

CEM6407

-60V ▲ 40mΩ ▲ -5.1A ▲ Dual Si MOSFET

SILICON Si MOSFET ▲ SMD type

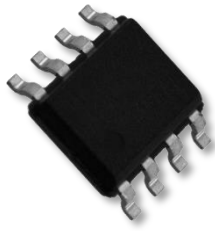
Dual P-channel enhancement mode

UL94V-0 rated flame retardant epoxy

SO8 package ▲ MSL 3

Super high dense cell density for extremely low $R_{DS(ON)}$

High power and current handling capability








MAXIMUM RATINGS

| Parameter ($T_A = 25^{\circ}\text{C}$, unless otherwise noted) | | Characteristics |
|--|----------------|---|
| Drain-Source Voltage | V_{DS} | -60V |
| Gate-Source Voltage | V_{GS} | $\pm 25\text{V}$ |
| Continuous Drain Current | I_D | -5.1A |
| Pulsed Drain Current ^{Note 1} | I_{DM} | -20.4A |
| Maximum Power Dissipation | P_D | 2W |
| Operating and Storage Temperature Range | T_J, T_{STG} | -55°C to $+150^{\circ}\text{C}$ |

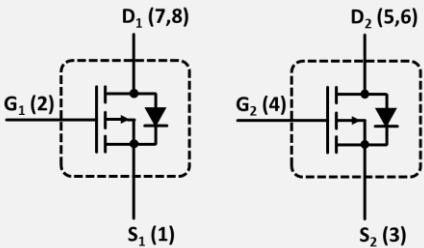
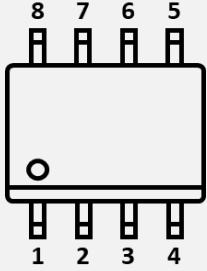
THERMAL CHARACTERISTICS

| Parameter | Symbol | Limit |
|---|--------------|--------------------------|
| Thermal Resistance, Junction-to-Ambient ^{Note 2} | R_{TH_JA} | 62.5°C/W |

APPLICATIONS

| DC/DC Converter | DC Fan | Load Switches | Power Banks | USB Storage |
|---|---|---|---|---|
|  |  |  |  |  |

PIN DESCRIPTION

| Circuit Diagram | Outline - Top View | Pin No. | Description |
|---|---|--------------------------------------|--|
|  |  | 1 2 3 4 5 6 7 8 | Source MOSFET 1 Gate MOSFET 1 Source MOSFET 2 Gate MOSFET 2 Drain MOSFET 2 Drain MOSFET 2 Drain MOSFET 1 Drain MOSFET 1 |

