

**GPP TRANSIENT VOLTAGE SUPPRESSOR**  
**1500 WATT PEAK POWER 5.0 WATTS STEADY STATE**

**FEATURES**

- \* Plastic package has underwriters laboratory certificate
- \* Glass passivated chip construction
- \* 1500 watt surge capability at 1ms
- \* Excellent clamping capability
- \* Low zener impedance
- \* Fast response time

Ratings at 25 °C ambient temperature unless otherwise specified.

**MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS**

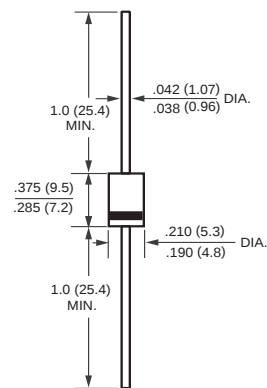
Ratings at 25 °C ambient temperature unless otherwise specified.

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

For capacitive load, derate current by 20%.



**1.5KE**



Dimensions in inches and (millimeters)

**DEVICES FOR BIPOLAR APPLICATIONS**

For Bidirectional use C or CA suffix for types 1.5KE 6.8 thru 1.5KE 450

Electrical characteristics apply in both direction

**MAXIMUM RATINGS** (At  $T_A = 25^\circ\text{C}$  unless otherwise noted)

| RATINGS                                                                                                                 | SYMBOL         | VALUE        | UNITS            |
|-------------------------------------------------------------------------------------------------------------------------|----------------|--------------|------------------|
| Peak Power Dissipation at $T_A = 25^\circ\text{C}$ , $T_P = 1\text{ms}$ ( Note 1 )                                      | PPM            | Minimum 1500 | Watts            |
| Steady State Power Dissipation at $T_L = 75^\circ\text{C}$ lead lengths, .375" ( 9.5 mm ) ( Note 2 )                    | $P_{M(AV)}$    | 5.0          | Watts            |
| Peak Forward Surge Current, 8.3ms single half sine wave- superimposed on rated load( JEDEC METHOD ) unidirectional only | $I_{FSM}$      | 200          | Amps             |
| Maximum Instantaneous Forward Current at 50.0A for unidirectional only ( Note 3 )                                       | $V_F$          | 3.5/5.0      | Volts            |
| Operating 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 0.8X0.8" ( 20X20mm ) per Fig.5.

3.  $V_F = 3.5\text{V}$  for devices of  $V_{(BR)} \leq 200\text{V}$  and  $V_F = 5.0\text{ Volts max.}$  for devices of  $V_{(BR)} \geq 200\text{V}$ .

