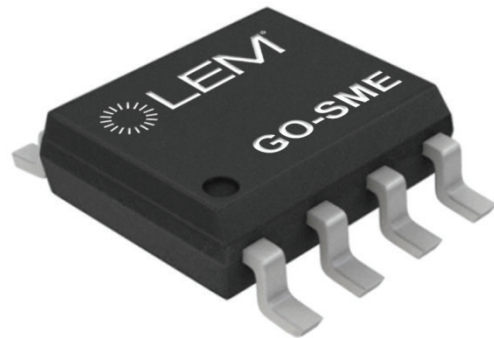


Ref: GO 8-SME/SP4, GO 15-SME/SP4

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
- Ratiometric output
- Response time 2 μs .

Special feature

- Single power supply +3.3 V.

Advantages

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

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 | |
| Maximum overload capability | $\hat{I}_{P\ max}$ | A | | | ±200 | $T_A = 25\ ^\circ\text{C}$, 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 | $I_{out\ max}$ | 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 | 3000 | 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 | 2400 | According to IEC 60950-1 |
| Impulse withstand voltage 1.2/50 μs | \hat{U}_w | V | 4000 | According to IEC 61800-5-1, IEC 62109-1, UL 60950-1 |
| Partial discharge RMS test voltage ($q_m < 5\ \text{pC}$) | U_t | V | 850 | Primary/secondary Corresponds to a recurring peak voltage of 728 V peak-to-peak 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 | 300 V RMS CAT II, PD2 | Basic insulation according to IEC 61800-5-1, IEC 62109-1, IEC 60950-1 |

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

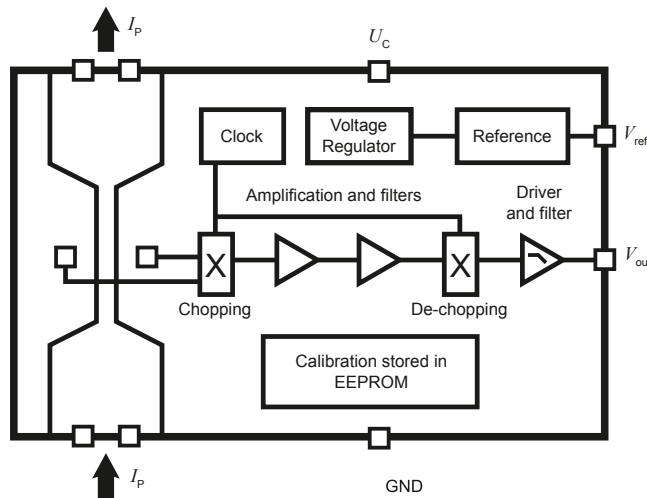
Only those products bearing the UL or UR Mark should be considered to be Listed or Recognized and covered under UL's Follow-Up Service. Always look for the Mark on the product.

Environmental and mechanical characteristics

| Parameter | Symbol | Unit | Min | Typ | Max | Conditions |
|---|-------------|------|-----|-----|-----|-----------------------|
| Ambient operating temperature | T_A | °C | -40 | | 125 | |
| Ambient storage temperature | T_S | °C | -55 | | 165 | |
| Resistance of the primary @ $T_A = 25\text{ °C}$ | R_p | mΩ | | 0.9 | | |
| Thermal resistance, junction to board ¹⁾ | $R_{th,JB}$ | °K/W | | 15 | | |
| Time constant | t | s | | 1 | | To reach steady state |

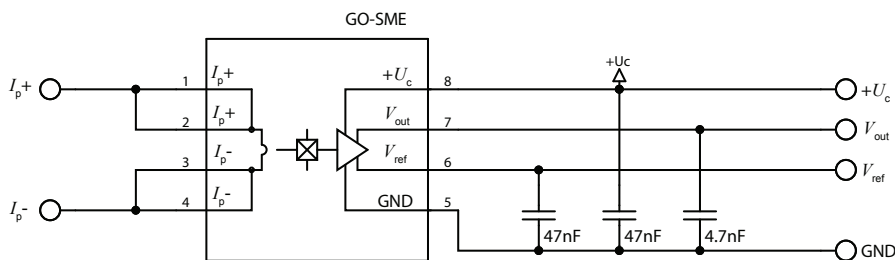
Note: ¹⁾ Done on LEM evaluation board PCB 2320.

