# 1500W, 6.8V - 440V Transient Voltage Suppressor

## FEATURES

- Excellent clamping capability
- Low dynamic impedance
- 1500W surge capability at 10 / 1000 μs waveform
- Fast response time: Typically less than 1.0ps from 0 volt to $V_{BR}$ for unidirectional and 5.0ns for bidirectional
- Typical $I_R$ less than 1μA above 10V
- UL recognized file # E-326243
- Compliant to RoHS Directive 2011/65/EU and in accordance to WEEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21

**DO-201**

Pb-Free

RoHS COMPLIANT

## MECHANICAL DATA

**Case:** DO-201

Molding compound: UL flammability classification rating 94V-0

Part No. with suffix "H" means AEC-Q101 qualified

Packing code with suffix "G" means green compound (halogen-free)

**Terminal:** Pure tin plated leads, solderable per JESD22-B102

Meet JESD 201 class 2 whisker test

**Weight:** 0.94g (approximately)

| MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS ($T_A$=25°C unless otherwise noted) | | | |
|---|---|---|---|
| PARAMETER | SYMBOL | VALUE | UNIT |
| Peak power dissipation at $T_A$=25°C, Tp=1ms (Note 1) | $P_{PK}$ | 1500 | W |
| Steady state power dissipation at $T_L$=75°C lead lengths .375", 9.5mm (Note 2) | $P_D$ | 5 | W |
| Peak forward surge current, 8.3 ms single half sine-wave superimposed on rated load | $I_{FSM}$ | 200 | A |
| Maximum Instantaneous Forward Voltage at 50 A for Unidirectional Only (Note 3) | $V_F$ | 3.5 / 5.0 | V |
| Operating junction temperature range | $T_J$ | - 55 to +175 | °C |
| Storage temperature range | $T_{STG}$ | - 55 to +175 | °C |

Note 1: Non-repetitive current pulse per fig. 3 and derated above $T_A$=25°C per fig. 2

Note 2: Mounted on copper pad area of 0.6" x 0.6" (16mm x 16mm)

Note 3: $V_F$=3.5V for devices of $V_{BR} \leqq$200V and $V_F$=5.0V max. for devices $V_{BR}$>200V

Devices for Bipolar Applications

1. For bidirectional use C or CA suffix for types 1.5KE6.8 - types 1.5KE440
2. Electrical characteristics apply in both directions

| ORDERING INFORMATION | | | | | |
|---|---|---|---|---|---|
| PART NO. | PART NO. SUFFIX | PACKING CODE | PACKING CODE SUFFIX | PACKAGE | PACKING |
| 1.5KExxxx (Note 1) | H | A0 | G | DO-201 | 500 / Ammo box |
| | | R0 | | DO-201 | 1,250 / 13" Paper reel |
| | | B0 | | DO-201 | 500 / Bulk packing |

Note 1: "xxxx" defines voltage from 6.8V (1.5KE6.8) to 440V (1.5KE440)

| EXAMPLE | | | | | |
|---|---|---|---|---|---|
| EXAMPLE PART NO. | PART NO. | PART NO. SUFFIX | PACKING CODE | PACKING CODE SUFFIX | DESCRIPTION |
| 1.5KE100AHR0G | 1.5KE100A | H | R0 | G | AEC-Q101 qualified Green compound |

