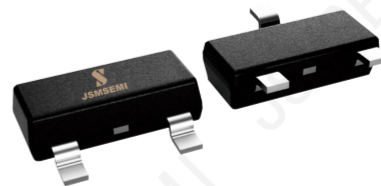


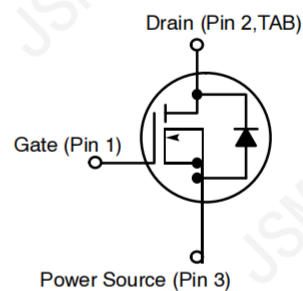
## Features

- Surface-mounted package
- Advanced trench cell design
- Extremely low threshold voltage
- ESD protected ( HBM > 2KV )



## Quick reference

- $BV \geq 60\text{ V}$
- $P_{tot} \leq 0.83\text{ W}$
- $I_D \leq 0.5\text{ A}$
- $R_{DS(ON)} \leq 3\ \Omega @ V_{GS} = 10\text{ V}$
- $R_{DS(ON)} \leq 4\ \Omega @ V_{GS} = 4.5\text{ V}$



## Limiting Values

| Symbol            | Parameter                                     | Conditions                                             | Min | Max               | Unit                        |
|-------------------|-----------------------------------------------|--------------------------------------------------------|-----|-------------------|-----------------------------|
| $V_{DS}$          | Drain-Source Voltage                          | $T_A = 25\text{ }^\circ\text{C}$                       | -   | 60 V              |                             |
| $V_{GS}$          | Gate-Source Voltage                           | $T_A = 25\text{ }^\circ\text{C}$                       | -   | $\pm 20\text{ V}$ |                             |
| $I_D^*$           | Drain Current                                 | $T_A = 25\text{ }^\circ\text{C}, V_{GS} = 10\text{ V}$ | -   | 0.5 A             |                             |
| $I_{DM}^{*,**}$   | Pulsed Drain Current                          | $T_A = 25\text{ }^\circ\text{C}, V_{GS} = 10\text{ V}$ | -   | 1.7 A             |                             |
| $P_{tot}^*$       | Total Power Dissipation                       | $T_A = 25\text{ }^\circ\text{C}$                       | -   | 0.83              | W                           |
|                   |                                               | $T_A = 100\text{ }^\circ\text{C}$                      | -   | 0.33              |                             |
| $T_{stg}$         | Storage Temperature - 55 150                  |                                                        |     |                   | $^\circ\text{C}$            |
| $T_J$             | Junction Temperature - 150                    |                                                        |     |                   | $^\circ\text{C}$            |
| $I_S^*$           | Diode Forward Current                         | $T_A = 25\text{ }^\circ\text{C}$                       | -   | 0.4 A             |                             |
| $R_{\theta JA}^*$ | Thermal Resistance- Junction to Ambient - 150 |                                                        |     |                   | $^\circ\text{C} / \text{W}$ |