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 | V_{ref} | Reference voltage (output) |
| 7 | V_{out} | Output voltage |
| 8 | U_c | Supply voltage |



Electrical data GO 8-SME/SP4

 At $T_A = -40\text{ °C} \dots 125\text{ °C}$, $U_C = +3.3\text{ V}$, $R_L = 10\text{ k}\Omega$ unless otherwise noted.

| Parameter | Symbol | Unit | Min | Typ | Max | Conditions |
|--|---------------------|-------------------------------|--------|---------|-------|---|
| Primary nominal RMS current | I_{PN} | A | | 8 | | |
| Primary current, measuring range | I_{PM} | A | -20 | | 20 | |
| Supply voltage ¹⁾ | U_C | V | 3.135 | 3.3 | 3.465 | |
| Current consumption | I_C | mA | | 20 | 26 | |
| Reference voltage (output) | V_{ref} | V | | $U_C/2$ | | @ 25 °C |
| Reference voltage (input) | V_{ref} | V | 0.5 | | 1.7 | |
| Output voltage range @ I_{PM} | $V_{out} - V_{ref}$ | V | -1.25 | | 1.25 | |
| Output internal resistance | R_{out} | Ω | | | 5 | Up to 10 kHz |
| Reference internal resistance | R_{ref} | Ω | 120 | 200 | 333 | |
| Capacitive loading | C_L | nF | 0 | | 6 | |
| Theoretical sensitivity | G_{th} | mV/A | | 62.5 | | |
| Electrical offset voltage @ $I_{PN} = 0$ | V_{OE} | mV | -5 | | 5 | $T_A = 25\text{ °C}$, $V_{out} - V_{ref}$ @ $V_{ref} = 1.65\text{ V}$ |
| Electrical offset current referred to I_{PN} | I_{OE} | mA | -80 | | 80 | $T_A = 25\text{ °C}$ |
| Temperature coefficient of V_{ref} | TCV_{ref} | ppm/K | -150 | | 150 | $V_{ref} = 1.65\text{ V}$ |
| Temperature coefficient of V_{OE} | TCV_{OE} | mV/K | -0.075 | | 0.075 | |
| Temperature coefficient of I_{OE} | TCI_{OE} | mA/K | -1.2 | | 1.2 | |
| Temperature coefficient of G | TCG | ppm/K | -150 | | 150 | |
| Step response time to 90 % of I_{PN} | t_r | μs | | | 2 | |
| Reaction time @ 10 % of I_{PN} | t_{ra} | μs | | | 1.5 | |
| Frequency bandwidth -3 dB, $T_A = 25\text{ °C}$ | BW | KHz | | 300 | | |
| Output noise voltage spectral density | e_{no} | $\mu\text{V}/\text{Hz}^{1/2}$ | | 8 | | NBW = 1 kHz ... 100 kHz |
| Sensitivity error | ε_G | % | -1 | | 1 | Factory adjustment |
| Linearity error 0 ... I_{PN} | ε_L | % @ I_{PN} | -0.3 | | 0.3 | |
| Linearity error 0 ... I_{PM} | ε_L | % @ I_{PM} | -0.6 | | 0.6 | |
| Accuracy @ I_{PN} | X | % @ I_{PN} | -1.3 | | 1.3 | $T_A = 25\text{ °C}$ |
| Accuracy @ I_{PN} @ $T_A = 85\text{ °C}$ ²⁾ | X | % @ I_{PN} | -3.1 | | 3.1 | |
| Accuracy @ I_{PN} @ $T_A = 105\text{ °C}$ | X | % @ I_{PN} | -3.7 | | 3.7 | |
| Accuracy @ I_{PN} @ $T_A = 125\text{ °C}$ | X | % @ I_{PN} | -4.3 | | 4.3 | |

Notes: ¹⁾ The output voltage V_{out} is fully ratiometric. The offset and sensitivity are dependent on the supply voltage U_C relative to the following formula:

$$I_P = \left(\frac{3.3}{U_C} \times V_{out} - V_{ref} \right) \times \frac{1}{G} \text{ with } G \text{ in (V/A)}$$

²⁾ Accuracy X :

$$\varepsilon_{TA} = (\varepsilon_L + \varepsilon_G) + \left(\frac{TCV_{OE}}{I_{PN} \times G} + TCG \times 10^{-6} \right) \times (T_A - 25) \times 100$$

Electrical data GO 15-SME/SP4

 At $T_A = -40\text{ °C} \dots 125\text{ °C}$, $U_C = +3.3\text{ V}$, $R_L = 10\text{ k}\Omega$ unless otherwise noted.

