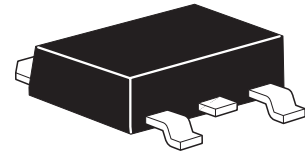


ZXMP10A18K

100V DPAK P-channel enhancement mode MOSFET

Summary

| $V_{(BR)DSS}$ | $R_{DS(on)}$ (Ω) | I_D (A) |
|---------------|---------------------------|-----------|
| -100 | 0.150 @ $V_{GS} = -10V$ | -5.9 |
| | 0.190 @ $V_{GS} = -6V$ | -5.2 |



Description

This new generation trench MOSFET from Zetex features a unique structure combining the benefits of low on-resistance and fast switching, making it ideal for high efficiency power management applications.

Features

- Low on-resistance
- Fast switching speed
- Low threshold
- Low gate drive
- DPAK package

Applications

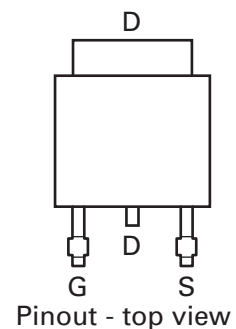
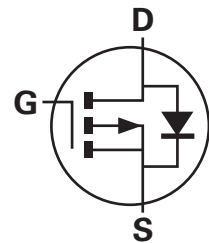
- DC-DC converters
- Power management functions
- Disconnect switches
- Motor control

Ordering information

| Device | Reel size (inches) | Tape width (mm) | Quantity per reel |
|--------------|--------------------|-----------------|-------------------|
| ZXMP10A18KTC | 13 | 16 | 2,500 |

Device marking

ZXMP
10A18



ZXMP10A18K

Absolute maximum ratings

| Parameter | Symbol | Limit | Unit |
|---|----------------|-------------|-----------------|
| Drain-source voltage | V_{DSS} | -100 | V |
| Gate-source voltage | V_{GS} | ± 20 | V |
| Continuous drain current @ $V_{GS} = 10V$; $T_{amb} = 25^{\circ}C^{(b)}$ | I_D | -5.9 | A |
| @ $V_{GS} = 10V$; $T_{amb} = 70^{\circ}C^{(b)}$ | | -4.7 | |
| @ $V_{GS} = 10V$; $T_{amb} = 25^{\circ}C^{(a)}$ | | -3.8 | |
| Pulsed drain current ^(c) | I_{DM} | -21.1 | A |
| Continuous source current (body diode) ^(b) | I_S | -10 | A |
| Pulsed source current (body diode) ^(c) | I_{SM} | -21.1 | A |
| Power dissipation at $T_{amb} = 25^{\circ}C^{(a)}$ | P_D | 4.3 | W |
| Linear derating factor | | 34.4 | mW/ $^{\circ}C$ |
| Power dissipation at $T_{amb} = 25^{\circ}C^{(b)}$ | P_D | 10.2 | W |
| Linear derating factor | | 81.3 | mW/ $^{\circ}C$ |
| Power dissipation at $T_{amb} = 25^{\circ}C^{(d)}$ | P_D | 2.17 | W |
| Linear derating factor | | 17.4 | mW/ $^{\circ}C$ |
| Operating and storage temperature range | T_j, T_{stg} | -55 to +150 | $^{\circ}C$ |

