



# MG50P12E2A

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| Gate-emitter Threshold Voltage          | $V_{GE(th)}$  | $V_{GE}=V_{CE}, I_C=1.7mA, T_{vj}=25$   | 5.2 | 5.8  | 6.4  | V  |
|---|---------------|---|-----|------|------|----|
| Collector-Emitter Cut-off Current       | $I_{CES}$     | $V_{CE}=1200V, V_{GE}=0V, T_{vj}=25$  |     |      | 1.0  | mA |
| Collector-Emitter Saturation Voltage    | $V_{CE(sat)}$ | $I_C=50A, V_{GE}=15V, T_{vj}=25$  |     | 1.90 | 2.30 | V  |
|   |               | $I_C=50A, V_{GE}=15V, T_{vj}=125$   |     | 2.20 |      |    |
|   |               | $I_C=50A, V_{GE}=15V, T_{vj}=150$   |     | 2.30 |      |    |
| Gate Charge                             | $Q_G$         |   |     | 0.35 |      | uC |
| Input Capacitance                       | $C_{ies}$     | $V_{CE}=25V, V_{GE}=0V,$<br>$f=1MHz, T_{vj}=25$                                   |     | 2.60 |      | nF |
| Reverse Transfer Capacitance            | $C_{res}$     |   |     | 0.10 |      | nF |
| Internal Gate Resistance                | $R_{gint}$    |   |     | 4.0  |      |    |
| Gate-Emitter leakage current            | $I_{GES}$     | $V_{CE}=0V, V_{GE}=20V, T_{vj}=25$  |     |      | 400  | nA |
| Turn-on Delay Time                      | $t_{d(on)}$   | $I_C=50A$<br>$V_{CE}=600V$<br>$V_{GE}=\pm 15V$<br>$R_G=15\Omega$<br>$T_{vj}=25$   |     | 168  |      | ns |
| Rise Time                               | $t_r$         |   |     | 34   |      | ns |
| Turn-off Delay Time                     | $t_{d(off)}$  |   |     | 320  |      | ns |
| Fall Time                               | $t_f$         |   |     | 78   |      | ns |
| Energy Dissipation During Turn-on Time  | $E_{on}$      |   |     | 5.42 |      | mJ |
| Energy Dissipation During Turn-off Time | $E_{off}$     |   |     | 4.15 |      | mJ |
| Turn-on Delay Time                      | $t_{d(on)}$   | $I_C=50A$<br>$V_{CE}=600V$<br>$V_{GE}=\pm 15V$<br>$R_G=15\Omega$<br>$T_{vj}=125$  |     | 175  |      | ns |
| Rise Time                               | $t_r$         |   |     | 42   |      | ns |
| Turn-off Delay Time                     | $t_{d(off)}$  |   |     | 426  |      | ns |
| Fall Time                               | $t_f$         |   |     | 148  |      | ns |
| Energy Dissipation During Turn-on Time  | $E_{on}$      |   |     | 7.26 |      | mJ |
| Energy Dissipation During Turn-off Time | $E_{off}$     |   |     | 5.80 |      | mJ |
| SC Data                                 | $I_{sc}$      | $T_p \leq 10\mu s, V_{GE}=15V, T_{vj}=150$ ,<br>$V_{cc}=900V, V_{CEM} \leq 1200V$ |     | 220  |      | A  |



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|                                   |           |                                 |          |   |
|-----------------------------------|-----------|---------------------------------|----------|---|
| Collector-Emitter Voltage         | $V_{CES}$ | $V_{GE}=0V, I_C=1mA, T_{vj}=25$ | 1200     | V |
| Continuous Collector Current      | $I_C$     | $T_c=100, T_{vjmax}=175$        | 35       | A |
| Repetitive Peak Collector Current | $I_{CRM}$ | $t_p=1ms$                       | 70       | A |
| Gate-Emitter Voltage              | $V_{GES}$ | $T_{vj}=25$                     | $\pm 20$ | V |
| Total Power Dissipation           | $P_{tot}$ | $T_c=25, T_{vjmax}=175$         | 227      | W |