ELECTRICAL CHARACTERISTICS ▲ $T_A = 25^\circ\text{C}$, unless otherwise noted

| Item | Condition | Symbol | Min. | Typ. | Max. | Unit |
|---|---|--------------|------|------|------|------------|
| Off Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | $V_{GS} = 0V, I_D = -250\mu A$ | BV_{DSS} | -60 | | | V |
| Zero Gate Voltage Drain Current | $V_{DS} = -60V, V_{GS} = 0V$ | I_{DSS} | | | -1 | μA |
| Gate Body Leakage Current, Forward | $V_{GS} = 20V, V_{DS} = 0V$ | I_{GSSF} | | | 100 | nA |
| Gate Body Leakage Current, Reverse | $V_{GS} = -20V, V_{DS} = 0V$ | I_{GSSR} | | | -100 | nA |
| On Characteristics ^{Note 3} | | | | | | |
| Gate Threshold Voltage | $V_{GS} = V_{DS}, I_D = -250\mu A$ | $V_{GS(th)}$ | -1 | | -3 | V |
| Static Drain-Source On-Resistance | $V_{GS} = -10V, I_D = -4A$ | $R_{DS(ON)}$ | | 40 | 48 | m Ω |
| Static Drain-Source On-Resistance | $V_{GS} = -4.5V, I_D = -2A$ | $R_{DS(ON)}$ | | 52 | 68 | m Ω |
| Dynamic Characteristics ^{Note 4} | | | | | | |
| Input Capacitance | $V_{DS} = -15V, V_{GS} = 0V, f = 1MHz$ | C_{ISS} | | 1305 | | pF |
| Output Capacitance | $V_{DS} = -15V, V_{GS} = 0V, f = 1MHz$ | C_{OSS} | | 145 | | pF |
| Reverse Transfer Capacitance | $V_{DS} = -15V, V_{GS} = 0V, f = 1MHz$ | C_{RSS} | | 85 | | pF |
| Switching Characteristics ^{Note 4} | | | | | | |
| Turn-On Delay Time | $V_{DD} = -48V, V_{GS} = -10V, I_D = -1A, R_{G(ext)} = 6\Omega$ | $t_{D(ON)}$ | | 12 | | ns |
| Turn-On Rise Time | $V_{DD} = -48V, V_{GS} = -10V, I_D = -1A, R_{G(ext)} = 6\Omega$ | t_R | | 7 | | ns |
| Turn-Off Delay Time | $V_{DD} = -48V, V_{GS} = -10V, I_D = -1A, R_{G(ext)} = 6\Omega$ | $t_{D(OFF)}$ | | 62 | | ns |
| Turn-Off Fall Time | $V_{DD} = -48V, V_{GS} = -10V, I_D = -1A, R_{G(ext)} = 6\Omega$ | t_F | | 27 | | ns |
| Total Gate Charge | $V_{DS} = -48V, V_{GS} = -10V, I_D = -1A$ | Q_G | | 25 | | nC |
| Gate Source Charge | $V_{DS} = -48V, V_{GS} = -10V, I_D = -1A$ | Q_{GS} | | 2 | | nC |
| Gate Drain Charge | $V_{DS} = -48V, V_{GS} = -10V, I_D = -1A$ | Q_{GD} | | 6 | | nC |
| Drain-Source Diode Characteristics and Maximum Ratings | | | | | | |
| Drain-Source Diode Forward Current ^{Note 2} | | I_S | | | -1.6 | A |
| Drain-Source Diode Forward Voltage ^{Note 3} | $V_{GS} = 0V, I_S = -1.6A$ | V_{SD} | | | -1.2 | V |

Notes

- 1: Repetitive Rating: Pulse width limited by maximum junction temperature
- 2: Surface Mounted on FR4 Board, $t \leq 10$ sec
- 3: Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
- 4: Guaranteed by design, not subject to production testing.

