

# P6KE SERIES - S

# TRANSIENT VOLTAGE SUPPRESSOR

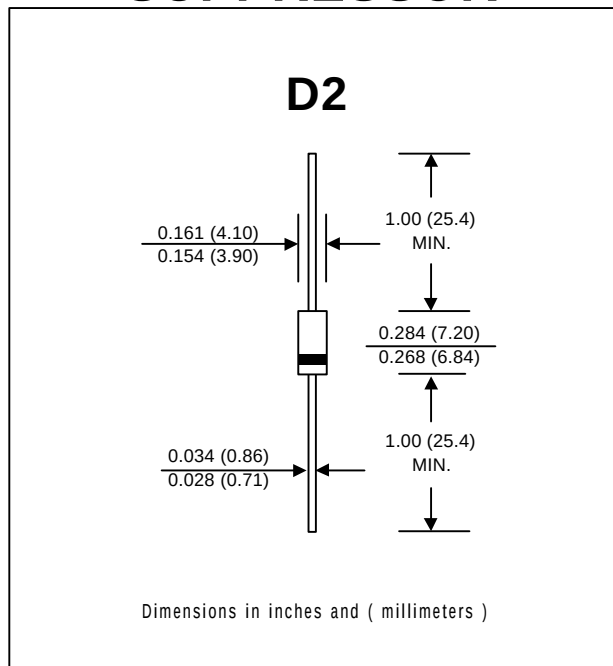
**V<sub>BR</sub> : 6.8 - 440 Volts**  
**P<sub>PK</sub> : 600 Watts**

## FEATURES :

- \* 600W surge capability at 1ms
- \* Excellent clamping capability
- \* Low zener impedance
- \* Fast response time : typically less than 1.0 ps from 0 volt to V<sub>BR(min.)</sub>
- \* Typical I<sub>R</sub> less than 1μA above 10V
- \* **Pb / RoHS Free**

## MECHANICAL DATA

- \* Case : D2 Molded plastic
- \* Epoxy : UL94V-O rate flame retardant
- \* Lead : Axial lead solderable per MIL-STD-202, method 208 guaranteed
- \* Polarity : Color band denotes cathode end
- \* Mounting position : Any
- \* Weight : 0.465 gram



## DEVICES FOR BIPOLAR APPLICATIONS

For Bi-directional use CS or CAS Suffix  
 Electrical characteristics apply in both directions

## MAXIMUM RATINGS

Rating at 25 °C ambient temperature unless otherwise specified.

| Rating                                                                                                           | Symbol                            | Value         | Unit |
|------------------------------------------------------------------------------------------------------------------|-----------------------------------|---------------|------|
| Peak Power Dissipation at Ta = 25 °C, Tp=1ms (Note1)                                                             | PPK                               | Minimum 600   | W    |
| Steady State Power Dissipation at T <sub>L</sub> = 75 °C<br>Lead Lengths 0.375", (9.5mm) (Note 2)                | P <sub>D</sub>                    | 5.0           | W    |
| Peak Forward Surge Current, 8.3ms Single Half<br>Sine-Wave Superimposed on Rated Load<br>(JEDEC Method) (Note 3) | I <sub>FSM</sub>                  | 100           | A    |
| Operating and Storage Temperature Range                                                                          | T <sub>J</sub> , T <sub>STG</sub> | - 65 to + 175 | °C   |

## Note :

- (1) Non-repetitive Current pulse, per Fig. 5 and derated above Ta = 25 °C per Fig. 1
- (2) Mounted on Copper Leaf area of 1.57 in<sup>2</sup> (40mm<sup>2</sup>).
- (3) 8.3 ms single half sine-wave, duty cycle = 4 pulses per minutes maximum.