|   |               |   |     |      |      |    |    |
|---|---------------|---|-----|------|------|----|----|
| Gate-emitter Threshold Voltage          | $V_{GE(th)}$  | $V_{GE}=V_{CE}, I_C=1.4mA, T_{vj}=25$                           | 5.2 | 5.8  | 6.4  | V  |    |
| Collector-Emitter Cut-off Current       | $I_{CES}$     | $V_{CE}=1200V, V_{GE}=0V, T_{vj}=25$                            |     |      | 1.0  | mA |    |
| Collector-Emitter Saturation Voltage    | $V_{CE(sat)}$ | $I_C=35A, V_{GE}=15V, T_{vj}=25$                                |     | 1.85 | 2.25 | V  |    |
|   |               | $I_C=35A, V_{GE}=15V, T_{vj}=125$                               |     | 2.15 |      |    |    |
|   |               | $I_C=35A, V_{GE}=15V, T_{vj}=150$                               |     | 2.25 |      |    |    |
| Gate Charge                             | $Q_G$         |   |     | 0.27 |      | uC |    |
| Input Capacitance                       | $C_{ies}$     | $V_{CE}=25V, V_{GE}=0V, f=1MHz, T_{vj}=25$                      |     | 2.00 |      | nF |    |
| Reverse Transfer Capacitance            | $C_{res}$     |   |     | 0.07 |      | nF |    |
| Gate-Emitter leakage current            | $I_{GES}$     | $V_{CE}=0V, V_{GE}=20V, T_{vj}=25$                              |     |      | 400  | nA |    |
| Turn-on Delay Time                      | $t_{d(on)}$   | $I_C=35A, V_{CE}=600V, V_{GE}=\pm 15V, R_G=12\Omega, T_{vj}=25$ |     | 25   |      | ns |    |
| Rise Time                               | $t_r$         |   |     | 13   |      | ns |    |
| Turn-off Delay Time                     | $t_{d(off)}$  |   |     | 24   |      | ns |    |
| Fall Time                               | $t_f$         |   |     | 115  |      | ns |    |
| Energy Dissipation During Turn-on Time  | $E_{on}$      |   |     |      | 1.90 |    | mJ |
| Energy Dissipation During Turn-off Time | $E_{off}$     |   |     |      | 2.00 |    | mJ |



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|   |              |  |   |     |    |
|---|--------------|--|---|-----|----|
| Turn-on Delay Time                      | $t_{d(on)}$  | $I_C = 35\text{ A}$<br>$V_{CE} = 600\text{ V}$<br>$V_{GE} = \pm 15\text{ V}$<br>$R_G = 12\Omega$<br>$T_{vj} = 125$ | 25  |     | ns |
| Rise Time                               | $t_r$        |  | 16  |     | ns |
| Turn-off Delay Time                     | $t_{d(off)}$ |  | 295   |     | ns |
| Fall Time                               | $t_f$        |  | 170   |     | ns |
| Energy Dissipation During Turn-on Time  | $E_{on}$     |  | 2.90  |     | mJ |
| Energy Dissipation During Turn-off Time | $E_{off}$    |  | 2.90  |     | mJ |
| SC Data                                 | $I_{sc}$     |  | $T_p \leq 10\mu s, V_{GE} = 15\text{ V}, T_{vj} = 150$ ,<br>$V_{cc} = 900\text{ V}, V_{CEM} \leq 1200\text{ V}$ | 150 |    |

|                                 |           |  |      |  |                  |
|---------------------------------|-----------|--|------|--|------------------|
| Repetitive Peak Reverse Voltage | $V_{RRM}$ | $T_j = 25$                               | 1200 |  | V                |
| Continuous DC Forward Current   | $I_F$     |  | 15   |  | A                |
| Repetitive Peak Forward Current | $I_{FRM}$ | $t_p = 1\text{ ms}$                      | 30   |  | A                |
| $I^2t$ -value                   | $I^2t$    | $V_R = 0, t_p = 10\text{ ms}, T_j = 125$ | 16.0 |  | A <sup>2</sup> s |
|                                 |           | $V_R = 0, t_p = 10\text{ ms}, T_j = 150$ | 14.0 |  |                  |

|                               |           |   |      |      |               |
|-------------------------------|-----------|---|------|------|---------------|
| Forward Voltage               | $V_F$     | $I_F = 15\text{ A}, T_{vj} = 25$                              | 2.00 | 2.40 | V             |
|                               |           | $I_F = 15\text{ A}, T_{vj} = 125$                             | 2.10 |      |               |
|                               |           | $I_F = 15\text{ A}, T_{vj} = 150$                             | 2.10 |      |               |
| Recovered Charge              | $Q_{rr}$  | $I_F = 15\text{ A}$   | 1.10 |      | $\mu\text{C}$ |
| Peak Reverse Recovery Current | $I_{rr}$  | $V_R = 600\text{ V}$<br>$-di_F/dt = 550\text{ A}/\mu\text{s}$ | 12.0 |      | A             |
| Reverse Recovery Energy       | $E_{rec}$ | $T_{vj} = 25$   | 0.30 |      | mJ            |
| Recovered Charge              | $Q_{rr}$  | $I_F = 15\text{ A}$   | 1.90 |      | $\mu\text{C}$ |
| Peak Reverse Recovery Current | $I_{rr}$  | $V_R = 600\text{ V}$<br>$-di_F/dt = 550\text{ A}/\mu\text{s}$ | 14.0 |      | A             |
| Reverse Recovery Energy       | $E_{rec}$ | $T_{vj} = 125$  | 0.60 |      | mJ            |



