



## P6KE SERIES

### TRANSIENT VOLTAGE SUPPRESSORS

**REVERSE VOLTAGE:** 6.8 to 440 VOLTS

**PEAK PULSE POWER:** 600 WATTS

#### FEATURES

- Plastic package has Underwriters Laboratory Flammability Classification 94V-0
- 600W peak pulse power capability on 10/1000 $\mu$ s waveform, repetition rate (duty cycle): 0.01%
- Excellent clamping capability
- Low incremental surge resistance
- Very fast response time

#### MECHANICAL DATA

Case: Molded plastic, DO-15

Epoxy: UL 94V-0 rate flame retardant

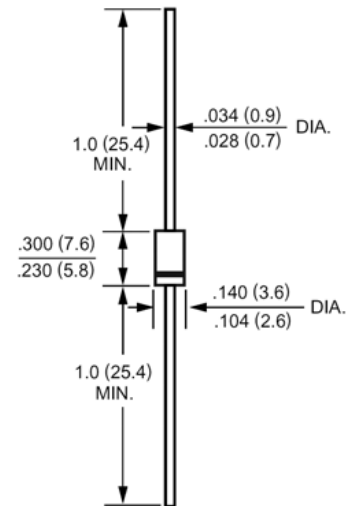
Lead: Axial leads, solderable per MIL-STD-202, method 208 guaranteed

Polarity: Color band denotes cathode except bipolar

Mounting position: Any

Weight: 0.015ounce, 0.4gram

#### DO-15



Dimensions in inches and (millimeters)

#### Maximum Ratings and Electrical Characteristics

Ratings at 25°C ambient temperature unless otherwise specified.

Single phase, half wave, 60Hz, resistive or inductive load.

For capacitive load, derate current by 20%.

|                                                                                                      | Symbols         | Limit          | Units              |
|------------------------------------------------------------------------------------------------------|-----------------|----------------|--------------------|
| Peak power dissipation with a 10/1000 $\mu$ s waveform (Note 1) (Fig. 1)                             | $P_{PPM}$       | Minimum 600    | Watts              |
| Peak pulse current with a 10/1000 $\mu$ s waveform (Note 1)                                          | $I_{PPM}$       | See Next Table | Amp                |
| Steady state power dissipation<br>at $T_L = 75^\circ\text{C}$ , lead lengths 0.375" (9.5mm) (Note 2) | $P_{M(AV)}$     | 5.0            | Watts              |
| Peak forward surge current, 8.3ms<br>single half sine-wave unidirectional only (Note 3)              | $I_{FSM}$       | 100            | Amp                |
| Maximum instantaneous forward voltage<br>at 50A for unidirectional only (Note 4)                     | $V_F$           | 3.5/5.0        | Volts              |
| Typical thermal resistance junction-to-lead                                                          | $R_{\theta JL}$ | 20             | $^\circ\text{C/W}$ |
| Typical thermal resistance junction-to-ambient                                                       | $R_{\theta JA}$ | 75             | $^\circ\text{C/W}$ |
| Operating junction and storage temperature range                                                     | $T_J, T_{stg}$  | -55 to +150    | $^\circ\text{C}$   |

#### NOTES:

- 1- Non-repetitive current pulse, per Fig.3 and derated above  $T_A = 25^\circ\text{C}$  per Fig. 2
- 2- Mounted on copper pad area of 1.6 x 1.6" (40 x 40mm) per Fig. 5
- 3- Measured on 8.3ms single half sine-wave or equivalent square wave, duty cycle = 4 pulses per minute maximum
- 4-  $V_F = 3.5\text{V}$  for P6KE200(A) & below;  $V_F = 5.0\text{V}$  for P6KE220(A) & above

#### Devices for Bidirectional Applications:

- 1- For bi-directional, use C or CA suffix for types P6KE6.8 thru types P6KE440A(e.g. P6KE6.8C, P6KE440CA).
- 2- Electrical characteristics apply in both directions.



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### Maximum Ratings and Electrical Characteristics

Ratings at 25°C ambient temperature unless otherwise specified.

Single phase, half wave, 60Hz, resistive or inductive load.

