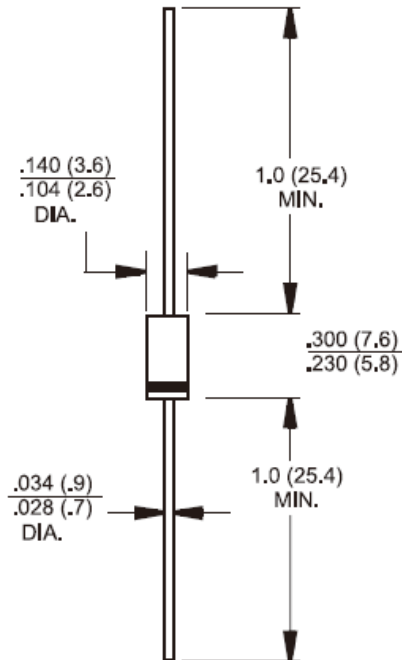


**DO-15**



**Dimensions in inches and (millimeters)**

**Marking Diagram**



|        |                        |
|--------|------------------------|
| P6KEXX | = Specific Device Code |
| G      | = Green Compound       |
| Y      | = Year                 |
| M      | = Work Month           |

**Features**

- ✧ UL Recognized File # E-326243
- ✧ Qualified as per AEC-Q101
- ✧ Plastic package has Underwriters Laboratory Flammability Classification 94V-0
- ✧ 600 watts surge capability at 10 / 1000 us waveform
- ✧ Excellent clamping capability
- ✧ Low Dynamic impedance
- ✧ Fast response time: Typically less than 1.0ps from 0 volt to VBR for unidirectional and 5.0ns for bidirectional
- ✧ Typical  $I_R$  less than 1uA above 10V
- ✧ High temperature soldering guaranteed: 260°C / 10 seconds / .375" (9.5mm) lead length / 5lbs., (2.3kg) tension
- ✧ Green compound with suffix "G" on packing code & prefix "G" on datecode

**Mechanical Data**

- ✧ Case: Molded plastic
- ✧ Lead: Pure tin plated lead free, solderable per MIL-STD-202, Method 208
- ✧ Polarity: Color band denotes cathode except bipolar
- ✧ Weight: 0.42 gram

**Maximum Ratings and Electrical Characteristics**

Rating 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%

| Type Number                                                                                               | Symbol                             | Value       | Unit               |
|-----------------------------------------------------------------------------------------------------------|------------------------------------|-------------|--------------------|
| Peak Power Dissipation at $T_A=25^\circ\text{C}$ , $T_p=1\text{ms}$ (Note 1)                              | $P_{PK}$                           | 600         | Watts              |
| Steady State Power Dissipation at $T_L=75^\circ\text{C}$<br>Lead Lengths .375", 9.5mm (Note 2)            | $P_D$                              | 5           | Watts              |
| Peak Forward Surge Current, 8.3ms Single Half Sine-wave Superimposed on Rated Load (JEDEC method)(Note 3) | $I_{FSM}$                          | 100         | Amps               |
| Maximum Instantaneous Forward Voltage at 50A for Unidirectional Only (Note 4)                             | $V_F$                              | 3.5 / 5.0   | Volts              |
| Typical Thermal Resistance                                                                                | $R_{\theta JL}$<br>$R_{\theta JA}$ | 10<br>62    | $^\circ\text{C/W}$ |
| Operating and Storage Temperature Range                                                                   | $T_J, T_{STG}$                     | -55 to +175 | $^\circ\text{C}$   |

Note 1: Non-repetitive Current Pulse Per Fig. 3 and Derated above  $T_A=25^\circ\text{C}$  Per Fig. 2

Note 2: Mounted on Copper Pad Area 0.4" x 0.4" (10mm x 10mm)

Note 3: 8.3ms Single Half Sine-wave or Equivalent Square Wave, Duty Cycle=4 Pulses Per Minute Maximum

Note 4:  $V_F=3.5\text{V}$  for Devices of  $V_{BR} \leq 200\text{V}$  and  $V_F=5.0\text{V}$  Max. for Device  $V_{BR} > 200\text{V}$

**Devices for Bipolar Applications**

1. For Bidirectional Use C or CA Suffix for Types P6KE6.8 through Types P6KE440
2. Electrical Characteristics Apply in Both Directions

