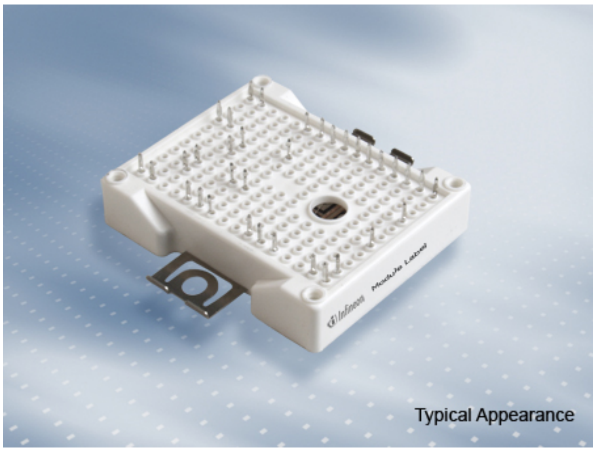
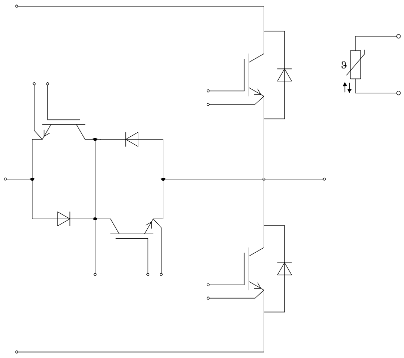
Technische Information / Technical Information

IGBT-Modul
IGBT-Module

# F3L200R12W2H3_B11

EasyPACK Modul mit aktiver "Neutral Point Clamp 2" Topologie und PressFIT / NTC
EasyPACK module with active "Neutral Point Clamp 2" topology and PressFIT / NTC



$V_{CES}$ = 1200V
$I_{C\ nom}$ = 100A / $I_{CRM}$ = 200A

**Typische Anwendungen**
- 3-Level-Applikationen
- Motorantriebe
- Solar Anwendungen
- USV-Systeme

**Typical Applications**
- 3-level-applications
- Motor drives
- Solar applications
- UPS systems

**Elektrische Eigenschaften**
- High Speed IGBT H3
- Niedrige Schaltverluste
- $T_{vj\ op}$ = 150°C

**Electrical Features**
- High speed IGBT H3
- Low switching losses
- $T_{vj\ op}$ = 150°C

**Mechanische Eigenschaften**
- 3 kV AC 1min Isolationsfestigkeit
- PressFIT Verbindungstechnik
- RoHS konform

**Mechanical Features**
- 3 kV AC 1min insulation
- PressFIT contact technology
- RoHS compliant

## Module Label Code

**Barcode Code 128**

00000123456000000000000

**DMX - Code**

| Content of the Code | Digit |
|---|---|
| Module Serial Number | 1 - 5 |
| Module Material Number | 6 - 11 |
| Production Order Number | 12 - 19 |
| Datecode (Production Year) | 20 - 21 |
| Datecode (Production Week) | 22 - 23 |

| | | |
|---|---|---|
| prepared by: CM | date of publication: 2016-04-04 | |
| approved by: AKDA | revision: V3.1 | UL approved (E83335) |

## IGBT, T1 / T4 / IGBT, T1 / T4

### Höchstzulässige Werte / Maximum Rated Values

| | | | | |
|---|---|---|---|---|
| Kollektor-Emitter-Sperrspannung<br>Collector-emitter voltage | $T_{vj}$ = 25°C | $V_{CES}$ | 1200 | V |
| Implementierter Kollektor-Strom<br>Implemented collector current | | $I_{CN}$ | 200 | A |
| Kollektor-Dauergleichstrom<br>Continuous DC collector current | $T_C$ = 100°C, $T_{vj\,max}$ = 175°C | $I_{C\,nom}$ | 100 | A |
| Periodischer Kollektor-Spitzenstrom<br>Repetitive peak collector current | $t_P$ = 1 ms | $I_{CRM}$ | 400 | A |
| Gesamt-Verlustleistung<br>Total power dissipation | $T_C$ = 25°C, $T_{vj\,max}$ = 175°C | $P_{tot}$ | 600 | W |
| Gate-Emitter-Spitzenspannung<br>Gate-emitter peak voltage | | $V_{GES}$ | +/-20 | V |