For capacitive load, derate current by 20%.

| Device Type | Breakdown Voltage            |                | Test Current | Reverse Stand off Voltage | Maximum Reverse Leakage at $V_{WM}$ | Maximum Peak Pulse Current | Maximum Clamping Voltage at $I_{PPM}$ | Maximum Temperature Coefficient of $V_{BR}$ |
|-------------|------------------------------|----------------|--------------|---------------------------|-------------------------------------|----------------------------|---------------------------------------|---------------------------------------------|
|             | $V_{BR}$ at $I_T$ ( Note 1 ) |                | $I_T$        | $V_{WM}$                  | $I_D$ ( Note 3 )                    | $I_{PPM}$ ( Note 2 )       | $V_C$                                 | /                                           |
|             | Volts ( min. )               | Volts ( max. ) | mAmps        | Volts                     | uAmps                               | Amps                       | Volts                                 | % / °C                                      |
| P6KE6.8     | 6.12                         | 7.48           | 10           | 5.50                      | 1000                                | 55.6                       | 10.8                                  | 0.057                                       |
| P6KE6.8A    | 6.45                         | 7.14           | 10           | 5.80                      | 1000                                | 57.1                       | 10.5                                  | 0.057                                       |
| P6KE7.5     | 6.75                         | 8.25           | 10           | 6.05                      | 500                                 | 51.3                       | 11.7                                  | 0.061                                       |
| P6KE7.5A    | 7.13                         | 7.88           | 10           | 6.40                      | 500                                 | 53.1                       | 11.3                                  | 0.061                                       |
| P6KE8.2     | 7.38                         | 9.02           | 10           | 6.63                      | 200                                 | 48.0                       | 12.5                                  | 0.065                                       |
| P6KE8.2A    | 7.79                         | 8.61           | 10           | 7.02                      | 200                                 | 49.6                       | 12.1                                  | 0.065                                       |
| P6KE9.1     | 8.19                         | 10.0           | 1.0          | 7.37                      | 50                                  | 43.5                       | 13.8                                  | 0.068                                       |
| P6KE9.1A    | 8.65                         | 9.55           | 1.0          | 7.78                      | 50                                  | 44.8                       | 13.4                                  | 0.068                                       |
| P6KE10      | 9.00                         | 11.0           | 1.0          | 8.10                      | 10                                  | 40.0                       | 15.0                                  | 0.073                                       |
| P6KE10A     | 9.50                         | 10.5           | 1.0          | 8.55                      | 10                                  | 41.4                       | 14.5                                  | 0.073                                       |
| P6KE11      | 9.90                         | 12.1           | 1.0          | 8.92                      | 5.0                                 | 37.0                       | 16.2                                  | 0.075                                       |
| P6KE11A     | 10.5                         | 11.6           | 1.0          | 9.40                      | 5.0                                 | 38.5                       | 15.6                                  | 0.075                                       |
| P6KE12      | 10.8                         | 13.2           | 1.0          | 9.72                      | 5.0                                 | 34.7                       | 17.3                                  | 0.078                                       |
| P6KE12A     | 11.4                         | 12.6           | 1.0          | 10.2                      | 5.0                                 | 35.9                       | 16.7                                  | 0.078                                       |
| P6KE13      | 11.7                         | 14.3           | 1.0          | 10.5                      | 5.0                                 | 31.6                       | 19.0                                  | 0.081                                       |
| P6KE13A     | 12.4                         | 13.7           | 1.0          | 11.1                      | 5.0                                 | 33.0                       | 18.2                                  | 0.081                                       |
| P6KE15      | 13.5                         | 16.5           | 1.0          | 12.1                      | 5.0                                 | 27.3                       | 22.0                                  | 0.084                                       |
| P6KE15A     | 14.3                         | 15.8           | 1.0          | 12.8                      | 5.0                                 | 28.3                       | 21.2                                  | 0.084                                       |
| P6KE16      | 14.4                         | 17.6           | 1.0          | 12.9                      | 5.0                                 | 25.5                       | 23.5                                  | 0.086                                       |
| P6KE16A     | 15.2                         | 16.8           | 1.0          | 13.6                      | 5.0                                 | 26.7                       | 22.5                                  | 0.086                                       |
| P6KE18      | 16.2                         | 19.8           | 1.0          | 14.5                      | 5.0                                 | 22.6                       | 26.5                                  | 0.088                                       |
