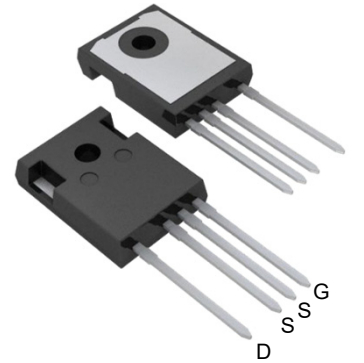


**Description**
**MOSFET Product Summary**

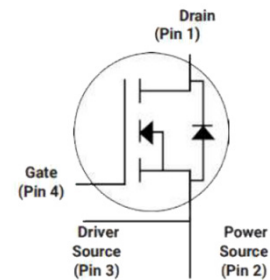
| $V_{DS}(V)$ | $R_{DS(on)}(m\Omega)$ | $I_D(A)$ |
|-------------|-----------------------|----------|
| 1200        | 75@ $V_{GS} = 18V$    | 38       |


**TO-247-4L**
**Feature**

- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitances
- Avalanche Ruggednes

**Applications**

- Solar Inverters
- Switch Mode Power Supplies
- UPS
- Battery Chargers


**Schematic diagram**
**Absolute maximum rating@25°C**

| Parameter                                    | Symbol      | Rating            | Unit |
|--|-------------|-------------------|------|
| Drain-Source Voltage                         | $V_{DS}$    | 1200              | V    |
| Gate-Source Voltage                          | $V_{GS}$    | -4/+18            | V    |
| Gate-Source Voltage(Absolute Maximum Values) | $V_{GSmax}$ | -8/+22            | V    |
| Continuous Drain Current                     | $I_D$       | $T_C=25^\circ C$  | 38   |
|  |             | $T_C=100^\circ C$ | 27   |
| Pulsed Drain Current                         | $I_{DM}$    | 80                | A    |
| Power Dissipation                            | $P_D$       | 214               | W    |
| Avalanche Energy, Single Pulse               | $E_{AS}$    | 600               | mJ   |
| Operating Junction Temperature               | $T_J$       | -55 to +175       | °C   |
| Storage Temperature                          | $T_{STG}$   | -55 to +175       | °C   |

## Thermal Resistance

| Parameter                               | Symbol          | Min | Typ | Max  | Unit                        |
|---|-----------------|-----|-----|------|-----------------------------|
| Thermal Resistance, Junction-to-Case    | $R_{\theta JC}$ | -   | -   | 0.70 | $^{\circ}\text{C}/\text{W}$ |
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | -   | -   | 40   | $^{\circ}\text{C}/\text{W}$ |