### Charakteristische Werte / Characteristic Values

| | | | | min. | typ. | max. | |
|---|---|---|---|---|---|---|---|
| Kollektor-Emitter-Sättigungsspannung<br>Collector-emitter saturation voltage | $I_C$ = 100 A, $V_{GE}$ = 15 V<br>$I_C$ = 100 A, $V_{GE}$ = 15 V<br>$I_C$ = 100 A, $V_{GE}$ = 15 V | $T_{vj}$ = 25°C<br>$T_{vj}$ = 125°C<br>$T_{vj}$ = 150°C | $V_{CE\,sat}$ | | 1,55<br>1,70<br>1,75 | 1,75 | V<br>V<br>V |
| Gate-Schwellenspannung<br>Gate threshold voltage | $I_C$ = 7,60 mA, $V_{CE}$ = $V_{GE}$, $T_{vj}$ = 25°C | | $V_{GEth}$ | 5,05 | 5,80 | 6,45 | V |
| Gateladung<br>Gate charge | $V_{GE}$ = -15 V ... +15 V | | $Q_G$ | | 1,60 | | µC |
| Interner Gatewiderstand<br>Internal gate resistor | $T_{vj}$ = 25°C | | $R_{Gint}$ | | 3,8 | | Ω |
| Eingangskapazität<br>Input capacitance | f = 1 MHz, $T_{vj}$ = 25°C, $V_{CE}$ = 25 V, $V_{GE}$ = 0 V | | $C_{ies}$ | | 11,5 | | nF |
| Rückwirkungskapazität<br>Reverse transfer capacitance | f = 1 MHz, $T_{vj}$ = 25°C, $V_{CE}$ = 25 V, $V_{GE}$ = 0 V | | $C_{res}$ | | 0,70 | | nF |
| Kollektor-Emitter-Reststrom<br>Collector-emitter cut-off current | $V_{CE}$ = 1200 V, $V_{GE}$ = 0 V, $T_{vj}$ = 25°C | | $I_{CES}$ | | | 1,0 | mA |
| Gate-Emitter-Reststrom<br>Gate-emitter leakage current | $V_{CE}$ = 0 V, $V_{GE}$ = 20 V, $T_{vj}$ = 25°C | | $I_{GES}$ | | | 100 | nA |
| Einschaltverzögerungszeit, induktive Last<br>Turn-on delay time, inductive load | $I_C$ = 100 A, $V_{CE}$ = 400 V<br>$V_{GE}$ = ±15 V<br>$R_{Gon}$ = 1,1 Ω | $T_{vj}$ = 25°C<br>$T_{vj}$ = 125°C<br>$T_{vj}$ = 150°C | $t_{d\,on}$ | | 0,14<br>0,155<br>0,16 | | µs<br>µs<br>µs |
| Anstiegszeit, induktive Last<br>Rise time, inductive load | $I_C$ = 100 A, $V_{CE}$ = 400 V<br>$V_{GE}$ = ±15 V<br>$R_{Gon}$ = 1,1 Ω | $T_{vj}$ = 25°C<br>$T_{vj}$ = 125°C<br>$T_{vj}$ = 150°C | $t_r$ | | 0,025<br>0,03<br>0,03 | | µs<br>µs<br>µs |
| Abschaltverzögerungszeit, induktive Last<br>Turn-off delay time, inductive load | $I_C$ = 100 A, $V_{CE}$ = 400 V<br>$V_{GE}$ = ±15 V<br>$R_{Goff}$ = 1,1 Ω | $T_{vj}$ = 25°C<br>$T_{vj}$ = 125°C<br>$T_{vj}$ = 150°C | $t_{d\,off}$ | | 0,32<br>0,40<br>0,42 | | µs<br>µs<br>µs |
| Fallzeit, induktive Last<br>Fall time, inductive load | $I_C$ = 100 A, $V_{CE}$ = 400 V<br>$V_{GE}$ = ±15 V<br>$R_{Goff}$ = 1,1 Ω | $T_{vj}$ = 25°C<br>$T_{vj}$ = 125°C<br>$T_{vj}$ = 150°C | $t_f$ | | 0,03<br>0,055<br>0,06 | | µs<br>µs<br>µs |
| Einschaltverlustenergie pro Puls<br>Turn-on energy loss per pulse | $I_C$ = 100 A, $V_{CE}$ = 400 V, $L_S$ = 25 nH<br>$V_{GE}$ = ±15 V, di/dt = 3700 A/µs ($T_{vj}$ = 150°C)<br>$R_{Gon}$ = 1,1 Ω | $T_{vj}$ = 25°C<br>$T_{vj}$ = 125°C<br>$T_{vj}$ = 150°C | $E_{on}$ | | 1,20<br>2,00<br>2,25 | | mJ<br>mJ<br>mJ |
| Abschaltverlustenergie pro Puls<br>Turn-off energy loss per pulse | $I_C$ = 100 A, $V_{CE}$ = 400 V, $L_S$ = 25 nH<br>$V_{GE}$ = ±15 V, du/dt = 2700 V/µs ($T_{vj}$ = 150°C)<br>$R_{Goff}$ = 1,1 Ω | $T_{vj}$ = 25°C<br>$T_{vj}$ = 125°C<br>$T_{vj}$ = 150°C | $E_{off}$ | | 3,50<br>5,30<br>5,90 | | mJ<br>mJ<br>mJ |
| Kurzschlußverhalten<br>SC data | $V_{GE}$ ≤ 15 V, $V_{CC}$ = 800 V<br>$V_{CEmax}$ = $V_{CES}$ -$L_{sCE}$ ·di/dt | $t_P$ ≤ 10 µs, $T_{vj}$ = 150°C | $I_{SC}$ | | 800 | | A |
| Wärmewiderstand, Chip bis Gehäuse<br>Thermal resistance, junction to case | pro IGBT / per IGBT | | $R_{thJC}$ | | 0,200 | 0,250 | K/W |

