

| flow 90CON 1 | | 1600 V / 35 A |
|----------------------------|---|----------------------|
| Features | <ul style="list-style-type: none"> • 3~ phase input rectifier with or without BRC *optional half controlled • Compatible with flow 90PACK 1 • Support designs with 90° mounting angle between heatsink and PCB • Clip-in PCB mounting | |
| flow 90 housing | | |
| Target Applications | <ul style="list-style-type: none"> • Motor drives • Servo drives | |
| Schematic | | |
| Types | <ul style="list-style-type: none"> • V23990-P717-G-PM • V23990-P717-G10-PM • V23990-P717-H-PM • V23990-P717-H10-PM | |

Maximum Ratings

$T_j=25^\circ\text{C}$, unless otherwise specified

| Parameter | Symbol | Condition | Value | Unit |
|-----------|--------|-----------|-------|------|
|-----------|--------|-----------|-------|------|

Input Rectifier Diode

| | | | | |
|--|------------|--|----------|------------------|
| Repetitive peak reverse voltage | V_{RRM} | | 1600 | V |
| Forward current | I_{FAV} | DC current $T_s=80^\circ\text{C}$ $T_c=80^\circ\text{C}$ | 39 53 | A |
| Surge (non-repetitive) forward current | I_{FSM} | $t_p=10\text{ms}$ $T_j=45^\circ\text{C}$ | 600 | A |
| I ² t-value | I^2t | | 1800 | A ² s |
| Power dissipation | P_{tot} | $T_s=80^\circ\text{C}$ $T_c=80^\circ\text{C}$ | 44 67 | W |
| Maximum Junction Temperature | T_{jmax} | | 150 | °C |

Input Rectifier Thyristor

| | | | | |
|--|------------|--|----------|------------------|
| Repetitive peak reverse voltage | V_{RRM} | | 1600 | V |
| Mean forward current | I_{FAV} | sine,d=0.5 $T_j=T_{jmax}$ | 36 48 | A |
| Surge (non-repetitive) forward current | I_{FSM} | $t_p=10\text{ms}$ $T_j=45^\circ\text{C}$ | 360 | A |
| I ² t-value | I^2t | | 650 | A ² s |
| Power dissipation | P_{tot} | $T_s=80^\circ\text{C}$ $T_c=80^\circ\text{C}$ | 56 84 | W |
| Maximum Junction Temperature | T_{jmax} | | 150 | °C |



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Maximum Ratings

 $T_i=25^\circ\text{C}$, unless otherwise specified

| Parameter | Symbol | Condition | Value | Unit |
|-----------|--------|-----------|-------|------|
|-----------|--------|-----------|-------|------|

Brake Switch

| | | | | |
|--------------------------------------|----------------------|---|------------|--------------------|
| Collector-emitter Break down voltage | V_{CE} | | 1200 | V |
| DC collector current | I_C | $T_j=T_{jmax}$ $T_c=80^\circ\text{C}$ | 18 23 | A |
| Repetitive peak collector current | I_{CRM} | t_p limited by T_{jmax} | 75 | A |
| Power dissipation | P_{tot} | $T_s=80^\circ\text{C}$ $T_c=80^\circ\text{C}$ | 47 66 | W |
| Gate-emitter peak voltage | V_{GE} | | ± 20 | V |
| Short circuit ratings | t_{SC} V_{CC} | $T_j \leq 150^\circ\text{C}$ $V_{Ge}=15\text{V}$ | 10 1200 | μs V |
| Maximum Junction Temperature | T_{jmax} | | 150 | $^\circ\text{C}$ |

Brake Inverse Diode

| | | | | |
|---------------------------------|------------|--|----------|------------------|
| Peak Repetitive Reverse Voltage | V_{RRM} | | 1200 | V |
| DC forward current | I_F | $T_j=T_{jmax}$ $T_c=80^\circ\text{C}$ | 8 8 | A |
| Repetitive peak forward current | I_{FRM} | t_p limited by T_{jmax} | 6 | A |
| Brake Inverse Diode | P_{tot} | $T_s=80^\circ\text{C}$ $T_c=80^\circ\text{C}$ | 20 30 | W |
| Maximum Junction Temperature | T_{jmax} | | 150 | $^\circ\text{C}$ |

Brake Diode

| | | | | |
|---------------------------------|------------|--|----------|------------------|
| Peak Repetitive Reverse Voltage | V_{RRM} | | 1200 | V |
| DC forward current | I_F | $T_j=T_{jmax}$ $T_c=80^\circ\text{C}$ | 13 17 | A |
| Repetitive peak forward current | I_{FRM} | t_p limited by T_{jmax} | 15 | A |
| Power dissipation | P_{tot} | $T_s=80^\circ\text{C}$ $T_c=80^\circ\text{C}$ | 26 40 | W |
| Maximum Junction Temperature | T_{jmax} | | 150 | $^\circ\text{C}$ |

Thermal Properties

| | | | | |
|---|-----------|--|----------------------------|------------------|
| Storage temperature | T_{stg} | | -40...+125 | $^\circ\text{C}$ |
| Operation temperature under switching condition | T_{op} | | -40...+($T_{jmax} - 25$) | $^\circ\text{C}$ |

Insulation Properties

| | | | | | |
|--------------------|----------|---------------|------------|----------|----|
| Insulation voltage | V_{is} | $t=2\text{s}$ | DC voltage | 4000 | V |
| Creepage distance | | | | min 12,7 | mm |
| Clearance | | | | 11,84 | mm |



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Characteristic Values

| Parameter | Symbol | Conditions | | | | | Value | | | Unit |
|-----------|--------|------------------------------------|---|---|------------|-----|-------|-----|--|------|
| | | V_{GE} [V] or V_{GS} [V] | V_r [V] or V_{CE} [V] or V_{DS} [V] | I_C [A] or I_F [A] or I_D [A] | T_j [°C] | Min | Typ | Max | | |

Input Rectifier Diode

| | | | | | | | | | |
|---|---------------|--|------|----|-----------|-----|--------------|------|-----|
| Forward voltage | V_F | | | 42 | 25 125 | 0,8 | 1,21 1,18 | 1,5 | V |
| Threshold voltage (for power loss calc. only) | V_{to} | | | 42 | 25 125 | | 0,92 0,82 | | V |
| Slope resistance (for power loss calc. only) | r_t | | | 42 | 25 125 | | 0,01 0,01 | | Ω |
| Reverse current | I_r | | 1600 | | 25 125 | | | 0,02 | mA |
| Thermal resistance junction to sink | $R_{th(j-s)}$ | Thermal grease thickness≤50um $\lambda = 1 \text{ W/mK}$ | | | | | 1,58 | | K/W |
| Thermal resistance junction to case | $R_{th(j-c)}$ | | | | | | 1,04 | | |