| P6KE18A     | 17.1                         | 18.9           | 1.0          | 15.3                      | 5.0                                 | 23.8                       | 25.2                                  | 0.088                                       |
| P6KE20A     | 18.0                         | 22.0           | 1.0          | 16.2                      | 5.0                                 | 20.6                       | 29.1                                  | 0.090                                       |
| P6KE20A     | 19.0                         | 21.0           | 1.0          | 17.1                      | 5.0                                 | 21.7                       | 27.7                                  | 0.090                                       |
| P6KE22      | 19.8                         | 24.2           | 1.0          | 17.8                      | 5.0                                 | 18.8                       | 31.9                                  | 0.092                                       |
| P6KE22A     | 20.9                         | 23.1           | 1.0          | 18.8                      | 5.0                                 | 19.6                       | 30.6                                  | 0.092                                       |
| P6KE24      | 21.6                         | 26.4           | 1.0          | 19.4                      | 5.0                                 | 17.3                       | 34.7                                  | 0.094                                       |
| P6KE24A     | 22.8                         | 25.2           | 1.0          | 20.5                      | 5.0                                 | 18.1                       | 33.2                                  | 0.094                                       |
| P6KE27      | 24.3                         | 29.7           | 1.0          | 21.8                      | 5.0                                 | 15.3                       | 39.1                                  | 0.096                                       |
| P6KE27A     | 25.7                         | 28.4           | 1.0          | 23.1                      | 5.0                                 | 16.0                       | 37.5                                  | 0.096                                       |
| P6KE30      | 27.0                         | 33.0           | 1.0          | 24.3                      | 5.0                                 | 13.8                       | 43.5                                  | 0.097                                       |
| P6KE30A     | 28.5                         | 31.5           | 1.0          | 25.6                      | 5.0                                 | 14.5                       | 41.4                                  | 0.097                                       |
| P6KE33      | 29.7                         | 36.3           | 1.0          | 26.8                      | 5.0                                 | 12.6                       | 47.7                                  | 0.098                                       |
| P6KE33A     | 31.4                         | 34.7           | 1.0          | 28.2                      | 5.0                                 | 13.1                       | 45.7                                  | 0.098                                       |
| P6KE36      | 32.4                         | 39.6           | 1.0          | 29.1                      | 5.0                                 | 11.5                       | 52.0                                  | 0.099                                       |
| P6KE36A     | 34.2                         | 37.8           | 1.0          | 30.8                      | 5.0                                 | 12.0                       | 49.9                                  | 0.099                                       |
| P6KE39      | 35.1                         | 42.9           | 1.0          | 31.6                      | 5.0                                 | 10.6                       | 56.4                                  | 0.100                                       |
| P6KE39A     | 37.1                         | 41.0           | 1.0          | 33.3                      | 5.0                                 | 11.1                       | 53.9                                  | 0.100                                       |
| P6KE43      | 38.7                         | 47.3           | 1.0          | 34.8                      | 5.0                                 | 9.7                        | 61.9                                  | 0.101                                       |
| P6KE43A     | 40.9                         | 45.2           | 1.0          | 36.8                      | 5.0                                 | 10.1                       | 59.3                                  | 0.101                                       |
| P6KE47      | 42.3                         | 51.7           | 1.0          | 38.1                      | 5.0                                 | 8.8                        | 67.8                                  | 0.101                                       |
| P6KE47A     | 44.7                         | 49.4           | 1.0          | 40.2                      | 5.0                                 | 9.3                        | 64.8                                  | 0.101                                       |
| P6KE51      | 45.9                         | 56.1           | 1.0          | 41.3                      | 5.0                                 | 8.2                        | 73.5                                  | 0.102                                       |
| P6KE51A     | 48.5                         | 53.6           | 1.0          | 43.6                      | 5.0                                 | 8.6                        | 70.1                                  | 0.102                                       |
| P6KE56      | 50.4                         | 61.6           | 1.0          | 45.4                      | 5.0                                 | 7.5                        | 80.5                                  | 0.103                                       |
| P6KE56A     | 53.2                         | 58.8           | 1.0          | 47.8                      | 5.0                                 | 7.8                        | 77.0                                  | 0.103                                       |