| Parameter | Symbol | Unit | Min | Typ | Max | Conditions |
|--|---------------------|-------------------------------|--------|---------|-------|---|
| Primary nominal RMS current | I_{PN} | A | | 15 | | |
| Primary current, measuring range | I_{PM} | A | -37.5 | | 37.5 | |
| Supply voltage ¹⁾ | U_C | V | 3.135 | 3.3 | 3.465 | |
| Current consumption | I_C | mA | | 20 | 26 | |
| Reference voltage (output) | V_{ref} | V | | $U_C/2$ | | @ 25 °C |
| Reference voltage (input) | V_{ref} | V | 0.5 | | 1.7 | |
| Output voltage range @ I_{PM} | $V_{out} - V_{ref}$ | V | -1.25 | | 1.25 | |
| Output internal resistance | R_{out} | Ω | | | 5 | Up to 10 kHz |
| Reference internal resistance | R_{ref} | Ω | 120 | 200 | 333 | |
| Capacitive loading | C_L | nF | 0 | | 6 | |
| Theoretical sensitivity | G_{th} | mV/A | | 33.3 | | |
| Electrical offset voltage @ $I_{PN} = 0$ | V_{OE} | mV | -5 | | 5 | $T_A = 25\text{ °C}$, $V_{out} - V_{ref}$ @ $V_{ref} = 1.65\text{ V}$ |
| Electrical offset current referred to I_{PN} | I_{OE} | mA | -150 | | 150 | $T_A = 25\text{ °C}$ |
| Temperature coefficient of V_{ref} | TCV_{ref} | ppm/K | -150 | | 150 | $V_{ref} = 1.65\text{ V}$ |
| Temperature coefficient of V_{OE} | TCV_{OE} | mV/K | -0.075 | | 0.075 | |
| Temperature coefficient of I_{OE} | TCI_{OE} | mA/K | -2.25 | | 2.25 | |
| Temperature coefficient of G | TCG | ppm/K | -150 | | 150 | |
| Step response time to 90 % of I_{PN} | t_r | μs | | | 2 | |
| Reaction time @ 10 % of I_{PN} | t_{ra} | μs | | | 1.5 | |
| Frequency bandwidth -3 dB, $T_A = 25\text{ °C}$ | BW | KHz | | 300 | | |
| Output noise voltage spectral density | e_{no} | $\mu\text{V}/\text{Hz}^{1/2}$ | | 5 | | NBW = 1 kHz ... 100 kHz |
| Sensitivity error | ε_G | % | -1 | | 1 | Factory adjustment |
| Linearity error 0 ... I_{PN} | ε_L | % @ I_{PN} | -0.3 | | 0.3 | |
| Linearity error 0 ... I_{PM} | ε_L | % @ I_{PM} | -0.6 | | 0.6 | |
| Accuracy @ I_{PN} | X | % @ I_{PN} | -1.3 | | 1.3 | $T_A = 25\text{ °C}$ |
| Accuracy @ I_{PN} @ $T_A = 85\text{ °C}$ ²⁾ | X | % @ I_{PN} | -3.1 | | 3.1 | |
| Accuracy @ I_{PN} @ $T_A = 105\text{ °C}$ | X | % @ I_{PN} | -3.7 | | 3.7 | |
| Accuracy @ I_{PN} @ $T_A = 125\text{ °C}$ | X | % @ I_{PN} | -4.3 | | 4.3 | |