## ELECTRICAL CHARACTERISTICS

Rating at 25 °C ambient temperature unless otherwise specified

| TYPE      | Breakdown Voltage @ It<br>( Note 1 ) |      |      | Working Peak<br>Reverse<br>Voltage | Maximum<br>Reverse Leakage<br>@ VRWM | Maximum<br>Reverse<br>Current | Maximum<br>Clamping<br>Voltage @ IRSM | Maximum<br>Temperature<br>Co-efficient<br>of VBR |      |      |      |      |
|-----------|--------------------------------------|------|------|------------------------------------|--------------------------------------|-------------------------------|---------------------------------------|--------------------------------------------------|------|------|------|------|
|           | VBR (V)                              |      | It   |                                    |                                      |                               |                                       |                                                  | VRWM | IR   | IRSM | VRSM |
|           | Min.                                 | Max. | (mA) |                                    |                                      |                               |                                       |                                                  | (V)  | (μA) | (A)  | (V)  |
|           |                                      |      |      |                                    |                                      |                               |                                       | (% / °C)                                         |      |      |      |      |
| P6KE6.8S  | 6.12                                 | 7.48 | 10   | 5.50                               | 1000                                 | 55.5                          | 10.8                                  | 0.057                                            |      |      |      |      |
| P6KE6.8AS | 6.45                                 | 7.14 | 10   | 5.80                               | 1000                                 | 57.0                          | 10.5                                  | 0.057                                            |      |      |      |      |
| P6KE7.5S  | 6.75                                 | 8.25 | 10   | 6.05                               | 500                                  | 51.0                          | 11.7                                  | 0.061                                            |      |      |      |      |
| P6KE7.5AS | 7.13                                 | 7.88 | 10   | 6.40                               | 500                                  | 53.0                          | 11.3                                  | 0.061                                            |      |      |      |      |
| P6KE8.2S  | 7.38                                 | 9.02 | 10   | 6.63                               | 200                                  | 48.0                          | 12.5                                  | 0.065                                            |      |      |      |      |
| P6KE8.2AS | 7.79                                 | 8.61 | 10   | 7.02                               | 200                                  | 50.0                          | 12.1                                  | 0.065                                            |      |      |      |      |
| P6KE9.1S  | 8.19                                 | 10.0 | 1.0  | 7.37                               | 150                                  | 44.0                          | 13.8                                  | 0.068                                            |      |      |      |      |
| P6KE9.1AS | 8.65                                 | 9.55 | 1.0  | 7.78                               | 150                                  | 45.0                          | 13.4                                  | 0.068                                            |      |      |      |      |
| P6KE10S   | 9.00                                 | 11.0 | 1.0  | 8.10                               | 150                                  | 40.0                          | 15.0                                  | 0.073                                            |      |      |      |      |
| P6KE10AS  | 9.50                                 | 10.5 | 1.0  | 8.55                               | 150                                  | 41.0                          | 14.5                                  | 0.073                                            |      |      |      |      |
| P6KE11S   | 9.90                                 | 12.1 | 1.0  | 8.92                               | 150                                  | 37.0                          | 16.2                                  | 0.075                                            |      |      |      |      |
| P6KE11AS  | 10.5                                 | 11.6 | 1.0  | 9.40                               | 150                                  | 38.0                          | 15.6                                  | 0.075                                            |      |      |      |      |
| P6KE12S   | 10.8                                 | 13.2 | 1.0  | 9.72                               | 5.0                                  | 35.0                          | 17.3                                  | 0.078                                            |      |      |      |      |
| P6KE12AS  | 11.4                                 | 12.6 | 1.0  | 10.2                               | 5.0                                  | 36.0                          | 16.7                                  | 0.078                                            |      |      |      |      |
| P6KE13S   | 11.7                                 | 14.3 | 1.0  | 10.5                               | 5.0                                  | 32.0                          | 19.0                                  | 0.081                                            |      |      |      |      |
| P6KE13AS  | 12.4                                 | 13.7 | 1.0  | 11.1                               | 5.0                                  | 33.0                          | 18.2                                  | 0.081                                            |      |      |      |      |
| P6KE15S   | 13.5                                 | 16.5 | 1.0  | 12.1                               | 5.0                                  | 27.0                          | 22.0                                  | 0.084                                            |      |      |      |      |
| P6KE15AS  | 14.3                                 | 15.8 | 1.0  | 12.8                               | 5.0                                  | 28.0                          | 21.2                                  | 0.084                                            |      |      |      |      |
| P6KE16S   | 14.4                                 | 17.6 | 1.0  | 12.9                               | 5.0                                  | 26.0                          | 23.5                                  | 0.086                                            |      |      |      |      |
| P6KE16AS  | 15.2                                 | 16.8 | 1.0  | 13.6                               | 5.0                                  | 27.0                          | 22.5                                  | 0.086                                            |      |      |      |      |