Thermal resistance

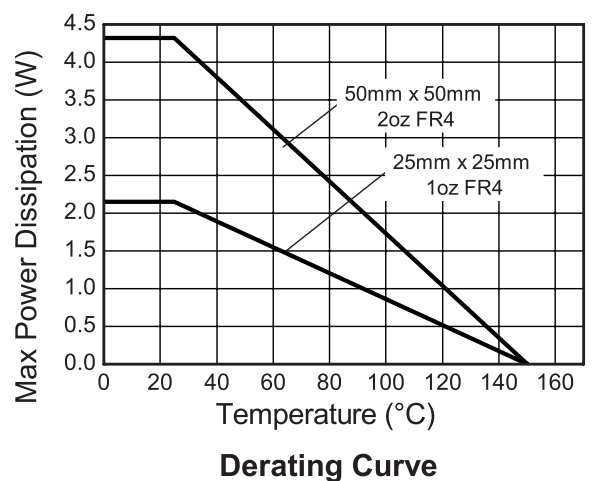
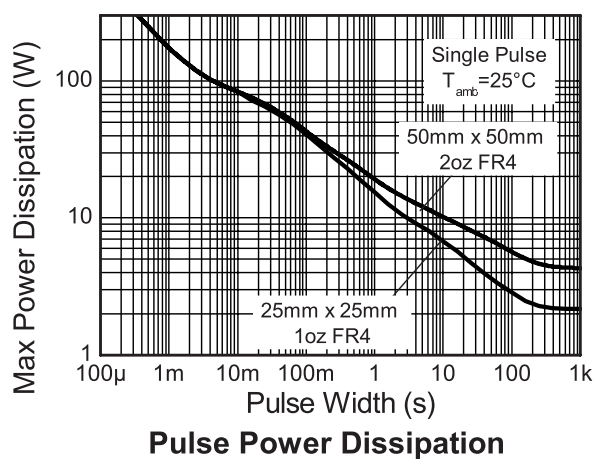
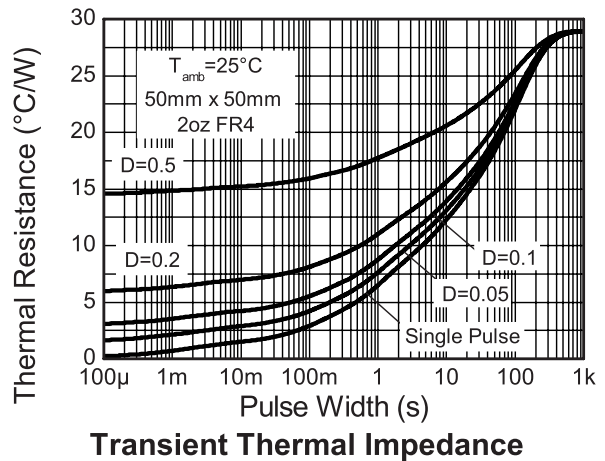
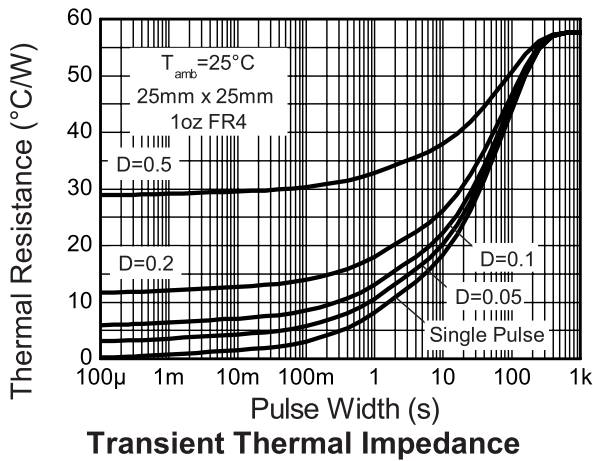
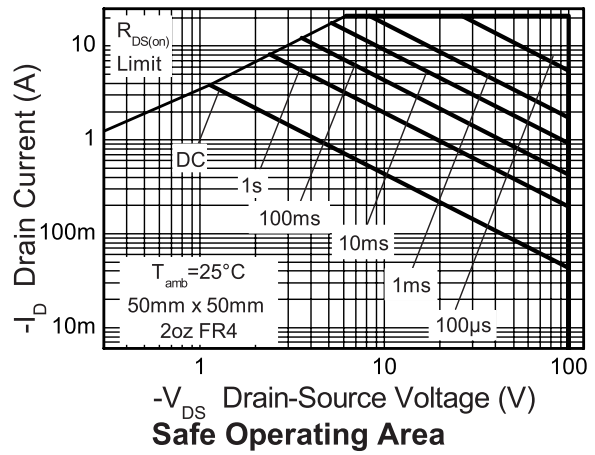
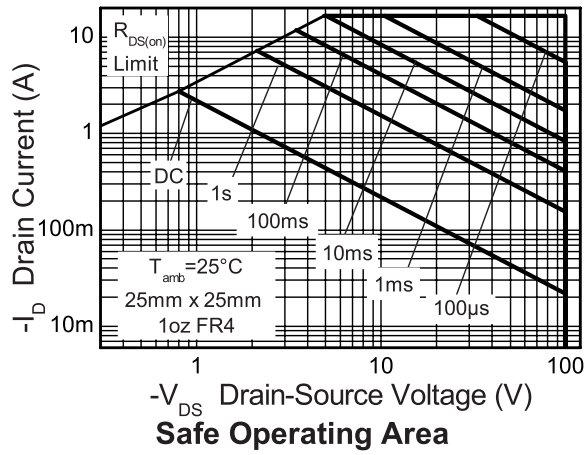
| Parameter | Symbol | Limit | Unit |
|------------------------------------|-----------------|-------|---------------|
| Junction to ambient ^(a) | $R_{\theta JA}$ | 29 | $^{\circ}C/W$ |
| Junction to ambient ^(b) | $R_{\theta JA}$ | 12.3 | $^{\circ}C/W$ |
| Junction to ambient ^(d) | $R_{\theta JA}$ | 57.6 | $^{\circ}C/W$ |