Input Rectifier Thyristor

| | | | | | | | | | |
|---|----------------|--|-----------------------|-----|-----------|---|----------------|-----------|------|
| Forward voltage | V_F | | | 35 | 25 125 | 1 | 1,41 1,48 | 1,8 | V |
| Threshold voltage (for power loss calc. only) | V_{to} | | $V_D=6 \text{ V}$ | 35 | 25 125 | | 0,97 0,85 | | V |
| Slope resistance (for power loss calc. only) | r_t | | | 35 | 25 125 | | 12,49 17,85 | | mΩ |
| Reverse current | I_r | | 1200 | | 25 150 | | | 0,05 8 | mA |
| Gate controlled delay time | t_{GD} | $I_c=0,5\text{A}$ $V_D=1/2 V_{DRM}$ | | | 25 125 | | | 2 | μs |
| Gate controlled rise time | t_{GR} | | | | 25 125 | | tbd. | | μs |
| Critical rate of rise of off-state voltage | $(dv/dt)_{cr}$ | $V_D=2/3 V_{DRM}$ linear voltage rise | | | 150 | | | 1000 | V/μs |
| Critical rate of rise of on-state current | $(di/dt)_{cr}$ | $V_D=2/3 V_{DRM}$ $I_c=0,3\text{A}; f=50\text{Hz}$ | $t_p=200 \mu\text{s}$ | 40 | 150 | | | 500 | A/μs |
| Circuit commutated turn-off time | t_q | $V_D=2/3 V_{DRM}$ | $t_p=200 \mu\text{s}$ | 100 | 27 125 | | 200 | | μs |
| Holding current | I_H | | $V_D=6 \text{ V}$ | | 25 125 | | | 100 | mA |
| Latching current | I_L | $I_c=0,3\text{A}$ $t_p=10 \mu\text{s}$ | | | 25 125 | | | 150 | mA |
| Gate trigger voltage | V_{GT} | | $V_D=6$ | | 25 125 | | | 1,5 | V |
| Gate trigger current | I_{GT} | | $V_D=6$ | | 25 125 | | | 55 | mA |
| Gate non-trigger voltage | V_{GD} | $V_D=2/3 V_{DRM}$ | | | 25 125 | | | 0,2 | V |
| Gate non-trigger current | I_{GD} | $V_D=2/3 V_{DRM}$ | | | 25 125 | | | 3 | mA |
| Thermal resistance junction to sink | $R_{th(j-s)}$ | Thermal grease thickness≤50um $\lambda = 1 \text{ W/mK}$ | | | | | 1,26 | | K/W |
| Thermal resistance junction to case | $R_{th(j-c)}$ | | | | | | 0,83 | | |

Brake Switch

| | | | | | | | | | |
|--------------------------------------|---------------|--|-----|-------|-----------|-----------|--------------|------|-----|
| Gate emitter threshold voltage | $V_{GE(th)}$ | $V_{CE}=V_{GE}$ | | 0,001 | 25 125 | 5 | 5,8 | 6,5 | V |
| Collector-emitter saturation voltage | V_{CEsat} | | 15 | | 25 125 | 1,3 | 2,17 2,65 | 2,2 | V |
| Collector-emitter cut-off incl diode | I_{CES} | | 0 | 1200 | 25 125 | | | 0,25 | mA |
| Gate-emitter leakage current | I_{GES} | | 20 | 0 | 25 125 | | | 650 | nA |
| Integrated Gate resistor | R_{gint} | | | | | | 8 | | Ω |
| Turn-on delay time | $t_{d(on)}$ | | | | 25 125 | | 20,8 25,2 | | |
| Rise time | t_r | | | | 25 125 | | 16,7 18 | | |
| Turn-off delay time | $t_{d(off)}$ | $R_{gon}=32 \Omega$ $R_{goff}=16 \Omega$ | ±15 | 600 | 25 125 | 25 125 | 193 335 | | ns |
| Fall time | t_f | | | | 25 125 | | 112 170 | | |
| Turn-on energy loss | E_{on} | | | | 25 125 | | 1,80 1,16 | | |
| Turn-off energy loss | E_{off} | | | | 25 125 | | 1,77 1,52 | | mWs |
| Input capacitance | C_{ies} | | | | | | 1808 | | |
| Output capacitance | C_{oss} | f=1MHz | 0 | 25 | 25 | | 95 | | pF |
| Reverse transfer capacitance | C_{rss} | | | | | | 82 | | |
| Gate charge | Q_G | | 15 | 960 | 25 | 25 | 155 | | nC |
| Thermal resistance junction to sink | $R_{th(j-s)}$ | Thermal grease thickness≤50um $\lambda = 1 \text{ W/mK}$ | | | | | 1,6 | | K/W |
| Thermal resistance junction to case | $R_{th(j-c)}$ | | | | | | 1,06 | | |



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Characteristic Values

| Parameter | Symbol | Conditions | | | | | Value | | | Unit |
|-----------|--------|------------------------------------|---|---|--|-----|-------|-----|--|------|
| | | V_{GE} [V] or V_{GS} [V] | V_r [V] or V_{CE} [V] or V_{DS} [V] | I_c [A] or I_F [A] or I_D [A] | T_j [$^{\circ}$ C] or $T_{th(j-c)}$ | Min | Typ | Max | | |

Brake Inverse Diode

| | | | | | | | | | |
|-------------------------------------|---------------|---|--|---|-----------|---|-------------|-----|-----|
| Diode forward voltage | V_F | | | 3 | 25 125 | 1 | 1,6 1,57 | 2,2 | V |
| Thermal resistance junction to sink | $R_{th(j-s)}$ | Thermal grease thickness≤50um $\lambda = 1 \text{ W/mK}$ | | | | | 3,49 | | K/W |
| Thermal resistance junction to case | $R_{th(j-c)}$ | | | | | | 2,30 | | K/W |

Brake Diode

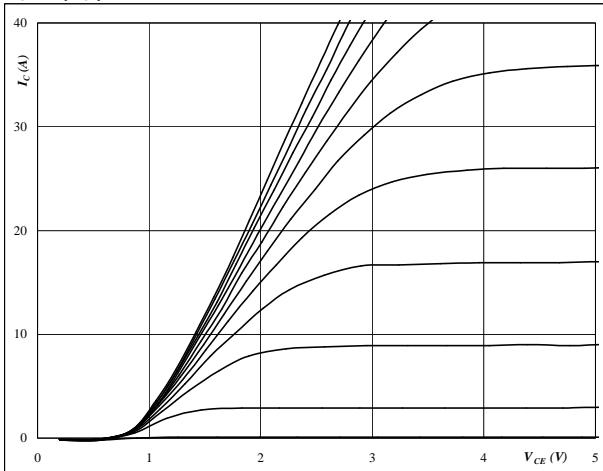
| | | | | | | | | | |
|---------------------------------------|----------------------|---|-----|-----|-----------|-----------|--------------|-----|------------------------|
| Diode forward voltage | V_F | | | 7,5 | 25 125 | 1 | 1,62 1,67 | 2,2 | V |
| Reverse leakage current | I_r | | ±15 | 300 | 7,5 | | | 250 | μA |
| Peak reverse recovery current | I_{RRM} | | | | 25 125 | | 17 17 | | A |
| Reverse recovery time | t_{rr} | $R_{gon}=32 \Omega$ $R_{gon}=32 \Omega$ | ±15 | 600 | 7,5 | 25 125 | 332 505 | | ns |
| Reverse recovered charge | Q_{rr} | | | | | 25 125 | 1,79 2,78 | | μC |
| Peak rate of fall of recovery current | $(di_{rf}/dt)_{max}$ | | | | | 25 125 | 495 210 | | $\text{A}/\mu\text{s}$ |
| Reverse recovery energy | E_{rec} | | | | | 25 125 | 1,79 2,78 | | mWs |
| Thermal resistance junction to sink | $R_{th(j-s)}$ | Thermal grease thickness≤50um $\lambda = 1 \text{ W/mK}$ | | | | | 2,65 | | K/W |
| Thermal resistance junction to case | $R_{th(j-c)}$ | | | | | | 1,75 | | |