| P6KE18S   | 16.2                                 | 19.8 | 1.0  | 14.5                               | 5.0                                  | 23.0                          | 26.5                                  | 0.088                                            |      |      |      |      |
| P6KE18AS  | 17.1                                 | 18.9 | 1.0  | 15.3                               | 5.0                                  | 24.0                          | 25.2                                  | 0.088                                            |      |      |      |      |
| P6KE20S   | 18.0                                 | 22.0 | 1.0  | 16.2                               | 5.0                                  | 21.0                          | 29.1                                  | 0.090                                            |      |      |      |      |
| P6KE20AS  | 19.0                                 | 21.0 | 1.0  | 17.1                               | 5.0                                  | 22.0                          | 27.7                                  | 0.090                                            |      |      |      |      |
| P6KE22S   | 19.8                                 | 24.2 | 1.0  | 17.8                               | 5.0                                  | 19.0                          | 31.9                                  | 0.092                                            |      |      |      |      |
| P6KE22AS  | 20.9                                 | 23.1 | 1.0  | 18.8                               | 5.0                                  | 20.0                          | 30.6                                  | 0.092                                            |      |      |      |      |
| P6KE24S   | 21.6                                 | 26.4 | 1.0  | 19.4                               | 5.0                                  | 17.0                          | 34.7                                  | 0.094                                            |      |      |      |      |
| P6KE24AS  | 22.8                                 | 25.2 | 1.0  | 20.5                               | 5.0                                  | 18.0                          | 33.2                                  | 0.094                                            |      |      |      |      |
| P6KE27S   | 24.3                                 | 29.7 | 1.0  | 21.8                               | 5.0                                  | 15.0                          | 39.1                                  | 0.096                                            |      |      |      |      |
| P6KE27AS  | 25.7                                 | 28.4 | 1.0  | 23.1                               | 5.0                                  | 16.0                          | 37.5                                  | 0.096                                            |      |      |      |      |
| P6KE30S   | 27.0                                 | 33.0 | 1.0  | 24.3                               | 5.0                                  | 14.0                          | 43.5                                  | 0.097                                            |      |      |      |      |
| P6KE30AS  | 28.5                                 | 31.5 | 1.0  | 25.6                               | 5.0                                  | 14.4                          | 41.4                                  | 0.097                                            |      |      |      |      |
| P6KE33S   | 29.7                                 | 36.3 | 1.0  | 26.8                               | 5.0                                  | 12.6                          | 47.7                                  | 0.098                                            |      |      |      |      |
| P6KE33AS  | 31.4                                 | 34.7 | 1.0  | 28.2                               | 5.0                                  | 13.2                          | 45.7                                  | 0.098                                            |      |      |      |      |
| P6KE36S   | 32.4                                 | 39.6 | 1.0  | 29.1                               | 5.0                                  | 11.6                          | 52.0                                  | 0.099                                            |      |      |      |      |
| P6KE36AS  | 34.2                                 | 37.8 | 1.0  | 30.8                               | 5.0                                  | 12.0                          | 49.9                                  | 0.099                                            |      |      |      |      |
| P6KE39S   | 35.1                                 | 42.9 | 1.0  | 31.6                               | 5.0                                  | 10.6                          | 56.4                                  | 0.100                                            |      |      |      |      |
| P6KE39AS  | 37.1                                 | 41.0 | 1.0  | 33.3                               | 5.0                                  | 11.2                          | 53.9                                  | 0.100                                            |      |      |      |      |
| P6KE43S   | 38.7                                 | 47.3 | 1.0  | 34.8                               | 5.0                                  | 9.6                           | 61.9                                  | 0.101                                            |      |      |      |      |
| P6KE43AS  | 40.9                                 | 45.2 | 1.0  | 36.8                               | 5.0                                  | 10.1                          | 59.3                                  | 0.101                                            |      |      |      |      |
| P6KE47S   | 42.3                                 | 51.7 | 1.0  | 38.1                               | 5.0                                  | 8.9                           | 67.8                                  | 0.101                                            |      |      |      |      |
| P6KE47AS  | 44.7                                 | 49.4 | 1.0  | 40.2                               | 5.0                                  | 9.3                           | 64.8                                  | 0.101                                            |      |      |      |      |
| P6KE51S   | 45.9                                 | 56.1 | 1.0  | 41.3                               | 5.0                                  | 8.2                           | 73.5                                  | 0.102                                            |      |      |      |      |
| P6KE51AS  | 48.5                                 | 53.6 | 1.0  | 43.6                               | 5.0                                  | 8.6                           | 70.1                                  | 0.102                                            |      |      |      |      |
| P6KE56S   | 50.4                                 | 61.6 | 1.0  | 45.4                               | 5.0                                  | 7.4                           | 80.5                                  | 0.103                                            |      |      |      |      |
| P6KE56AS  | 53.2                                 | 58.8 | 1.0  | 47.8                               | 5.0                                  | 7.8                           | 77.0                                  | 0.103                                            |      |      |      |      |