## RATINGS AND CHARACTERISTICS CURVES ($T_A$=25°C unless otherwise noted)

FIG. 1 PEAK PULSE POWER RATING CURVE

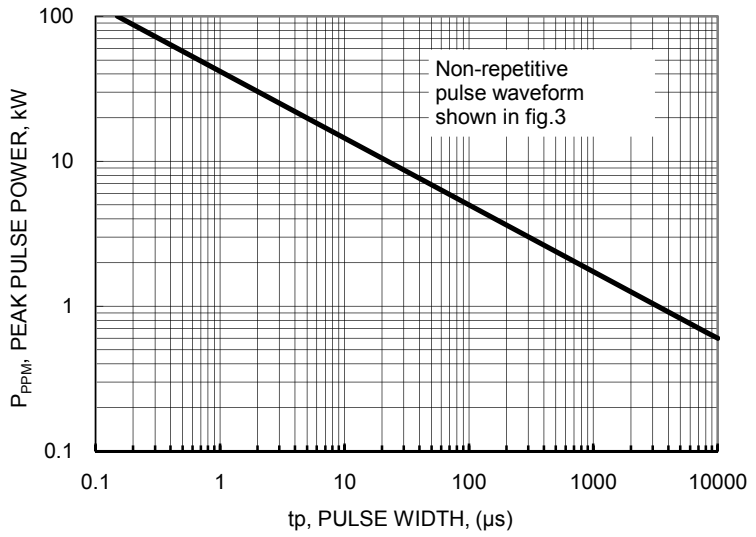



FIG.2 PULSE DERATING CURVE

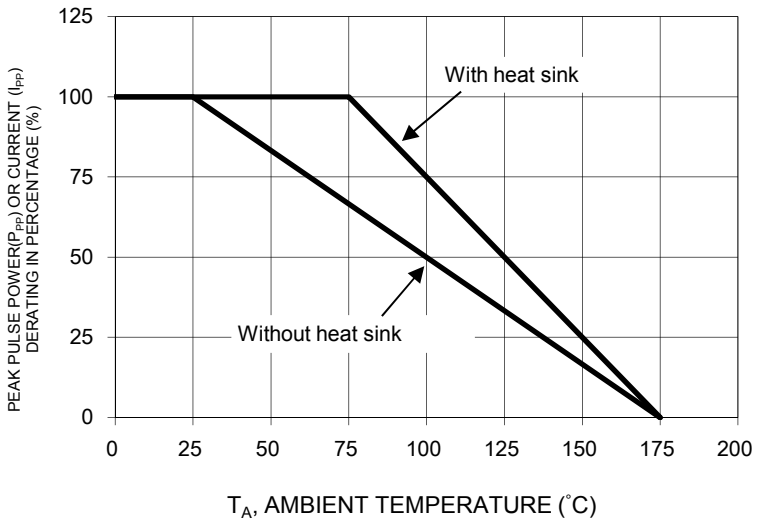



FIG. 3 CLAMPING POWER PULSE WAVEFORM

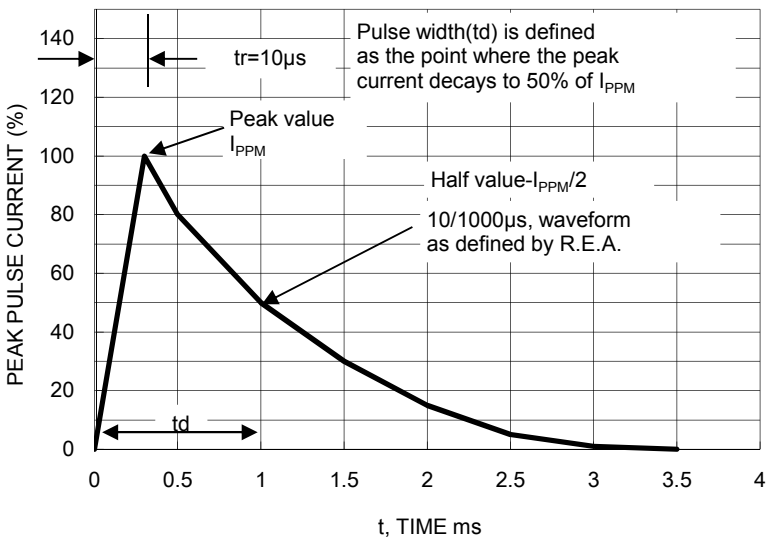



FIG. 4 MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT UNIDIRECTIONAL ONLY