Brake

Figure 1
Typical output characteristics

Brake IGBT

$$I_C = f(V_{CE})$$


At

$$t_p = 250 \mu\text{s}$$

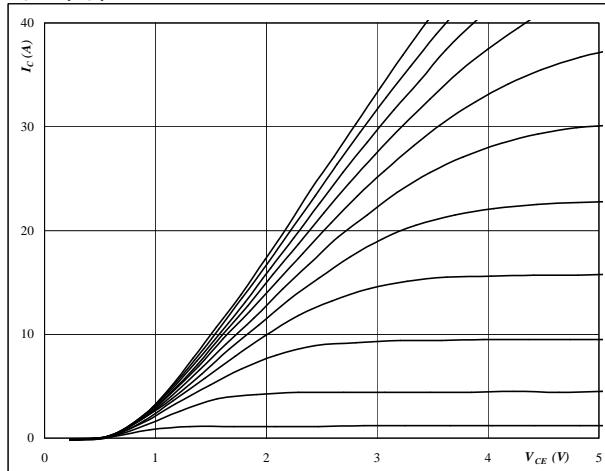
$$T_j = 25^\circ\text{C}$$

 V_{GE} from 7 V to 17 V in steps of 1 V

Figure 2
Typical output characteristics

Brake IGBT

$$I_C = f(V_{CE})$$


At

$$t_p = 250 \mu\text{s}$$

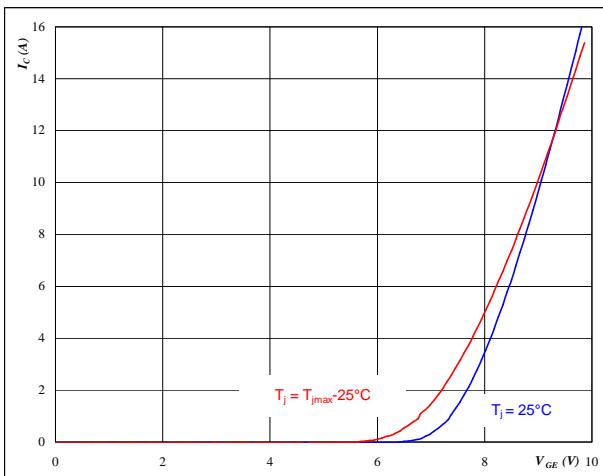
$$T_j = 125^\circ\text{C}$$

 V_{GE} from 7 V to 17 V in steps of 1 V

Figure 3
Typical transfer characteristics

Brake IGBT

$$I_C = f(V_{GE})$$


At

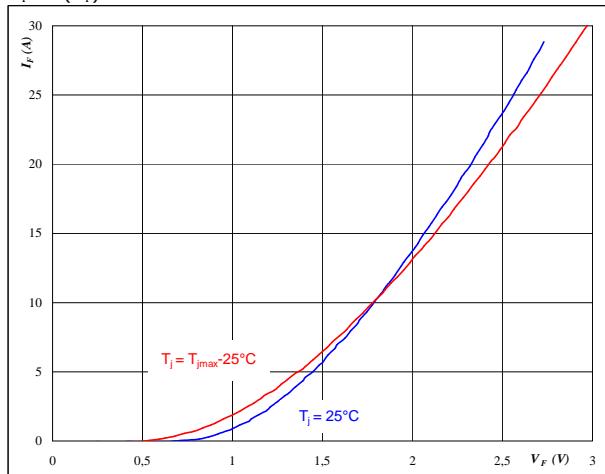
$$t_p = 250 \mu\text{s}$$

$$V_{CE} = 10 \text{ V}$$

Figure 4
Typical diode forward current as a function of forward voltage

Brake FWD

$$I_F = f(V_F)$$


At

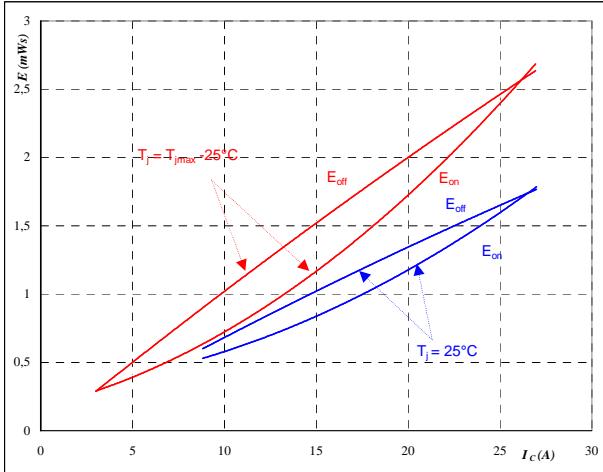
$$t_p = 250 \mu\text{s}$$

Brake

Figure 5

**Typical switching energy losses
as a function of collector current**

$$E = f(I_c)$$



With an inductive load at

$$T_j = \frac{25}{125} \quad ^\circ C$$

$$V_{CE} = 600 \quad V$$

$$V_{GE} = 15 \quad V$$

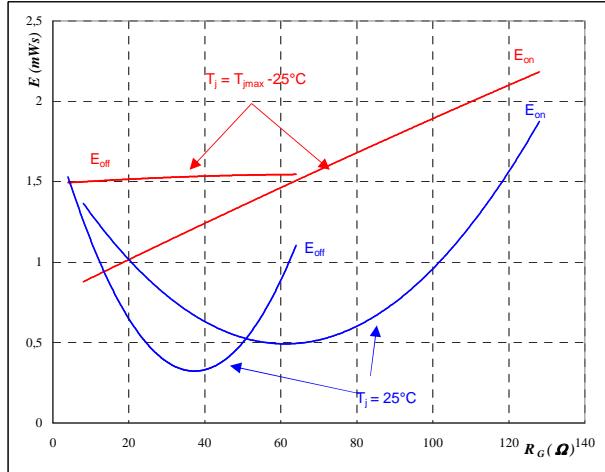
$$R_{gon} = 32 \quad \Omega$$

$$R_{goff} = 16 \quad \Omega$$

Figure 6

**Typical switching energy losses
as a function of gate resistor**

$$E = f(R_G)$$



With an inductive load at

$$T_j = \frac{25}{125} \quad ^\circ C$$

$$V_{CE} = 600 \quad V$$

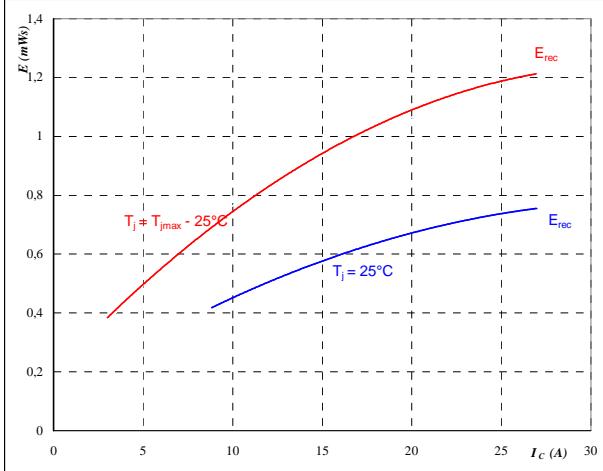
$$V_{GE} = 15 \quad V$$

$$I_c = 15 \quad A$$

Figure 7