## ELECTRICAL CHARACTERISTICS

Rating at 25 °C ambient temperature unless otherwise specified

| TYPE      | Breakdown Voltage @ It<br>( Note 1 ) |      |      | Working Peak<br>Reverse<br>Voltage<br>V <sub>RWM</sub> | Maximum<br>Reverse Leakage<br>@ V <sub>RWM</sub><br>I <sub>R</sub> | Maximum<br>Reverse<br>Current<br>I <sub>RS</sub> M | Maximum<br>Clamping<br>Voltage @ I <sub>RS</sub> M<br>V <sub>RS</sub> M | Maximum<br>Temperature<br>Co-efficient<br>of V <sub>BR</sub><br>(% / °C) |
|-----------|--------------------------------------|------|------|--------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------------------------------|--------------------------------------------------------------------------|
|           | V <sub>BR</sub> (V)                  |      | It   |                                                        |                                                                    |                                                    |                                                                         |                                                                          |
|           | Min.                                 | Max. | (mA) |                                                        |                                                                    |                                                    |                                                                         |                                                                          |
|           |                                      |      | (V)  | (μA)                                                   | (A)                                                                | (V)                                                |                                                                         |                                                                          |
| P6KE62S   | 55.8                                 | 68.2 | 1.0  | 50.2                                                   | 5.0                                                                | 6.8                                                | 89.0                                                                    | 0.104                                                                    |
| P6KE62AS  | 58.9                                 | 65.1 | 1.0  | 53.0                                                   | 5.0                                                                | 7.1                                                | 85.0                                                                    | 0.104                                                                    |
| P6KE68S   | 61.2                                 | 74.8 | 1.0  | 55.1                                                   | 5.0                                                                | 6.1                                                | 98.0                                                                    | 0.104                                                                    |
| P6KE68AS  | 64.6                                 | 71.4 | 1.0  | 58.1                                                   | 5.0                                                                | 6.5                                                | 92.0                                                                    | 0.104                                                                    |
| P6KE75S   | 67.5                                 | 82.5 | 1.0  | 60.7                                                   | 5.0                                                                | 5.5                                                | 108                                                                     | 0.105                                                                    |
| P6KE75AS  | 71.3                                 | 78.8 | 1.0  | 64.1                                                   | 5.0                                                                | 5.8                                                | 103                                                                     | 0.105                                                                    |
| P6KE82S   | 73.8                                 | 90.2 | 1.0  | 66.4                                                   | 5.0                                                                | 5.1                                                | 118                                                                     | 0.105                                                                    |
| P6KE82AS  | 77.9                                 | 86.1 | 1.0  | 70.1                                                   | 5.0                                                                | 5.3                                                | 113                                                                     | 0.105                                                                    |
| P6KE91S   | 81.9                                 | 100  | 1.0  | 73.7                                                   | 5.0                                                                | 4.5                                                | 131                                                                     | 0.106                                                                    |
| P6KE91AS  | 86.5                                 | 95.5 | 1.0  | 77.8                                                   | 5.0                                                                | 4.8                                                | 125                                                                     | 0.106                                                                    |
| P6KE100S  | 90.0                                 | 110  | 1.0  | 81.0                                                   | 5.0                                                                | 4.2                                                | 144                                                                     | 0.106                                                                    |
| P6KE100AS | 95.0                                 | 105  | 1.0  | 85.5                                                   | 5.0                                                                | 4.4                                                | 137                                                                     | 0.106                                                                    |
| P6KE110S  | 99.0                                 | 121  | 1.0  | 89.2                                                   | 5.0                                                                | 3.8                                                | 158                                                                     | 0.107                                                                    |
| P6KE110AS | 105                                  | 116  | 1.0  | 94.0                                                   | 5.0                                                                | 4.0                                                | 152                                                                     | 0.107                                                                    |
| P6KE120S  | 108                                  | 132  | 1.0  | 97.2                                                   | 5.0                                                                | 3.5                                                | 173                                                                     | 0.107                                                                    |
| P6KE120AS | 114                                  | 126  | 1.0  | 102                                                    | 5.0                                                                | 3.6                                                | 165                                                                     | 0.107                                                                    |
| P6KE130S  | 117                                  | 143  | 1.0  | 106                                                    | 5.0                                                                | 3.2                                                | 187                                                                     | 0.107                                                                    |
| P6KE130AS | 124                                  | 137  | 1.0  | 111                                                    | 5.0                                                                | 3.3                                                | 179                                                                     | 0.107                                                                    |
