



CEBF634

250V ▲ 0.45Ω ▲ 8.1A ▲ Si MOSFET

SILICON Si MOSFET ▲ SMD type

N-channel enhancement mode

UL94V-0 rated flame retardant epoxy

TO263 (D2PAK) package ▲ MSL 3

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

High power and current handling capability






MAXIMUM RATINGS

| Parameter ($T_C = 25^\circ\text{C}$, unless otherwise noted) | | Characteristics |
|--|----------------------------|---|
| Drain-Source Voltage | V_{DS} | 250V |
| Gate-Source Voltage | V_{GS} | $\pm 20\text{V}$ |
| Continuous Drain Current at $T_C = 25^\circ\text{C}$ | I_D | 8.1A |
| Continuous Drain Current at $T_C = 100^\circ\text{C}$ | I_D | 5.1A |
| Pulsed Drain Current ^{Note 1} | I_{DM} ^{Note 4} | 32A |
| Maximum Power Dissipation at $T_C = 25^\circ\text{C}$ | P_D | 74W |
| Power Dissipation Derating above 25°C | ΔP_D | 0.59W/ $^\circ\text{C}$ |
| Operating and Storage Temperature Range | T_J, T_{STG} | -55°C to $+150^\circ\text{C}$ |

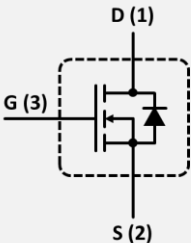
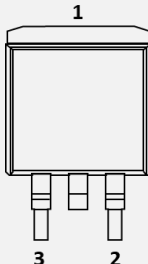
THERMAL CHARACTERISTICS

| Parameter | Symbol | Limit |
|---|--------------|--------------------------------|
| Thermal Resistance, Junction-to-Case | R_{TH_JC} | 1.7 $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction-to-Ambient | R_{TH_JA} | 62.5 $^\circ\text{C}/\text{W}$ |

APPLICATIONS

| E-Bike | Industrial Control | Power over Ethernet | Power Inverter | UPS |
|---|---|---|---|---|
|  |  |  |  |  |

PIN DESCRIPTION

| Circuit Diagram | Outline - Bottom View | Pin No. | Description |
|---|---|-------------|-------------------------|
|  |  | 1 2 3 | Drain Source Gate |

ELECTRICAL CHARACTERISTICS ▲ $T_C = 25^\circ\text{C}$, 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} | 250 | | | V |
| Zero Gate Voltage Drain Current | $V_{DS} = 250V, V_{GS} = 0V$ | I_{DSS} | | | 25 | 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 2} | | | | | | |
| Gate Threshold Voltage | $V_{GS} = V_{DS}, I_D = 250\mu A$ | $V_{GS(th)}$ | 2 | | 4 | V |
| Static Drain-Source On-Resistance | $V_{GS} = 10V, I_D = 4.5A$ | $R_{DS(ON)}$ | | | 0.45 | Ω |
| Forward Transconductance | $V_{DS} = 50V, I_D = 5.1A$ | g_{FS} | | 4.4 | | S |
| Dynamic Characteristics ^{Note 3} | | | | | | |
| Input Capacitance | $V_{DS} = 25V, V_{GS} = 0V, f = 1MHz$ | C_{ISS} | | 925 | | pF |
| Output Capacitance | $V_{DS} = 25V, V_{GS} = 0V, f = 1MHz$ | C_{OSS} | | 95 | | pF |
| Reverse Transfer Capacitance | $V_{DS} = 25V, V_{GS} = 0V, f = 1MHz$ | C_{RSS} | | 20 | | pF |
| Switching Characteristics ^{Note 3} | | | | | | |
| Turn-On Delay Time | $V_{DD} = 125V, V_{GS} = 10V, I_D = 5.6A, R_{G(ext)} = 12\Omega$ | $t_{D(ON)}$ | | 16 | 32 | ns |
| Turn-On Rise Time | $V_{DD} = 125V, V_{GS} = 10V, I_D = 5.6A, R_{G(ext)} = 12\Omega$ | t_R | | 3.5 | 7 | ns |
| Turn-Off Delay Time | $V_{DD} = 125V, V_{GS} = 10V, I_D = 5.6A, R_{G(ext)} = 12\Omega$ | $t_{D(OFF)}$ | | 38 | 76 | ns |
| Turn-Off Fall Time | $V_{DD} = 125V, V_{GS} = 10V, I_D = 5.6A, R_{G(ext)} = 12\Omega$ | t_F | | 4 | 8 | ns |
| Total Gate Charge | $V_{DS} = 200V, V_{GS} = 10V, I_D = 5.6A$ | Q_G | | 18 | 23 | nC |
| Gate Source Charge | $V_{DS} = 200V, V_{GS} = 10V, I_D = 5.6A$ | Q_{GS} | | 3 | | nC |
| Gate Drain Charge | $V_{DS} = 200V, V_{GS} = 10V, I_D = 5.6A$ | Q_{GD} | | 5 | | nC |
| Drain-Source Diode Characteristics and Maximum Ratings | | | | | | |
| Drain-Source Diode Forward Current | | I_S | | | 8.1 | A |
| Drain-Source Diode Forward Voltage ^{Note 2} | $V_{GS} = 0V, I_S = 8.1A$ | V_{SD} | | 0.9 | 1.5 | V |