# RATING AND CHARACTERISTIC CURVES ( 1.5KE6.8 THRU 1.5KE450CA )

FIG. 1 - PULSE POWER RATING CURVE

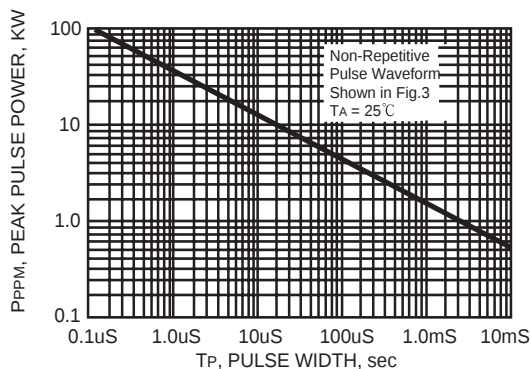


FIG. 2 - PULSE DERATING CURVE

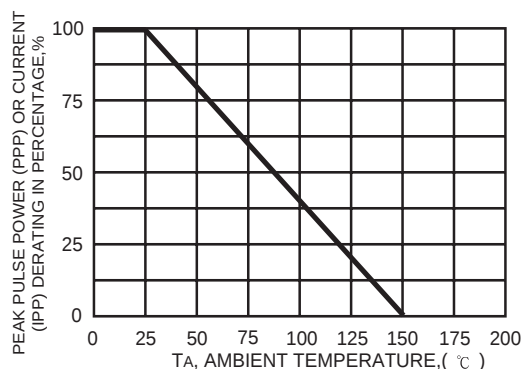


FIG. 3 - PULSE WAVEFORM

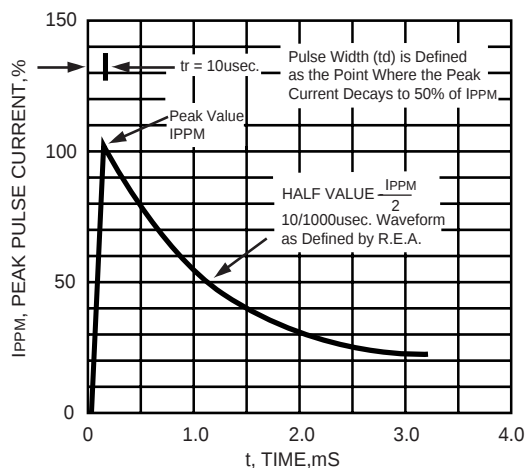


FIG. 4 - TYPICAL JUNCTION CAPACITANCE

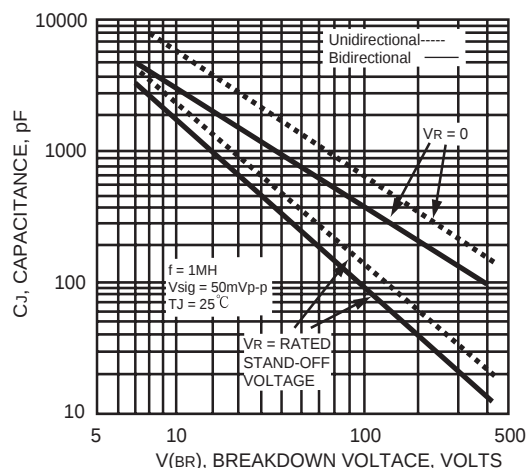