REFERENCE DATA ▲ TYPICAL DEVICE PERFORMANCE

Fig. 1 • Output Characteristics

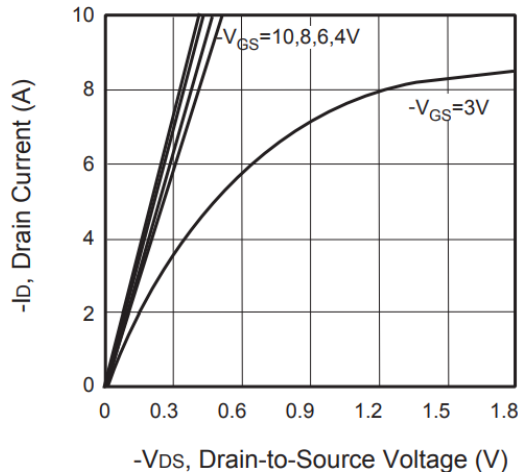


Fig. 2 • Transfer Characteristics

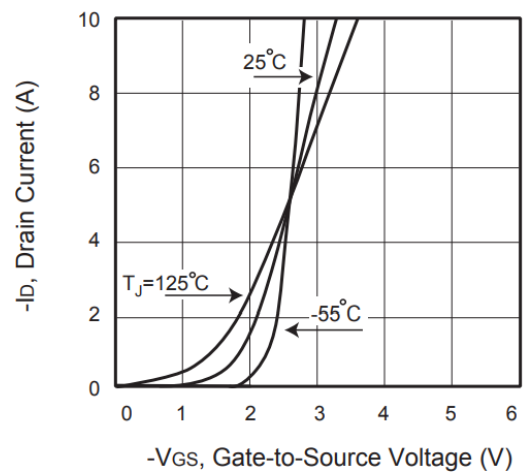


Fig. 3 • Capacitance

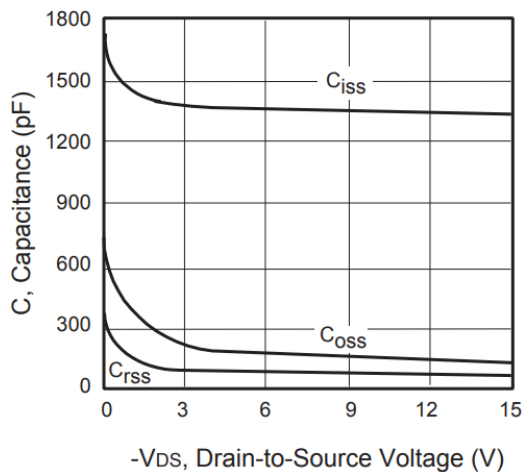


Fig. 4 • On-Resistance Variation with Temperature

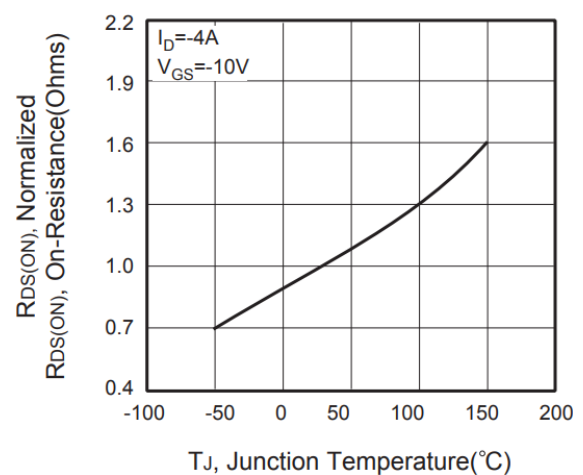


Fig. 5 • Gate Threshold Variation with Temperature

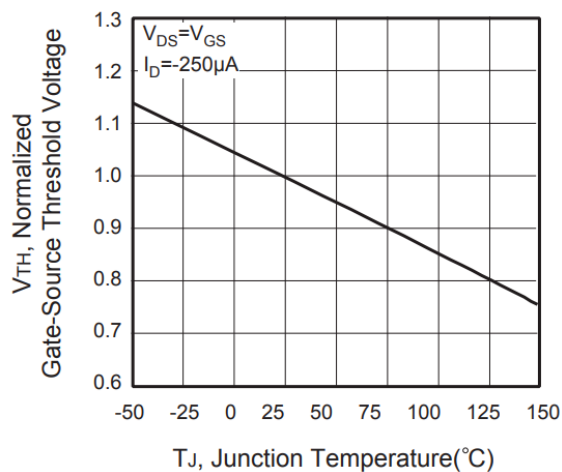
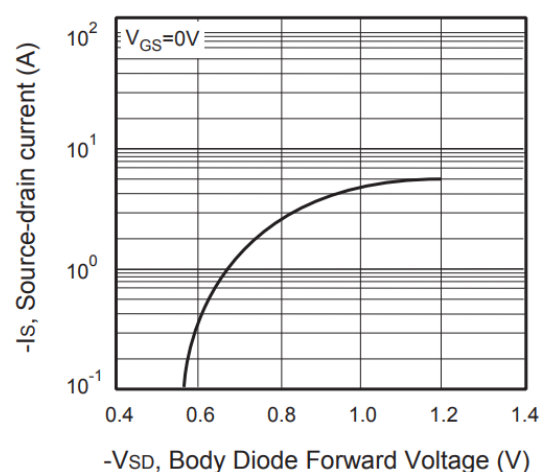