NOTES:

- (a) For a device surface mounted on 50mm x 50mm x 1.6mm FR4 PCB with high coverage of single sided 2oz copper, in still air conditions.
- (b) For a device surface mounted on FR4 PCB measured at $t \leq 10$ sec.
- (c) Repetitive rating 50mm x 50mm x 1.6mm FR4 PCB, $D=0.02$ pulse width=300 μs - pulse width limited by maximum junction temperature.
- (d) For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

ZXMP10A18K

Thermal characteristics



ZXMP10A18K

Electrical characteristics (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|--|---------------|------|-------|----------------|---------------|---|
| Static | | | | | | |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | -100 | | | V | $I_D = -250\mu\text{A}$, $V_{GS} = 0\text{V}$ |
| Zero gate voltage drain current | I_{DSS} | | | -1 | μA | $V_{DS} = -100\text{V}$, $V_{GS} = 0\text{V}$ |
| Gate-body leakage | I_{GSS} | | | 100 | nA | $V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$ |
| Gate-source threshold voltage | $V_{GS(th)}$ | -2.0 | | -4.0 | V | $I_D = -250\mu\text{A}$, $V_{DS} = V_{GS}$ |
| Static drain-source on-state resistance ^(*) | $R_{DS(on)}$ | | | 0.150 0.190 | Ω | $V_{GS} = -10\text{V}$, $I_D = -2.8\text{A}$ $V_{GS} = -6\text{V}$, $I_D = -2.4\text{A}$ |
| Forward transconductance ^{(*)(‡)} | g_{fs} | | 6.0 | | S | $V_{DS} = -15\text{V}$, $I_D = -2.8\text{A}$ |
| Dynamic^(‡) (3) | | | | | | |
| Input capacitance | C_{iss} | | 1055 | | pF | $V_{DS} = -50\text{V}$, $V_{GS} = 0\text{V}$ $f = 1\text{MHz}$ |
| Output capacitance | C_{oss} | | 90 | | pF | |
| Reverse transfer capacitance | C_{rss} | | 76 | | pF | |
| Switching^(†) (‡) | | | | | | |
| Turn-on-delay time | $t_{d(on)}$ | | 4.9 | | ns | $V_{DD} = -50\text{V}$, $I_D = -1\text{A}$ $R_G = 6.0\Omega$, $V_{GS} = -10\text{V}$ |
| Rise time | t_r | | 6.8 | | ns | |
| Turn-off delay time | $t_{d(off)}$ | | 33.9 | | ns | |
| Fall time | t_f | | 17.9 | | ns | |
| Total gate charge | Q_g | | 26.9 | | nC | $V_{DS} = -50\text{V}$, $V_{GS} = -10\text{V}$ $I_D = -2.8\text{A}$ |
| Gate-source charge | Q_{gs} | | 3.9 | | nC | |
| Gate drain charge | Q_{gd} | | 10.2 | | nC | |
| Source-drain diode | | | | | | |
| Diode forward voltage ^(*) | V_{SD} | | -0.85 | -0.95 | V | $T_j = 25^{\circ}\text{C}$, $I_S = -3.5\text{A}$, $V_{GS} = 0\text{V}$ |
| Reverse recovery time ^(‡) | t_{rr} | | 49 | | ns | $T_j = 25^{\circ}\text{C}$, $I_S = -2.8\text{A}$, $di/dt = 100\text{A/ms}$ |
| Reverse recovery charge ^(‡) | Q_{rr} | | 107 | | nC | |