FIG. 5 - STEADY STATE POWER DERATING CURVE

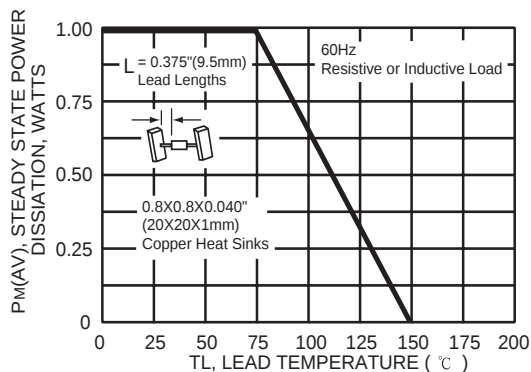
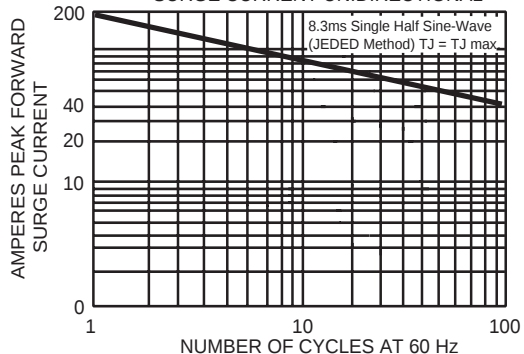
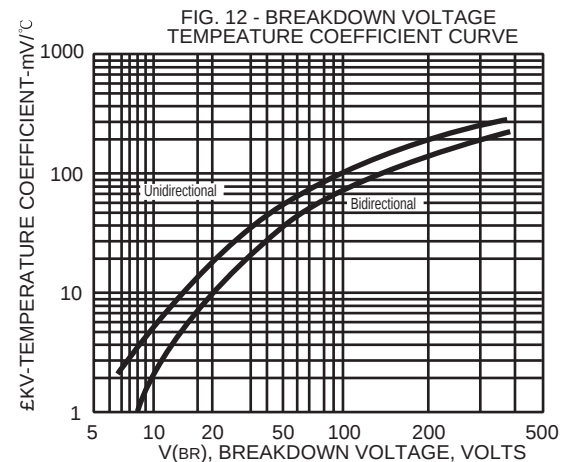
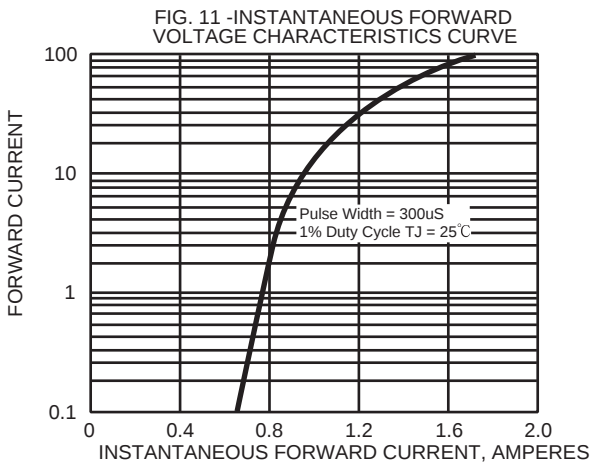
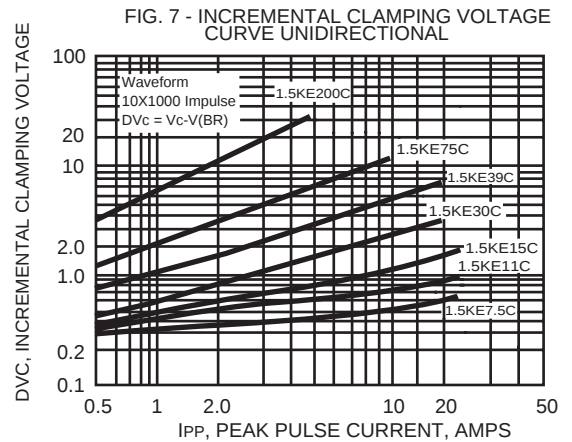
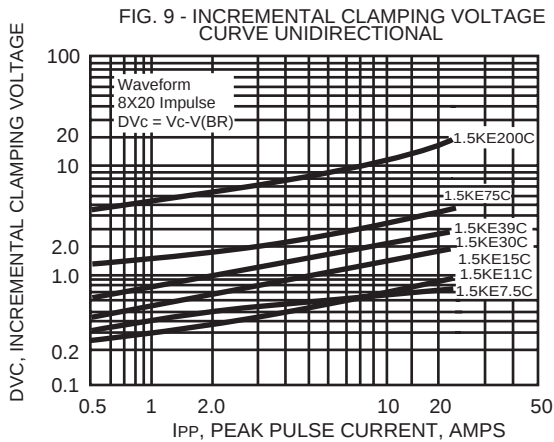
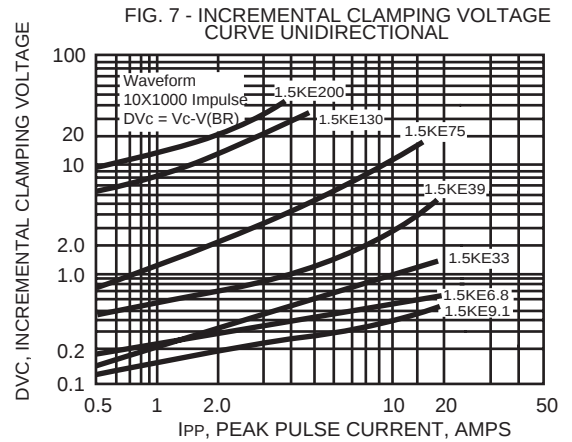
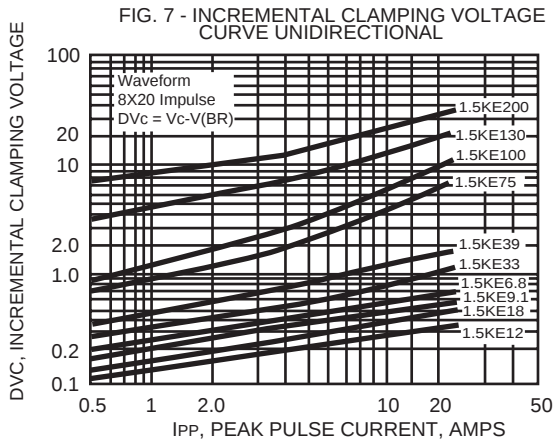