Notes

- 1: Repetitive Rating: Pulse width limited by maximum junction temperature
- 2: Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
- 3: Guaranteed by design, not subject to production testing.
- 4: Pulse width limited by safe operating area.

REFERENCE DATA ▲ TYPICAL DEVICE PERFORMANCE

Fig. 1 • Output Characteristics

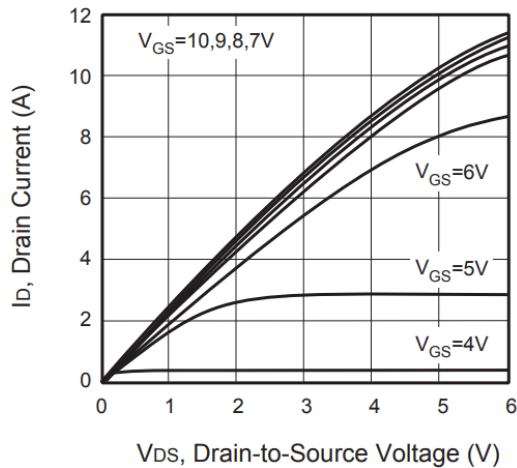


Fig. 2 • Transfer Characteristics

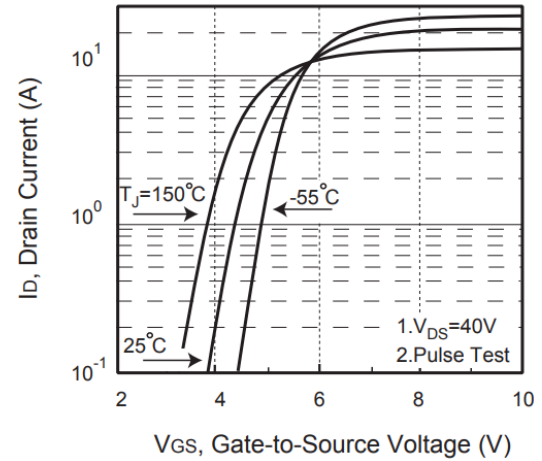


Fig. 3 • Capacitance

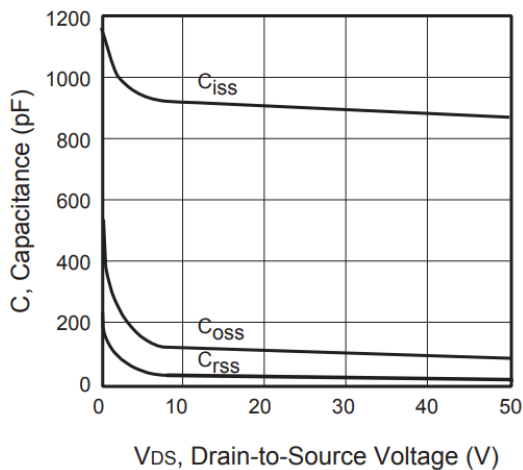


Fig. 4 • On-Resistance Variation with Temperature

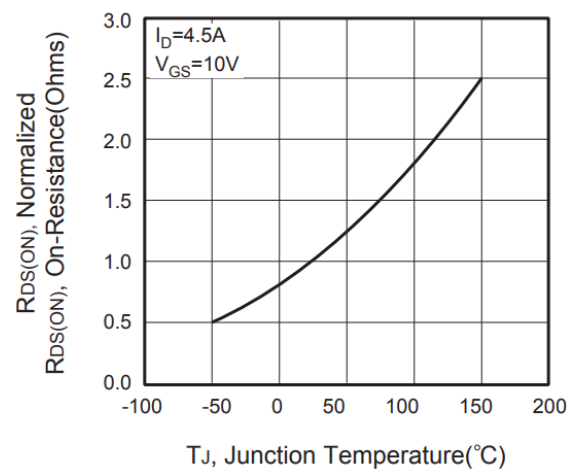


Fig. 5 • Gate Threshold Variation with Temperature

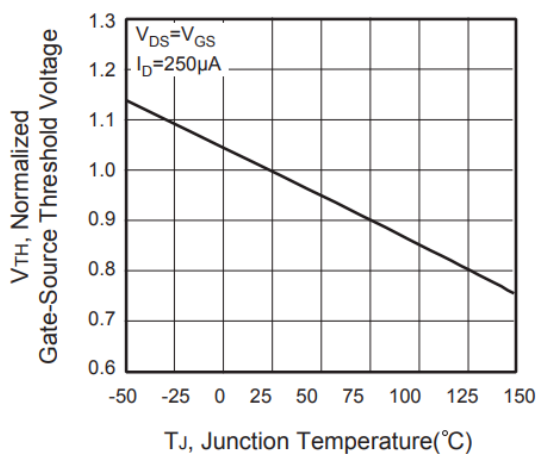
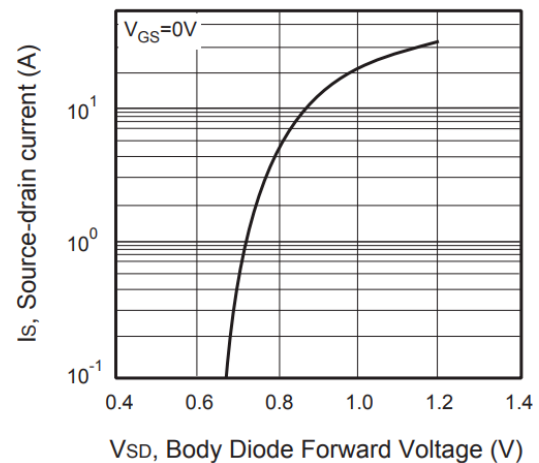