## RATINGS AND CHARACTERISTIC CURVES (P6KE SERIES)

FIG. 1 PEAK PULSE POWER RATING CURVE

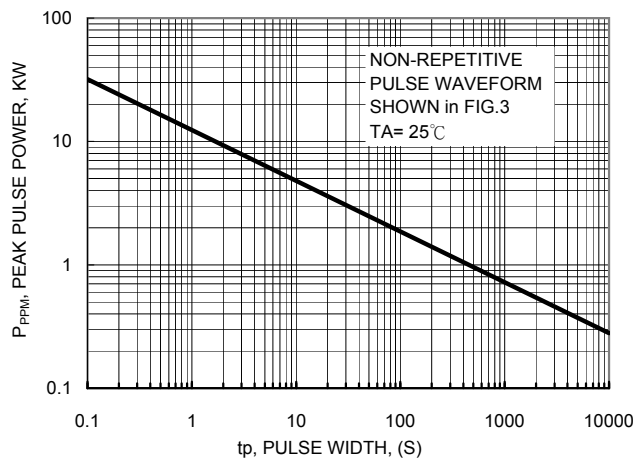


FIG.2 PULSE DERATING CURVE

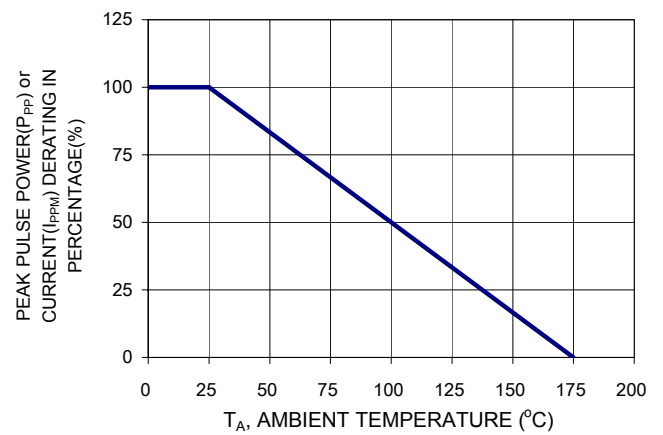


FIG. 3 CLAMPING POWER PULSE WAVEFORM

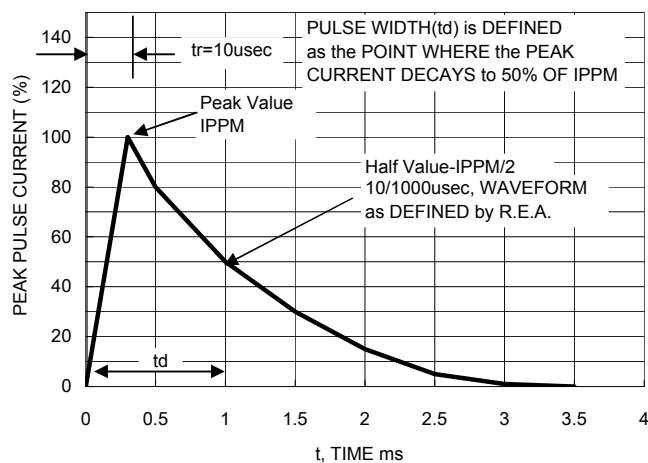


FIG. 4 MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT UNIDIRECTIONAL ONLY