FIG. 6 - MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT UNIDIRECTIONAL



# RATING AND CHARACTERISTIC CURVES ( 1.5KE6.8 THRU 1.5KE450CA )



# TRANSIENT VOLTAGE SUPPRESSORS

1500W SERIES TVS DIODES / 1.5KE ( CASE 10 ) 1500W

| TYPE      | Breakdown Voltage |      |          | Reverse Stand off Voltage VWM (Volts) | Maximum Reverse Leakage at VWM Id(uA) | Maximum Peak Pulse Current IPPM (Amps) | Maximum Clamping Voltage at IPPM Vc (Volts) |
|-----------|-------------------|------|----------|---------------------------------------|---------------------------------------|----------------------------------------|---------------------------------------------|
|           | VBR (Volts)       |      | @It (mA) |                                       |                                       |                                        |                                             |
|           | MIN.              | MAX. |          |                                       |                                       |                                        |                                             |
| 1.5KE6.8  | 6.12              | 7.48 | 10       | 5.50                                  | 1000                                  | 139                                    | 10.8                                        |
| 1.5KE6.8A | 6.45              | 7.14 | 10       | 5.80                                  | 1000                                  | 143                                    | 10.5                                        |
| 1.5KE7.5  | 6.75              | 8.25 | 10       | 6.05                                  | 500                                   | 128                                    | 11.7                                        |
| 1.5KE7.5A | 7.13              | 7.88 | 10       | 6.40                                  | 500                                   | 133                                    | 11.3                                        |
| 1.5KE8.2  | 7.38              | 9.02 | 10       | 6.63                                  | 200                                   | 120                                    | 12.5                                        |
| 1.5KE8.2A | 7.79              | 8.61 | 10       | 7.02                                  | 200                                   | 124                                    | 12.1                                        |
| 1.5KE9.1  | 8.19              | 10.0 | 1.0      | 7.37                                  | 50                                    | 109                                    | 13.8                                        |
| 1.5KE9.1A | 8.65              | 9.55 | 1.0      | 7.78                                  | 50                                    | 112                                    | 13.4                                        |
| 1.5KE10   | 9.00              | 11.0 | 1.0      | 8.10                                  | 10                                    | 100                                    | 15.0                                        |
| 1.5KE10A  | 9.50              | 10.5 | 1.0      | 8.55                                  | 10                                    | 103                                    | 14.5                                        |
| 1.5KE11   | 9.90              | 12.1 | 1.0      | 8.92                                  | 5.0                                   | 92.6                                   | 16.2                                        |
| 1.5KE11A  | 10.5              | 11.6 | 1.0      | 9.40                                  | 5.0                                   | 96.2                                   | 15.6                                        |
| 1.5KE12   | 10.8              | 13.2 | 1.0      | 9.72                                  | 5.0                                   | 86.7                                   | 17.3                                        |
| 1.5KE12A  | 11.4              | 12.6 | 1.0      | 10.2                                  | 5.0                                   | 89.8                                   | 16.7                                        |
| 1.5KE13   | 11.7              | 14.3 | 1.0      | 10.5                                  | 5.0                                   | 78.9                                   | 19.0                                        |
| 1.5KE13A  | 12.4              | 13.7 | 1.0      | 11.1                                  | 5.0                                   | 82.4                                   | 18.2                                        |
| 1.5KE15   | 13.5              | 16.5 | 1.0      | 12.1                                  | 5.0                                   | 68.2                                   | 22.0                                        |
| 1.5KE15A  | 14.3              | 15.8 | 1.0      | 12.8                                  | 5.0                                   | 70.8                                   | 21.2                                        |
| 1.5KE16   | 14.4              | 17.6 | 1.0      | 12.9                                  | 5.0                                   | 63.8                                   | 23.5                                        |
| 1.5KE16A  | 15.2              | 16.8 | 1.0      | 13.6                                  | 5.0                                   | 66.7                                   | 22.5                                        |