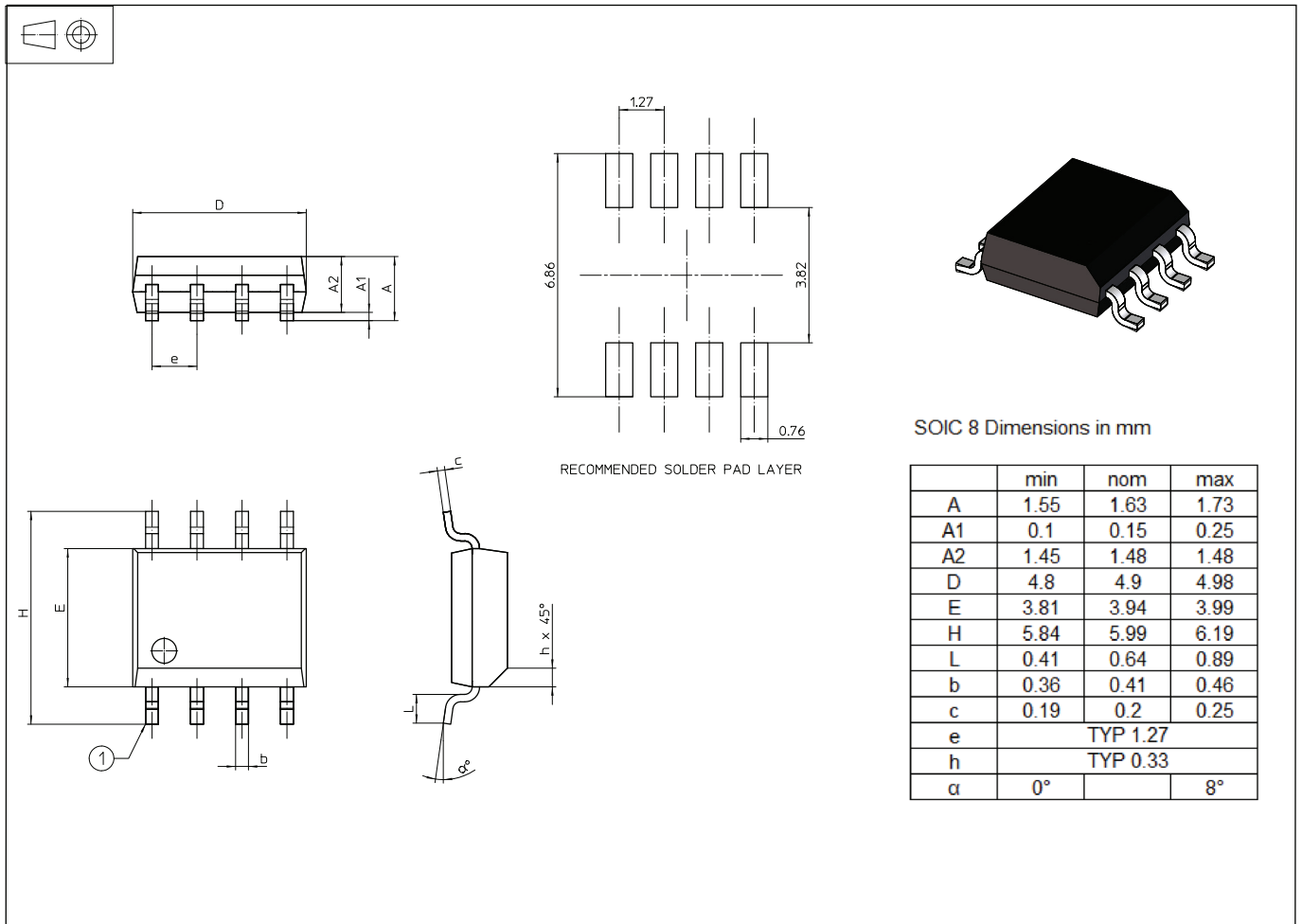
Notes: ¹⁾ The output voltage V_{out} is fully ratiometric. The offset and sensitivity are dependent on the supply voltage U_C relative to the following formula:

$$I_P = \left(\frac{3.3}{U_C} \times V_{out} - V_{ref} \right) \times \frac{1}{G} \text{ with } G \text{ in (V/A)}$$

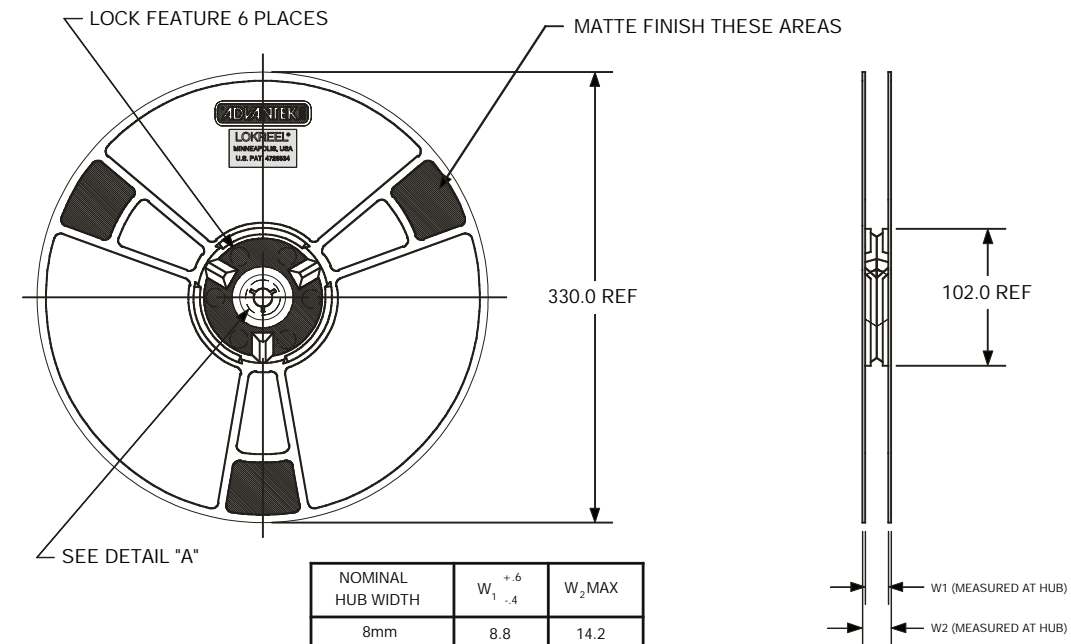
²⁾ Accuracy X :