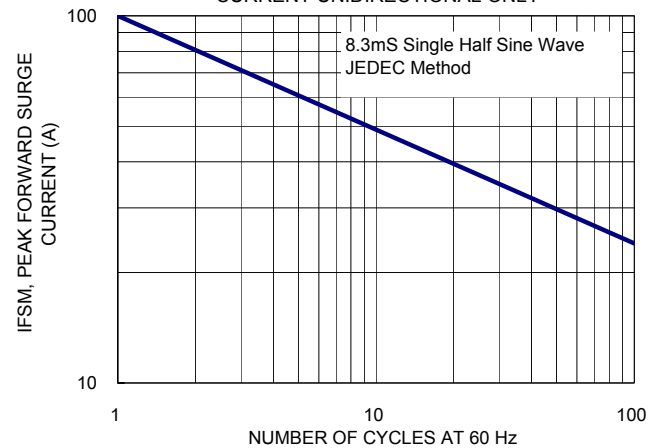
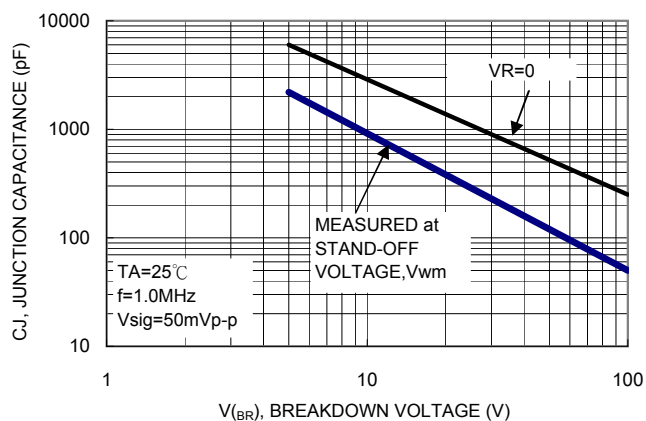