Fig. 6 • Body Diode Forward Voltage Variation with Source Current



REFERENCE DATA ▲ TYPICAL DEVICE PERFORMANCE

Fig. 7 • Gate Charge

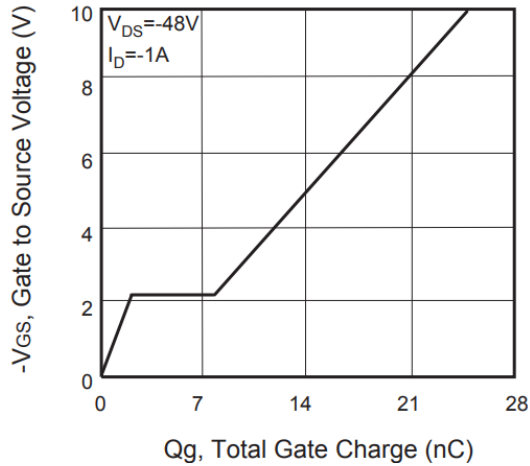


Fig. 8 • Maximum Safe Operating Area

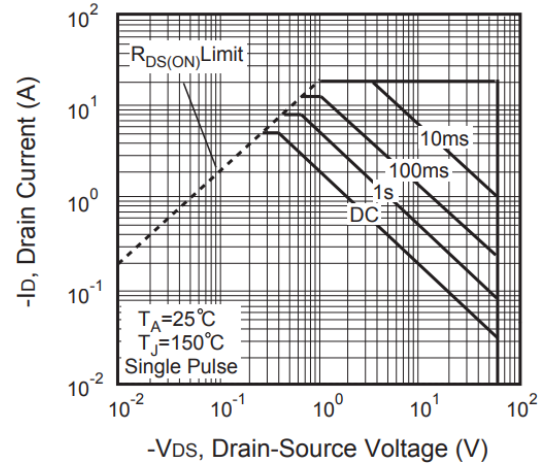


Fig. 9 • Breakdown Voltage Variation vs. Temperature

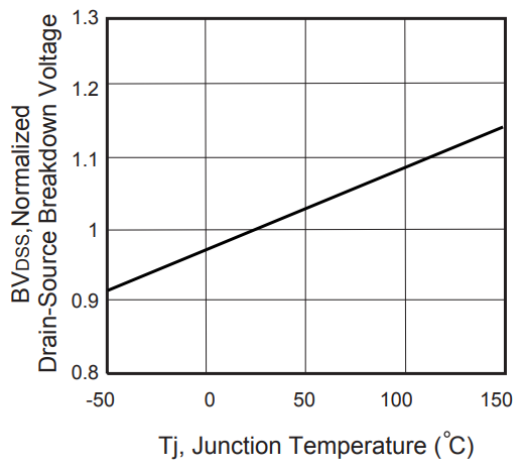


Fig. 10 • Switching Test Circuit

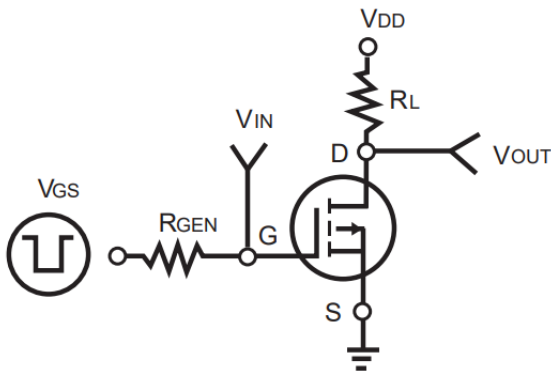
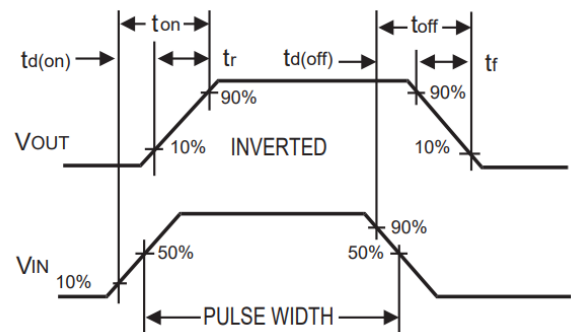
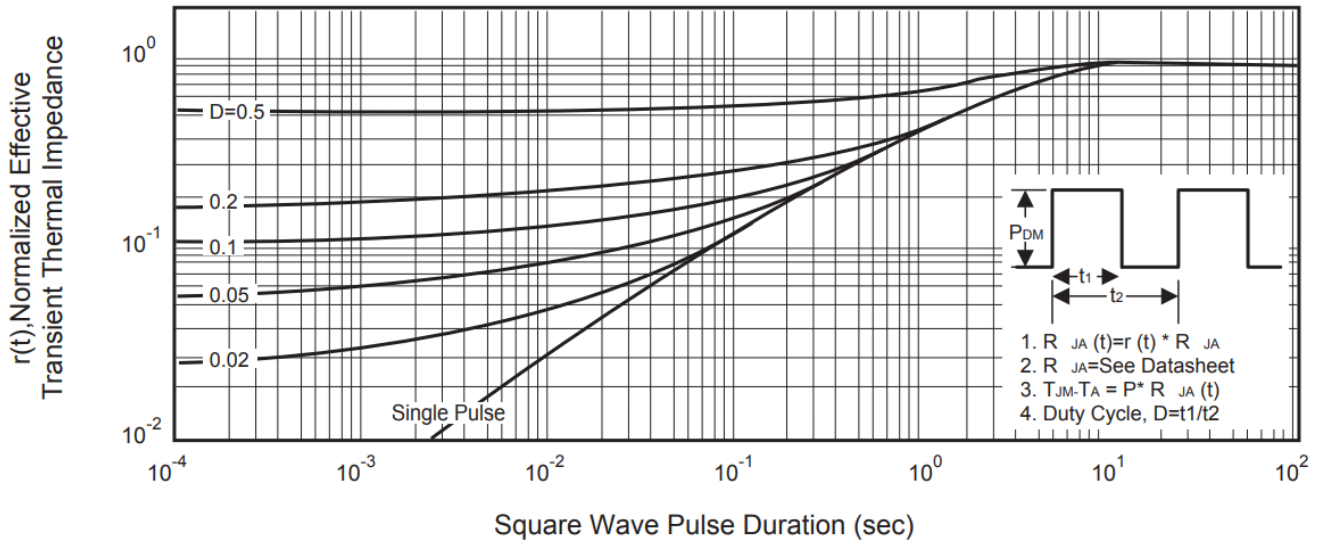


Fig. 11 • Switching Waveforms

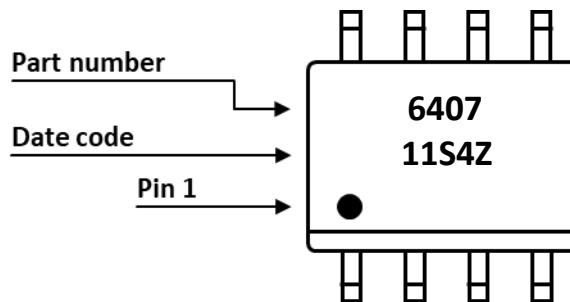


REFERENCE DATA ▲ TYPICAL DEVICE PERFORMANCE

Fig. 12 • Normalized Thermal Transient Impedance Curve



PART MARKING



DATE CODE

Example: 11S4Z



Coding list for „Day“

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A |
| 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 |
| B | C | D | E | F | G | H | I | J | K |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| L | M | N | O | P | Q | R | S | T | U |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| V | | | | | | | | | |
| 31 | | | | | | | | | |

