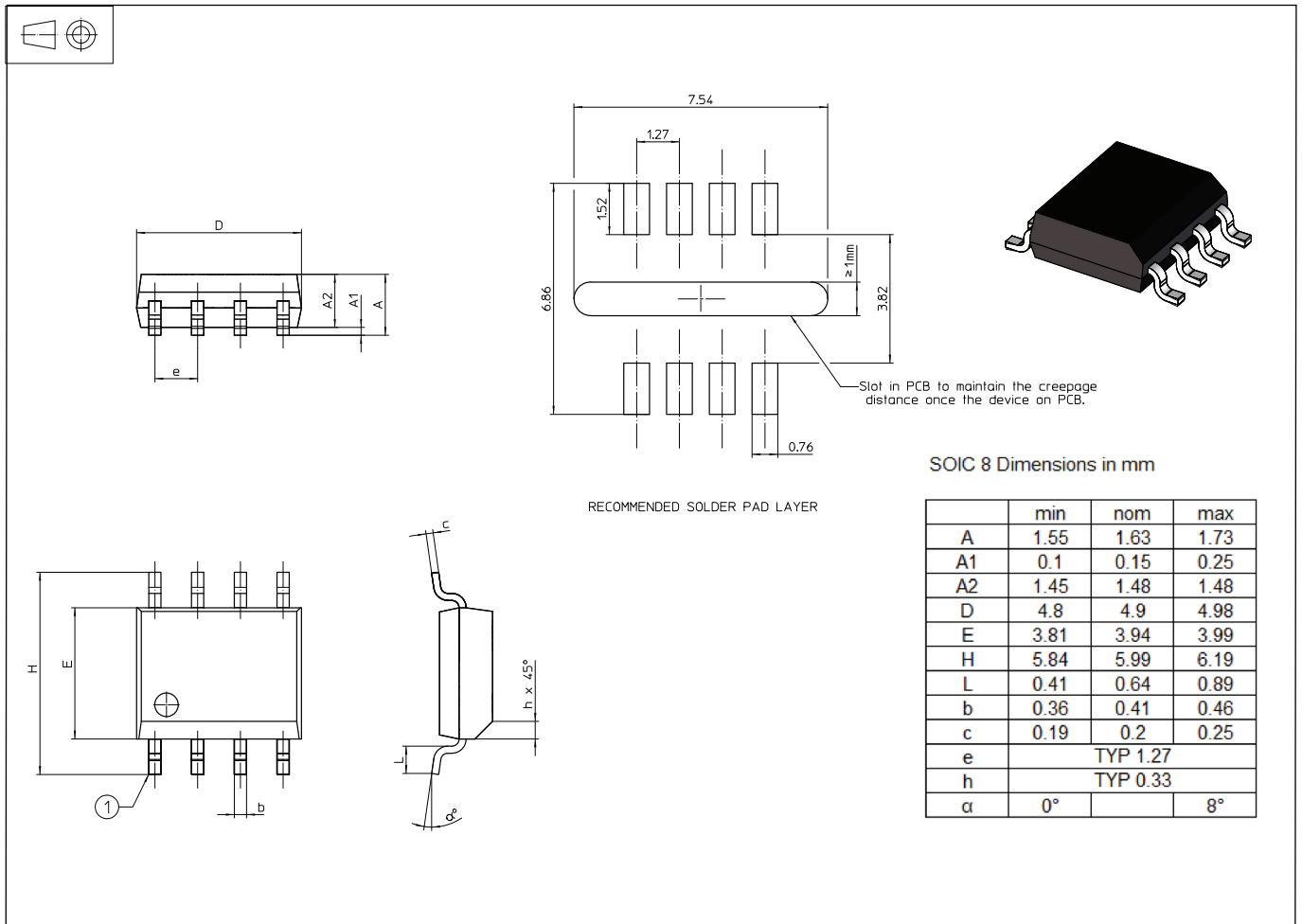
On the other hand, measured values are part of a statistical distribution that can be specified by an interval with upper and lower limits and a probability for measured values to lie within this interval.

Unless otherwise stated (e.g. “100 % tested”), the LEM definition for such intervals designated with “min” and “max” is that the probability for values of samples to lie in this interval is 99.73 %.

For a normal (Gaussian) distribution, this corresponds to an interval between  $-3$  sigma and  $+3$  sigma. If “typical” values are not obviously mean or average values, those values are defined to delimit intervals with a probability of 68.27 %, corresponding to an interval between  $-\text{sigma}$  and  $+\text{sigma}$  for a normal distribution.

Typical, maximal and minimal values are determined during the initial characterization of the product.

Dimensions (in mm)