Fig. 6 • Body Diode Forward Voltage Variation with Source Current



REFERENCE DATA ▲ TYPICAL DEVICE PERFORMANCE

Fig. 7 • Gate Charge

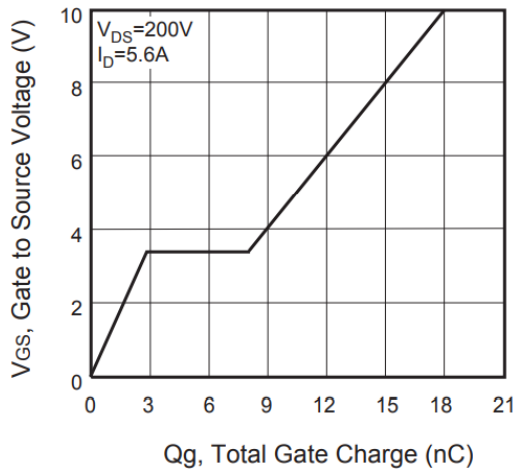


Fig. 8 • Maximum Safe Operating Area

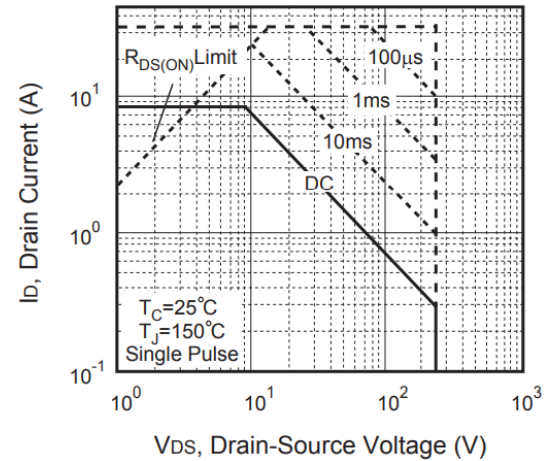


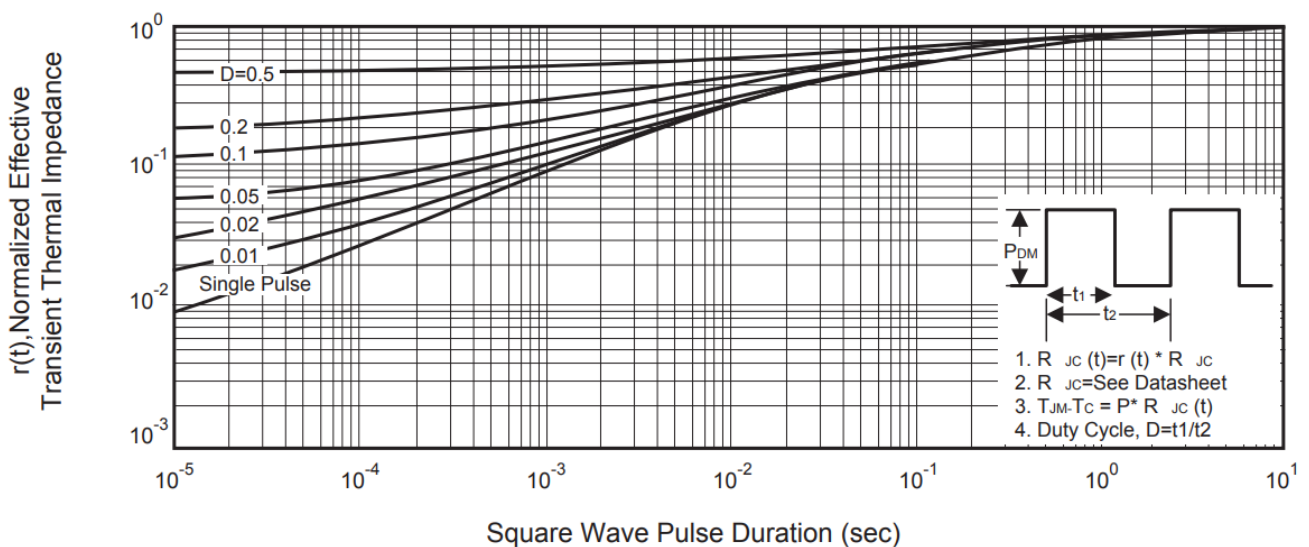
Fig. 9 • Switching Test Circuit



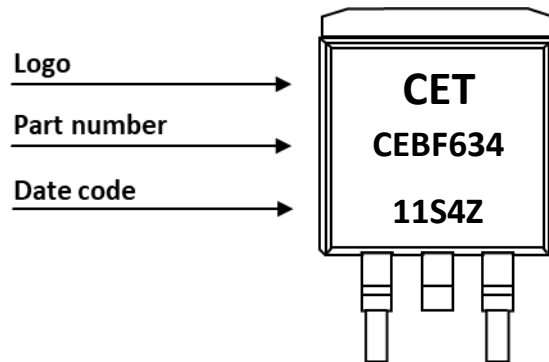
Fig. 10 • Switching Waveforms



Fig. 11 • 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



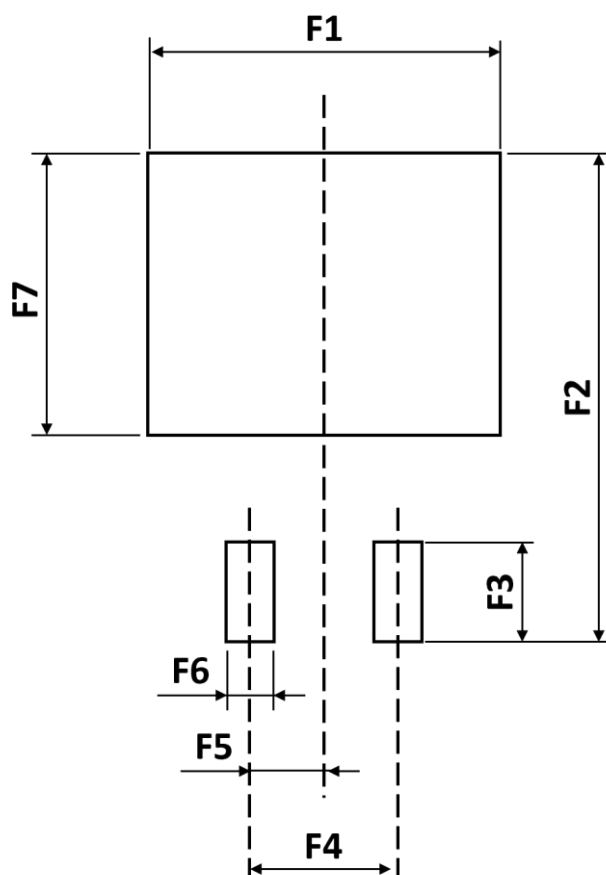
| Sym | Millimeters (Min.) | Millimeters (Typ.) | Millimeters (Max.) |