## Electrical characteristics per line@25°C (unless otherwise specified)

| Parameter                            | Symbol       | Conditions  | Min. | Typ. | Max. | Units         |
|--------------------------------------|--------------|---|------|------|------|---------------|
| <b>Statistic Characteristics</b>     |              |   |      |      |      |               |
| Drain-Source Breakdown Voltage       | $BV_{DSS}$   | $V_{GS} = 0V, I_D = 100\mu\text{A}$   | 1200 | -    | -    | V             |
| Zero Gate Voltage Drain Current      | $I_{DSS}$    | $V_{DS} = 1200V, V_{GS} = 0V$<br>$T_C = 25^{\circ}\text{C}$   | -    | 1.0  | 10   | $\mu\text{A}$ |
|                                      |              | $V_{DS} = 1200V, V_{GS} = 0V$<br>$T_C = 175^{\circ}\text{C}$  | -    | 5.0  | -    |               |
| Gate-Body Leakage Current            | $I_{GSS}$    | $V_{GS} = 18V, V_{DS} = 0V$   | -    | -    | 100  | nA            |
| Gate Threshold Voltage               | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 5\text{mA}$   | 2.3  | 2.8  | 3.6  | V             |
| Drain-Source On-State Resistance     | $R_{DS(ON)}$ | $V_{GS} = 18V, I_D = 20\text{A}$  | -    | 75   | 85   | m $\Omega$    |
| Transconductance                     | $g_{fs}$     | $V_{DS} = 20V, I_D = 20\text{A}$  | -    | 10   | -    | S             |
| <b>Dynamic Characteristics</b>       |              |   |      |      |      |               |
| Input Capacitance                    | $C_{iss}$    | $V_{DS} = 1000V, V_{GS} = 0V,$<br>$f = 1\text{MHz}, V_{AC} = 25\text{mV}$   | -    | 920  | -    | $\text{pF}$   |
| Output Capacitance                   | $C_{oss}$    |   | -    | 57   | -    |               |
| Reverse Transfer Capacitance         | $C_{rss}$    |   | -    | 3.9  | -    |               |
| Turn-On Switching Energy             | $E_{on}$     | $V_{DS} = 800V, I_D = 20\text{A}$<br>$V_{GS} = -4/+15V,$<br>$R_G = 0\Omega, L = 120\mu\text{H}$                       | -    | 270  | -    | $\mu\text{J}$ |
| Turn-Off Switching Energy            | $E_{off}$    |   | -    | 35   | -    |               |
| Turn-on Delay Time                   | $t_{d(on)}$  | $V_{DS} = 800V, I_D = 20\text{A}$<br>$V_{GS} = -4/+15V,$<br>$R_G = 0\Omega, L = 120\mu\text{H}$                       | -    | 13   | -    | ns            |
| Turn-on Rise Time                    | $t_r$        |   | -    | 19   | -    |               |
| Turn-Off Delay Time                  | $t_{d(off)}$ |   | -    | 14   | -    |               |
| Turn-Off Fall Time                   | $t_f$        |   | -    | 15   | -    |               |
| Total Gate Charge                    | $Q_g$        | $V_{DS} = 800V, I_D = 20\text{A},$<br>$V_{GS} = -4/+18V$  | -    | 40   | -    | nC            |
| Gate-Source Charge                   | $Q_{gs}$     |   | -    | 7.0  | -    |               |
| Gate-Drain Charge                    | $Q_{gd}$     |   | -    | 19   | -    |               |
| Gate Resistance                      | $R_G$        | $f = 1\text{MHz}, V_{AC} = 25\text{mV}$   | -    | 1.5  | -    | $\Omega$      |
| <b>Reverse Diode Characteristics</b> |              |   |      |      |      |               |
| Diode Forward Voltage                | $V_{SD}$     | $V_{GS} = -4V, I_{SD} = 10\text{A}$<br>$T_J = 25^{\circ}\text{C}$   | -    | 4.3  | -    | V             |
|                                      |              | $V_{GS} = -4V, I_{SD} = 10\text{A}$<br>$T_J = 175^{\circ}\text{C}$  | -    | 3.8  | -    |               |
| Reverse Recovery Time                | $t_{rr}$     | $V_{DS} = 800V, V_{GS} = -4V,$<br>$I_D = 20\text{A}, T_J = 150^{\circ}\text{C},$<br>$di/dt = 700\text{A}/\mu\text{s}$ | -    | 41   | -    | ns            |
| Reverse Recovery Charge              | $Q_{rr}$     |   | -    | 405  | -    | $\mu\text{C}$ |

Typical Characteristics

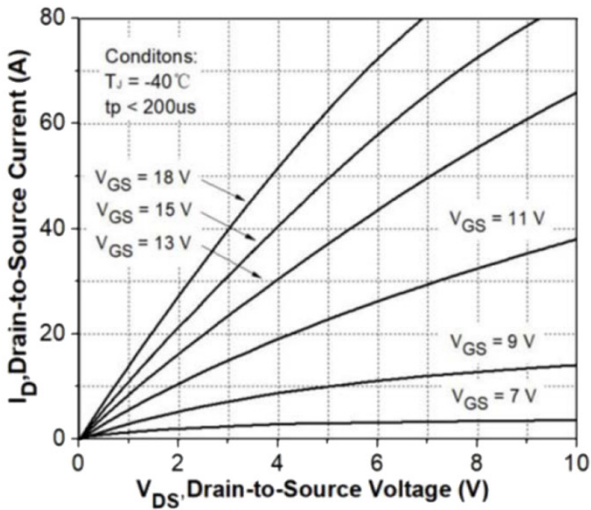


Fig 1. Output Characteristic ( $T_J = -40^\circ\text{C}$ )