**Typical reverse recovery energy loss
as a function of collector current**

$$E_{rec} = f(I_c)$$



With an inductive load at

$$T_j = \frac{25}{125} \quad ^\circ C$$

$$V_{CE} = 600 \quad V$$

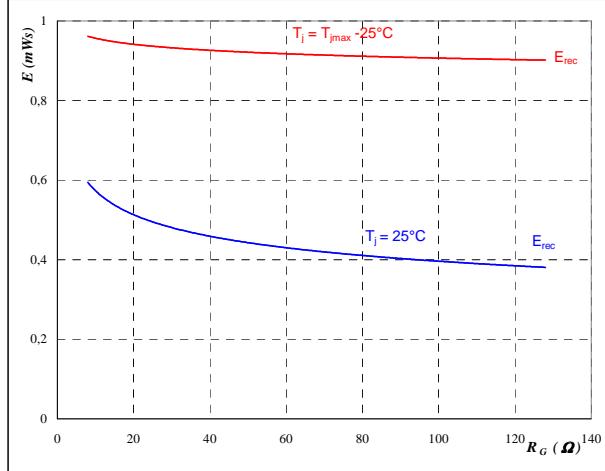
$$V_{GE} = 15 \quad V$$

$$R_{gon} = 32 \quad \Omega$$

Figure 8

**Typical reverse recovery energy loss
as a function of gate resistor**

$$E_{rec} = f(R_G)$$



With an inductive load at

$$T_j = \frac{25}{125} \quad ^\circ C$$

$$V_{CE} = 600 \quad V$$

$$V_{GE} = 15 \quad V$$

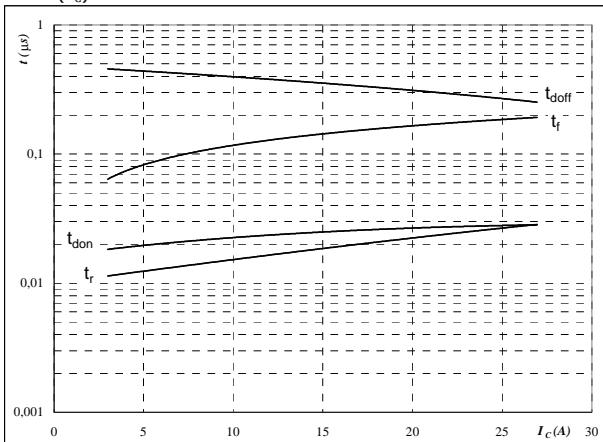
$$I_c = 15 \quad A$$

Brake

Figure 9

Typical switching times as a function of collector current

$$t = f(I_C)$$



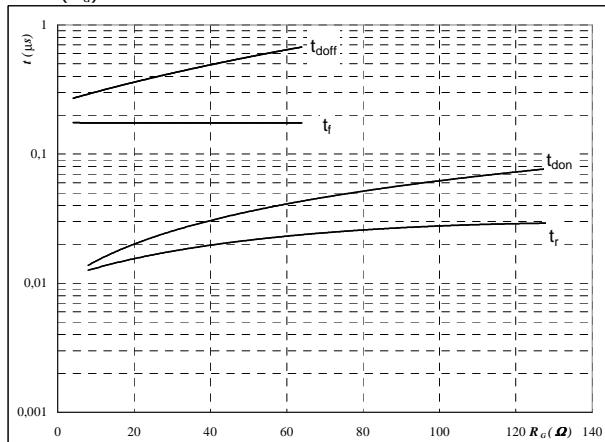
With an inductive load at

| | | |
|--------------|-----|----|
| $T_j =$ | 125 | °C |
| $V_{CE} =$ | 600 | V |
| $V_{GE} =$ | 15 | V |
| $R_{gon} =$ | 32 | Ω |
| $R_{goff} =$ | 16 | Ω |

Brake IGBT**Figure 10**

Typical switching times as a function of gate resistor

$$t = f(R_G)$$



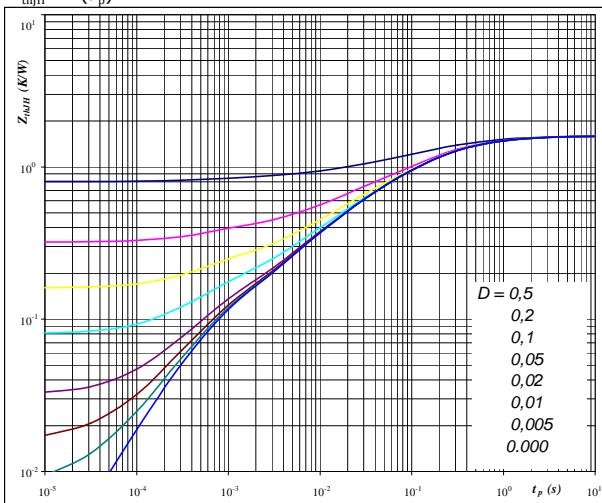
With an inductive load at

| | | |
|------------|-----|----|
| $T_j =$ | 125 | °C |
| $V_{CE} =$ | 600 | V |
| $V_{GE} =$ | 15 | V |
| $I_C =$ | 15 | A |

Brake IGBT**Figure 11**

IGBT transient thermal impedance as a function of pulse width

$$Z_{thIH} = f(t_p)$$



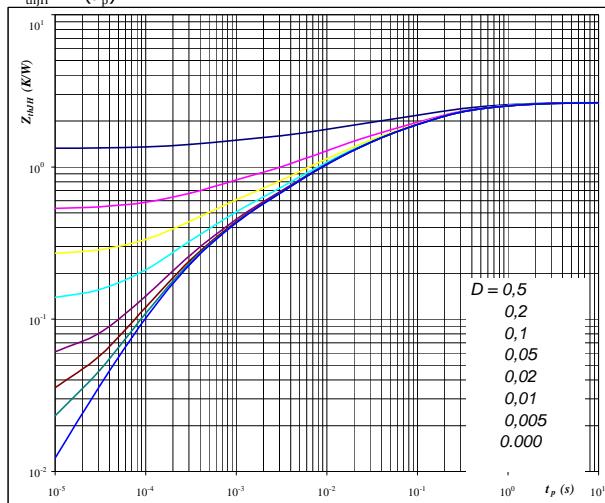
At

| | | |
|--------------|-----------|-----|
| $D =$ | t_p / T | |
| $R_{thIH} =$ | 1,60 | K/W |