| P6KE150S  | 135                                  | 165  | 1.0  | 121                                                    | 5.0                                                                | 2.8                                                | 215                                                                     | 0.108                                                                    |
| P6KE150AS | 143                                  | 158  | 1.0  | 128                                                    | 5.0                                                                | 2.9                                                | 207                                                                     | 0.108                                                                    |
| P6KE160S  | 144                                  | 176  | 1.0  | 130                                                    | 5.0                                                                | 2.6                                                | 230                                                                     | 0.108                                                                    |
| P6KE160AS | 152                                  | 168  | 1.0  | 136                                                    | 5.0                                                                | 2.7                                                | 219                                                                     | 0.108                                                                    |
| P6KE170S  | 153                                  | 187  | 1.0  | 138                                                    | 5.0                                                                | 2.5                                                | 244                                                                     | 0.108                                                                    |
| P6KE170AS | 162                                  | 179  | 1.0  | 145                                                    | 5.0                                                                | 2.6                                                | 234                                                                     | 0.108                                                                    |
| P6KE180S  | 162                                  | 198  | 1.0  | 146                                                    | 5.0                                                                | 2.3                                                | 258                                                                     | 0.108                                                                    |
| P6KE180AS | 171                                  | 189  | 1.0  | 154                                                    | 5.0                                                                | 2.4                                                | 246                                                                     | 0.108                                                                    |
| P6KE200S  | 180                                  | 220  | 1.0  | 162                                                    | 5.0                                                                | 2.1                                                | 287                                                                     | 0.108                                                                    |
| P6KE200AS | 190                                  | 210  | 1.0  | 171                                                    | 5.0                                                                | 2.2                                                | 274                                                                     | 0.108                                                                    |
| P6KE220S  | 198                                  | 242  | 1.0  | 175                                                    | 5.0                                                                | 1.75                                               | 344                                                                     | 0.108                                                                    |
| P6KE220AS | 209                                  | 231  | 1.0  | 185                                                    | 5.0                                                                | 1.83                                               | 328                                                                     | 0.108                                                                    |
| P6KE250S  | 225                                  | 275  | 1.0  | 202                                                    | 5.0                                                                | 1.67                                               | 360                                                                     | 0.110                                                                    |
| P6KE250AS | 237                                  | 263  | 1.0  | 214                                                    | 5.0                                                                | 1.75                                               | 344                                                                     | 0.110                                                                    |
| P6KE300S  | 270                                  | 330  | 1.0  | 243                                                    | 5.0                                                                | 1.40                                               | 430                                                                     | 0.110                                                                    |
| P6KE300AS | 285                                  | 315  | 1.0  | 256                                                    | 5.0                                                                | 1.45                                               | 414                                                                     | 0.110                                                                    |
| P6KE350S  | 315                                  | 385  | 1.0  | 284                                                    | 5.0                                                                | 1.20                                               | 504                                                                     | 0.110                                                                    |
| P6KE350AS | 332                                  | 368  | 1.0  | 300                                                    | 5.0                                                                | 1.25                                               | 482                                                                     | 0.110                                                                    |
| P6KE400S  | 360                                  | 440  | 1.0  | 324                                                    | 5.0                                                                | 1.05                                               | 574                                                                     | 0.110                                                                    |
| P6KE400AS | 380                                  | 420  | 1.0  | 342                                                    | 5.0                                                                | 1.10                                               | 548                                                                     | 0.110                                                                    |
| P6KE440S  | 396                                  | 484  | 1.0  | 356                                                    | 5.0                                                                | 0.95                                               | 631                                                                     | 0.110                                                                    |
| P6KE440AS | 418                                  | 462  | 1.0  | 376                                                    | 5.0                                                                | 1.00                                               | 602                                                                     | 0.110                                                                    |

### Note:

- ( 1 )  $V_{BR}$  measured after  $I_t$  applied for 300  $\mu$ s.,  $I_t$  = square wave pulse or equivalent.
- ( 2 )  $V_F = 3.5 V_{max.}$ ,  $I_F = 50$  Amps. ( 6.8 Volts thru 91 Volts )  
 $V_F = 5.0 V_{max.}$ ,  $I_F = 50$  Amps. ( 100 Volts thru 440 Volts ) per 1/2 square or equivalent sine wave.  
PW = 8.3 ms, duty cycle = 4 pulses per minute maximum.
- ( 3 ) For Bipolar types moving  $V_R$  of 10 Volts and under, the  $I_R$  limit is doubled.