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| Device Type | Breakdown Voltage            |                | Test Current | Reverse Stand off Voltage | Maximum Reverse Leakage at $V_{WM}$ | Maximum Peak Pulse Current | Maximum Clamping Voltage at $I_{PPM}$ | Maximum Temperature Coefficient of $V_{BR}$ |
|-------------|------------------------------|----------------|--------------|---------------------------|-------------------------------------|----------------------------|---------------------------------------|---------------------------------------------|
|             | $V_{BR}$ at $I_T$ ( Note 1 ) |                | $I_T$        | $V_{WM}$                  | $I_D$ ( Note 3 )                    | $I_{PPM}$ ( Note 2 )       | $V_C$                                 | /                                           |
|             | Volts ( min. )               | Volts ( max. ) | mAmps        | Volts                     | $\mu$ Amps                          | Amps                       | Volts                                 | % / °C                                      |
| P6KE62      | 55.8                         | 68.2           | 1.0          | 50.2                      | 5.0                                 | 6.7                        | 89.0                                  | 0.104                                       |
| P6KE62A     | 58.9                         | 65.1           | 1.0          | 53.0                      | 5.0                                 | 7.1                        | 85.0                                  | 0.104                                       |
| P6KE68      | 61.2                         | 74.8           | 1.0          | 55.1                      | 5.0                                 | 6.1                        | 98.0                                  | 0.104                                       |
| P6KE68A     | 64.6                         | 71.4           | 1.0          | 58.1                      | 5.0                                 | 6.5                        | 92.0                                  | 0.104                                       |
| P6KE75      | 67.5                         | 82.5           | 1.0          | 60.7                      | 5.0                                 | 5.6                        | 108                                   | 0.105                                       |
| P6KE75A     | 71.3                         | 78.8           | 1.0          | 64.1                      | 5.0                                 | 5.8                        | 103                                   | 0.105                                       |
| P6KE82      | 73.8                         | 90.2           | 1.0          | 66.4                      | 5.0                                 | 5.1                        | 118                                   | 0.105                                       |
| P6KE82A     | 77.9                         | 86.1           | 1.0          | 70.1                      | 5.0                                 | 5.3                        | 113                                   | 0.105                                       |
| P6KE91      | 81.9                         | 100            | 1.0          | 73.7                      | 5.0                                 | 4.6                        | 131                                   | 0.106                                       |
| P6KE91A     | 86.5                         | 95.5           | 1.0          | 77.8                      | 5.0                                 | 4.8                        | 125                                   | 0.106                                       |
| P6KE100     | 90.0                         | 110            | 1.0          | 81.0                      | 5.0                                 | 4.2                        | 144                                   | 0.106                                       |
| P6KE100A    | 95.0                         | 105            | 1.0          | 85.5                      | 5.0                                 | 4.4                        | 137                                   | 0.106                                       |
| P6KE110     | 99.0                         | 121            | 1.0          | 89.2                      | 5.0                                 | 3.8                        | 158                                   | 0.107                                       |
| P6KE110A    | 105                          | 116            | 1.0          | 94.0                      | 5.0                                 | 3.9                        | 152                                   | 0.107                                       |
| P6KE120     | 108                          | 132            | 1.0          | 97.2                      | 5.0                                 | 3.5                        | 173                                   | 0.107                                       |
| P6KE120A    | 114                          | 126            | 1.0          | 102                       | 5.0                                 | 3.6                        | 165                                   | 0.107                                       |
| P6KE130     | 117                          | 143            | 1.0          | 105                       | 5.0                                 | 3.2                        | 187                                   | 0.107                                       |
| P6KE130A    | 124                          | 137            | 1.0          | 111                       | 5.0                                 | 3.4                        | 179                                   | 0.107                                       |