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|  |             |                           |      |        |
|--|-------------|---------------------------|------|--------|
| Repetitive Peak Reverse Voltage              | $V_{RRM}$   | $T_j=25$                  | 1600 | V      |
| Average output Current<br>50/60Hz, sine wave | $I_{F(AV)}$ | $T_c=100$                 | 65   | A      |
| Maximum RMS Current at<br>Rectifier Output   | $I_{RMSM}$  | $T_c=100$                 | 110  | A      |
| Surge Forward Current                        | $I_{FSM}$   | $V_R=0, t_p=10ms, T_j=45$ | 850  | A      |
| $I^2t$ -value                                | $I^2t$      | $V_R=0, t_p=10ms, T_j=45$ | 3610 | $A^2s$ |

|                       |       |                      |     |    |
|-----------------------|-------|----------------------|-----|----|
| Diode Forward Voltage | $V_F$ | $I_F=50A, T_j=125$   | 1.0 | V  |
| Reverse Current       | $I_R$ | $T_j=125, V_R=1600V$ | 1.5 | mA |

|                   |             |   |      |      |    |
|-------------------|-------------|---|------|------|----|
| Rated Resistance  | $R_{25}$    |   | 5.0  | k    |    |
| Deviation of R100 | R/R         | $T_c=100, R_{100}=493.3$                        | -5   | 5    | %  |
| Power Dissipation | $P_{25}$    |   |      | 20.0 | mW |
| B-value           | $B_{25/50}$ | $R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298.15 K))]$ | 3375 |      | K  |

