

## 100V N-Channel Enhancement Mode MOSFET

**Voltage** 100 V  **$R_{DS(ON),max}$**  3.3 m $\Omega$

**Current** 219 A  **$Q_G$  (TYP)** 65 nC

### Feature

- $R_{DS(ON),max} < 3.3 \text{ m}\Omega$  at  $V_{GS} = 10 \text{ V}$ ,  $I_D = 64 \text{ A}$
- $R_{DS(ON),max} < 4.7 \text{ m}\Omega$  at  $V_{GS} = 6 \text{ V}$ ,  $I_D = 32 \text{ A}$
- High switching speed
- Low reverse transfer capacitance
- Lead free in compliance with EU RoHS 2.0
- Green molding compound as per IEC 61249 standard

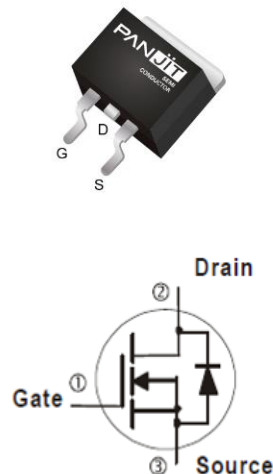
### Mechanical Data

- Case: TO-263AB-L package
- Terminals: Solderable per MIL-STD-750, Method 2026
- Approx. Weight: 1.4549 grams

### Application

- BMS, SR of industrial PSU.

### TO-263AB-L



## Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$ unless otherwise specified)

| PARAMETER                                        |                           | SYMBOL         | LIMIT    | UNITS            |
|--------------------------------------------------|---------------------------|----------------|----------|------------------|
| Drain-Source Voltage                             |                           | $V_{DS}$       | 100      | V                |
| Gate-Source Voltage                              |                           | $V_{GS}$       | $\pm 20$ |                  |
| Continuous Drain Current (Note 3)                | $T_C = 25^\circ\text{C}$  | $I_D$          | 219      | A                |
|                                                  | $T_C = 100^\circ\text{C}$ |                | 155      |                  |
| Pulsed Drain Current (Note 6)                    | $T_C = 25^\circ\text{C}$  | $I_{DM}$       | 876      | A                |
| Single Pulse Avalanche Current (Note 5)          |                           | $I_{AS}$       | 70       | A                |
| Single Pulse Avalanche Energy (Note 5)           |                           | $E_{AS}$       | 245      | mJ               |
| Power Dissipation                                | $T_C = 25^\circ\text{C}$  | $P_D$          | 333      | W                |
|                                                  | $T_C = 100^\circ\text{C}$ |                | 166      |                  |
| Operating Junction and Storage Temperature Range |                           | $T_J, T_{STG}$ | -55~175  | $^\circ\text{C}$ |

### Thermal Characteristics

| PARAMETER          |                              | SYMBOL          | VALUES |      |      | UNITS              |
|--------------------|------------------------------|-----------------|--------|------|------|--------------------|
|                    |                              |                 | MIN.   | TYP. | MAX. |                    |
| Thermal Resistance | Junction-to-Case (Bottom)    | $R_{\theta JC}$ | -      | 0.3  | 0.45 | $^\circ\text{C/W}$ |
|                    | Junction-to-Ambient (Note 4) | $R_{\theta JA}$ | -      | -    | 40   | $^\circ\text{C/W}$ |