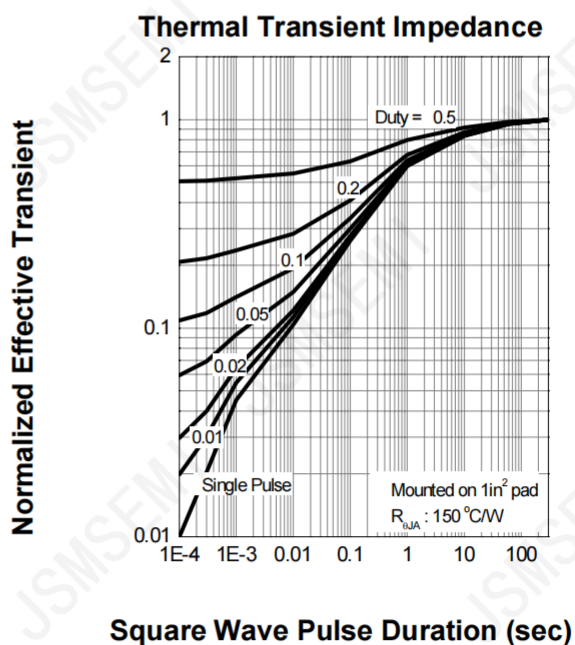
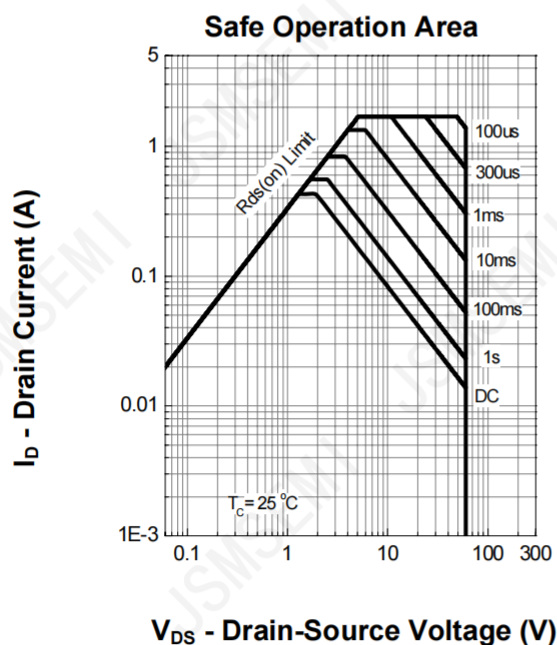
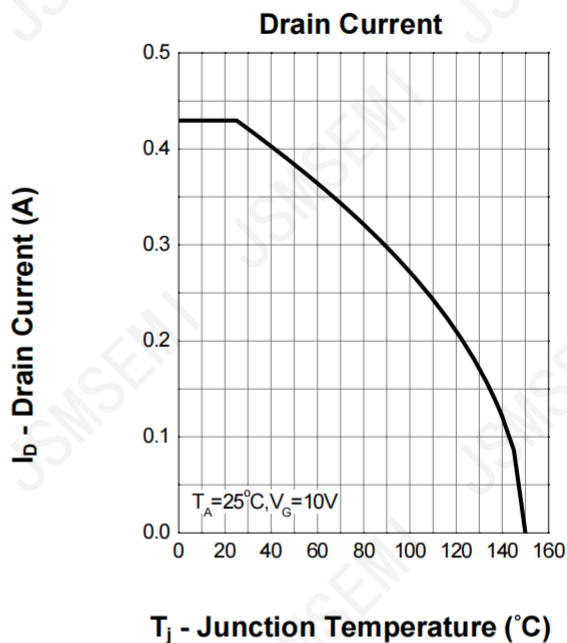
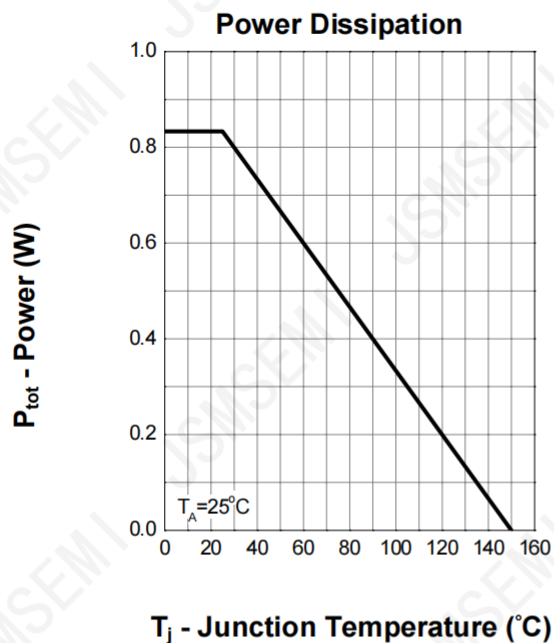
Notes: \* Surface Mounted on 1 in<sup>2</sup> pad area,  $t \leq 10\text{ sec}$  \*\* Pulse width  $\leq 300\ \mu\text{s}$ , duty cycle  $\leq 2\%$