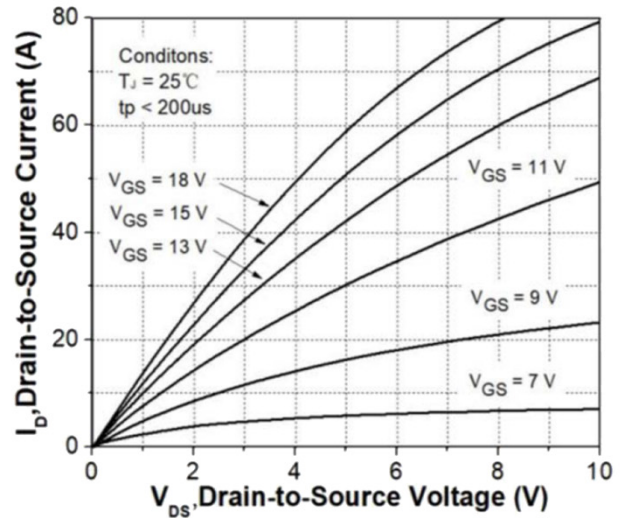


Fig 2. Output Characteristic ( $T_J = 25^\circ\text{C}$ )

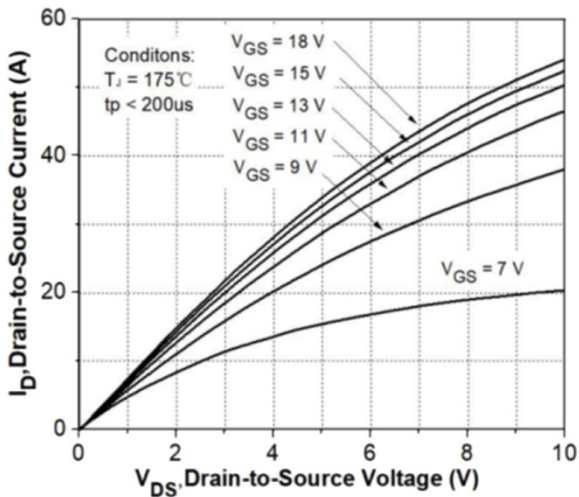


Fig 3. Output Characteristic ( $T_J = 175^\circ\text{C}$ )