FIG. 5 TYPICAL JUNCTION CAPACITANCE



**ELECTRICAL CHARACTERISTICS (TA=25°C unless otherwise noted)**

| General Part Number | Nominal Voltage | Breakdown Voltage (Note 1) |       | Test Current   | Stand-Off Voltage | Maximum Reverse Leakage @ V <sub>WM</sub> | Maximum Peak Surge Current | Maximum Clamping Voltage @ I <sub>PPM</sub> | Maximum Temperature Coefficient |
|---------------------|-----------------|----------------------------|-------|----------------|-------------------|-------------------------------------------|----------------------------|---------------------------------------------|---------------------------------|
|                     |                 | V <sub>BR</sub>            |       | I <sub>T</sub> | V <sub>WM</sub>   | I <sub>D</sub>                            | I <sub>PPM</sub>           | V <sub>C</sub>                              | of V <sub>BR</sub>              |
|                     | (V)             | (V)                        |       | (mA)           | (V)               | (uA)                                      | (A)                        | (V)                                         | (%/°C)                          |
|                     |                 | Min                        | Max   |                |                   |                                           | (Note 2)                   |                                             |                                 |
| P6KE6.8             | 6.8             | 6.12                       | 7.48  | 10             | 5.50              | 1000                                      | 58.0                       | 10.8                                        | 0.057                           |
| P6KE6.8A            | 6.8             | 6.46                       | 7.14  | 10             | 5.80              | 1000                                      | 60.0                       | 10.5                                        | 0.057                           |
| P6KE7.5             | 7.5             | 6.75                       | 8.25  | 10             | 6.05              | 500                                       | 53.0                       | 11.7                                        | 0.061                           |
| P6KE7.5A            | 7.5             | 7.13                       | 7.88  | 10             | 6.40              | 500                                       | 55.0                       | 11.3                                        | 0.061                           |
| P6KE8.2             | 8.2             | 7.38                       | 9.02  | 10             | 6.63              | 200                                       | 50.0                       | 12.5                                        | 0.065                           |
| P6KE8.2A            | 8.2             | 7.79                       | 8.61  | 10             | 7.02              | 200                                       | 52.0                       | 12.1                                        | 0.065                           |
| P6KE9.1             | 9.1             | 8.19                       | 10.00 | 1              | 7.37              | 50                                        | 45.0                       | 13.8                                        | 0.068                           |
| P6KE9.1A            | 9.1             | 8.65                       | 9.55  | 1              | 7.78              | 50                                        | 47.0                       | 13.4                                        | 0.068                           |
| P6KE10              | 10              | 9.00                       | 11.00 | 1              | 8.10              | 10                                        | 42.0                       | 15.0                                        | 0.073                           |
| P6KE10A             | 10              | 9.50                       | 10.5  | 1              | 8.55              | 10                                        | 43.0                       | 14.5                                        | 0.073                           |
| P6KE11              | 11              | 9.90                       | 12.1  | 1              | 8.92              | 1                                         | 38.0                       | 16.2                                        | 0.075                           |
| P6KE11A             | 11              | 10.5                       | 11.6  | 1              | 9.40              | 1                                         | 40.0                       | 15.6                                        | 0.075                           |
| P6KE12              | 12              | 10.8                       | 13.2  | 1              | 9.72              | 1                                         | 36.0                       | 17.3                                        | 0.078                           |
| P6KE12A             | 12              | 11.4                       | 12.6  | 1              | 10.2              | 1                                         | 37.0                       | 16.7                                        | 0.078                           |
| P6KE13              | 13              | 11.7                       | 14.3  | 1              | 10.5              | 1                                         | 33.0                       | 19.0                                        | 0.081                           |
| P6KE13A             | 13              | 12.4                       | 13.7  | 1              | 11.1              | 1                                         | 34.0                       | 18.2                                        | 0.081                           |
| P6KE15              | 15              | 13.5                       | 16.5  | 1              | 12.1              | 1                                         | 28.0                       | 22.0                                        | 0.084                           |
| P6KE15A             | 15              | 14.3                       | 15.8  | 1              | 12.8              | 1                                         | 29.0                       | 21.2                                        | 0.084                           |
| P6KE16              | 16              | 14.4                       | 17.6  | 1              | 12.9              | 1                                         | 26.0                       | 23.5                                        | 0.086                           |
| P6KE16A             | 16              | 15.2                       | 16.8  | 1              | 13.6              | 1                                         | 28.0                       | 22.5                                        | 0.086                           |
| P6KE18              | 18              | 16.2                       | 19.8  | 1              | 14.5              | 1                                         | 23.0                       | 26.5                                        | 0.088                           |
| P6KE18A             | 18              | 17.1                       | 18.9  | 1              | 15.3              | 1                                         | 25.0                       | 25.5                                        | 0.088                           |
| P6KE20              | 20              | 18.0                       | 22.0  | 1              | 16.2              | 1                                         | 21.0                       | 29.1                                        | 0.090                           |
| P6KE20A             | 20              | 19.0                       | 21.0  | 1              | 17.1              | 1                                         | 22.0                       | 27.7                                        | 0.090                           |
| P6KE22              | 22              | 19.8                       | 24.2  | 1              | 17.8              | 1                                         | 19.0                       | 31.9                                        | 0.092                           |