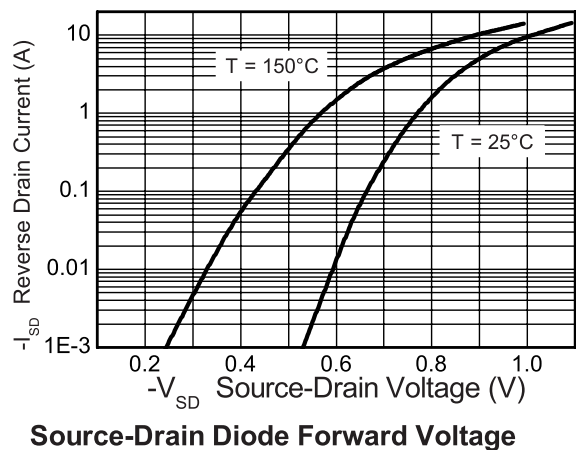
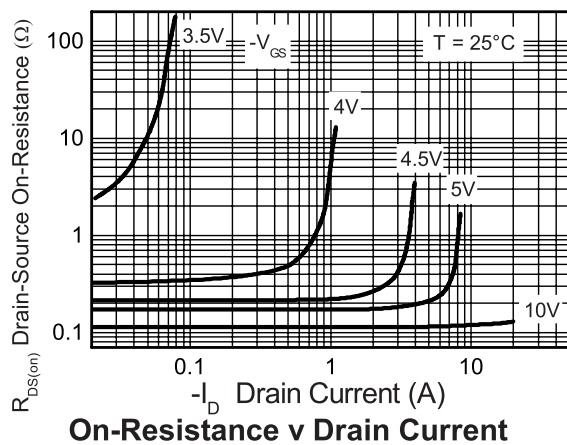
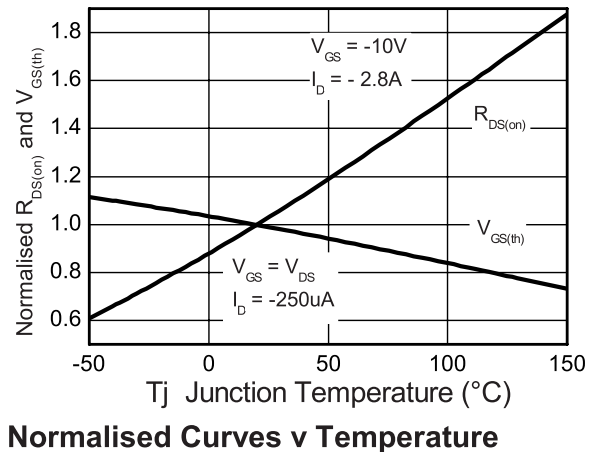
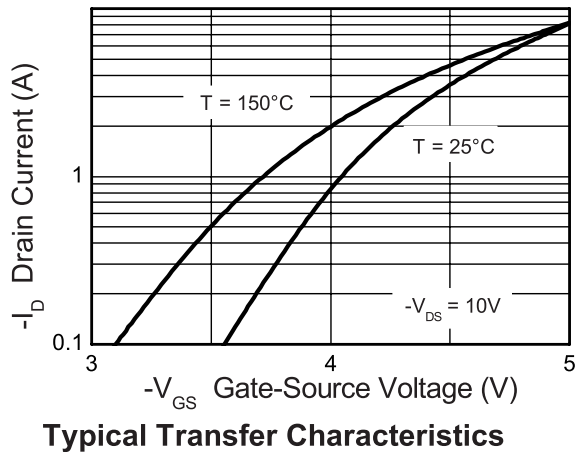
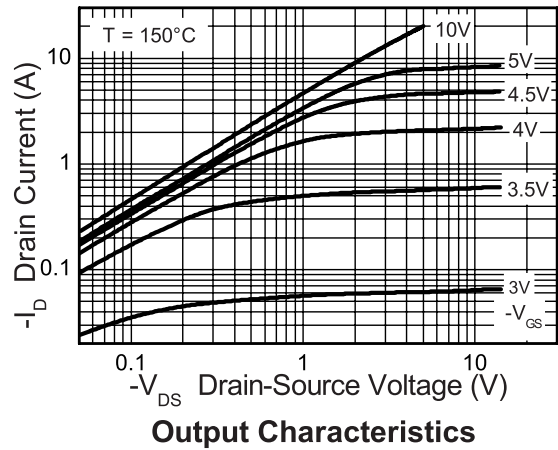
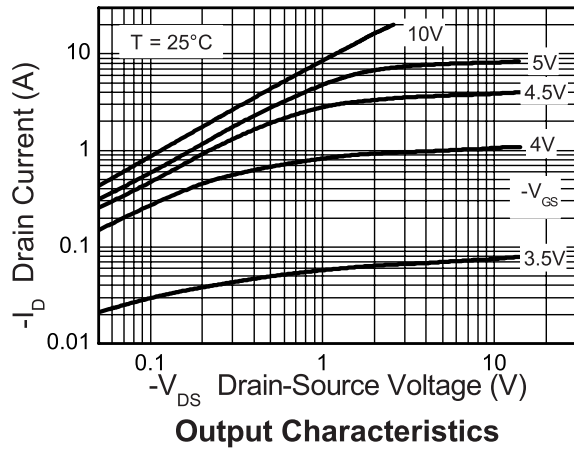
NOTES:

(*) Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$

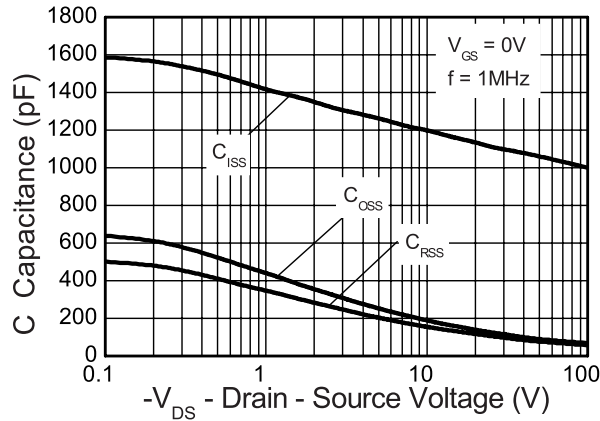
(†) Switching characteristics are independent of operating junction temperature.

(‡) For design aid only, not subject to production testing.

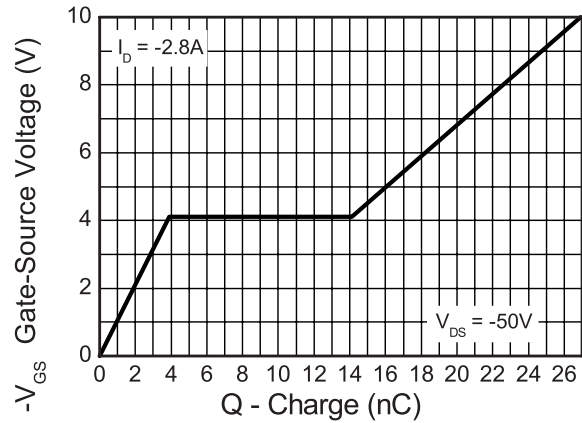
Typical characteristics



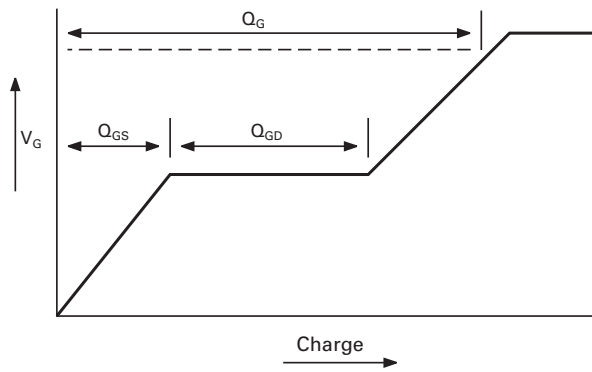
Typical characteristics



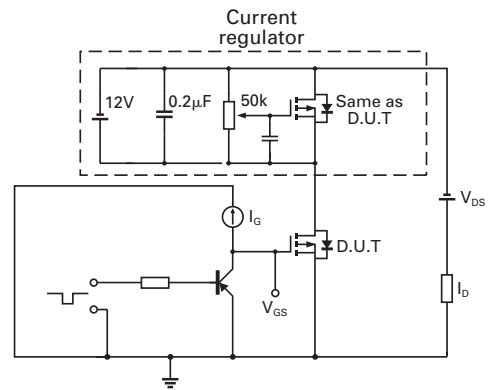
Capacitance v Drain-Source Voltage



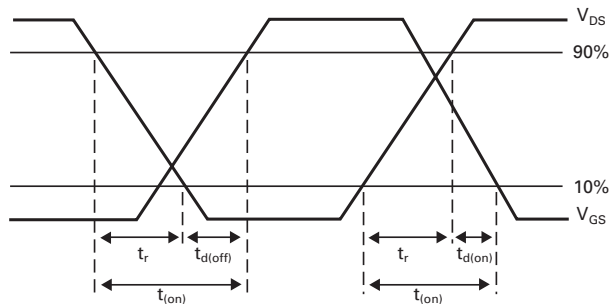
Gate-Source Voltage v Gate Charge



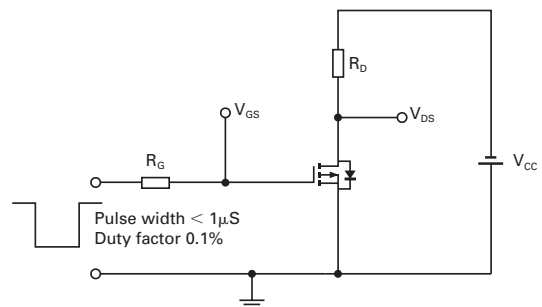
Basic gate charge waveform



Gate charge test circuit



Switching time waveforms



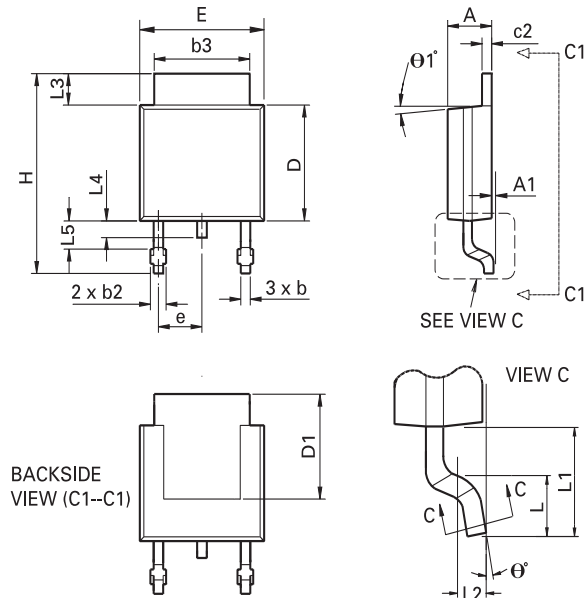
Switching time test circuit

ZXMP10A18K

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Package outline - DPAK



| DIM | Inches | | Millimeters | | DIM | Inches | | Millimeters | |
|-----|--------|-------|-------------|-------|----------|-----------|-------|-------------|-------|