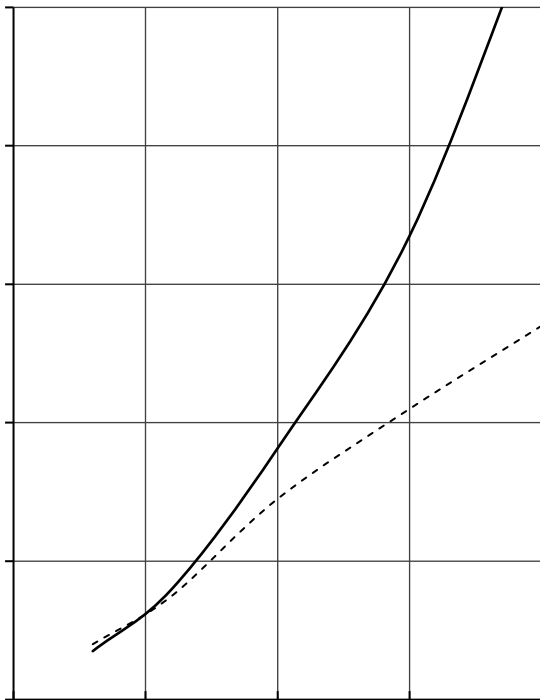
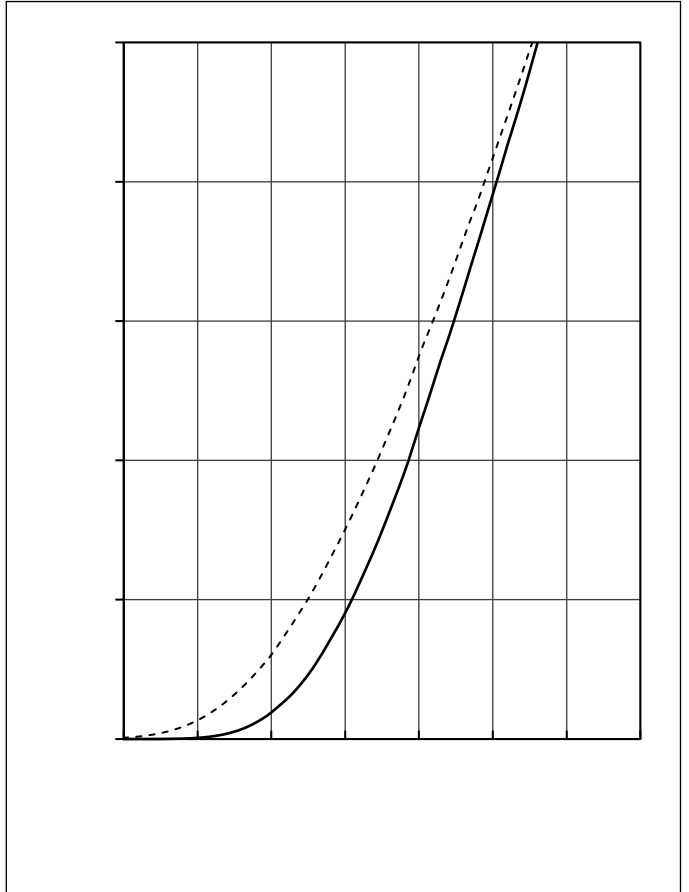
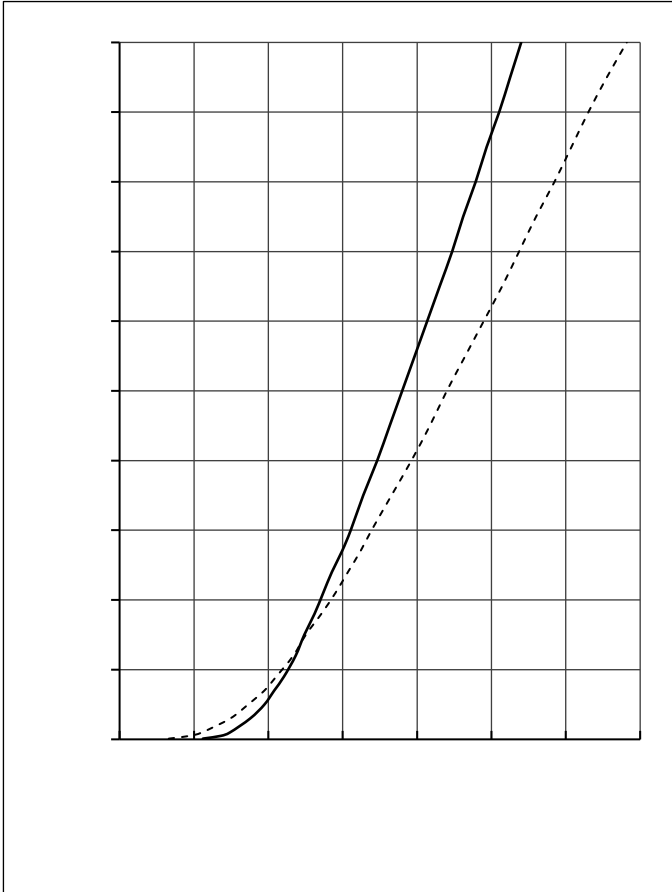