**Electrical Characteristics** (  $T_A = 25\text{ }^{\circ}\text{C}$  Unless Otherwise Noted )

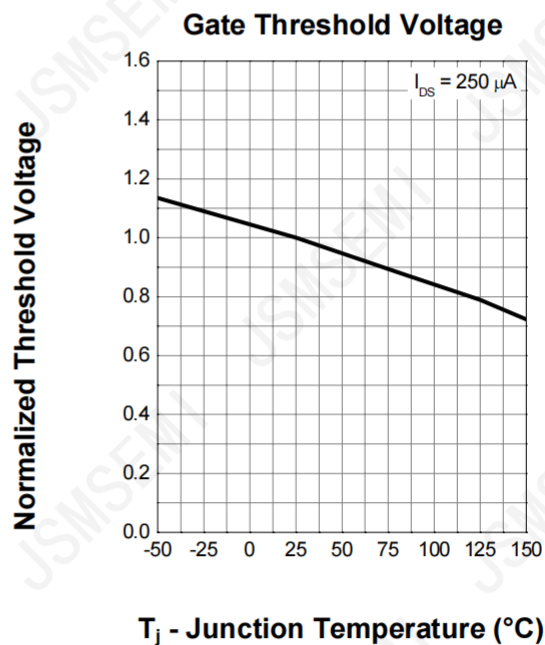
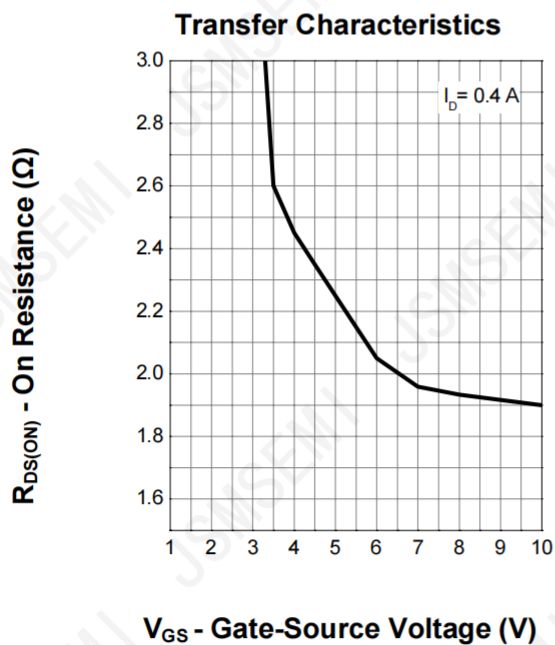
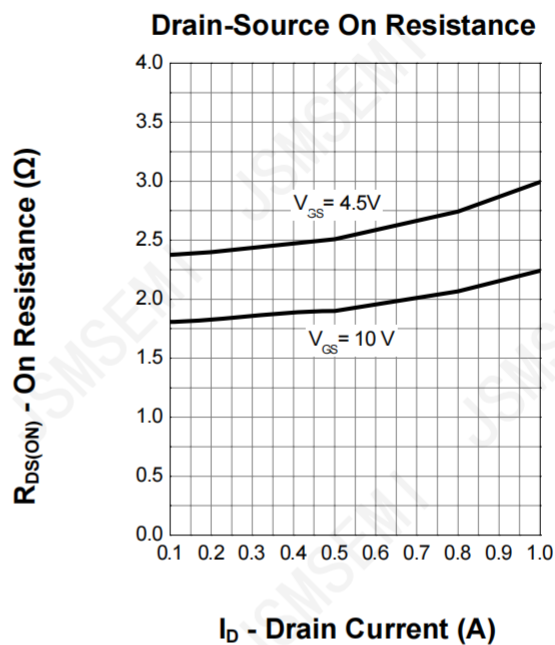
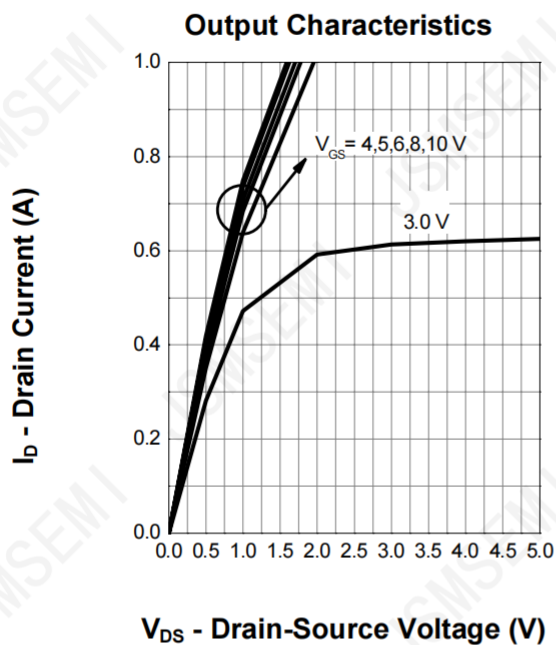
| Symbol                               | Parameter                      | Conditions                                                                                                                    | Min | Typ | Max  | Unit |
|--------------------------------------|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-----|-----|------|------|
| Static Characteristics               |                                |                                                                                                                               |     |     |      |      |
| BV <sub>DSS</sub>                    | Drain-Source Breakdown Voltage | V <sub>GS</sub> = 0 V, I <sub>DS</sub> = 250 μA                                                                               | 60  | -   | -    | V    |
| V <sub>GS(th)</sub>                  | Gate Threshold Voltage         | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>DS</sub> = 250 μA                                                                  | 1.0 | 1.6 | 2.5  | V    |
| I <sub>DSS</sub>                     | Drain Leakage Current          | V <sub>DS</sub> = 48 V, V <sub>GS</sub> = 0 V                                                                                 | -   | -   | 1    | μA   |
|                                      |                                | T <sub>J</sub> = 85 °C                                                                                                        | -   | -   | 30   | μA   |
| I <sub>GSS</sub>                     | Gate Leakage Current           | V <sub>GS</sub> = ± 20 V, V <sub>DS</sub> = 0 V                                                                               | -   | -   | ± 10 | μA   |
| R <sub>DS(ON)</sub> <sup>a</sup>     | On-State Resistance            | V <sub>GS</sub> = 10 V, I <sub>DS</sub> = 0.4 A                                                                               |     | 1.9 | 3.0  | Ω    |
|                                      |                                | V <sub>GS</sub> = 4.5 V, I <sub>DS</sub> = 0.3 A                                                                              | -   | 2.4 | 4.0  |      |
| Diode Characteristics                |                                |                                                                                                                               |     |     |      |      |
| V <sub>SD</sub> <sup>a</sup>         | Diode Forward Voltage          | I <sub>SD</sub> = 0.4 A, V <sub>GS</sub> = 0 V                                                                                | -   | 0.7 | 1.3  | V    |
| t <sub>rr</sub>                      | Reverse Recovery Time          | I <sub>SD</sub> = 0.4 A, dI <sub>SD</sub> / dt = 100 A / μs                                                                   | -   | 40  | -    | ns   |