| 1.5KE18   | 16.2              | 19.8 | 1.0      | 14.5                                  | 5.0                                   | 56.6                                   | 26.5                                        |
| 1.5KE18A  | 17.1              | 18.9 | 1.0      | 15.3                                  | 5.0                                   | 59.5                                   | 25.2                                        |
| 1.5KE20   | 18.0              | 22.0 | 1.0      | 16.2                                  | 5.0                                   | 51.5                                   | 29.1                                        |
| 1.5KE20A  | 19.0              | 21.0 | 1.0      | 17.1                                  | 5.0                                   | 54.2                                   | 27.7                                        |
| 1.5KE22   | 19.8              | 24.2 | 1.0      | 17.8                                  | 5.0                                   | 47                                     | 31.9                                        |
| 1.5KE22A  | 20.9              | 23.1 | 1.0      | 18.8                                  | 5.0                                   | 49                                     | 30.6                                        |
| 1.5KE24   | 21.6              | 26.4 | 1.0      | 19.4                                  | 5.0                                   | 43.2                                   | 34.7                                        |
| 1.5KE24A  | 22.8              | 25.2 | 1.0      | 20.5                                  | 5.0                                   | 45.2                                   | 33.2                                        |
| 1.5KE27   | 24.3              | 29.7 | 1.0      | 21.8                                  | 5.0                                   | 38.4                                   | 39.1                                        |
| 1.5KE27A  | 25.7              | 28.4 | 1.0      | 23.1                                  | 5.0                                   | 40                                     | 37.5                                        |
| 1.5KE30   | 27.0              | 33.0 | 1.0      | 24.3                                  | 5.0                                   | 34.5                                   | 43.5                                        |
| 1.5KE30A  | 28.5              | 31.5 | 1.0      | 25.6                                  | 5.0                                   | 36.2                                   | 41.4                                        |
| 1.5KE33   | 29.7              | 36.3 | 1.0      | 26.8                                  | 5.0                                   | 31.4                                   | 47.7                                        |
| 1.5KE33A  | 31.4              | 34.7 | 1.0      | 28.2                                  | 5.0                                   | 32.8                                   | 45.7                                        |
| 1.5KE36   | 32.4              | 39.6 | 1.0      | 29.1                                  | 5.0                                   | 28.8                                   | 52.0                                        |
| 1.5KE36A  | 34.2              | 37.8 | 1.0      | 30.8                                  | 5.0                                   | 30.1                                   | 49.9                                        |
| 1.5KE39   | 35.1              | 42.9 | 1.0      | 31.6                                  | 5.0                                   | 26.6                                   | 56.4                                        |
| 1.5KE39A  | 37.1              | 41.0 | 1.0      | 33.3                                  | 5.0                                   | 27.8                                   | 53.9                                        |
| 1.5KE43   | 38.7              | 47.3 | 1.0      | 34.8                                  | 5.0                                   | 24.2                                   | 61.9                                        |
| 1.5KE43A  | 40.9              | 45.2 | 1.0      | 36.8                                  | 5.0                                   | 25.3                                   | 59.3                                        |
| 1.5KE47   | 42.3              | 51.7 | 1.0      | 38.1                                  | 5.0                                   | 22.1                                   | 67.8                                        |
| 1.5KE47A  | 44.7              | 49.4 | 1.0      | 40.2                                  | 5.0                                   | 23.1                                   | 64.8                                        |
| 1.5KE51   | 45.9              | 56.1 | 1.0      | 41.3                                  | 5.0                                   | 20.4                                   | 73.5                                        |
| 1.5KE51A  | 48.5              | 53.6 | 1.0      | 43.6                                  | 5.0                                   | 21.4                                   | 70.1                                        |
| 1.5KE56   | 50.4              | 61.6 | 1.0      | 45.4                                  | 5.0                                   | 18.6                                   | 80.5                                        |
| 1.5KE56A  | 53.2              | 58.8 | 1.0      | 47.8                                  | 5.0                                   | 19.5                                   | 77.0                                        |