|-----|-----------------------|-----------------------|-----------------------|
| A | 4.37 | 4.57 | 4.77 |
| A1 | 1.22 | 1.27 | 1.42 |
| A2 | 2.49 | 2.69 | 2.89 |
| A3 | 0.00 | 0.13 | 0.25 |
| b | 0.70 | 0.81 | 0.96 |
| b1 | 1.17 | 1.27 | 1.47 |
| c | 0.30 | 0.38 | 0.53 |
| D1 | 8.50 | 8.70 | 8.90 |
| D4 | 6.60 | - | - |

| Sym | Millimeters (Min.) | Millimeters (Typ.) | Millimeters (Max.) |
|-----|-----------------------|-----------------------|-----------------------|
| E | 9.86 | 10.16 | 10.36 |
| E5 | 7.06 | - | - |
| e | 2.54 BSC | | |
| H | 14.70 | 15.10 | 15.50 |
| H2 | 1.07 | 1.27 | 1.47 |
| L | 2.00 | 2.30 | 2.60 |
| L1 | 1.40 | 1.55 | 1.70 |
| L4 | 0.25 BSC | | |
| θ | 0° | 5° | 9° |

ORDERING INFORMATION

| Part Number | Package | Packing | Reel Qty. | Inner Box Qty. | Outer Box Qty. |
|-------------|---------------|---------|-----------|----------------|----------------|
| CEBF634 | TO263 (D2PAK) | Reel | 800pcs | 800pcs | 6,400pcs |

RECOMMENDED PAD LAYOUT



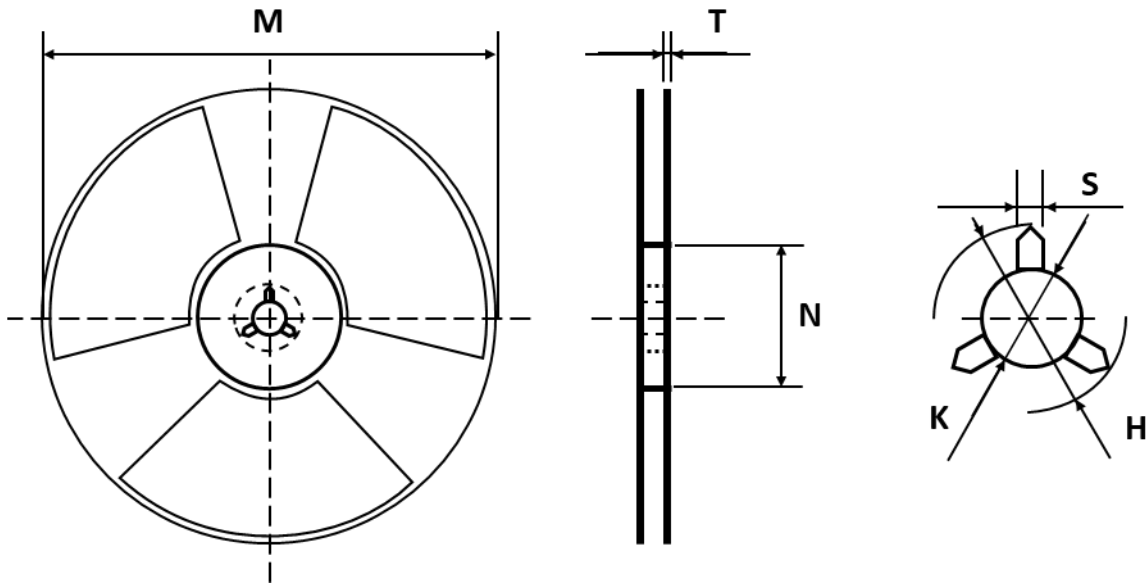
| Sym | Millimeters (Min.) | Millimeters (Typ.) | Millimeters (Max.) |
|-----|-----------------------|-----------------------|-----------------------|
| F1 | - | 12.20 | - |
| F2 | - | 16.90 | - |
| F3 | - | 2.54 | - |
| F4 | - | 5.08 | - |