| P6KE150     | 135                          | 165            | 1.0          | 121                       | 5.0                                 | 2.8                        | 215                                   | 0.108                                       |
| P6KE150A    | 143                          | 158            | 1.0          | 128                       | 5.0                                 | 2.9                        | 207                                   | 0.108                                       |
| P6KE160     | 144                          | 176            | 1.0          | 130                       | 5.0                                 | 2.6                        | 230                                   | 0.108                                       |
| P6KE160A    | 152                          | 168            | 1.0          | 136                       | 5.0                                 | 2.7                        | 219                                   | 0.108                                       |
| P6KE170     | 153                          | 187            | 1.0          | 138                       | 5.0                                 | 2.5                        | 244                                   | 0.108                                       |
| P6KE170A    | 162                          | 179            | 1.0          | 145                       | 5.0                                 | 2.6                        | 234                                   | 0.108                                       |
| P6KE180     | 162                          | 198            | 1.0          | 146                       | 5.0                                 | 2.3                        | 258                                   | 0.108                                       |
| P6KE180A    | 171                          | 189            | 1.0          | 154                       | 5.0                                 | 2.4                        | 246                                   | 0.108                                       |
| P6KE200     | 180                          | 220            | 1.0          | 162                       | 5.0                                 | 2.1                        | 287                                   | 0.108                                       |
| P6KE200A    | 190                          | 210            | 1.0          | 171                       | 5.0                                 | 2.2                        | 274                                   | 0.108                                       |
| P6KE220     | 198                          | 242            | 1.0          | 175                       | 5.0                                 | 1.7                        | 344                                   | 0.108                                       |
| P6KE220A    | 209                          | 231            | 1.0          | 185                       | 5.0                                 | 1.8                        | 328                                   | 0.108                                       |
| P6KE250     | 225                          | 275            | 1.0          | 202                       | 5.0                                 | 1.7                        | 360                                   | 0.110                                       |
| P6KE250A    | 237                          | 263            | 1.0          | 214                       | 5.0                                 | 1.7                        | 344                                   | 0.110                                       |
| P6KE300     | 270                          | 330            | 1.0          | 243                       | 5.0                                 | 1.4                        | 430                                   | 0.110                                       |
| P6KE300A    | 285                          | 315            | 1.0          | 256                       | 5.0                                 | 1.4                        | 414                                   | 0.110                                       |
| P6KE350     | 315                          | 385            | 1.0          | 284                       | 5.0                                 | 1.2                        | 504                                   | 0.110                                       |
| P6KE350A    | 332                          | 368            | 1.0          | 300                       | 5.0                                 | 1.2                        | 482                                   | 0.110                                       |
| P6KE400     | 360                          | 440            | 1.0          | 324                       | 5.0                                 | 1.0                        | 574                                   | 0.110                                       |
| P6KE400A    | 380                          | 420            | 1.0          | 342                       | 5.0                                 | 1.1                        | 548                                   | 0.110                                       |
| P6KE440     | 396                          | 484            | 1.0          | 356                       | 5.0                                 | 0.95                       | 631                                   | 0.110                                       |
| P6KE440A    | 418                          | 462            | 1.0          | 376                       | 5.0                                 | 1.00                       | 602                                   | 0.110                                       |