Figure 12

FWD transient thermal impedance as a function of pulse width

$$Z_{thIH} = f(t_p)$$



At

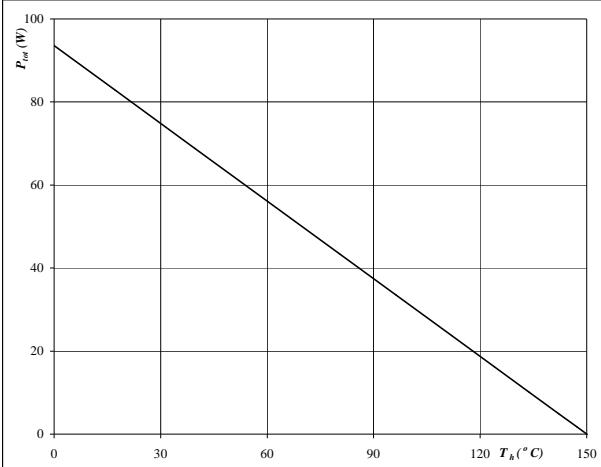
| | | |
|--------------|-----------|-----|
| $D =$ | t_p / T | |
| $R_{thIH} =$ | 2,65 | K/W |

Brake

Figure 13

Power dissipation as a function of heatsink temperature

$$P_{\text{tot}} = f(T_h)$$


At

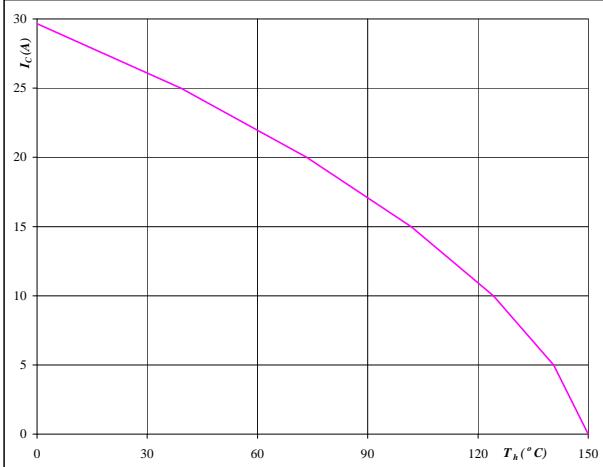
$$T_j = 150 \text{ } ^\circ\text{C}$$

Brake IGBT

Figure 14

Collector current as a function of heatsink temperature

$$I_C = f(T_h)$$


At

$$T_j = 150 \text{ } ^\circ\text{C}$$

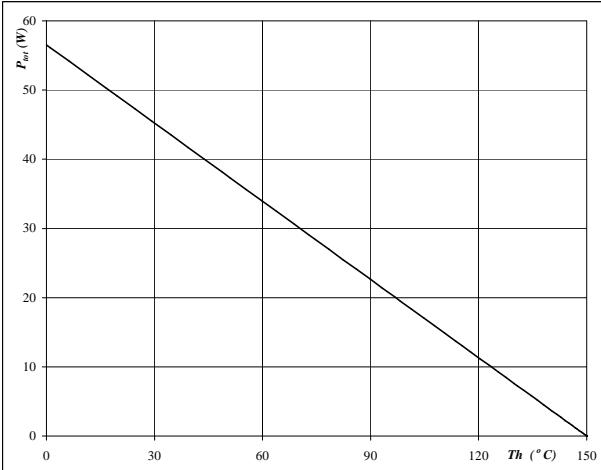
$$V_{GE} = 15 \text{ V}$$

Brake IGBT

Figure 15

Power dissipation as a function of heatsink temperature

$$P_{\text{tot}} = f(T_h)$$


At

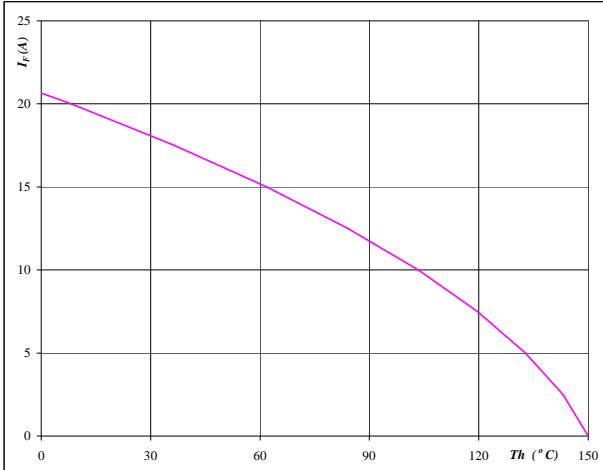
$$T_j = 150 \text{ } ^\circ\text{C}$$

Brake FWD

Figure 16

Forward current as a function of heatsink temperature

$$I_F = f(T_h)$$


At

$$T_j = 150 \text{ } ^\circ\text{C}$$

Brake FWD

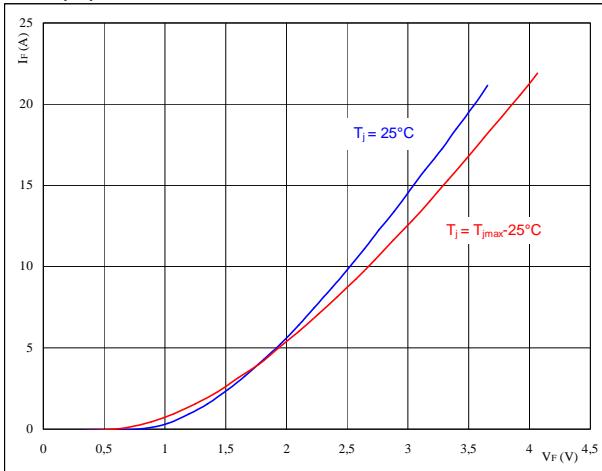
Brake Inverse Diode

Figure 1

Brake inverse diode

Typical diode forward current as a function of forward voltage

$$I_F = f(V_F)$$

**At**

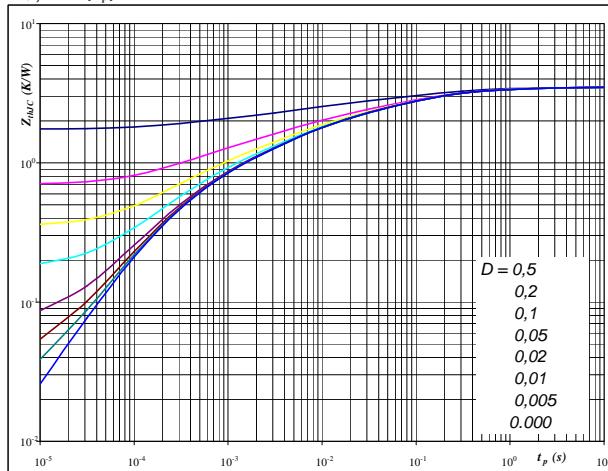
$$t_p = 250 \mu\text{s}$$

Figure 2

Brake inverse diode

Diode transient thermal impedance as a function of pulse width

$$Z_{thJH} = f(t_p)$$

**At**

$$D = t_p / T$$

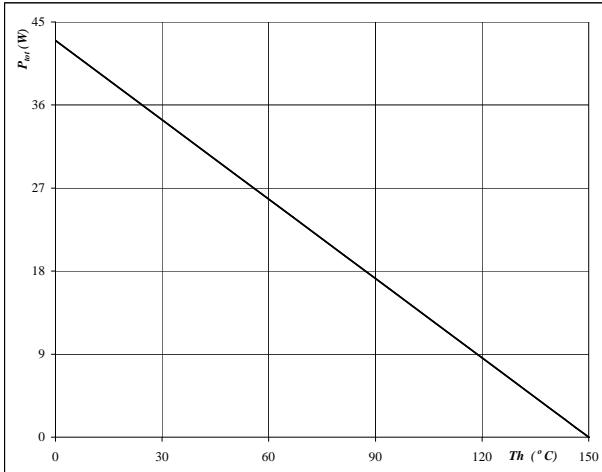
$$R_{thJH} = 3,49 \text{ K/W}$$

Figure 3

Brake inverse diode

Power dissipation as a function of heatsink temperature

$$P_{tot} = f(T_h)$$

**At**

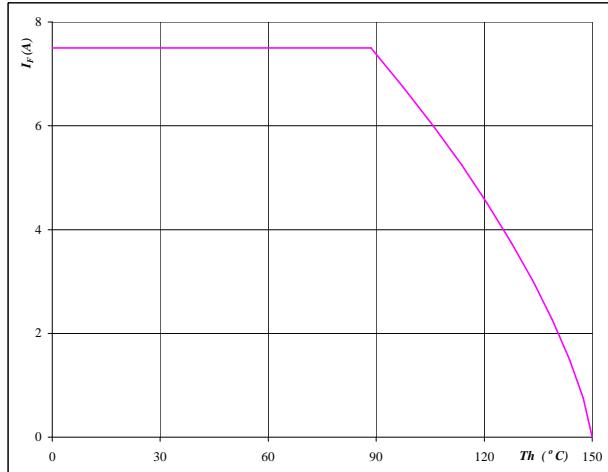
$$T_j = 150 \text{ °C}$$

Figure 4

Brake inverse diode

Forward current as a function of heatsink temperature

$$I_F = f(T_h)$$

**At**

$$T_j = 150 \text{ °C}$$

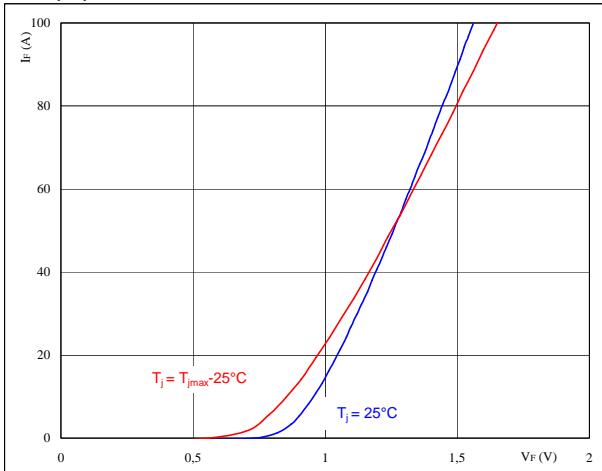
Input Rectifier Diode

Figure 1

Rectifier diode

Typical diode forward current as a function of forward voltage

$$I_F = f(V_F)$$

**At**

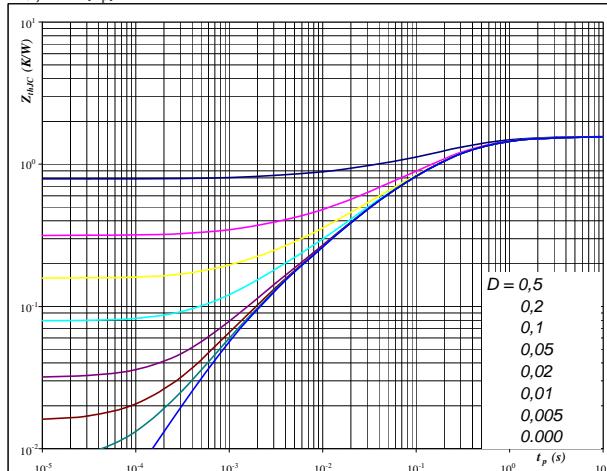
$$t_p = 250 \mu\text{s}$$

Figure 2

Rectifier diode

Diode transient thermal impedance as a function of pulse width

$$Z_{thH} = f(t_p)$$

**At**

$$D = t_p / T$$

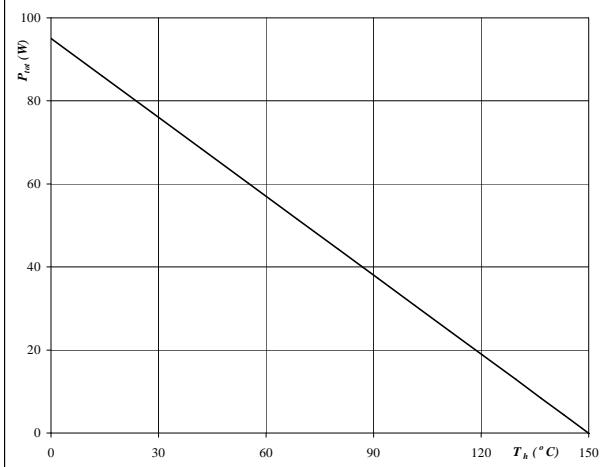
$$R_{thH} = 1,58 \text{ K/W}$$

Figure 3

Rectifier diode

Power dissipation as a function of heatsink temperature

$$P_{tot} = f(T_h)$$

**At**

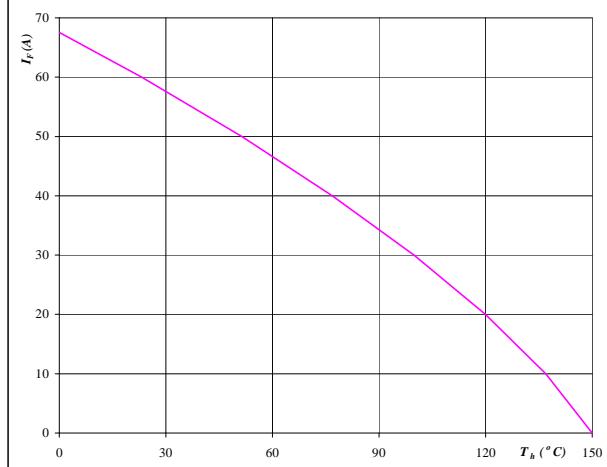
$$T_j = 150 ^\circ\text{C}$$

Figure 4

Rectifier diode

Forward current as a function of heatsink temperature