## RATING AND CHARACTERISTIC CURVES ( P6KE SERIES - S )

FIG.1 - PULSE DERATING CURVE

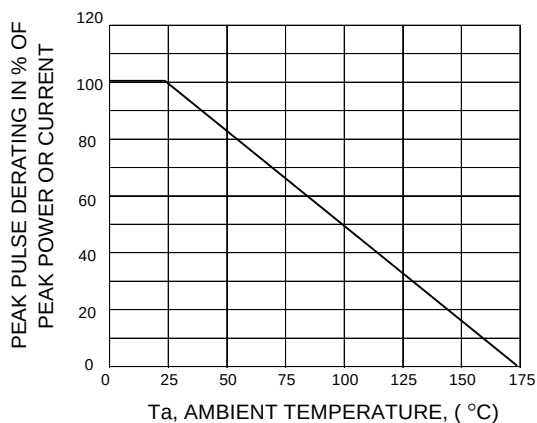


FIG.2 - MAXIMUM NON-REPETITIVE SURGE CURRENT

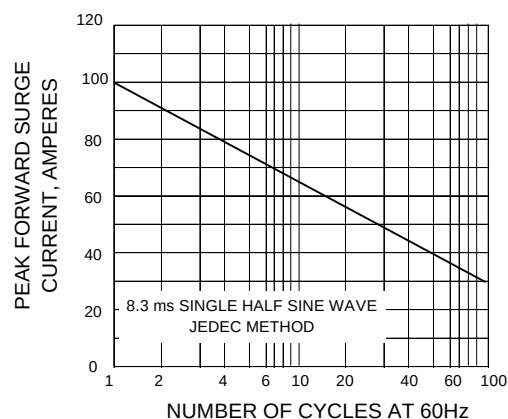


FIG.3 - STEADY STATE POWER DERATING

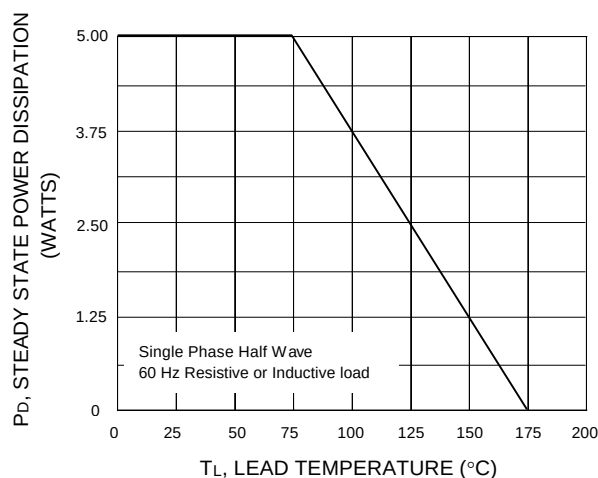


FIG.4 - PULSE RATING CURVE

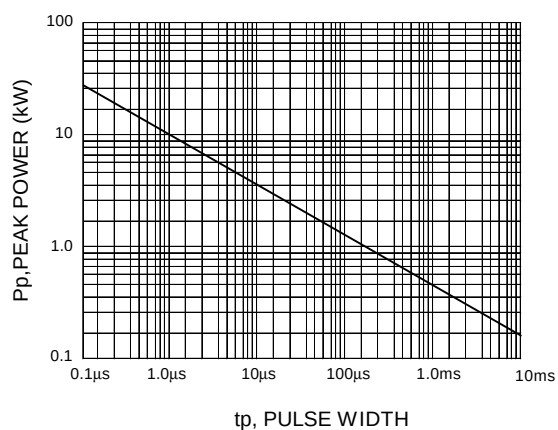


FIG.5 - PULSE WAVEFORM