| P6KE22A             | 22              | 20.9                       | 23.1  | 1              | 18.8              | 1                                         | 20.0                       | 30.6                                        | 0.092                           |
| P6KE24              | 24              | 21.6                       | 26.4  | 1              | 19.4              | 1                                         | 18.0                       | 34.7                                        | 0.094                           |
| P6KE24A             | 24              | 22.8                       | 25.2  | 1              | 20.5              | 1                                         | 19.0                       | 33.2                                        | 0.094                           |
| P6KE27              | 27              | 24.3                       | 29.7  | 1              | 21.8              | 1                                         | 16.0                       | 39.1                                        | 0.096                           |
| P6KE27A             | 27              | 25.7                       | 28.4  | 1              | 23.1              | 1                                         | 16.8                       | 37.5                                        | 0.096                           |
| P6KE30              | 30              | 27.0                       | 33.0  | 1              | 24.3              | 1                                         | 14.0                       | 43.5                                        | 0.097                           |
| P6KE30A             | 30              | 28.5                       | 31.5  | 1              | 25.6              | 1                                         | 15.0                       | 41.4                                        | 0.097                           |
| P6KE33              | 33              | 29.7                       | 36.3  | 1              | 26.8              | 1                                         | 13.0                       | 47.7                                        | 0.098                           |
| P6KE33A             | 33              | 31.4                       | 34.7  | 1              | 28.2              | 1                                         | 13.8                       | 45.7                                        | 0.098                           |
| P6KE36              | 36              | 32.4                       | 39.6  | 1              | 29.1              | 1                                         | 12.0                       | 52.0                                        | 0.099                           |
| P6KE36A             | 36              | 34.2                       | 37.8  | 1              | 30.8              | 1                                         | 12.6                       | 49.9                                        | 0.099                           |
| P6KE39              | 39              | 35.1                       | 42.9  | 1              | 31.6              | 1                                         | 11.1                       | 56.4                                        | 0.100                           |
| P6KE39A             | 39              | 37.1                       | 41.0  | 1              | 33.3              | 1                                         | 11.6                       | 53.9                                        | 0.100                           |
| P6KE43              | 43              | 38.7                       | 47.3  | 1              | 34.8              | 1                                         | 10.0                       | 61.9                                        | 0.101                           |
| P6KE43A             | 43              | 40.9                       | 45.2  | 1              | 36.8              | 1                                         | 10.6                       | 59.3                                        | 0.101                           |
| P6KE47              | 47              | 42.3                       | 51.7  | 1              | 38.1              | 1                                         | 9.2                        | 67.8                                        | 0.101                           |
| P6KE47A             | 47              | 44.7                       | 49.4  | 1              | 40.2              | 1                                         | 9.7                        | 64.8                                        | 0.101                           |
| P6KE51              | 51              | 45.9                       | 56.1  | 1              | 41.3              | 1                                         | 8.5                        | 73.5                                        | 0.102                           |
| P6KE51A             | 51              | 48.5                       | 53.6  | 1              | 43.6              | 1                                         | 8.9                        | 70.1                                        | 0.102                           |
| P6KE56              | 56              | 50.4                       | 61.6  | 1              | 45.4              | 1                                         | 7.8                        | 80.5                                        | 0.103                           |
| P6KE56A             | 56              | 53.2                       | 58.8  | 1              | 47.8              | 1                                         | 8.1                        | 77.0                                        | 0.103                           |
| P6KE62              | 62              | 55.8                       | 68.2  | 1              | 50.2              | 1                                         | 7.0                        | 89.0                                        | 0.104                           |
| P6KE62A             | 62              | 58.9                       | 65.1  | 1              | 53.0              | 1                                         | 7.4                        | 85.0                                        | 0.104                           |
| P6KE68              | 68              | 61.2                       | 74.8  | 1              | 55.1              | 1                                         | 6.4                        | 98.0                                        | 0.104                           |
| P6KE68A             | 68              | 64.6                       | 71.4  | 1              | 58.1              | 1                                         | 6.8                        | 92.0                                        | 0.104                           |
| P6KE75              | 75              | 67.5                       | 82.5  | 1              | 60.7              | 1                                         | 5.8                        | 108                                         | 0.105                           |
| P6KE75A             | 75              | 71.3                       | 78.8  | 1              | 64.1              | 1                                         | 6.1                        | 103                                         | 0.105                           |
| P6KE82              | 82              | 73.8                       | 90.2  | 1              | 66.4              | 1                                         | 5.3                        | 118                                         | 0.105                           |
| P6KE82A             | 82              | 77.9                       | 86.1  | 1              | 70.1              | 1                                         | 5.5                        | 113                                         | 0.105                           |
| P6KE91              | 91              | 81.9                       | 100   | 1              | 73.7              | 1                                         | 4.8                        | 131                                         | 0.106                           |
| P6KE91A             | 91              | 86.5                       | 95.5  | 1              | 77.8              | 1                                         | 5.0                        | 125                                         | 0.106                           |