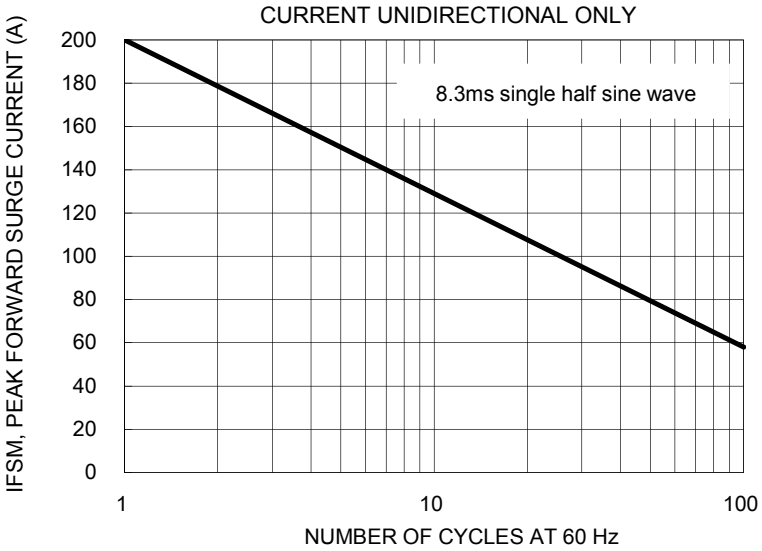
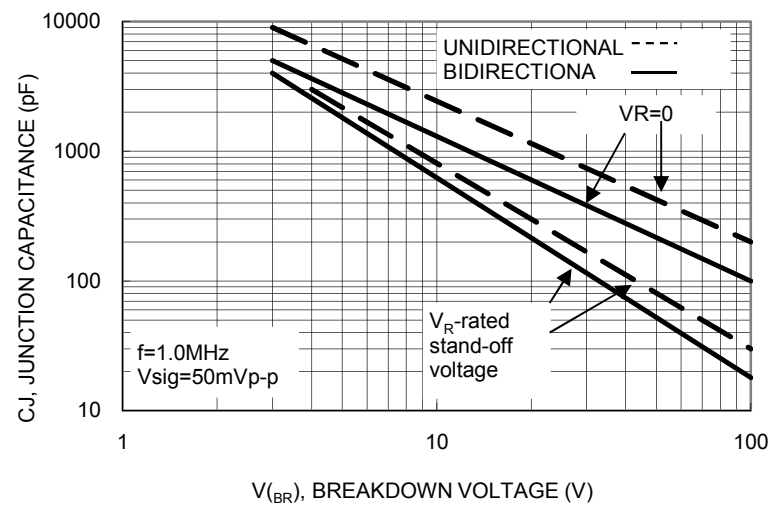