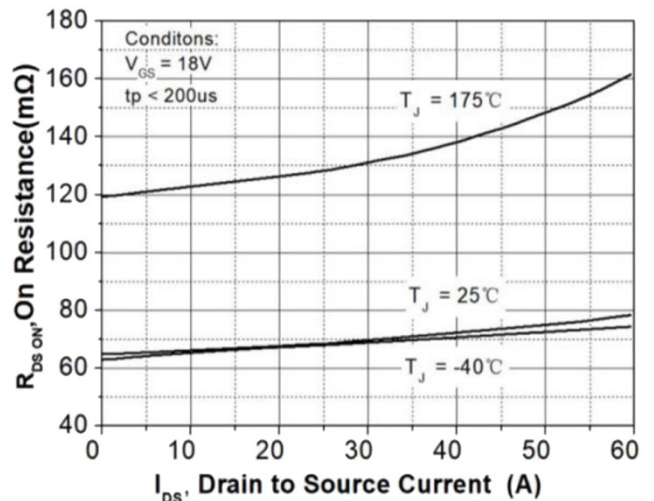


Fig 4:  $R_{ds(on)}$  Vs  $I_{ds}$  Characteristic

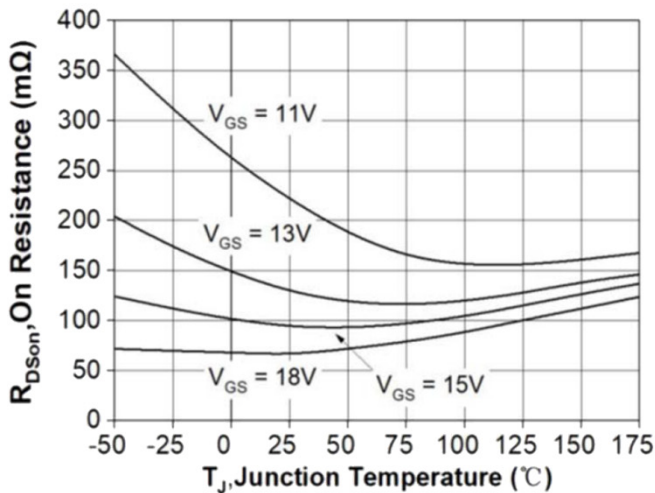


Fig 5:  $R_{ds(on)}$  vs. Temperature

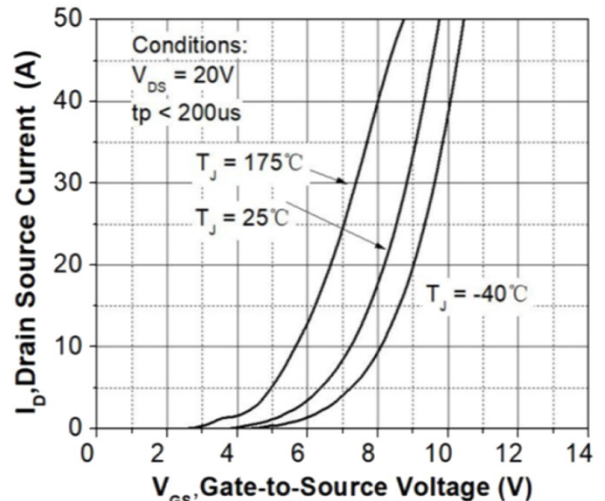
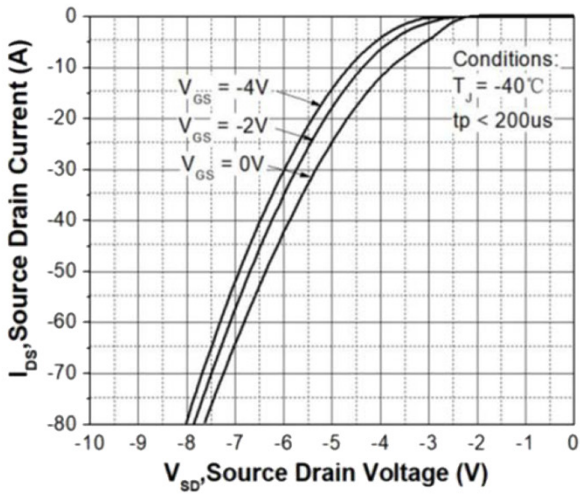
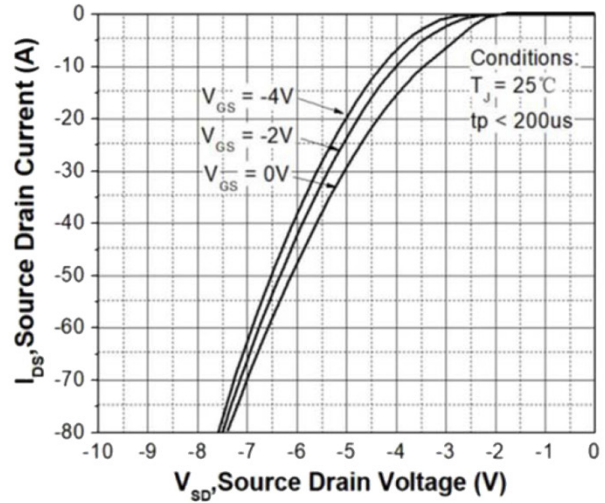