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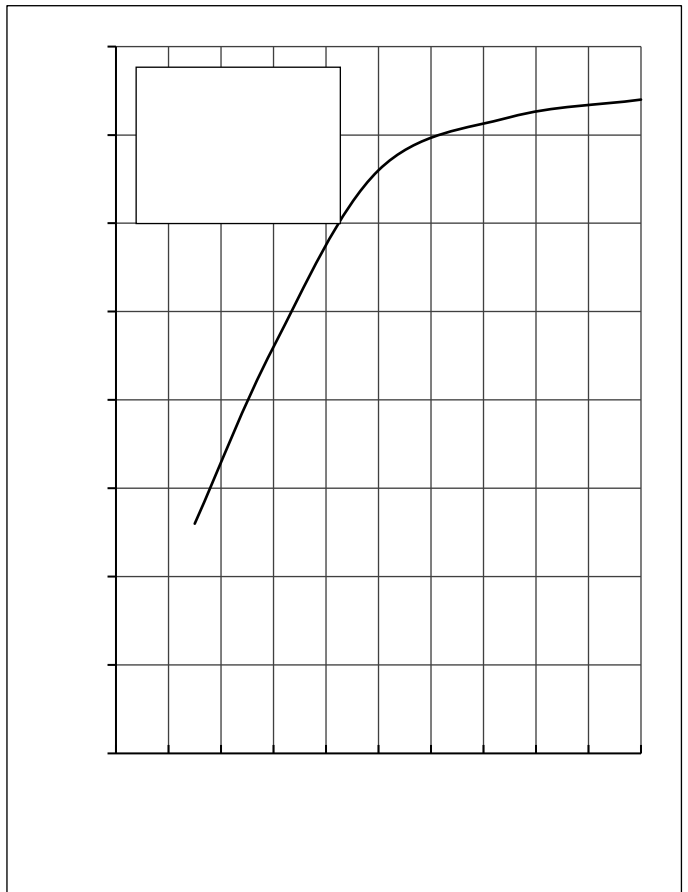
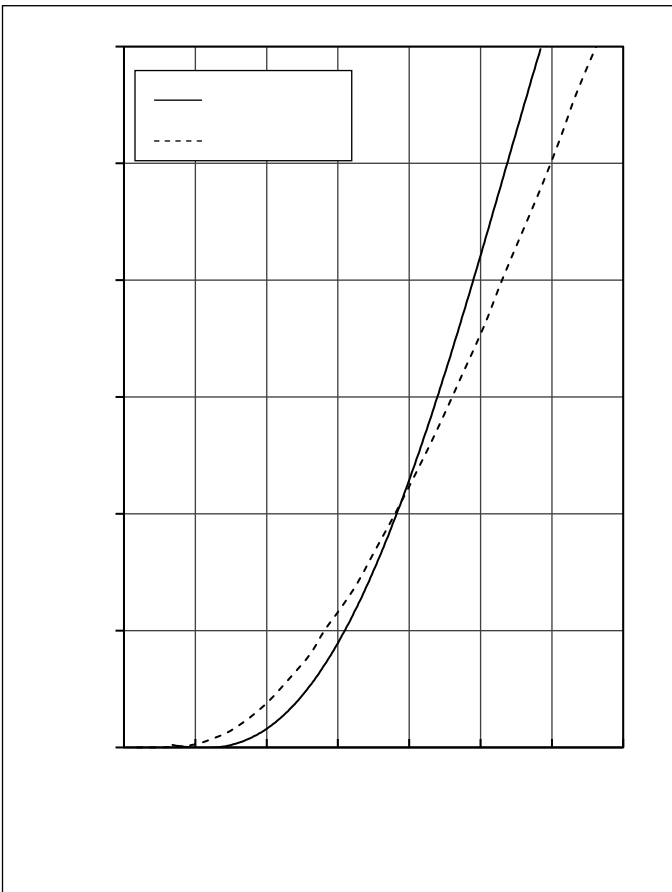
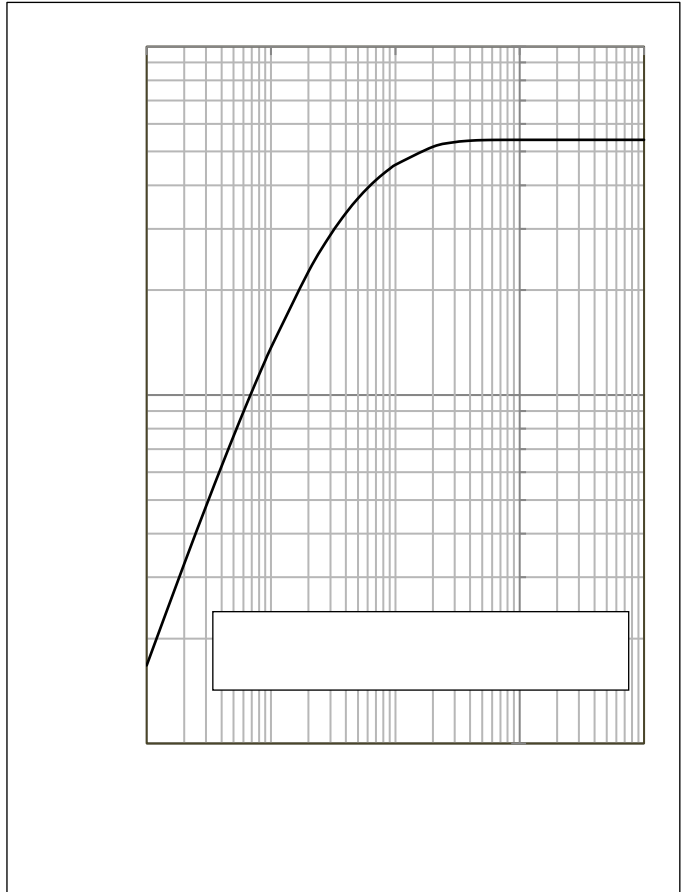
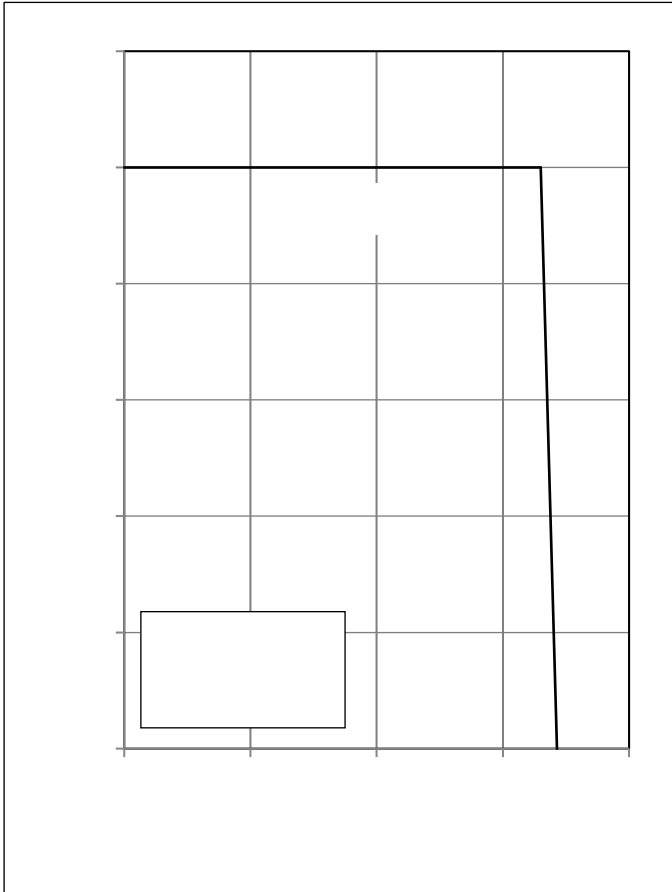