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1500W SERIES TVS DIODES / 1.5KE ( CASE 10 ) 1500W

| TYPE      | Breakdown Voltage          |       |                         | Reverse Stand off Voltage<br>V <sub>WM</sub><br>(Volts) | Maximum Reverse Leakage at V <sub>WM</sub><br>I <sub>D</sub> (uA) | Maximum Peak Pulse Current<br>I <sub>PPM</sub><br>(Amps) | Maximum Clamping Voltage at I <sub>PPM</sub><br>V <sub>C</sub> (Volts) |
|-----------|----------------------------|-------|-------------------------|---------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------|------------------------------------------------------------------------|
|           | V <sub>BR</sub><br>(Volts) |       | @I <sub>T</sub><br>(mA) |                                                         |                                                                   |                                                          |                                                                        |
|           | MIN.                       | MAX.  |                         |                                                         |                                                                   |                                                          |                                                                        |
| 1.5KE62   | 55.8                       | 68.2  | 1.0                     | 50.2                                                    | 5.0                                                               | 16.9                                                     | 89.0                                                                   |
| 1.5KE62A  | 58.9                       | 65.1  | 1.0                     | 53.0                                                    | 5.0                                                               | 17.6                                                     | 85.0                                                                   |
| 1.5KE68   | 61.2                       | 74.8  | 1.0                     | 55.1                                                    | 5.0                                                               | 15.3                                                     | 98.0                                                                   |
| 1.5KE68A  | 64.6                       | 71.4  | 1.0                     | 58.1                                                    | 5.0                                                               | 16.3                                                     | 92.0                                                                   |
| 1.5KE75   | 67.5                       | 82.5  | 1.0                     | 60.7                                                    | 5.0                                                               | 13.9                                                     | 109                                                                    |
| 1.5KE75A  | 71.3                       | 78.8  | 1.0                     | 64.1                                                    | 5.0                                                               | 14.6                                                     | 104                                                                    |
| 1.5KE82   | 73.8                       | 90.2  | 1.0                     | 66.4                                                    | 5.0                                                               | 12.7                                                     | 118                                                                    |
| 1.5KE82A  | 77.9                       | 86.1  | 1.0                     | 70.1                                                    | 5.0                                                               | 13.3                                                     | 113                                                                    |
| 1.5KE91   | 81.9                       | 100   | 1.0                     | 73.7                                                    | 5.0                                                               | 11.5                                                     | 131                                                                    |
| 1.5KE91A  | 86.5                       | 95.5  | 1.0                     | 77.8                                                    | 5.0                                                               | 12.0                                                     | 125                                                                    |
| 1.5KE100  | 90.0                       | 110   | 1.0                     | 81.0                                                    | 5.0                                                               | 10.4                                                     | 144                                                                    |
| 1.5KE100A | 95.0                       | 105   | 1.0                     | 85.5                                                    | 5.0                                                               | 10.9                                                     | 137                                                                    |
| 1.5KE110  | 99.0                       | 121   | 1.0                     | 89.2                                                    | 5.0                                                               | 9.5                                                      | 158                                                                    |
| 1.5KE110A | 105                        | 116   | 1.0                     | 94.0                                                    | 5.0                                                               | 9.9                                                      | 152                                                                    |
| 1.5KE120  | 108                        | 132   | 1.0                     | 97.2                                                    | 5.0                                                               | 8.7                                                      | 173                                                                    |
| 1.5KE120A | 114                        | 126   | 1.0                     | 102                                                     | 5.0                                                               | 9.1                                                      | 165                                                                    |
| 1.5KE130  | 117                        | 143   | 1.0                     | 105                                                     | 5.0                                                               | 8.0                                                      | 187                                                                    |
| 1.5KE130A | 124                        | 137   | 1.0                     | 111                                                     | 5.0                                                               | 8.4                                                      | 179                                                                    |
| 1.5KE150  | 135                        | 165   | 1.0                     | 121                                                     | 5.0                                                               | 7.0                                                      | 215                                                                    |
| 1.5KE150A | 143                        | 158   | 1.0                     | 128                                                     | 5.0                                                               | 7.2                                                      | 207                                                                    |