$$\varepsilon_{TA} = (\varepsilon_L + \varepsilon_G) + \left(\frac{TCV_{OE}}{I_{PN} \times G} + TCG \times 10^{-6} \right) \times (T_A - 25) \times 100$$

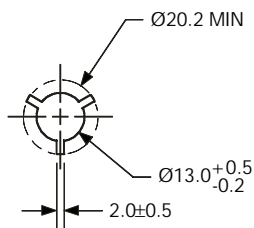
Dimensions (in mm)



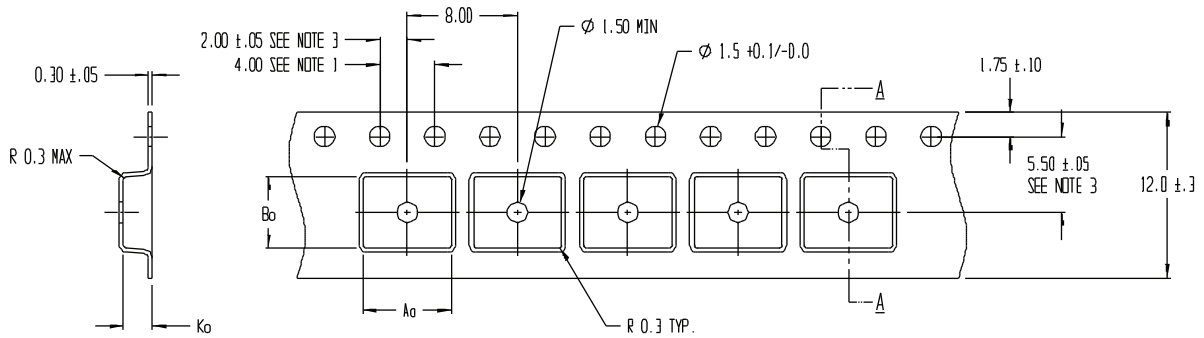
Tape and reel dimensions (in mm)



| NOMINAL HUB WIDTH | $W_1 \begin{smallmatrix} +.6 \\ -.4 \end{smallmatrix}$ | $W_2 \text{ MAX}$ |
|-------------------|--|-------------------|
| 8mm | 8.8 | 14.2 |
| 12mm | 12.8 | 18.2 |
| 16mm | 16.8 | 22.2 |
| 24mm | 24.8 | 30.2 |
| 32mm | 32.8 | 38.2 |
| 44mm | 44.8 | 50.2 |
| 56mm | 56.8 | 62.2 |



DETAIL "A"



SECTION A - A

- Notes:**
- 1) 10 Sprocket hole pitch cumulative tolerance ± 0.2 mm
 - 2) Camber in compliance with EIA 481
 - 3) Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole.

Soldering requirements

MSL3, 260 °C - IPC/JEDEC J-STD-020

Ordering information

| Item number | Description | Package type | Package quantity |
|--------------------|-----------------------------|---------------------|-------------------------|
| G2.05.11.004.0 | GO 8-SME/SP4 | Reel | 3000 |
| G2.05.11.104.0 | GO 8-SME/SP4 KIT 5P | Blister | 5 |
| G2.05.11.304.0 | GO 8-SMS/SP4 SET OF 50 PCS | ESD Bag | 50 |
| G2.05.J5.004.0 | GO 15-SME/SP4 | Reel | 3000 |
| G2.05.J5.104.0 | GO 15-SME/SP4 KIT 5P | Blister | 5 |
| G2.05.J5.304.0 | GO 15-SME/SP4 SET OF 50 PCS | ESD Bag | 50 |