| | Min | Max | Min | Max | | Min | Max | Min | Max |
| A | 0.086 | 0.094 | 2.18 | 2.39 | e | 0.090 BSC | | 2.29 BSC | |
| A1 | - | 0.005 | - | 0.127 | H | 0.370 | 0.410 | 9.40 | 10.41 |
| b | 0.020 | 0.035 | 0.508 | 0.89 | L | 0.055 | 0.070 | 1.40 | 1.78 |
| b2 | 0.030 | 0.045 | 0.762 | 1.14 | L1 | 0.108 REF | | 2.74 REF | |
| b3 | 0.205 | 0.215 | 5.21 | 5.46 | L2 | 0.020 BSC | | 0.508 BSC | |
| c | 0.018 | 0.024 | 0.457 | 0.61 | L3 | 0.035 | 0.065 | 0.89 | 1.65 |
| c2 | 0.018 | 0.023 | 0.457 | 0.584 | L4 | 0.025 | 0.040 | 0.635 | 1.016 |
| D | 0.213 | 0.245 | 5.41 | 6.22 | L5 | 0.045 | 0.060 | 1.14 | 1.52 |
| D1 | 0.205 | - | 5.21 | - | theta 1° | 0° | 10° | 0° | 10° |
| E | 0.250 | 0.265 | 6.35 | 6.73 | theta 0° | 0° | 15° | 0° | 15° |
| E1 | 0.170 | - | 4.32 | - | - | - | - | - | - |

Note: Controlling dimensions are in inches. Approximate dimensions are provided in millimeters

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