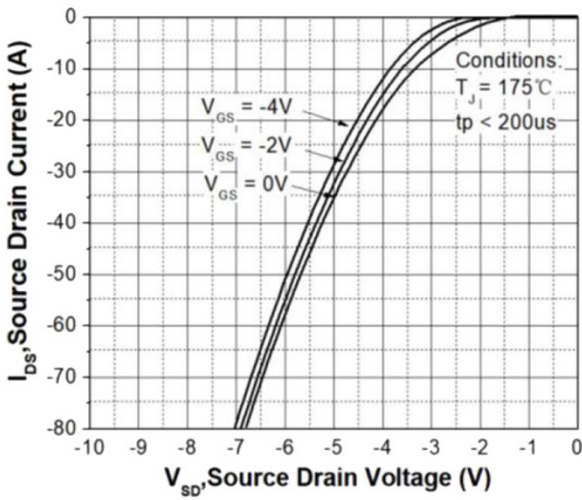
Fig 6: Transfer Characteristic



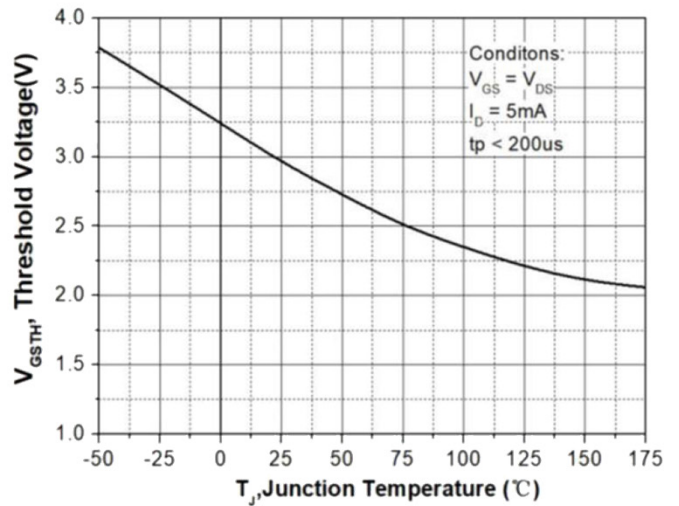
**Fig 7: Body-diode Characteristic ( $T_J=-40^\circ\text{C}$ )**



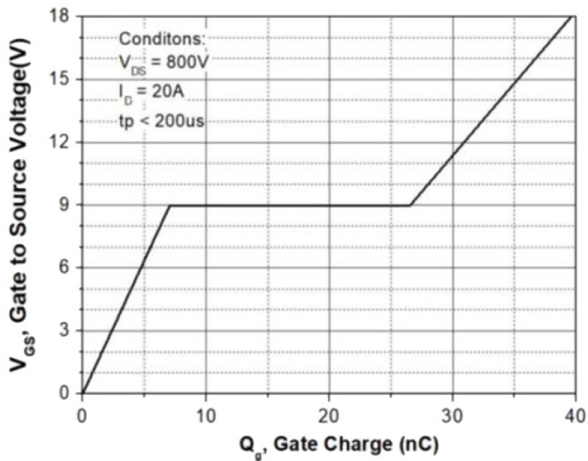
**Fig 8: Body-diode Characteristic ( $T_J=25^\circ\text{C}$ )**



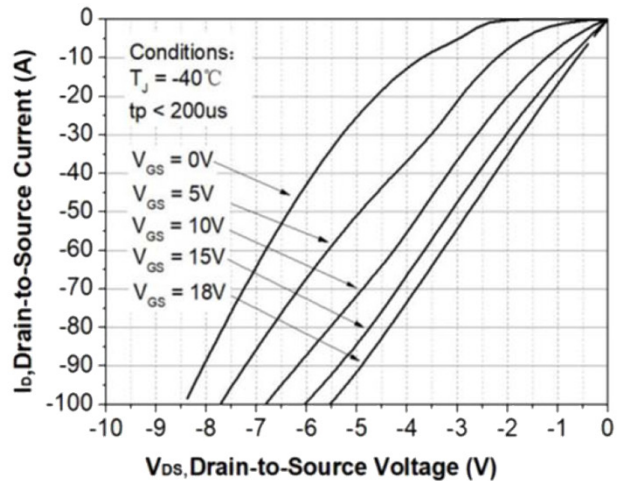
**Fig 9: Body-diode Characteristic ( $T_J=175^\circ\text{C}$ )**



**Fig 10:  $V_{TH}$  Vs  $T_J$  Temperature Characteristic**



**Fig 11: Gate Charge Characteristics**



**Fig 12: 3rd Quadrant Characteristic ( $T_J=-40^\circ\text{C}$ )**

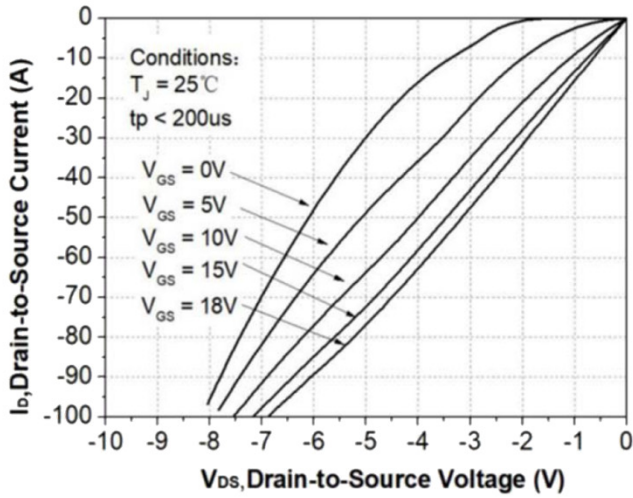


Fig 13: 3rd Quadrant Characteristic( $T_j=25^\circ\text{C}$ )