**Electrical Characteristics** ( $T_A = 25^\circ\text{C}$  unless otherwise specified)

| PARAMETER                                 | SYMBOL        | TEST CONDITION                                                                               | MIN. | TYP. | MAX.      | UNITS         |
|-------------------------------------------|---------------|----------------------------------------------------------------------------------------------|------|------|-----------|---------------|
| <b>Static Characteristics</b>             |               |                                                                                              |      |      |           |               |
| Drain-Source Breakdown Voltage            | $BV_{DSS}$    | $V_{GS}=0\text{ V}, I_D=250\text{ }\mu\text{A}$                                              | 100  | -    | -         | V             |
| Gate Threshold Voltage                    | $V_{GS(th)}$  | $V_{DS}=V_{GS}, I_D=440\text{ }\mu\text{A}$                                                  | 1.8  | 2.8  | 3.8       |               |
| Drain-Source On-State Resistance (Note 1) | $R_{DS(on)}$  | $V_{GS}=10\text{ V}, I_D=64\text{ A}$                                                        | -    | 2.8  | 3.3       | m $\Omega$    |
|                                           |               | $V_{GS}=6\text{ V}, I_D=32\text{ A}$                                                         | -    | 3.5  | 4.7       |               |
| Zero Gate Voltage Drain Current           | $I_{DSS}$     | $V_{DS}=100\text{ V}, V_{GS}=0\text{ V}$                                                     | -    | -    | 1         | $\mu\text{A}$ |
| Gate-Source Leakage Current               | $I_{GSS}$     | $V_{GS}=\pm 20\text{ V}, V_{DS}=0\text{ V}$                                                  | -    | -    | $\pm 100$ | nA            |
| Transfer characteristics (Note 1)         | $g_{fs}$      | $V_{DS}=10\text{ V}, I_D=64\text{ A}$                                                        | -    | 120  | -         | S             |
| <b>Dynamic Characteristics</b> (Note 6)   |               |                                                                                              |      |      |           |               |
| Total Gate Charge                         | $Q_g$         | $V_{DS}=50\text{ V}, I_D=64\text{ A}, V_{GS}=10\text{ V}$                                    | -    | 65   | 85        | nC            |
| Gate-Source Charge                        | $Q_{gs}$      |                                                                                              | -    | 20   | -         |               |
| Gate-Drain Charge                         | $Q_{gd}$      |                                                                                              | -    | 11   | -         |               |
| Gate Plateau Voltage                      | $V_{plateau}$ |                                                                                              | -    | 4.5  | -         | V             |
| Input Capacitance                         | $C_{iss}$     | $V_{DS}=50\text{ V}, V_{GS}=0\text{ V}, f=250\text{ kHz}$                                    | -    | 4710 | 6120      | pF            |
| Output Capacitance                        | $C_{oss}$     |                                                                                              | -    | 1830 | 2380      |               |
| Reverse Transfer Capacitance              | $C_{rss}$     |                                                                                              | -    | 21   | -         |               |
| Output Charge                             | $Q_{oss}$     | $V_{DS}=50\text{ V}, V_{GS}=0\text{ V}$                                                      | -    | 142  | 185       | nC            |
| Turn-On Delay Time                        | $t_{d(on)}$   | $V_{DD}=50\text{ V}, I_D=64\text{ A}, V_{GS}=10\text{ V}, R_G=1.6\text{ }\Omega$<br>(Note 2) | -    | 15.5 | -         | ns            |
| Rise Time                                 | $t_r$         |                                                                                              | -    | 4.9  | -         |               |
| Turn-Off Delay Time                       | $t_{d(off)}$  |                                                                                              | -    | 24.7 | -         |               |
| Fall Time                                 | $t_f$         |                                                                                              | -    | 4.9  | -         |               |
| Gate Resistance                           | $R_g$         | $f=1.0\text{ MHz}$                                                                           | -    | 0.35 | 0.7       | $\Omega$      |
| <b>Drain-Source Diode</b>                 |               |                                                                                              |      |      |           |               |
| Diode Forward Voltage                     | $V_{SD}$      | $I_S=64\text{ A}, V_{GS}=0\text{ V}$                                                         | -    | 0.9  | 1.2       | V             |
| Reverse Recovery Charge                   | $Q_{rr}$      | $I_F=64\text{ A}, V_{DD}=50\text{ V}, di/dt=100\text{ A}/\mu\text{s}$                        | -    | 192  | -         | nC            |
| Reverse Recovery Time                     | $T_{rr}$      |                                                                                              | -    | 87   | -         | ns            |