| Q <sub>rr</sub>                      | Reverse Recovery Charge        |                                                                                                                               | -   | 40  | -    | nC   |
| Dynamic Characteristics <sup>b</sup> |                                |                                                                                                                               |     |     |      |      |
| R <sub>G</sub>                       | Gate Resistance                | V <sub>GS</sub> = V <sub>DS</sub> = 0 V, F = 1 MHz                                                                            | -   | 130 | -    | Ω    |
| C <sub>iss</sub>                     | Input Capacitance              | V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 25 V<br>Frequency = 1 MHz                                                            | -   | 30  | -    | pF   |
| C <sub>oss</sub>                     | Output Capacitance             |                                                                                                                               | -   | 4.2 | -    |      |
| C <sub>rss</sub>                     | Reverse Transfer Capacitance   |                                                                                                                               | -   | 3   | -    |      |
| t <sub>d(on)</sub>                   | Turn-on Delay Time             | V <sub>DS</sub> = 30 V, V <sub>GEN</sub> = 10 V,<br>R <sub>G</sub> = 25 Ω, R <sub>L</sub> = 150 Ω,<br>I <sub>DS</sub> = 0.2 A | -   | 3.9 | 9    | ns   |
| t <sub>r</sub>                       | Turn-on Rise Time              |                                                                                                                               | -   | 3.5 | 8    |      |
| t <sub>d(off)</sub>                  | Turn-off Delay Time            |                                                                                                                               | -   | 16  | 40   |      |
| t <sub>f</sub>                       | Turn-off Fall Time             |                                                                                                                               | -   | 10  | 20   |      |
|                                      |                                |                                                                                                                               |     |     |      |      |
| Q <sub>g</sub>                       | Total Gate Charge              | V <sub>GS</sub> = 4.5 V, V <sub>DS</sub> = 10 V,<br>I <sub>DS</sub> = 0.4 A                                                   | -   | 305 | -    | pC   |
| Q <sub>gs</sub>                      | Gate-Source Charge             |                                                                                                                               | -   | 85  | -    |      |
| Q <sub>gd</sub>                      | Gate-Drain Charge              |                                                                                                                               | -   | 205 | -    |      |