$$I_F = f(T_h)$$

**At**

$$T_j = 150 ^\circ\text{C}$$

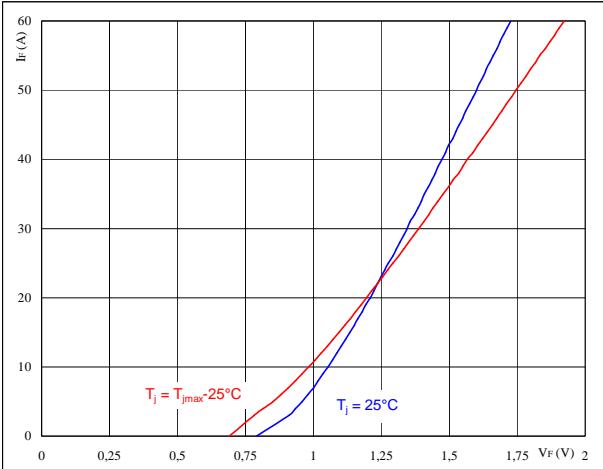
Thyristor

Figure 1

Thyristor

Typical thyristor forward current as a function of forward voltage

$$I_F = f(V_F)$$

**At**

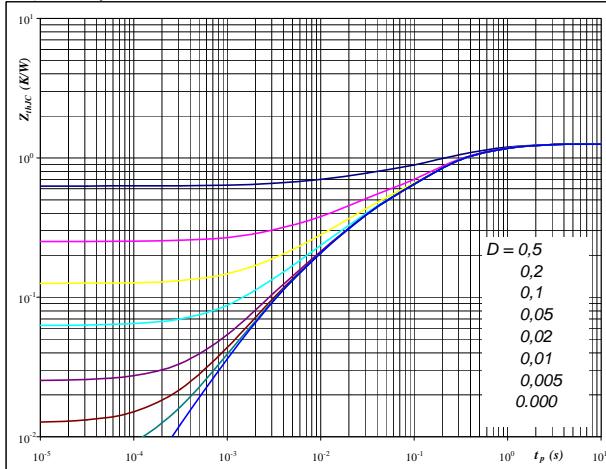
$$t_p = 250 \mu\text{s}$$

Figure 2

Thyristor

Thyristor transient thermal impedance as a function of pulse width

$$Z_{thjH} = f(t_p)$$

**At**

$$D = t_p / T$$

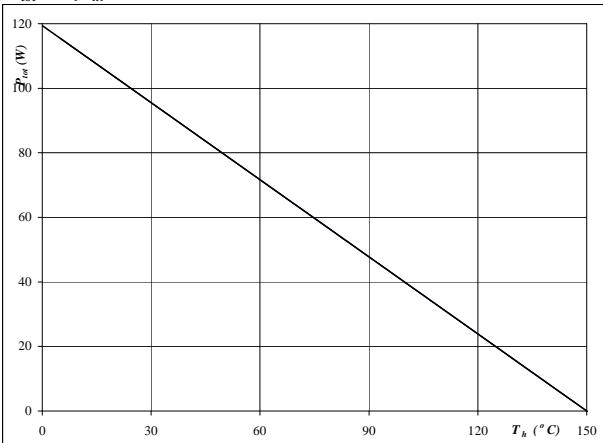
$$R_{thjH} = 1,26 \text{ K/W}$$

Figure 3

Thyristor

Power dissipation as a function of heatsink temperature

$$P_{tot} = f(T_h)$$

**At**

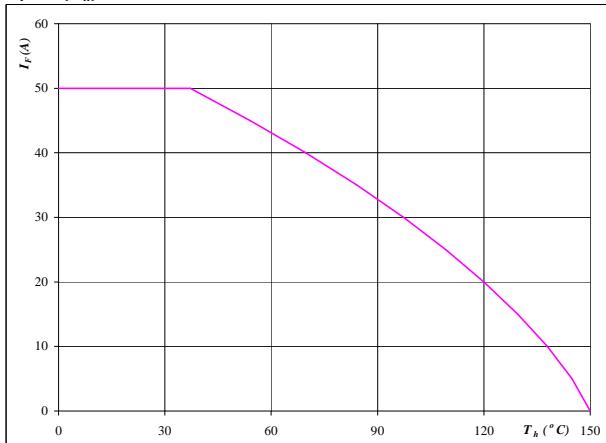
$$T_j = 150 ^\circ\text{C}$$

Figure 4

Thyristor

Forward current as a function of heatsink temperature

$$I_F = f(T_h)$$

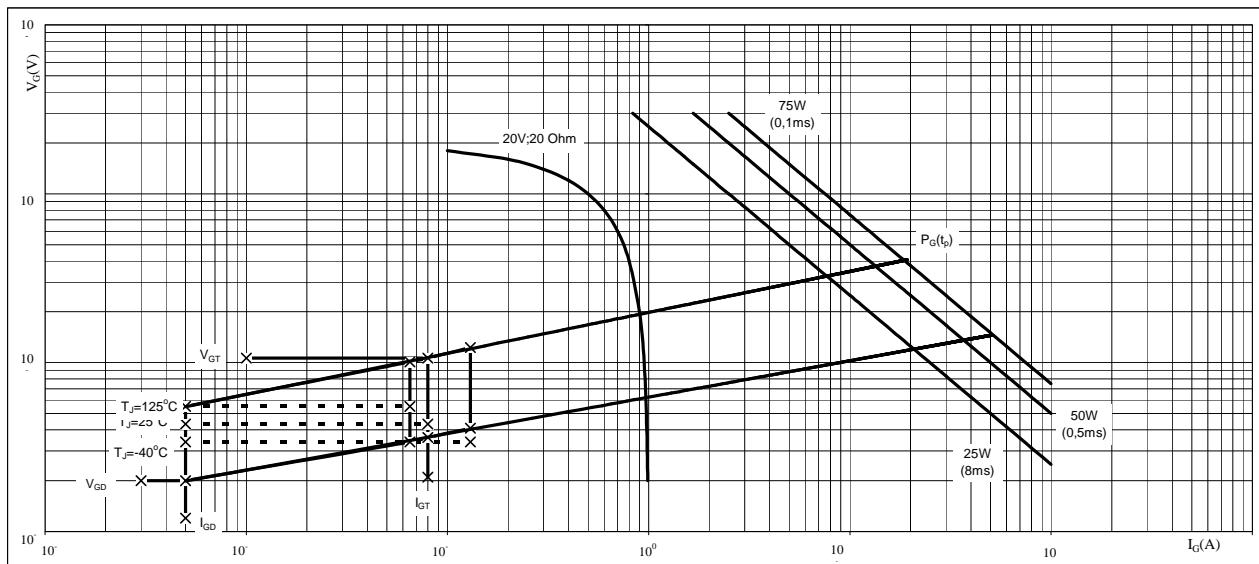
**At**

$$T_j = 150 ^\circ\text{C}$$

Thyristor

Figure 5
Gate trigger characteristics

Thyristor

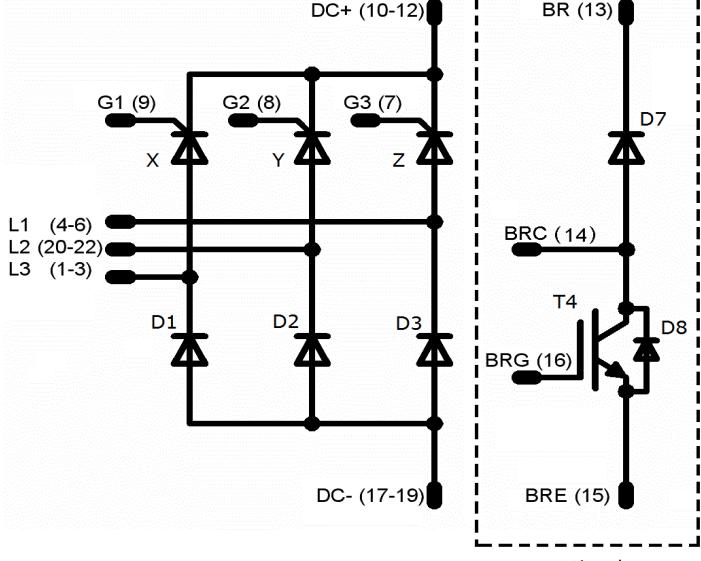


Ordering Code and Marking - Outline - Pinout

| Ordering Code & Marking | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|------------|----------|-----------|--|--------|-----------|----------|----|-----|--------|-----|------|----------|----|-------|------|---|----------|------------|--------|-----------|----------|-------|------|------|--|--|
| Version | | | | Ordering Code | | | | | | | | | | | | | | | | | | | | | | | |
| without thermal paste flow 90 1 housing | | | | V23990-P717-G-PM | | | | | | | | | | | | | | | | | | | | | | | |
| without thermal paste flow 90 1 housing half controlled | | | | V23990-P717-G10-PM | | | | | | | | | | | | | | | | | | | | | | | |
| without thermal paste flow 90 1 housing w/o BRC | | | | V23990-P717-H-PM | | | | | | | | | | | | | | | | | | | | | | | |
| without thermal paste flow 90 1 housing half controlled w/o BRC | | | | V23990-P717-H10-PM | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Text <table border="1"> <tr> <td>VIN</td> <td>Date code</td> <td>Name&Ver</td> <td>UL</td> <td>Lot</td> <td>Serial</td> </tr> <tr> <td>VIN</td> <td>WWYY</td> <td>NNNNNNVV</td> <td>UL</td> <td>LLLLL</td> <td>SSSS</td> </tr> </table> | VIN | Date code | Name&Ver | UL | Lot | Serial | VIN | WWYY | NNNNNNVV | UL | LLLLL | SSSS | Datamatrix <table border="1"> <tr> <td>Name&Ver</td> <td>Lot number</td> <td>Serial</td> <td>Date code</td> </tr> <tr> <td>NNNNNNVV</td> <td>LLLLL</td> <td>SSSS</td> <td>WWYY</td> </tr> </table> | Name&Ver | Lot number | Serial | Date code | NNNNNNVV | LLLLL | SSSS | WWYY | | |