NOTES :

1. Pulse width  $\leq 300\text{ }\mu\text{s}$ , Duty cycle  $\leq 2\%$ .
2. Essentially independent of operating temperature typical characteristics.
3. The maximum drain current calculated by maximum junction temperature and thermal impedance. It can be varied by application and environment.
4.  $R_{\theta JA}$  is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. Mounted on a 1 inch<sup>2</sup> with 2oz.square pad of copper.
5.  $E_{AS}$  is calculated based on the condition of  $L = 0.1\text{ mH}$ ,  $I_{AS} = 70\text{ A}$ ,  $V_{DD} = 50\text{ V}$ ,  $V_{GS} = 10\text{ V}$ . 100% test in production.
6. Guaranteed by design, not subject to production testing.

TYPICAL CHARACTERISTIC CURVES

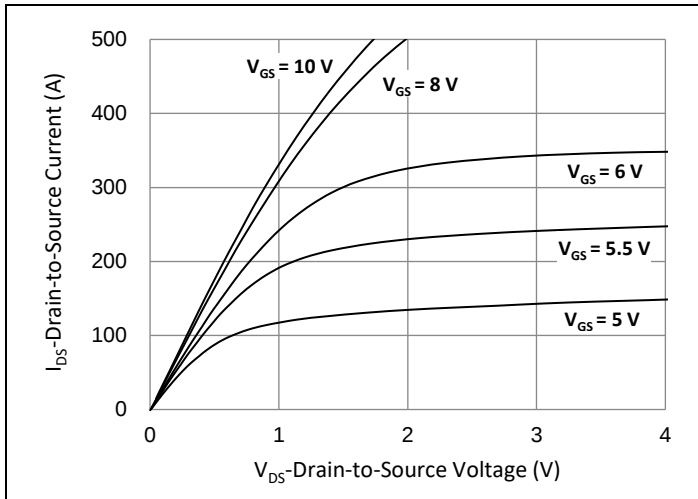


Fig.1 Output Characteristics

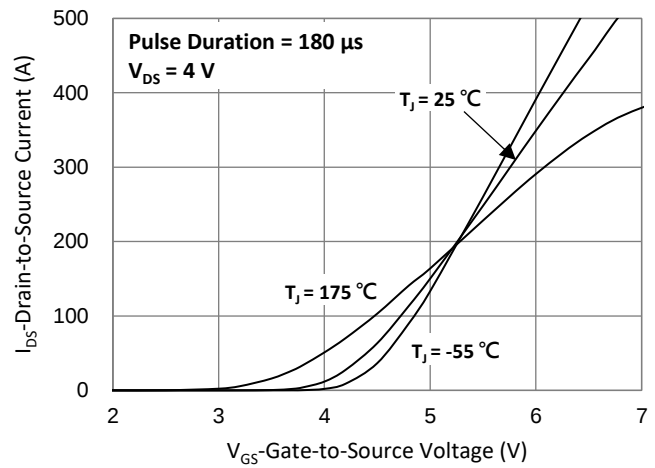


Fig.2 Transfer Characteristics

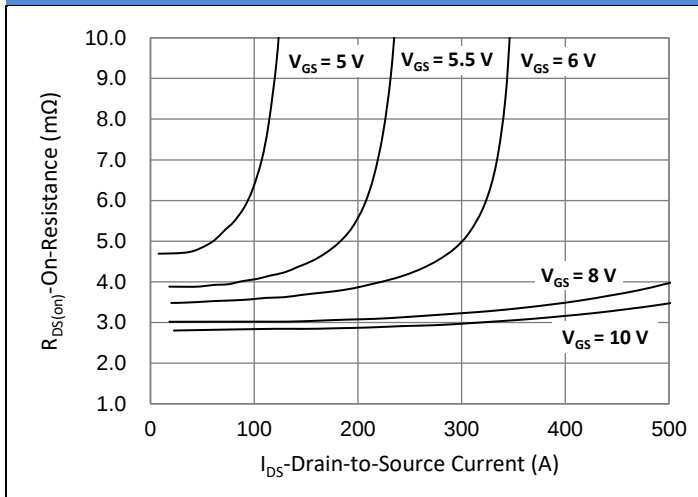