# ELECTRICAL CHARACTERISTICS (TA=25°C unless otherwise noted)

| General Part Number | Nominal Voltage | Breakdown Voltage (Note 1) |     | Test Current | Stand-Off Voltage | Maximum Reverse Leakage @ $V_{WM}$ | Maximum Peak Surge Current | Maximum Clamping Voltage @ $I_{PPM}$ | Maximum Temperature Coefficient |
|---------------------|-----------------|----------------------------|-----|--------------|-------------------|------------------------------------|----------------------------|--------------------------------------|---------------------------------|
|                     |                 | $V_{BR}$                   |     | $I_T$        | $V_{WM}$          | $I_D$                              | $I_{PPM}$                  | $V_C$                                | of $V_{BR}$                     |
|                     | (V)             | (V)                        |     | (mA)         | (V)               | ( $\mu A$ )                        | (A)                        | (V)                                  | (%/°C)                          |
|                     |                 | Min                        | Max |              |                   |                                    | (Note 2)                   |                                      |                                 |
| P6KE100             | 100             | 90                         | 110 | 1            | 81.0              | 1                                  | 4.3                        | 144                                  | 0.106                           |
| P6KE100A            | 100             | 95                         | 105 | 1            | 85.5              | 1                                  | 4.5                        | 137                                  | 0.106                           |
| P6KE110             | 110             | 99                         | 121 | 1            | 89.2              | 1                                  | 3.9                        | 158                                  | 0.107                           |
| P6KE110A            | 110             | 105                        | 116 | 1            | 94.0              | 1                                  | 4.1                        | 152                                  | 0.107                           |
| P6KE120             | 120             | 108                        | 132 | 1            | 97.2              | 1                                  | 3.6                        | 173                                  | 0.107                           |
| P6KE120A            | 120             | 114                        | 126 | 1            | 102               | 1                                  | 3.8                        | 165                                  | 0.107                           |
| P6KE130             | 130             | 117                        | 143 | 1            | 105               | 1                                  | 3.3                        | 187                                  | 0.107                           |
| P6KE130A            | 130             | 124                        | 137 | 1            | 111               | 1                                  | 3.5                        | 179                                  | 0.107                           |
| P6KE150             | 150             | 135                        | 165 | 1            | 121               | 1                                  | 2.9                        | 215                                  | 0.108                           |
| P6KE150A            | 150             | 143                        | 158 | 1            | 128               | 1                                  | 3.0                        | 207                                  | 0.108                           |
| P6KE160             | 160             | 144                        | 176 | 1            | 130               | 1                                  | 2.7                        | 230                                  | 0.108                           |
| P6KE160A            | 160             | 152                        | 168 | 1            | 136               | 1                                  | 2.8                        | 219                                  | 0.108                           |
| P6KE170             | 170             | 153                        | 187 | 1            | 138               | 1                                  | 2.5                        | 244                                  | 0.108                           |
| P6KE170A            | 170             | 162                        | 179 | 1            | 145               | 1                                  | 2.6                        | 234                                  | 0.108                           |
| P6KE180             | 180             | 162                        | 198 | 1            | 146               | 1                                  | 2.4                        | 258                                  | 0.108                           |
| P6KE180A            | 180             | 171                        | 189 | 1            | 154               | 1                                  | 2.5                        | 246                                  | 0.108                           |
| P6KE200             | 200             | 180                        | 220 | 1            | 162               | 1                                  | 2.1                        | 287                                  | 0.108                           |
| P6KE200A            | 200             | 190                        | 210 | 1            | 171               | 1                                  | 2.2                        | 274                                  | 0.108                           |
| P6KE220             | 220             | 198                        | 242 | 1            | 175               | 1                                  | 1.8                        | 344                                  | 0.108                           |
| P6KE220A            | 220             | 209                        | 231 | 1            | 185               | 1                                  | 1.9                        | 328                                  | 0.108                           |
| P6KE250             | 250             | 225                        | 275 | 1            | 202               | 1                                  | 1.7                        | 360                                  | 0.110                           |
| P6KE250A            | 250             | 237                        | 263 | 1            | 214               | 1                                  | 1.8                        | 344                                  | 0.110                           |
| P6KE300             | 300             | 270                        | 330 | 1            | 243               | 1                                  | 1.4                        | 430                                  | 0.110                           |
| P6KE300A            | 300             | 285                        | 315 | 1            | 256               | 1                                  | 1.5                        | 414                                  | 0.110                           |
| P6KE350             | 350             | 315                        | 385 | 1            | 284               | 1                                  | 1.2                        | 504                                  | 0.110                           |
| P6KE350A            | 350             | 332                        | 368 | 1            | 300               | 1                                  | 1.3                        | 482                                  | 0.110                           |
| P6KE400             | 400             | 360                        | 440 | 1            | 324               | 1                                  | 1.0                        | 574                                  | 0.110                           |
| P6KE400A            | 400             | 380                        | 420 | 1            | 342               | 1                                  | 1.1                        | 548                                  | 0.110                           |
| P6KE440             | 440             | 396                        | 484 | 1            | 356               | 1                                  | 1.0                        | 631                                  | 0.110                           |
| P6KE440A            | 440             | 418                        | 462 | 1            | 376               | 1                                  | 1.04                       | 602                                  | 0.110                           |

## Notes:

1.  $V_{BR}$  measure after  $I_T$  applied for 300us,  $I_T$ =square wave pulse or equivalent.
2. Surge current waveform per Figure. 3 and derate per Figure. 2.
3. For bipolar types having  $V_{WM}$  of 10 volts and under, the  $I_D$  limit is doubled.
4. All terms and symbols are consistent with ANSI/IEEE C62.35.