FIG. 5 TYPICAL JUNCTION CAPACITANCE



| JEDEC TYPE NUMBER | GENERAL PART NUMBER | Nominal Voltage | Breakdown Voltage $V_{BR}$ (V) (Note 1) | | Test Current $I_T$ | Stand-Off Voltage $V_{WM}$ | Maximum Reverse Leakage @ $V_{WM}$ | Maximum Peak Pulse Current $I_{PPM}$ | Maximum Clamping Voltage @ $I_{PPM}$ | Maximum Temperature Coefficient of $V_{BR}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| | | V | Min | Max | (mA) | (V) | $I_R$ (μA) | (A) (Note 2) | Vc(V) | (%/°C) |
| 1N6267 | 1.5KE6.8 | 6.8 | 6.12 | 7.48 | 10 | 5.50 | 1000 | 145 | 10.8 | 0.057 |
| 1N6267A | 1.5KE6.8A | 6.8 | 6.45 | 7.14 | 10 | 5.80 | 1000 | 150 | 10.5 | 0.057 |
| 1N6268 | 1.5KE7.5 | 7.5 | 6.75 | 8.25 | 10 | 6.05 | 500 | 134 | 11.7 | 0.061 |
| 1N6268A | 1.5KE7.5A | 7.5 | 7.13 | 7.88 | 10 | 6.40 | 500 | 139 | 11.3 | 0.061 |
| 1N6269 | 1.5KE8.2 | 8.2 | 7.38 | 9.02 | 10 | 6.63 | 200 | 126 | 12.5 | 0.065 |
| 1N6269A | 1.5KE8.2A | 8.2 | 7.79 | 8.61 | 10 | 7.02 | 200 | 130 | 12.1 | 0.065 |
| 1N6270 | 1.5KE9.1 | 9.1 | 8.19 | 10.00 | 1.0 | 7.37 | 50 | 114 | 13.8 | 0.068 |
| 1N6270A | 1.5KE9.1A | 9.1 | 8.65 | 9.55 | 1.0 | 7.78 | 50 | 117 | 13.4 | 0.068 |
| 1N6271 | 1.5KE10 | 10 | 9.00 | 11.00 | 1.0 | 8.10 | 10 | 105 | 15.0 | 0.073 |
| 1N6271A | 1.5KE10A | 10 | 9.50 | 10.5 | 1.0 | 8.55 | 10 | 108 | 14.5 | 0.073 |
| 1N6272 | 1.5KE11 | 11 | 9.90 | 12.1 | 1.0 | 8.92 | 1 | 97 | 16.2 | 0.075 |
| 1N6272A | 1.5KE11A | 11 | 10.5 | 11.6 | 1.0 | 9.40 | 1 | 100 | 15.6 | 0.075 |
| 1N6273 | 1.5KE12 | 12 | 10.8 | 13.2 | 1.0 | 9.72 | 1 | 91 | 17.3 | 0.078 |
| 1N6273A | 1.5KE12A | 12 | 11.4 | 12.6 | 1.0 | 10.20 | 1 | 94 | 16.7 | 0.078 |
| 1N6274 | 1.5KE13 | 13 | 11.7 | 14.3 | 1.0 | 10.50 | 1 | 82 | 19.0 | 0.081 |
| 1N6274A | 1.5KE13A | 13 | 12.4 | 13.7 | 1.0 | 11.10 | 1 | 86 | 18.2 | 0.081 |
| 1N6275 | 1.5KE15 | 15 | 13.5 | 16.5 | 1.0 | 12.10 | 1 | 71 | 22.0 | 0.084 |
| 1N6275A | 1.5KE15A | 15 | 14.3 | 15.8 | 1.0 | 12.80 | 1 | 74 | 21.2 | 0.084 |
| 1N6276 | 1.5KE16 | 16 | 14.4 | 17.6 | 1.0 | 12.90 | 1 | 67 | 23.5 | 0.086 |
| 1N6276A | 1.5KE16A | 16 | 15.2 | 16.8 | 1.0 | 13.60 | 1 | 70 | 22.5 | 0.086 |