| VIN | Date code | Name&Ver | UL | Lot | Serial | | | | | | | | | | | | | | | | | | | | | | |
| VIN | WWYY | NNNNNNVV | UL | LLLLL | SSSS | | | | | | | | | | | | | | | | | | | | | | |
| Name&Ver | Lot number | Serial | Date code | | | | | | | | | | | | | | | | | | | | | | | | |
| NNNNNNVV | LLLLL | SSSS | WWYY | | | | | | | | | | | | | | | | | | | | | | | | |

| Outline | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|------|---|----------|-----------------|---|---|----------|---|----|---|----|---|------|---|----|---|------|---|----|---|------|---|----|---|------|---|----|---|------|---|----|---|------|---|----|---|------|---|----|---|------|---|----|----|------|---|-----|----|------|---|-----|----|------|---|-----|----|-----|---|-----|----|---|---|-----|----|---|---|-----|----|---|---|-----|----|---|---|-----|----|-----|---|-----|----|------|---|-----|----|----|---|----|----|----|---|----|----|----|---|----|--|--|--|--|
| Pin table | | | | Outline Drawing | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Pin | X | Y | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 53 | 0 | L3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | 50,1 | 0 | L3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 47,2 | 0 | L3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 40,2 | 0 | L1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | 37,3 | 0 | L1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | 34,4 | 0 | L1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | 27,4 | 0 | G3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | 24,5 | 0 | G2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | 21,6 | 0 | G1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | 18,7 | 0 | DC+ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | 15,8 | 0 | DC+ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | 12,9 | 0 | DC+ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | 7,1 | 0 | Br+ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 | 0 | 0 | BrC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | 0 | 7 | BrE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | 3 | 7 | BrG | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17 | 7 | 7 | DC- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 | 9,9 | 7 | DC- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19 | 12,8 | 7 | DC- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | 44 | 7 | L2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21 | 47 | 7 | L2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 | 50 | 7 | L2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Ordering Code and Marking - Outline - Pinout