| 1.5KE160  | 144                        | 176   | 1.0                     | 130                                                     | 5.0                                                               | 6.5                                                      | 230                                                                    |
| 1.5KE160A | 152                        | 168   | 1.0                     | 136                                                     | 5.0                                                               | 6.8                                                      | 219                                                                    |
| 1.5KE170  | 153                        | 187   | 1.0                     | 138                                                     | 5.0                                                               | 6.1                                                      | 244                                                                    |
| 1.5KE170A | 162                        | 179   | 1.0                     | 145                                                     | 5.0                                                               | 6.4                                                      | 234                                                                    |
| 1.5KE180  | 162                        | 198   | 1.0                     | 146                                                     | 5.0                                                               | 5.8                                                      | 258                                                                    |
| 1.5KE180A | 171                        | 189   | 1.0                     | 154                                                     | 5.0                                                               | 6.1                                                      | 246                                                                    |
| 1.5KE200  | 180                        | 220   | 1.0                     | 162                                                     | 5.0                                                               | 5.2                                                      | 287                                                                    |
| 1.5KE200A | 190                        | 210   | 1.0                     | 171                                                     | 5.0                                                               | 5.5                                                      | 274                                                                    |
| 1.5KE220  | 198                        | 242   | 1.0                     | 175                                                     | 5.0                                                               | 4.4                                                      | 344                                                                    |
| 1.5KE220A | 209                        | 231   | 1.0                     | 185                                                     | 5.0                                                               | 4.6                                                      | 328                                                                    |
| 1.5KE250  | 225                        | 275   | 1.0                     | 202                                                     | 5.0                                                               | 4.2                                                      | 360                                                                    |
| 1.5KE250A | 237                        | 263   | 1.0                     | 214                                                     | 5.0                                                               | 4.4                                                      | 344                                                                    |
| 1.5KE300  | 270                        | 330   | 1.0                     | 243                                                     | 5.0                                                               | 3.5                                                      | 430                                                                    |
| 1.5KE300A | 285                        | 315   | 1.0                     | 256                                                     | 5.0                                                               | 3.6                                                      | 414                                                                    |
| 1.5KE350  | 315                        | 385   | 1.0                     | 284                                                     | 5.0                                                               | 3.0                                                      | 504                                                                    |
| 1.5KE350A | 333                        | 368   | 1.0                     | 300                                                     | 5.0                                                               | 3.1                                                      | 482                                                                    |
| 1.5KE400  | 360                        | 440   | 1.0                     | 324                                                     | 5.0                                                               | 2.6                                                      | 574                                                                    |
| 1.5KE400A | 380                        | 420   | 1.0                     | 342                                                     | 5.0                                                               | 2.7                                                      | 548                                                                    |
| 1.5KE440  | 396                        | 484   | 1.0                     | 356                                                     | 5.0                                                               | 2.4                                                      | 631                                                                    |
| 1.5KE440A | 418                        | 462   | 1.0                     | 376                                                     | 5.0                                                               | 2.5                                                      | 602                                                                    |
| 1.5KE450  | 405                        | 495   | 1.0                     | 364                                                     | 5.0                                                               | 2.2                                                      | 682                                                                    |
| 1.5KE450A | 427.5                      | 472.5 | 1.0                     | 385                                                     | 5.0                                                               | 2.3                                                      | 652                                                                    |

- Notes :
1.  $V_{BR}$  measured after  $I_T$  applied for 300ms.  $I_T$  = square pulse or equivalent.
  2. For bidirectional use C or CA suffixs for all types (ex. 1.5KE6.8C, 1.5KE450CA) electrical characteristics apply in both directions.
  3. For bidirectional types having  $V_{WM}$  of 10 volts and less, the  $I_D$  limit is doubled.
  4. All devices UL listed file# E211196.