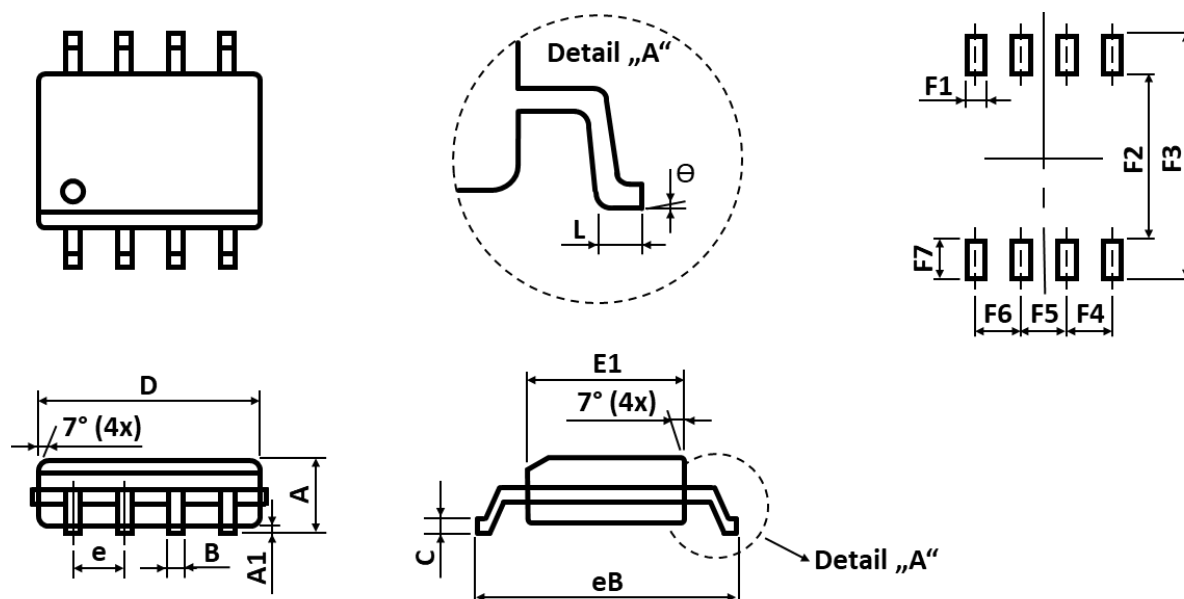
Coding list for „Month“

| | | | | | |
|-----|-----|-----|-----|-----|-----|
| 1 | 2 | 3 | 4 | 5 | 6 |
| Jan | Feb | Mar | Apr | May | Jun |
| 7 | 8 | 9 | A | B | C |
| Jul | Aug | Sep | Oct | Nov | Dec |

Coding list for „Year“

| | | | | |
|------|------|------|------|------|
| 0 | 1 | 2 | 3 | 4 |
| 2020 | 2021 | 2022 | 2023 | 2024 |
| 5 | 6 | 7 | 8 | 9 |
| 2025 | 2026 | 2027 | 2028 | 2029 |

PACKAGE OUTLINE AND RECOMMENDED PAD LAYOUT



| Sym | Millimeters (Min.) | Millimeters (Typ.) | Millimeters (Max.) |
|-----|--------------------|--------------------|--------------------|
| A | 1.350 | - | 1.750 |
| A1 | 0.100 | - | 0.250 |
| B | 0.310 | - | 0.510 |
| C | 0.170 | - | 0.250 |
| D | 4.690 | - | 5.000 |

| Sym | Millimeters (Min.) | Millimeters (Typ.) | Millimeters (Max.) |
|-----|--------------------|--------------------|--------------------|
| E1 | 3.700 | - | 4.060 |
| eB | 5.800 | - | 6.200 |
| e | - | 1.270 | - |
| L | 0.400 | - | 0.950 |
| Θ | 0° | - | 8° |

| Sym | Millimeters (Min.) | Millimeters (Typ.) | Millimeters (Max.) |
|-----|--------------------|--------------------|--------------------|
| F1 | - | 0.500 | - |
| F2 | - | 4.250 | - |
| F3 | - | 6.250 | - |
| F4 | - | 1.270 | - |

| Sym | Millimeters (Min.) | Millimeters (Typ.) | Millimeters (Max.) |
|-----|--------------------|--------------------|--------------------|
| F5 | - | 1.270 | - |
| F6 | - | 1.270 | - |
| F7 | - | 1.000 | - |