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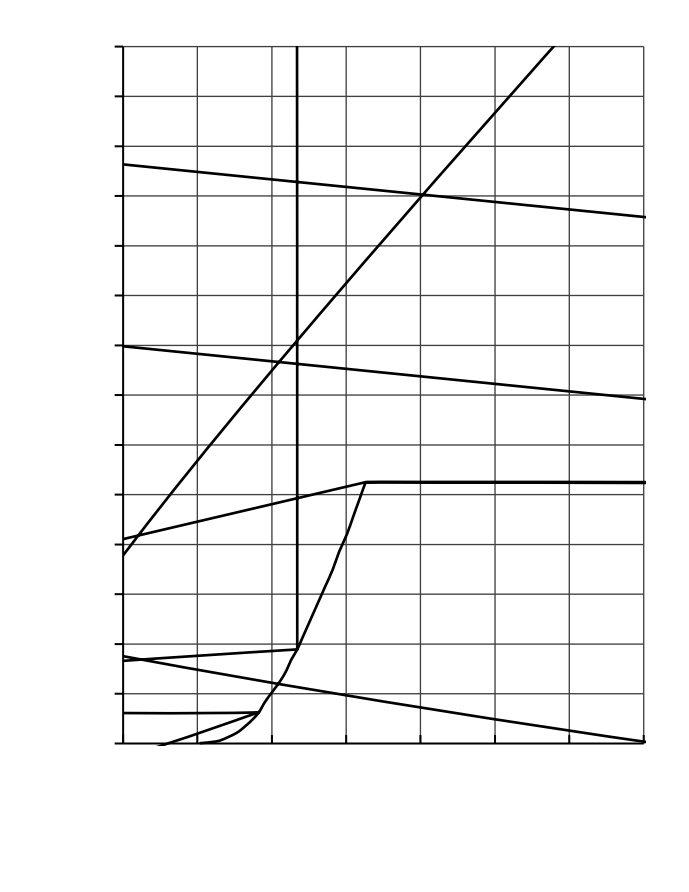
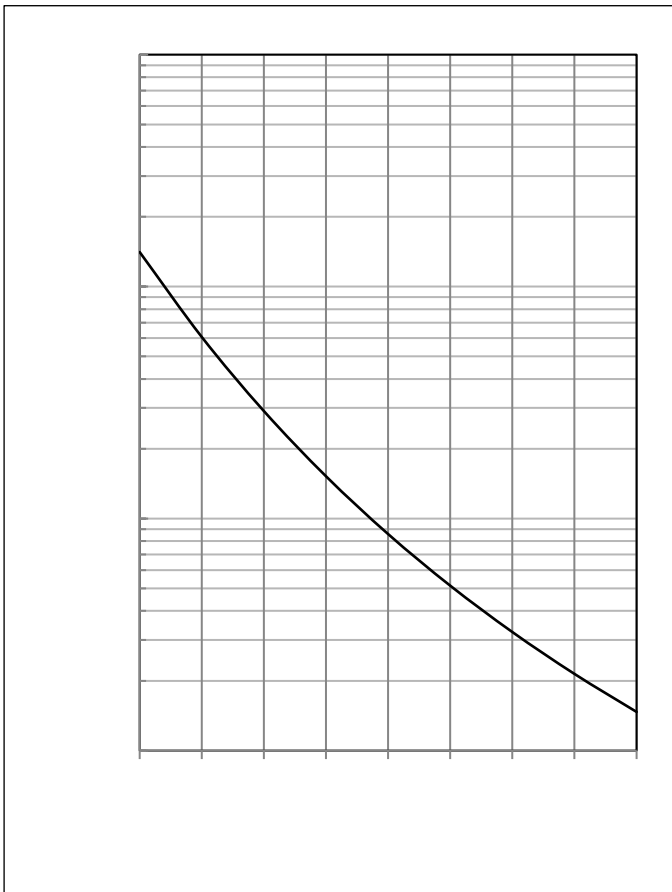
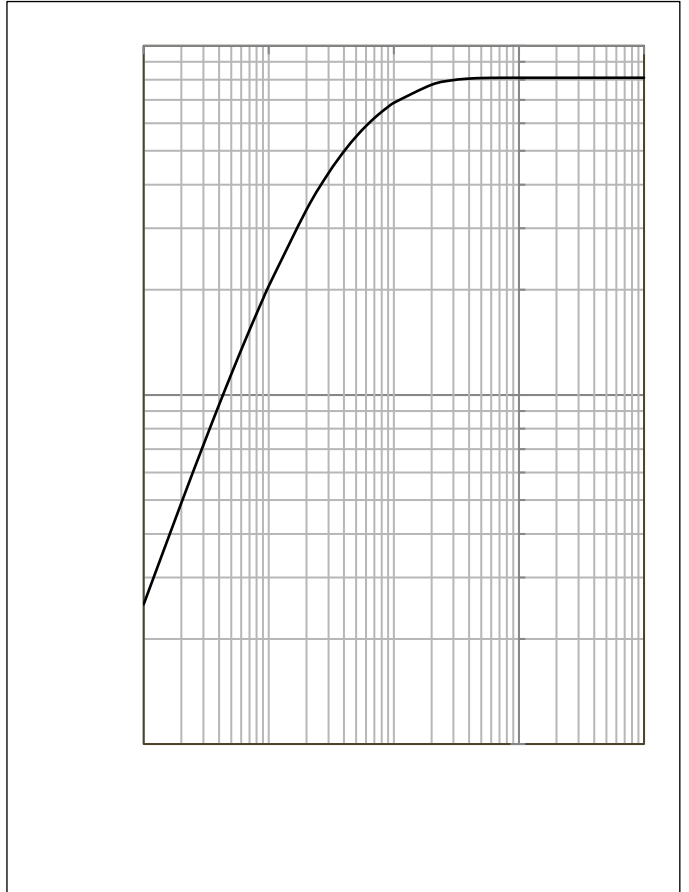
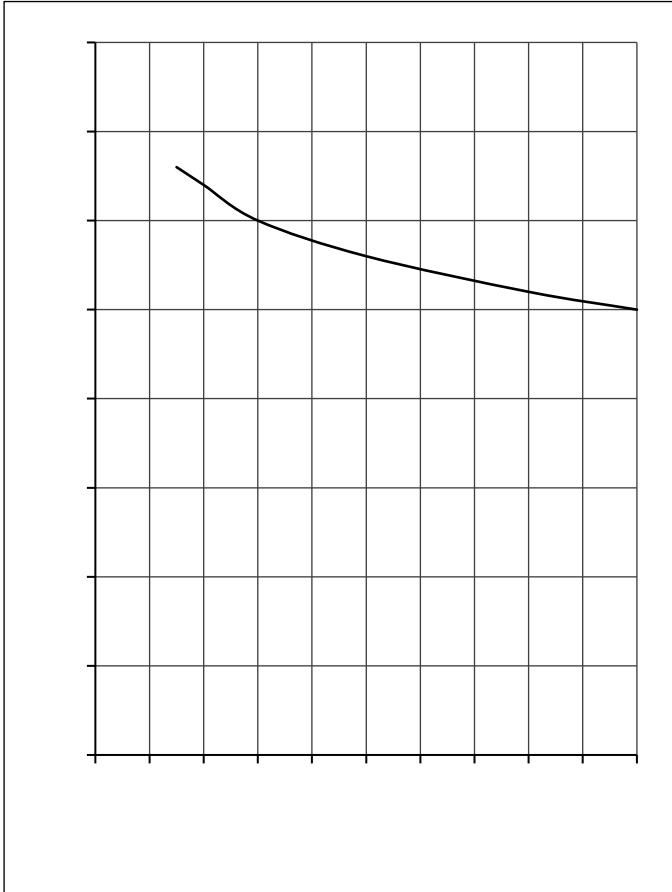