| Sym | Millimeters (Min.) | Millimeters (Typ.) | Millimeters (Max.) |
|-----|-----------------------|-----------------------|-----------------------|
| F5 | - | 2.54 | - |
| F6 | - | 1.60 | - |
| F7 | - | 9.75 | - |

Notes:

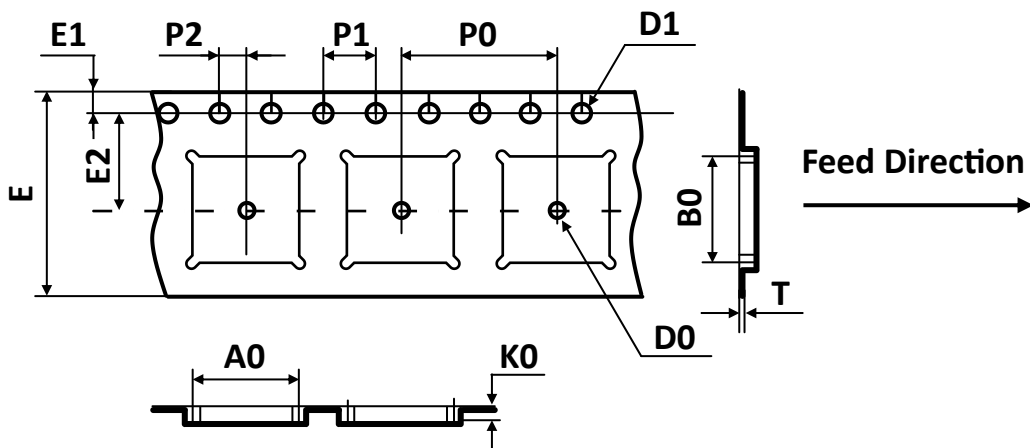
1. The suggested land pattern dimensions have been provided for reference only.
2. For further information, please reference document IPC-7351A.

REEL DIMENSIONS ▲ All dimensions in mm



| Tape Size | Reel Size | M | N | T | H | K | S |
|-----------|-----------|---------|---------|-------|-------|----------------|----------------|
| 24mm | Ø330 | Ø330.00 | Ø100.00 | 2.10 | 22.00 | 13.00 | 2.00 |
| | | ±2.00 | ±0.50 | ±0.20 | ±0.50 | +0.50 -0.20 | +0.50 -0.20 |

TAPE DIMENSIONS ▲ All dimensions in mm



| Package | A0 | B0 | K0 | D0 | D1 | E | E1 | E2 | P0 | P1 | P2 | T |
|-------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| TO263 (D ² PAK) | 10.80 | 16.30 | 4.85 | 1.50 | 1.55 | 24.00 | 1.75 | 11.50 | 16.00 | 4.00 | 2.00 | 0.35 |
| | ±0.10 | ±0.10 | ±0.10 | ±0.10 | ±0.05 | ±0.30 | ±0.10 | ±0.10 | ±0.10 | ±0.10 | ±0.10 | ±0.05 |

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. | $T_{s \min}$ | 100 °C | 150 °C |
| Preheat temperature max. | $T_{s \max}$ | 150 °C | 200 °C |
| Preheat time t_s from $T_{s \min}$ to $T_{s \max}$ | 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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