| Pinout | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-----------------|----|----|----|------------|------|-----------------|---|---|---|------|-------|---|----|----|----|--------|---------|---|----|----|----|------------|-------|---|----|----|----|--------|---------|---|----|----|----|------------|
|  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Type | Half controlled | X | Y | Z | Note | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P717G | - | D4 | D5 | D6 | diodes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P717G10 | x | T1 | T2 | T3 | thyristors | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P717H | - | D4 | D5 | D6 | diodes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P717H10 | x | T1 | T2 | T3 | thyristors | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Identification | | | | | |
|-------------------|-----------|---------|---------|---------------------------|---------|
| ID | Component | Voltage | Current | Function | Comment |
| D1,D2,D3,D4,D5,D6 | FWD | 1600 V | 42 A | Input Rectifier Diodes | |
| T1,T2,T3 | Thyristor | 1600 V | 45 A | Input Rectifier Thyristor | |
| T4 | IGBT | 1200 V | 25 A | Brake Switch | |
| D7 | FWD | 1200 V | 7,5 A | Brake Diode | |
| D8 | FWD | 1200 V | 3 A | Brake Inverse Diode | |



Vincotech

V23990-P717-*-PM

datasheet

| Packaging instruction | | | | | |
|-----------------------------------|----|------|----------|------|--------|
| Standard packaging quantity (SPQ) | 80 | >SPQ | Standard | <SPQ | Sample |

| Handling instruction | | | | | |
|---|--|--|--|--|--|
| Handling instructions for <i>flow</i> 90 1 packages see vincotech.com website. | | | | | |

| Package data | | | | | |
|--|--|--|--|--|--|
| Package data for <i>flow</i> 90 1 packages see vincotech.com website. | | | | | |

| UL recognition and file number | | | | | |
|--|--|--|--|--|---|
| This device is certified according to UL 1557 standard, UL file number E192116. For more information see vincotech.com website. | | | | |  |

| Document No.: | Date: | Modification: | Pages |
|----------------------|--------------|----------------------|--------------|
| V23990-P717-x-D4-14 | 19 May. 2016 | New brand | all |

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2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.