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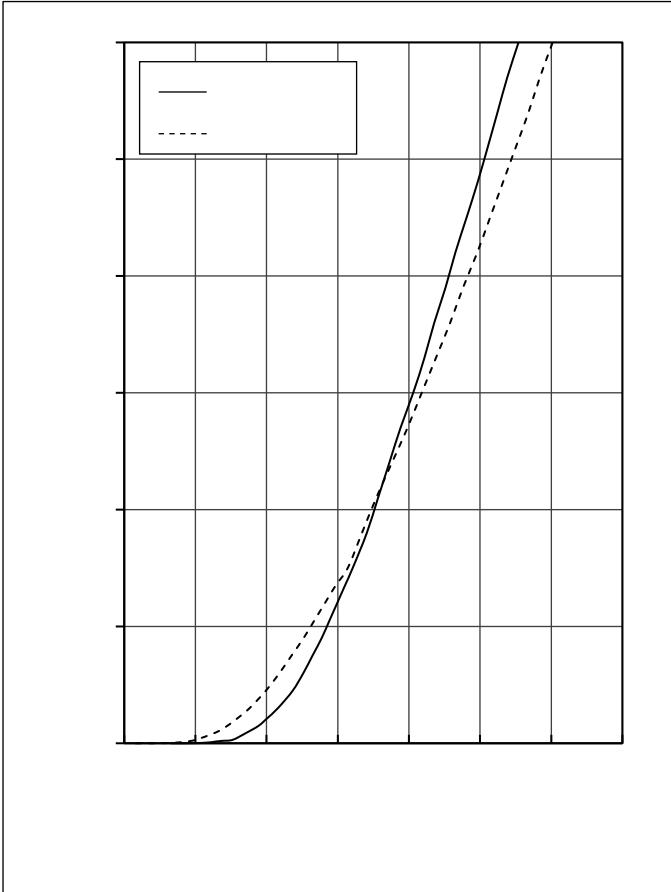