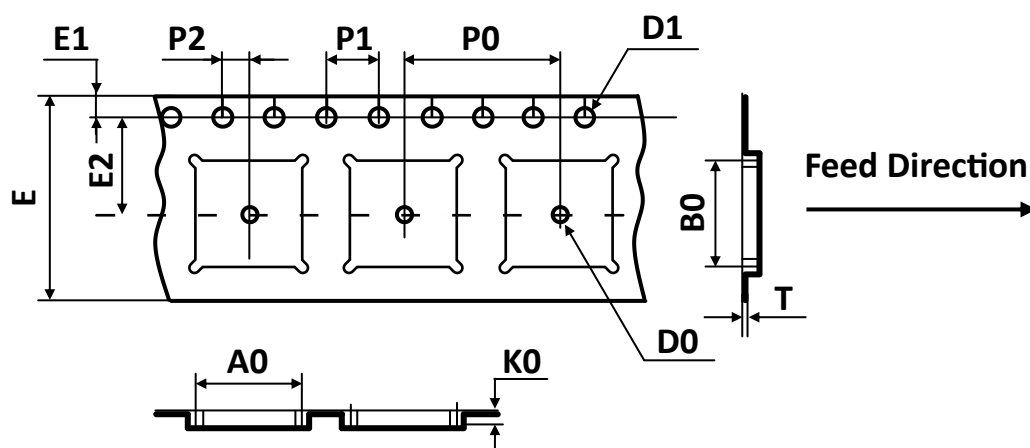
Notes: 1. The suggested land pattern dimensions have been provided for reference only.
2. For further information, please reference document IPC-7351A.

ORDERING INFORMATION

| Part Number | Package | Packing | Reel Qty. | Inner Box Qty. | Outer Box Qty. |
|-------------|---------|----------|-----------|----------------|----------------|
| CEM6407 | SO8 | 13" Reel | 2,500pcs | 5,000pcs | 40,000pcs |

REEL DIMENSIONS ▲ All dimensions in mm


| Tape Size | Reel Size | M | N | T | H | K | S |
|-----------|-----------|---------|---------|-------|-------|-------|-------|
| 12mm | Ø330 | Ø330.00 | Ø100.00 | 2.20 | 20.00 | 13.20 | 3.00 |
| | | ±2.00 | ±0.50 | ±0.20 | ±1.00 | ±0.20 | ±1.00 |

TAPE DIMENSIONS ▲ All dimensions in mm


| Package | A0 | B0 | K0 | D0 | D1 | E | E1 | E2 | P0 | P1 | P2 | T |
|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| SO8 | 6.50 | 5.30 | 2.05 | 1.50 | 1.50 | 12.00 | 1.75 | 5.50 | 8.00 | 4.00 | 2.00 | 0.25 |
| | ±0.10 | ±0.10 | ±0.15 | ±0.10 | ±0.10 | ±0.10 | ±0.10 | ±0.10 | ±0.10 | ±0.10 | ±0.05 | ±0.02 |

Note: All dimensions meet EIA-481-D requirements.

RECOMMENDED REFLOW SOLDERING PROFILE



Recommended reflow soldering conditions ▲ Refer to JEDEC J-STD-020E

| Profile Features | | Sn-Pb Eutetic Assembly | Pb-Free Assembly |
|--|---------------------|------------------------|------------------|
| Preheat temperature min. | $T_{s \text{ min}}$ | 100 °C | 150 °C |
| Preheat temperature max. | $T_{s \text{ max}}$ | 150 °C | 200 °C |
| Preheat time t_s from $T_{s \text{ min}}$ to $T_{s \text{ max}}$ | t_s | 120 seconds | 120 seconds |
| Ramp-up rate (T_L to T_p) | | max. 3 °C/second | max. 3 °C/second |
| Liquidous temperature | T_L | 183 °C | 217 °C |
| Time t_L maintained above T_L | t_L | 150 seconds max. | 150 seconds max. |
| Peak package body temperature | T_p | 235°C | 260°C |
| Timeframe of within 5°C below and up to max actual peak body temperature | t_p | 20 seconds max. | 30 seconds max. |
| Ramp-down rate (T_L to T_p) | | max. 6 °C/second | max. 6 °C/second |
| Time 25°C to peak temperature | | max. 6 minutes | max. 8 minutes |

REVISION TABLE

| Revision | Date | Status | Notes |
|----------|------------|-----------------|---------------------|
| 001 | 30/09/2022 | Initial release | Initial publication |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

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