Notes : a : Pulse test ; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$  b : Guaranteed by design, not subject to production testing

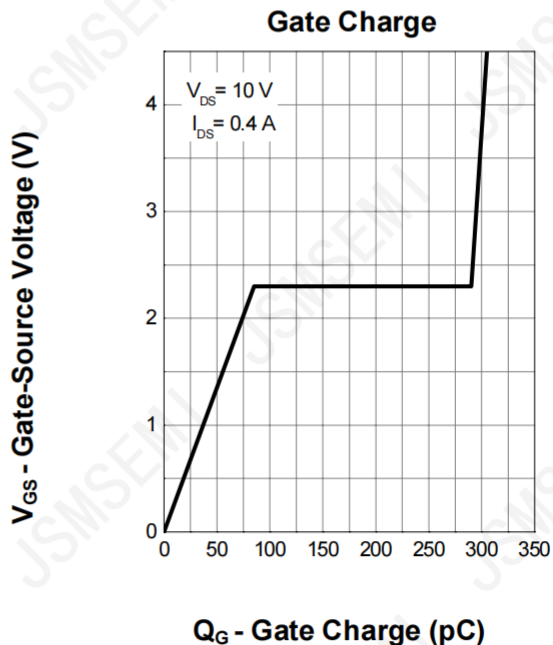
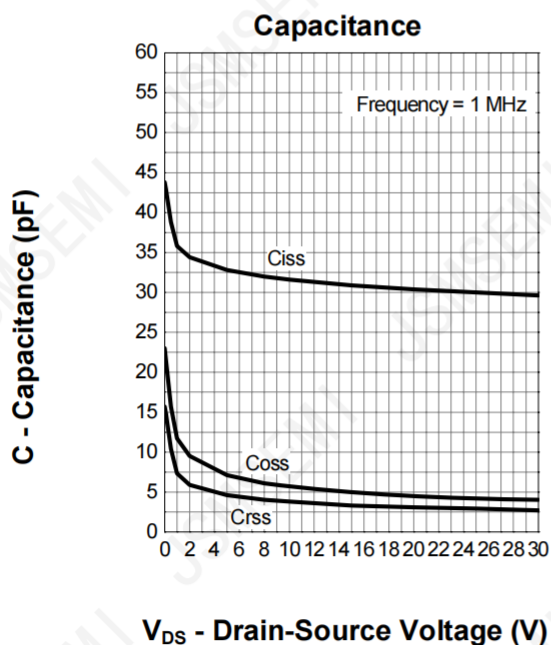
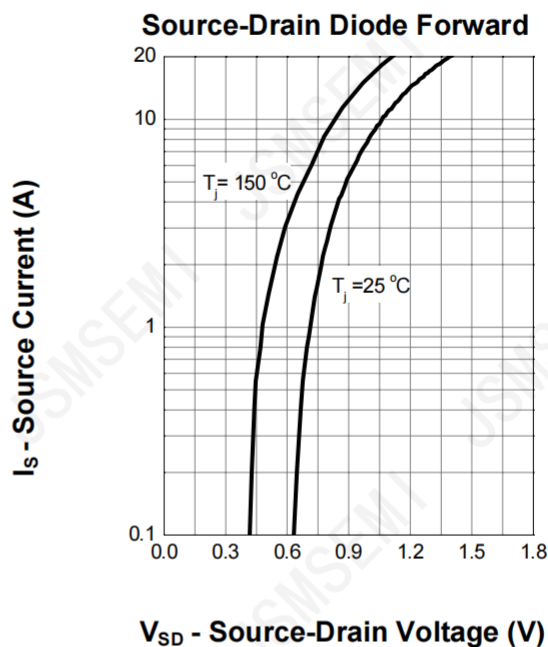
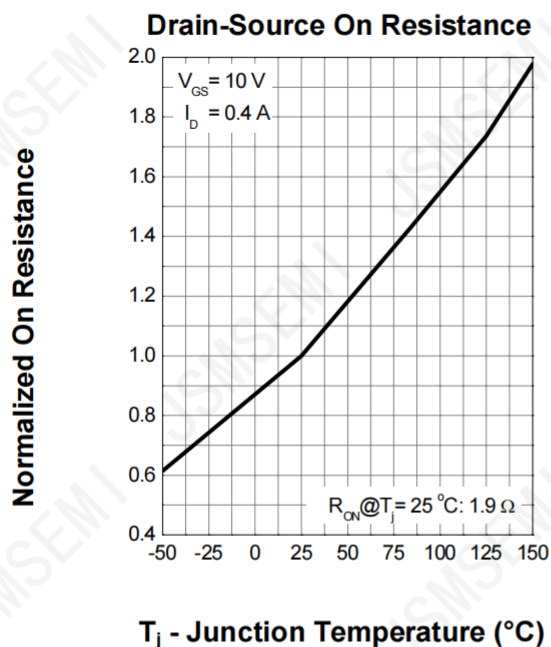
## Typical Characteristics