| | |
|---|---|
| prepared by: CM | date of publication: 2016-04-04 |
| approved by: AKDA | revision: V3.1 |

| | | | min. | typ. | max. | |
|---|---|---|---|---|---|---|
| Wärmewiderstand, Gehäuse bis Kühlkörper<br>Thermal resistance, case to heatsink | pro IGBT / per IGBT<br>$\lambda_{Paste}$ = 1 W/(m·K) / $\lambda_{grease}$ = 1 W/(m·K) | $R_{thCH}$ | | 0,200 | | K/W |
| Temperatur im Schaltbetrieb<br>Temperature under switching conditions | | $T_{vj\,op}$ | -40 | | 150 | °C |

## Diode, D2 / D3 / Diode, D2 / D3

### Höchstzulässige Werte / Maximum Rated Values

| | | | | |
|---|---|---|---|---|
| Periodische Spitzensperrspannung<br>Repetitive peak reverse voltage | $T_{vj}$ = 25°C | $V_{RRM}$ | 650 | V |
| Implementierter Durchlassstrom<br>Implemented forward current | | $I_{FN}$ | 125 | A |
| Dauergleichstrom<br>Continuous DC forward current | | $I_F$ | 100 | A |
| Periodischer Spitzenstrom<br>Repetitive peak forward current | $t_P$ = 1 ms | $I_{FRM}$ | 250 | A |
| Grenzlastintegral<br>I²t - value | $V_R$ = 0 V, $t_P$ = 10 ms, $T_{vj}$ = 125°C<br>$V_R$ = 0 V, $t_P$ = 10 ms, $T_{vj}$ = 150°C | $I^2t$ | 1450<br>1400 | A²s<br>A²s |