### NOTES:

- 1- Pulse test:  $t_p \leq 50\text{ms}$
- 2- Surge current waveform per Fig. 3 and derated per Fig. 2
- 3- For bidirectional types having  $V_{WM}$  of 10 volts and less, the  $I_D$  limit is doubled
- 4- All terms and symbols are consistent with ANSI/IEEE C62.35

## RATINGS AND CHARACTERISTIC CURVES

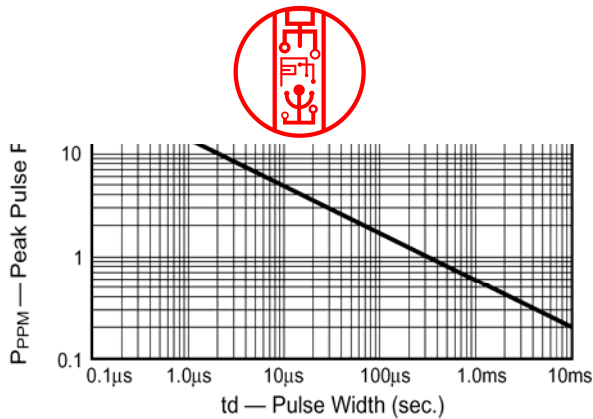


Fig. 2 – Pulse Derating Curve

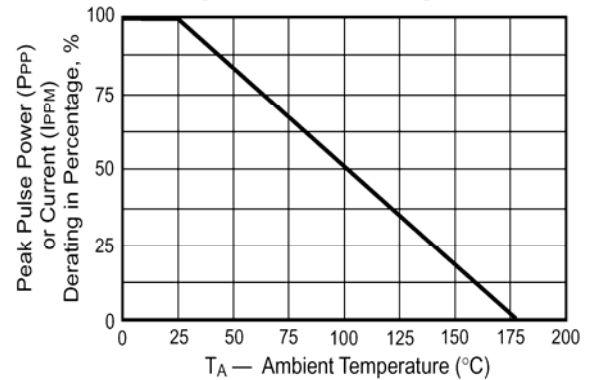


Fig. 3 – Pulse Waveform

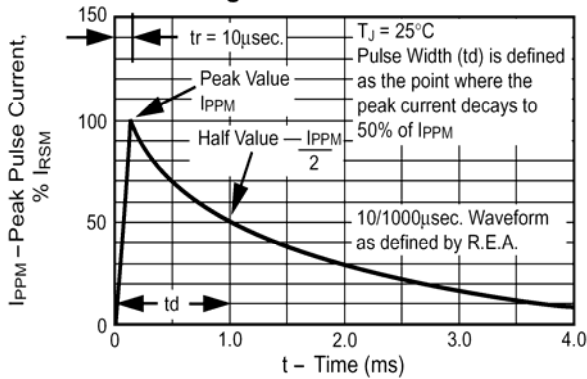


Fig. 4 – Typ. Junction Capacitance Uni-Directional

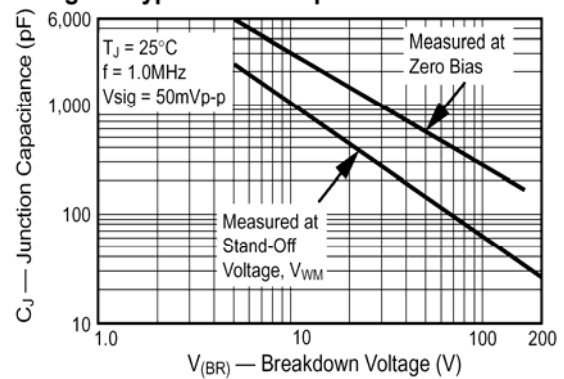


Fig. 5 – Steady State Power Derating Curve

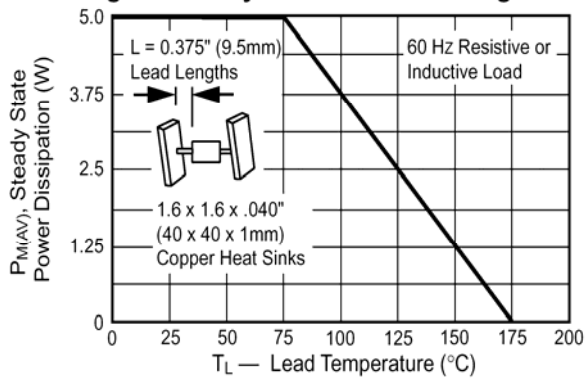


Fig. 6 - Max. Non-Repetitive Forward Surge Current

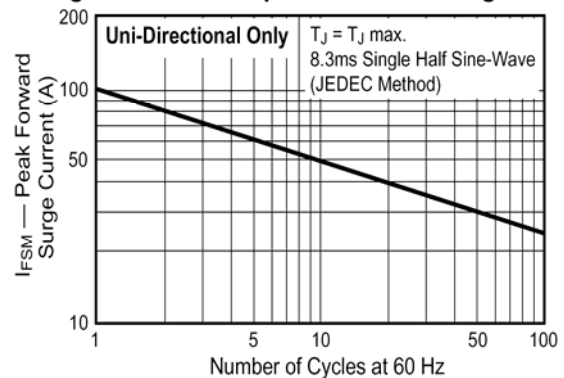


Fig. 7 – Typ. Reverse Leakage Characteristics

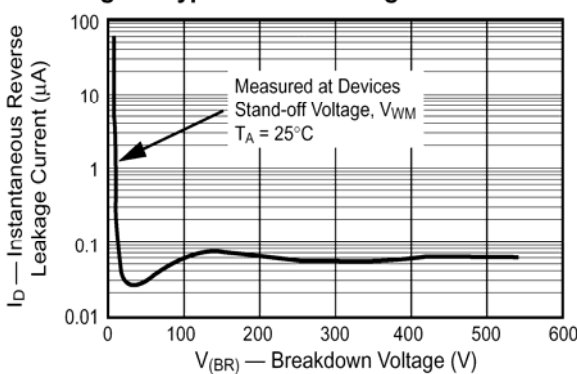


Fig. 8 – Typ. Transient Thermal Impedance