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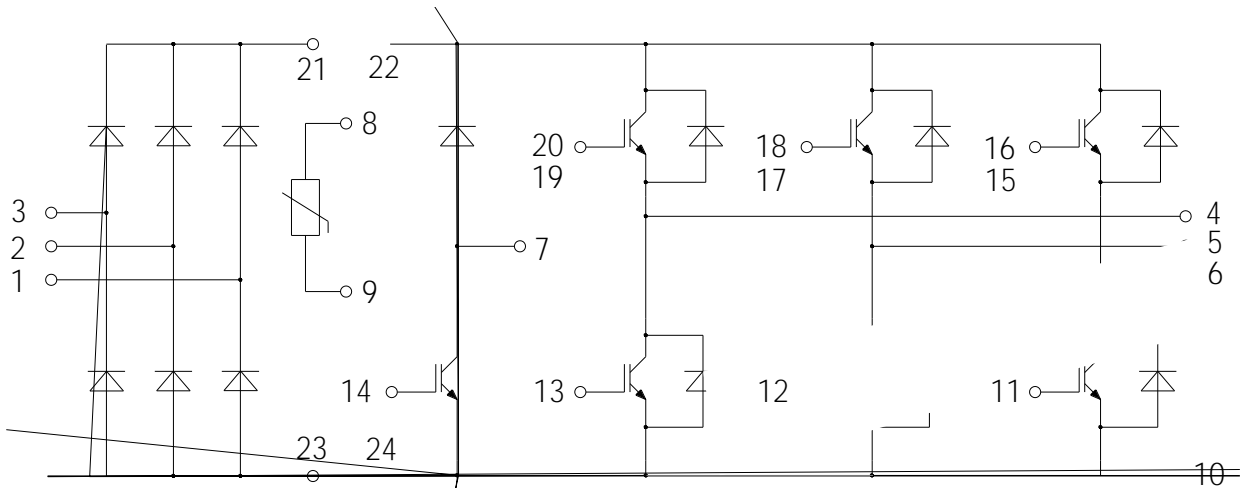


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## ● Package Outline Information

Dimensions in Millimeters