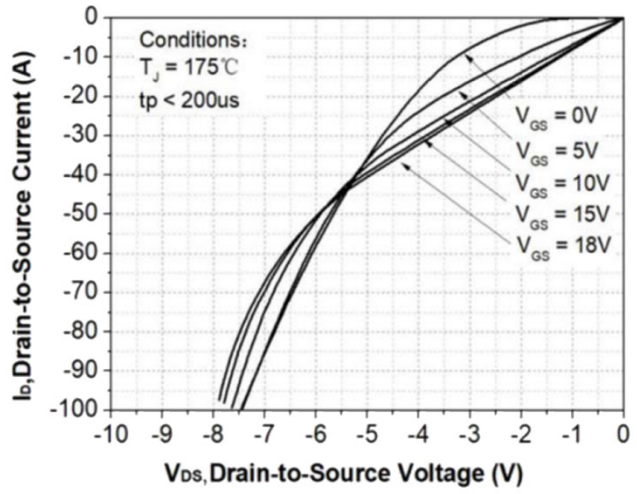


Fig 14: 3rd Quadrant Characteristic( $T_j=175^\circ\text{C}$ )

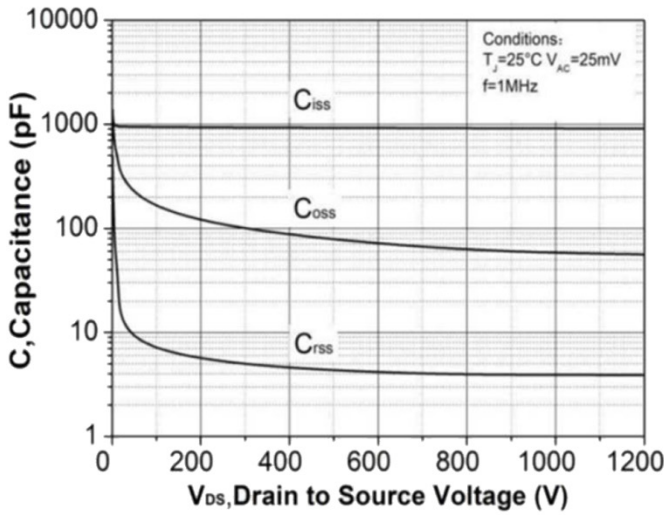


Fig 15: Capacitance Characteristic

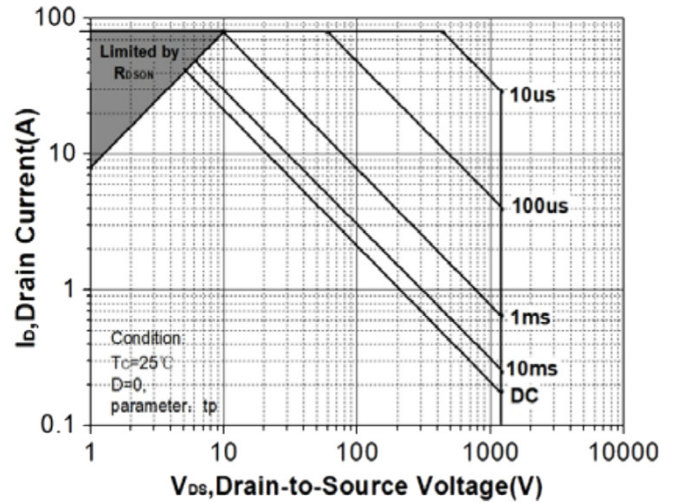


Fig 16: Safe Operating Area

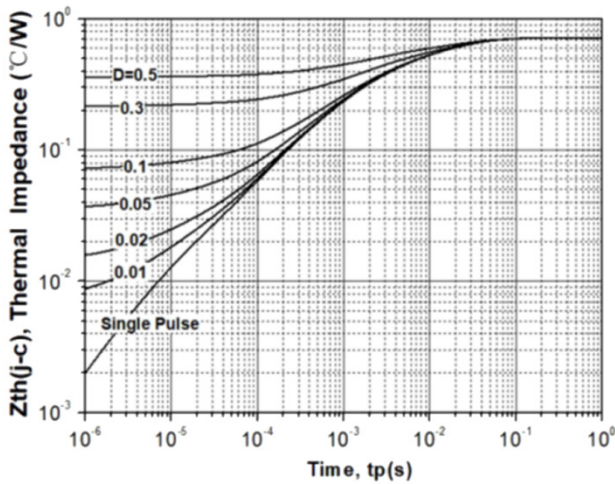
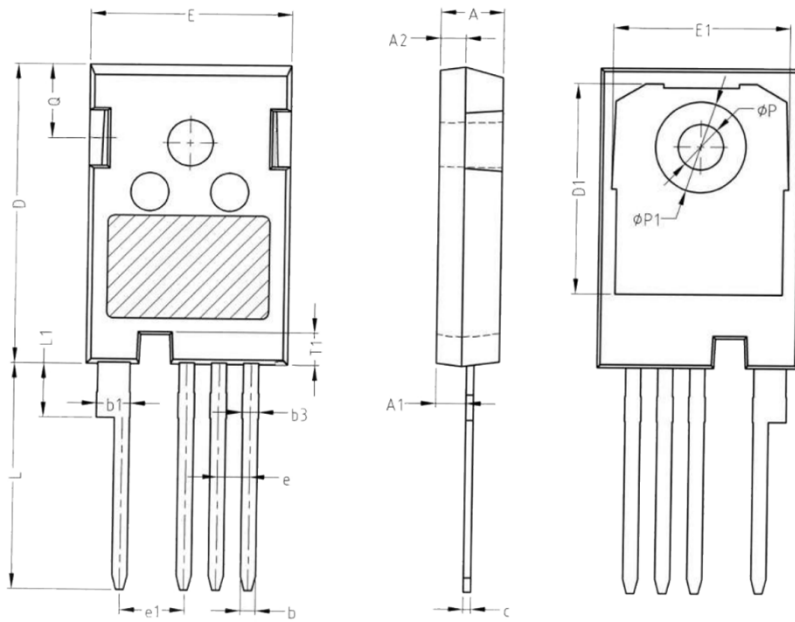



Fig 17: Transient Thermal Impedance

## Product dimension (TO-247-4L)



| Dim | Millimeters |       | Inches     |       |
|-----|-------------|-------|------------|-------|
|     | Min         | Max   | Min        | Max   |
| A   | 4.80        | 5.20  | 0.189      | 0.205 |
| A1  | 2.21        | 2.61  | 0.087      | 0.103 |
| A2  | 1.80        | 2.20  | 0.071      | 0.087 |
| b   | 1.06        | 1.36  | 0.042      | 0.054 |
| b1  | 2.33        | 2.93  | 0.092      | 0.115 |
| b3  | 1.07        | 1.60  | 0.042      | 0.063 |
| c   | 0.51        | 0.75  | 0.020      | 0.030 |
| D   | 23.30       | 23.60 | 0.917      | 0.929 |
| D1  | 16.25       | 16.85 | 0.640      | 0.663 |
| E   | 15.74       | 16.14 | 0.620      | 0.635 |
| E1  | 13.72       | 14.32 | 0.540      | 0.564 |
| T1  | 2.35        | 2.65  | 0.093      | 0.104 |
| e   | 2.54 BSC    |       | 0.100 BSC  |       |
| e1  | 5.08 BSC    |       | 0.200 BSC  |       |
| Q   | 5.49        | 6.09  | 0.216      | 0.240 |
| L   | 17.27       | 17.87 | 0.680      | 0.704 |
| L1  | 3.99        | 4.39  | 0.157      | 0.173 |
| φP  | 3.40        | 3.80  | 0.134      | 0.150 |
| φP1 | 7.19 Ref.   |       | 0.283 Ref. |       |


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