| 1N6277 | 1.5KE18 | 18 | 16.2 | 19.8 | 1.0 | 14.50 | 1 | 59 | 26.5 | 0.088 |
| 1N6277A | 1.5KE18A | 18 | 17.1 | 18.9 | 1.0 | 15.30 | 1 | 60 | 25.5 | 0.088 |
| 1N6278 | 1.5KE20 | 20 | 18.0 | 22.0 | 1.0 | 16.20 | 1 | 54 | 29.1 | 0.090 |
| 1N6278A | 1.5KE20A | 20 | 19.0 | 21.0 | 1.0 | 17.10 | 1 | 56 | 27.7 | 0.090 |
| 1N6279 | 1.5KE22 | 22 | 19.8 | 24.2 | 1.0 | 17.80 | 1 | 49 | 31.9 | 0.092 |
| 1N6279A | 1.5KE22A | 22 | 20.9 | 23.1 | 1.0 | 18.80 | 1 | 51 | 30.6 | 0.092 |
| 1N6280 | 1.5KE24 | 24 | 21.6 | 26.4 | 1.0 | 19.40 | 1 | 45 | 34.7 | 0.094 |
| 1N6280A | 1.5KE24A | 24 | 22.8 | 25.2 | 1.0 | 20.50 | 1 | 47 | 33.2 | 0.094 |
| 1N6281 | 1.5KE27 | 27 | 24.3 | 29.7 | 1.0 | 21.80 | 1 | 40 | 39.1 | 0.096 |
| 1N6281A | 1.5KE27A | 27 | 25.7 | 28.4 | 1.0 | 23.10 | 1 | 42 | 37.5 | 0.096 |
| 1N6282 | 1.5KE30 | 30 | 27.0 | 33.0 | 1.0 | 24.30 | 1 | 36 | 43.5 | 0.097 |
| 1N6282A | 1.5KE30A | 30 | 28.5 | 31.5 | 1.0 | 25.60 | 1 | 38 | 41.4 | 0.097 |
| 1N6283 | 1.5KE33 | 33 | 29.7 | 36.3 | 1.0 | 26.80 | 1 | 33 | 47.7 | 0.098 |
| 1N6283A | 1.5KE33A | 33 | 31.4 | 34.7 | 1.0 | 28.20 | 1 | 34 | 45.7 | 0.098 |
| 1N6284 | 1.5KE36 | 36 | 32.4 | 39.6 | 1.0 | 29.10 | 1 | 30 | 52.0 | 0.099 |
| 1N6284A | 1.5KE36A | 36 | 34.2 | 37.8 | 1.0 | 30.80 | 1 | 31 | 49.9 | 0.099 |
| 1N6285 | 1.5KE39 | 39 | 35.1 | 42.9 | 1.0 | 31.60 | 1 | 27 | 56.4 | 0.100 |
| 1N6285A | 1.5KE39A | 39 | 37.1 | 41.0 | 1.0 | 33.30 | 1 | 29 | 53.9 | 0.100 |
| 1N6286 | 1.5KE43 | 43 | 38.7 | 47.3 | 1.0 | 34.80 | 1 | 25 | 61.9 | 0.101 |
| 1N6286A | 1.5KE43A | 43 | 40.9 | 45.2 | 1.0 | 36.80 | 1 | 26 | 59.3 | 0.101 |
| 1N6287 | 1.5KE47 | 47 | 42.3 | 51.7 | 1.0 | 38.10 | 1 | 23 | 67.8 | 0.101 |
| 1N6287A | 1.5KE47A | 47 | 44.7 | 49.4 | 1.0 | 40.20 | 1 | 24 | 64.8 | 0.101 |
| 1N6288 | 1.5KE51 | 51 | 45.9 | 56.1 | 1.0 | 41.30 | 1 | 21 | 73.5 | 0.102 |
| 1N6288A | 1.5KE51A | 51 | 48.5 | 53.6 | 1.0 | 43.60 | 1 | 22 | 70.1 | 0.102 |
| 1N6289 | 1.5KE56 | 56 | 50.4 | 61.6 | 1.0 | 45.40 | 1 | 19 | 80.5 | 0.103 |
| 1N6289A | 1.5KE56A | 56 | 53.2 | 58.8 | 1.0 | 47.80 | 1 | 20 | 77.0 | 0.103 |