## Typical Characteristics (cont.)

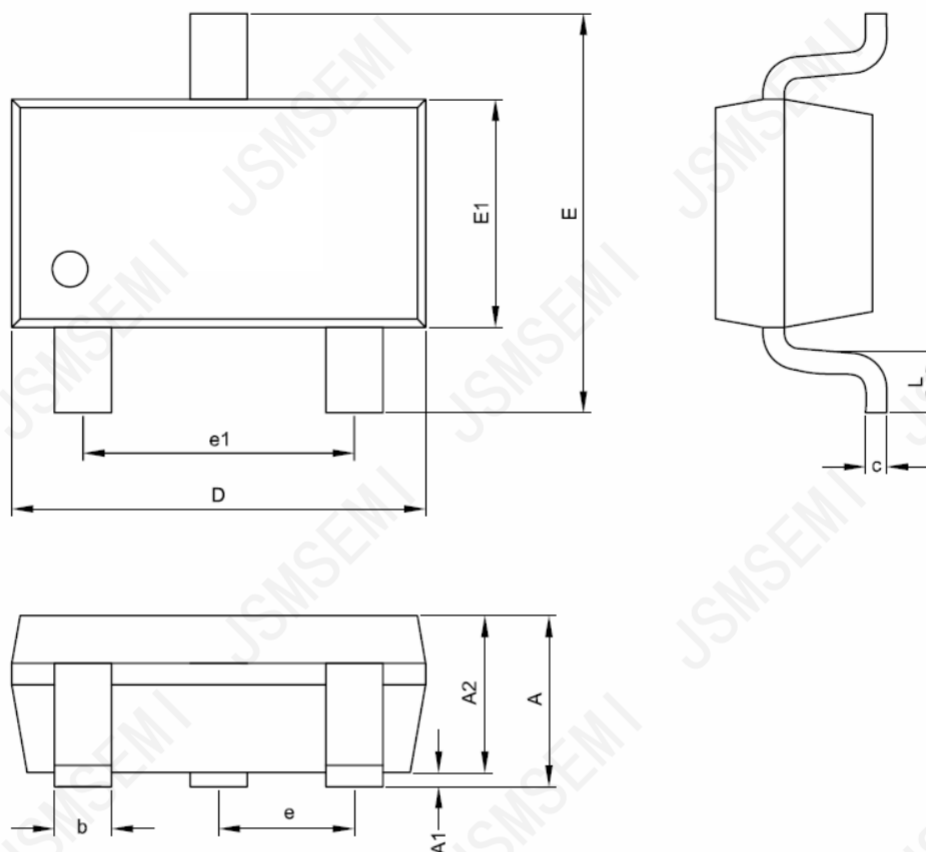


## Typical Characteristics (cont.)



## Package Dimensions

SOT-23



| Symbol | Dimensions In Millimeters |      |
|--------|---------------------------|------|
|        | MIN.                      | MAX. |
| A      | —                         | 1.12 |
| A1     | 0.00                      | 0.1  |
| A2     | 0.90                      | 1.02 |
| D      | 2.90 BSC                  |      |
| E      | 2.40 BSC                  |      |
| E1     | 1.20                      | 1.40 |
| c      | 0.08                      | 0.25 |
| b      | 0.30                      | 0.50 |
| e      | 0.95 BSC                  |      |
| e1     | 1.90 BSC                  |      |
| L      | 0.20                      | 0.60 |

## Revision History

| Rev. | Change          | Date      |
|------|-----------------|-----------|
| V1.0 | Initial version | 2/23/2024 |
|      |                 |           |

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