Fig.3 On-Resistance vs. Drain Current

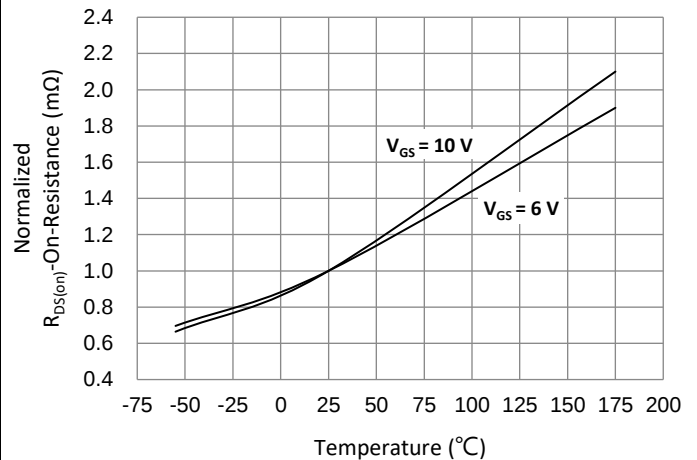


Fig.4 On-Resistance vs. Junction temperature

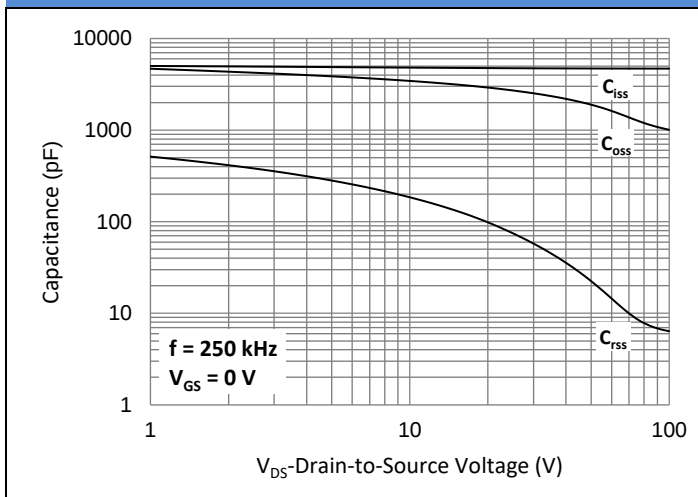


Fig.5 Capacitance vs. Drain-Source Voltage

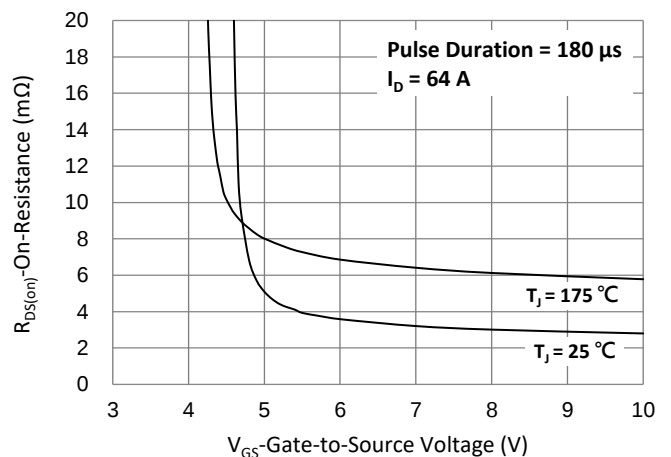


Fig.6 On-Resistance vs. Gate-Source Voltage

TYPICAL CHARACTERISTIC CURVES

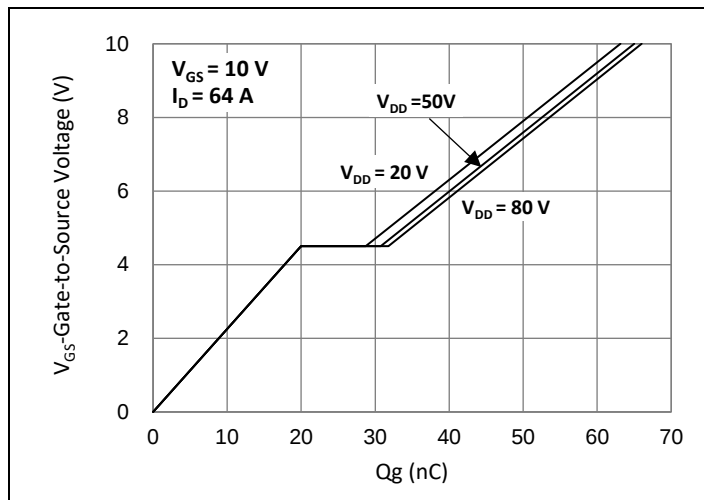


Fig.7 Gate-Charge Characteristics

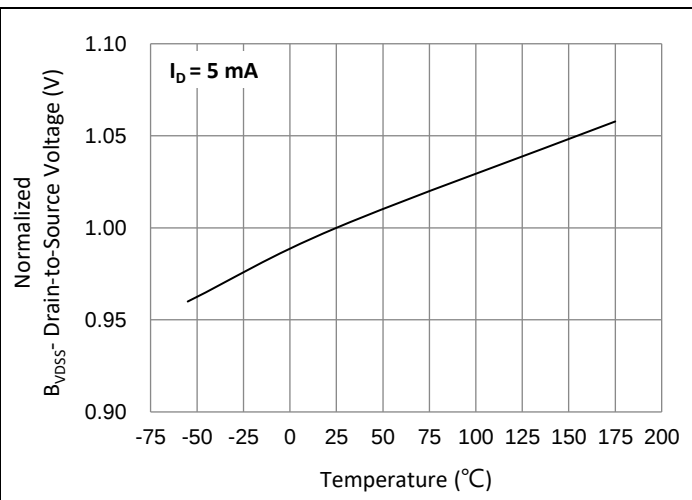


Fig.8 Breakdown Voltage Variation vs. Temperature