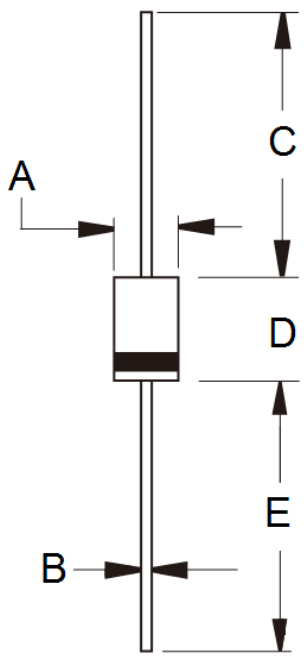
| JEDEC TYPE NUMBER | GENERAL PART NUMBER | Nominal Voltage | Breakdown Voltage $V_{BR}$ (V) (Note 1) | | Test Current $I_T$ | Stand-Off Voltage $V_{WM}$ | Maximum Reverse Leakage @ $V_{WM}$ | Maximum Peak Pulse Current $I_{PPM}$ | Maximum Clamping Voltage @ $I_{PPM}$ | Maximum Temperature Coefficient of $V_{BR}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| | | V | Min | Max | (mA) | (V) | $I_R$ (μA) | (A) (Note 2) | Vc(V) | (%/°C) |
| 1N6290 | 1.5KE62 | 62 | 55.8 | 68.2 | 1.0 | 50.2 | 1 | 17 | 89.0 | 0.104 |
| 1N6290A | 1.5KE62A | 62 | 58.9 | 65.1 | 1.0 | 53.0 | 1 | 18 | 85.0 | 0.104 |
| 1N6291 | 1.5KE68 | 68 | 61.2 | 74.8 | 1.0 | 55.1 | 1 | 16 | 98.0 | 0.104 |
| 1N6291A | 1.5KE68A | 68 | 64.6 | 71.4 | 1.0 | 58.1 | 1 | 17 | 92.0 | 0.104 |
| 1N6292 | 1.5KE75 | 75 | 67.5 | 82.5 | 1.0 | 60.7 | 1 | 14 | 108 | 0.105 |
| 1N6292A | 1.5KE75A | 75 | 71.3 | 78.8 | 1.0 | 64.1 | 1 | 15 | 103 | 0.105 |
| 1N6293 | 1.5KE82 | 82 | 73.8 | 90.2 | 1.0 | 66.4 | 1 | 13 | 118 | 0.105 |
| 1N6293A | 1.5KE82A | 82 | 77.9 | 86.1 | 1.0 | 70.1 | 1 | 13.9 | 113 | 0.105 |
| 1N6294 | 1.5KE91 | 91 | 81.9 | 100 | 1.0 | 73.7 | 1 | 12 | 131 | 0.106 |
| 1N6294A | 1.5KE91A | 91 | 86.5 | 95.5 | 1.0 | 77.8 | 1 | 12.6 | 125 | 0.106 |
| 1N6295 | 1.5KE100 | 100 | 90 | 110 | 1.0 | 81.0 | 1 | 10.9 | 144 | 0.106 |
| 1N6295A | 1.5KE100A | 100 | 95 | 105 | 1.0 | 85.5 | 1 | 11.4 | 137 | 0.106 |
| 1N6296 | 1.5KE110 | 110 | 99 | 121 | 1.0 | 89.2 | 1 | 9.9 | 158 | 0.107 |
| 1N6296A | 1.5KE110A | 110 | 105 | 116 | 1.0 | 94.0 | 1 | 10.3 | 152 | 0.107 |
| 1N6297 | 1.5KE120 | 120 | 108 | 132 | 1.0 | 97.2 | 1 | 9.1 | 173 | 0.107 |
| 1N6297A | 1.5KE120A | 120 | 114 | 126 | 1.0 | 102 | 1 | 9.5 | 165 | 0.107 |
| 1N6298 | 1.5KE130 | 130 | 117 | 143 | 1.0 | 105 | 1 | 8.4 | 187 | 0.107 |
| 1N6298A | 1.5KE130A | 130 | 124 | 137 | 1.0 | 111 | 1 | 8.7 | 179 | 0.107 |
| 1N6299 | 1.5KE150 | 150 | 135 | 165 | 1.0 | 121 | 1 | 7.3 | 215 | 0.108 |
| 1N6299A | 1.5KE150A | 150 | 143 | 158 | 1.0 | 128 | 1 | 7.6 | 207 | 0.108 |
| 1N6300 | 1.5KE160 | 160 | 144 | 176 | 1.0 | 130 | 1 | 6.8 | 230 | 0.108 |
| 1N6300A | 1.5KE160A | 160 | 152 | 168 | 1.0 | 136 | 1 | 7.1 | 219 | 0.108 |