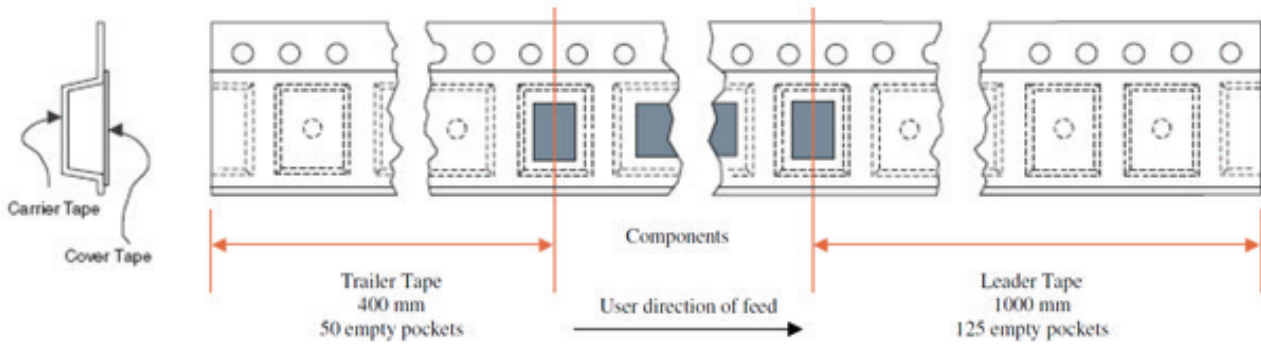


Soldering requirements

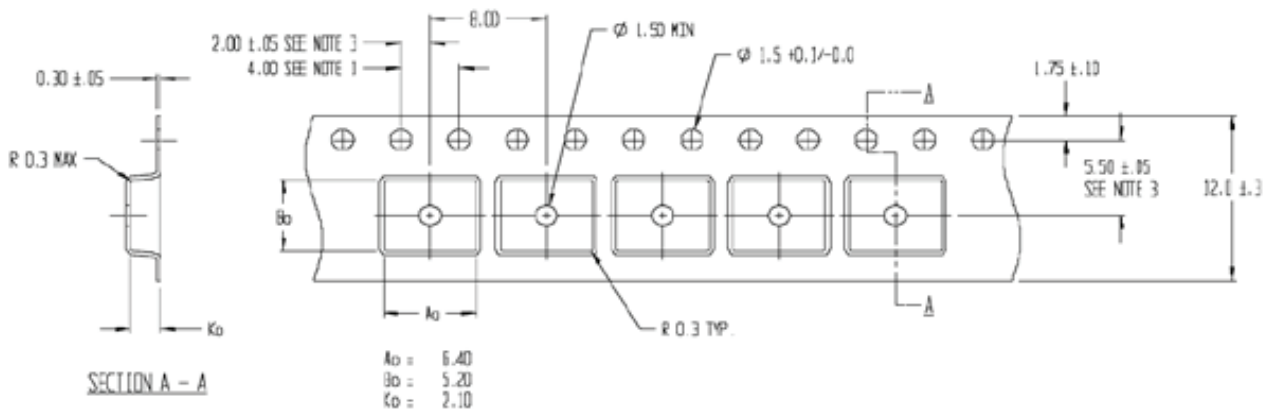
MSL3, 260 °C - IPC/JEDEC J-STD-020

Tape and reel dimensions (in mm)

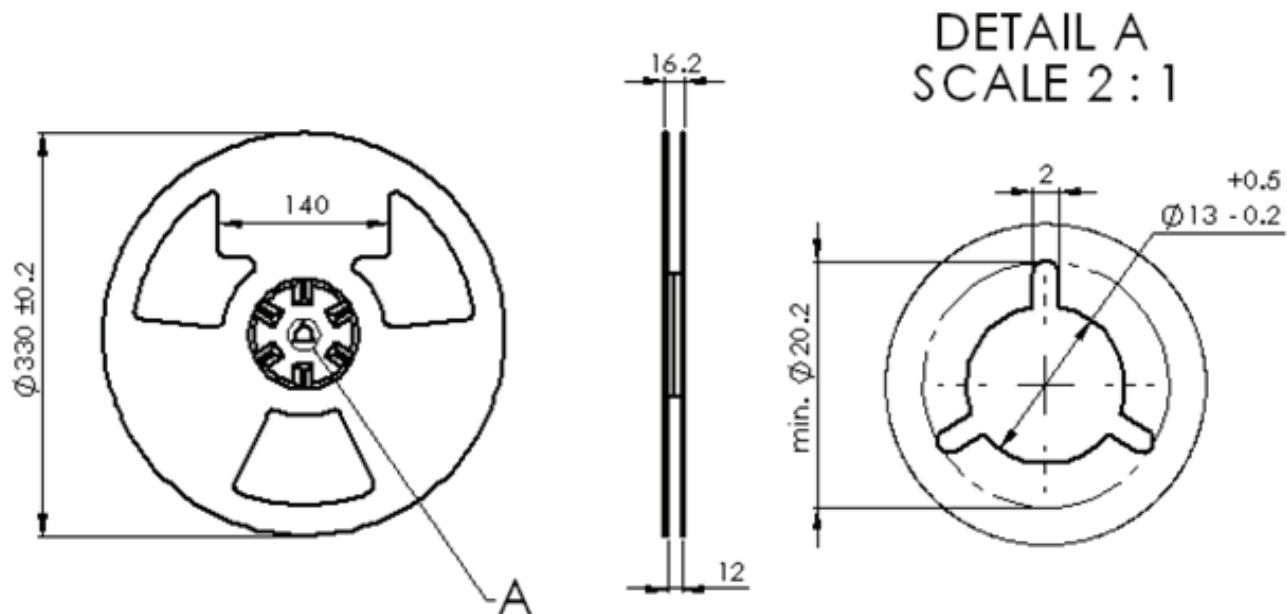
Leader & Trailer:



Carrier Tape Data:



Plastic Reel Data:





**Soldering requirements**

MSL3, 260 °C - IPC/JEDEC J-STD-020

**Ordering information**

Item number	Description	Package type	Package quantity
G2.05.13.000.0	GO 10-SME	Reel	3000
G2.05.13.100.0	GO 10-SME KIT 5P	Blister	5
G2.05.13.300.0	GO 10-SME SET OF 50 PCS	ESD Bag	50
G2.05.17.000.0	GO 20-SME	Reel	3000
G2.05.17.100.0	GO 20-SME KIT 5P	Blister	5
G2.05.17.300.0	GO 20-SME SET OF 50 PCS	ESD Bag	50