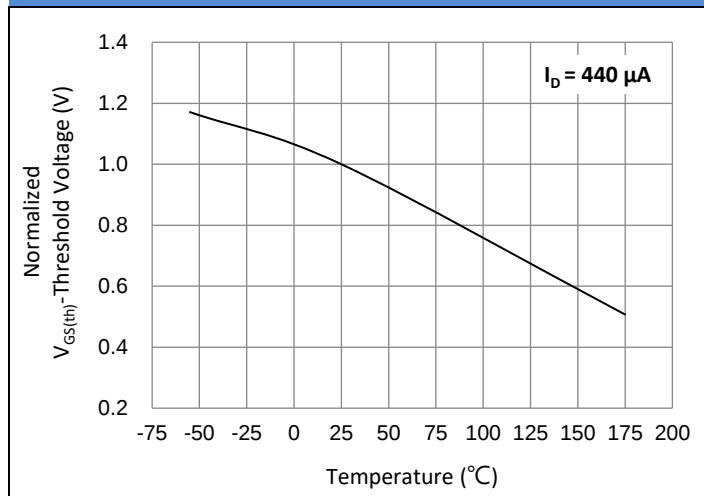


Fig.9 Threshold Voltage Variation with Temperature

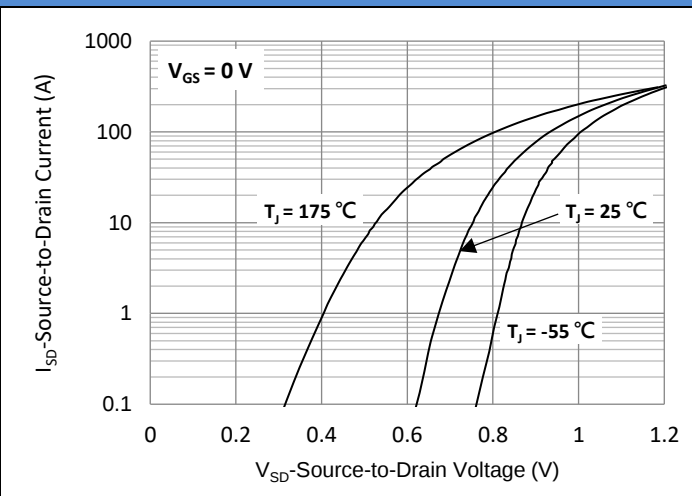


Fig.10 Source-Drain Diode Forward Voltage

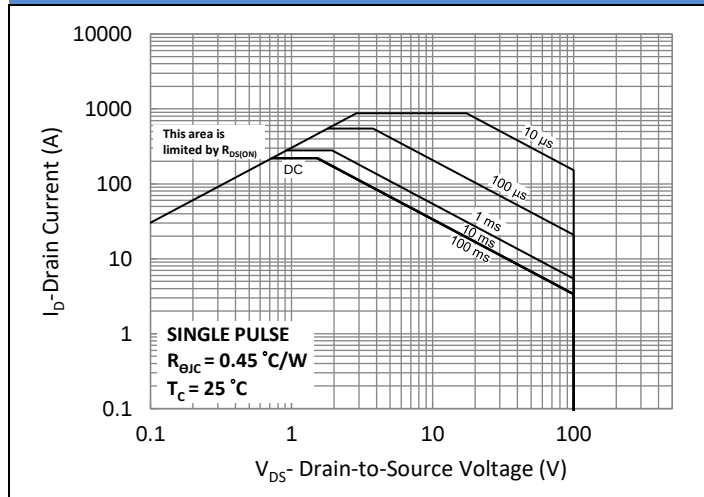


Fig.11 Maximum Safe Operating Area

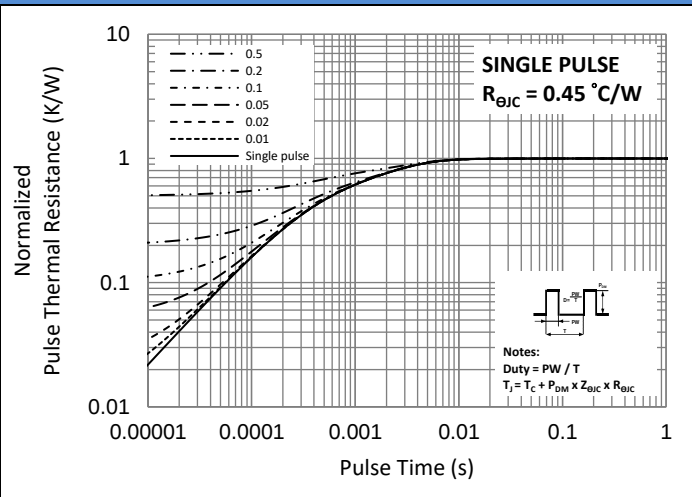
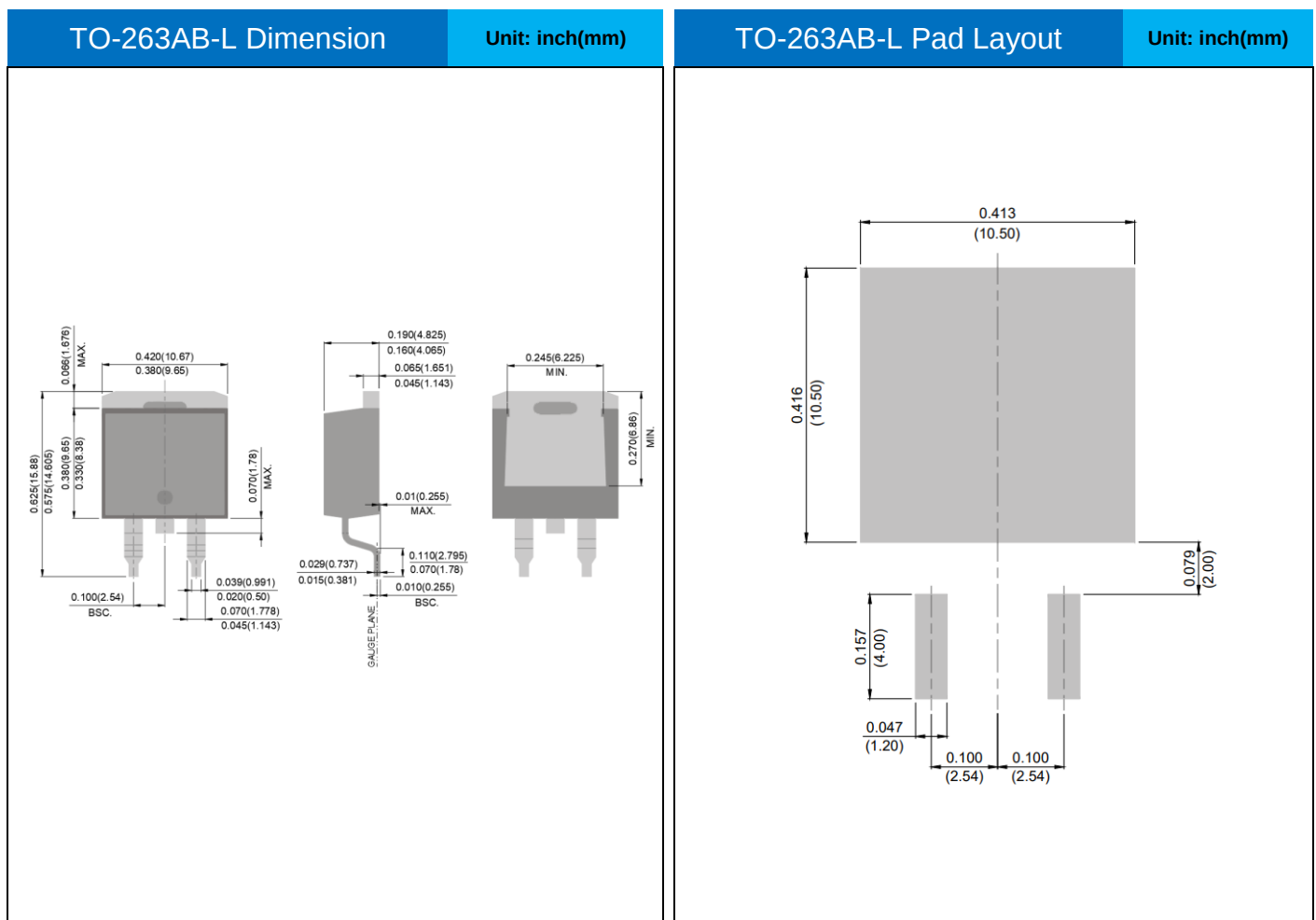


Fig.12 Normalized Transient Thermal Impedance

## Product and Packing Information

| Part No.      | Package Type | Packing Type  | Marking  |
|---------------|--------------|---------------|----------|
| PSMB033N10NS2 | TO-263AB-L   | 800pcs / Reel | 033N10NS |

## Packaging Information & Mounting Pad Layout



## Marking Diagram

|          |
|----------|
| PJ       |
| 033N10NS |
| YWLL x   |

**Y** = Year Code  
**W** = Week Code (A~Z)  
**LL** = Lot Code (00~99)  
**x** = Production Line Code

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