| 1N6301 | 1.5KE170 | 170 | 153 | 187 | 1.0 | 138 | 1 | 6.4 | 244 | 0.108 |
| 1N6301A | 1.5KE170A | 170 | 162 | 179 | 1.0 | 145 | 1 | 6.7 | 234 | 0.108 |
| 1N6302 | 1.5KE180 | 180 | 162 | 198 | 1.0 | 146 | 1 | 6.1 | 258 | 0.108 |
| 1N6302A | 1.5KE180A | 180 | 171 | 189 | 1.0 | 154 | 1 | 6.4 | 246 | 0.108 |
| 1N6303 | 1.5KE200 | 200 | 180 | 220 | 1.0 | 162 | 1 | 5.4 | 287 | 0.108 |
| 1N6303A | 1.5KE200A | 200 | 190 | 210 | 1.0 | 171 | 1 | 5.7 | 274 | 0.108 |
| | 1.5KE220 | 220 | 198 | 242 | 1.0 | 175 | 1 | 4.5 | 344 | 0.110 |
| | 1.5KE220A | 220 | 209 | 231 | 1.0 | 185 | 1 | 4.8 | 328 | 0.110 |
| | 1.5KE250 | 250 | 225 | 275 | 1.0 | 202 | 1 | 4.3 | 360 | 0.110 |
| | 1.5KE250A | 250 | 237 | 263 | 1.0 | 214 | 1 | 4.5 | 344 | 0.110 |
| | 1.5KE300 | 300 | 270 | 330 | 1.0 | 243 | 1 | 3.6 | 430 | 0.110 |
| | 1.5KE300A | 300 | 285 | 315 | 1.0 | 256 | 1 | 3.8 | 414 | 0.110 |
| | 1.5KE350 | 350 | 315 | 385 | 1.0 | 284 | 1 | 3.1 | 504 | 0.110 |
| | 1.5KE350A | 350 | 333 | 368 | 1.0 | 300 | 1 | 3.2 | 482 | 0.110 |
| | 1.5KE400 | 400 | 360 | 440 | 1.0 | 324 | 1 | 2.7 | 574 | 0.110 |
| | 1.5KE400A | 400 | 380 | 420 | 1.0 | 342 | 1 | 2.8 | 548 | 0.110 |
| | 1.5KE440 | 440 | 396 | 484 | 1.0 | 356 | 1 | 2.4 | 631 | 0.110 |
| | 1.5KE440A | 440 | 418 | 462 | 1.0 | 376 | 1 | 2.5 | 602 | 0.110 |

Notes:

1. $V_{BR}$ measure after $I_T$ applied for 300 μs, $I_T$=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 $I_R$ limit is doubled.
4. All terms and symbols are consistent with ANSI/IEEE C62.35.

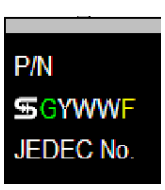
## PACKAGE OUTLINE DIMENSIONS

**DO-201**




| DIM. | Unit (mm) | | Unit (inch) | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 5.00 | 5.60 | 0.197 | 0.220 |
| B | 0.96 | 1.06 | 0.038 | 0.042 |
| C | 25.40 | - | 1.000 | - |
| D | 8.50 | 9.50 | 0.335 | 0.375 |
| E | 25.40 | - | 1.000 | - |

## MARKING DIAGRAM




P/N = Specific Device Code
G = Green Compound
YWW = Date Code
F = Factory Code

Note: Cathode band for uni-directional products only

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Version: N1602

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Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

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