### Charakteristische Werte / Characteristic Values

| | | | | min. | typ. | max. | |
|---|---|---|---|---|---|---|---|
| Durchlassspannung<br>Forward voltage | $I_F$ = 100 A, $V_{GE}$ = 0 V<br>$I_F$ = 100 A, $V_{GE}$ = 0 V<br>$I_F$ = 100 A, $V_{GE}$ = 0 V | $T_{vj}$ = 25°C<br>$T_{vj}$ = 125°C<br>$T_{vj}$ = 150°C | $V_F$ | | 1,55<br>1,50<br>1,45 | 1,70 | V<br>V<br>V |
| Rückstromspitze<br>Peak reverse recovery current | $I_F$ = 100 A, - $di_F/dt$ = 3700 A/µs ($T_{vj}$=150°C)<br>$V_R$ = 400 V<br>$V_{GE}$ = -15 V | $T_{vj}$ = 25°C<br>$T_{vj}$ = 125°C<br>$T_{vj}$ = 150°C | $I_{RM}$ | | 90,0<br>100<br>100 | | A<br>A<br>A |
| Sperrverzögerungsladung<br>Recovered charge | $I_F$ = 100 A, - $di_F/dt$ = 3700 A/µs ($T_{vj}$=150°C)<br>$V_R$ = 400 V<br>$V_{GE}$ = -15 V | $T_{vj}$ = 25°C<br>$T_{vj}$ = 125°C<br>$T_{vj}$ = 150°C | $Q_r$ | | 3,25<br>5,90<br>6,40 | | µC<br>µC<br>µC |
| Abschaltenergie pro Puls<br>Reverse recovery energy | $I_F$ = 100 A, - $di_F/dt$ = 3700 A/µs ($T_{vj}$=150°C)<br>$V_R$ = 400 V<br>$V_{GE}$ = -15 V | $T_{vj}$ = 25°C<br>$T_{vj}$ = 125°C<br>$T_{vj}$ = 150°C | $E_{rec}$ | | 0,95<br>1,55<br>1,65 | | mJ<br>mJ<br>mJ |
| Wärmewiderstand, Chip bis Gehäuse<br>Thermal resistance, junction to case | pro Diode / per diode | | $R_{thJC}$ | | 0,550 | 0,650 | K/W |
| Wärmewiderstand, Gehäuse bis Kühlkörper<br>Thermal resistance, case to heatsink | pro Diode / per diode<br>$\lambda_{Paste}$ = 1 W/(m·K) / $\lambda_{grease}$ = 1 W/(m·K) | | $R_{thCH}$ | | 0,600 | | K/W |
| Temperatur im Schaltbetrieb<br>Temperature under switching conditions | | | $T_{vj\,op}$ | -40 | | 150 | °C |



| | |
|---|---|
| prepared by: CM | date of publication: 2016-04-04 |
| approved by: AKDA | revision: V3.1 |

## IGBT, T2 / T3 / IGBT, T2 / T3

### Höchstzulässige Werte / Maximum Rated Values

| | | | | |
|---|---|---|---|---|
| Kollektor-Emitter-Sperrspannung<br>Collector-emitter voltage | $T_{vj}$ = 25°C | $V_{CES}$ | 650 | V |
| Kollektor-Dauergleichstrom<br>Continuous DC collector current | $T_C$ = 100°C, $T_{vj\,max}$ = 175°C | $I_{C\,nom}$ | 100 | A |
| Periodischer Kollektor-Spitzenstrom<br>Repetitive peak collector current | $t_P$ = 1 ms | $I_{CRM}$ | 200 | A |
| Gesamt-Verlustleistung<br>Total power dissipation | $T_C$ = 25°C, $T_{vj\,max}$ = 175°C | $P_{tot}$ | 250 | W |
| Gate-Emitter-Spitzenspannung<br>Gate-emitter peak voltage | | $V_{GES}$ | +/-20 | V |

### Charakteristische Werte / Characteristic Values

| | | | | min. | typ. | max. | |
|---|---|---|---|---|---|---|---|
| Kollektor-Emitter-Sättigungsspannung<br>Collector-emitter saturation voltage | $I_C$ = 100 A, $V_{GE}$ = 15 V<br>$I_C$ = 100 A, $V_{GE}$ = 15 V<br>$I_C$ = 100 A, $V_{GE}$ = 15 V | $T_{vj}$ = 25°C<br>$T_{vj}$ = 125°C<br>$T_{vj}$ = 150°C | $V_{CE\,sat}$ | | 1,45<br>1,60<br>1,70 | 1,90 | V<br>V<br>V |
| Gate-Schwellenspannung<br>Gate threshold voltage | $I_C$ = 1,60 mA, $V_{CE}$ = $V_{GE}$, $T_{vj}$ = 25°C | | $V_{GEth}$ | 4,95 | 5,80 | 6,45 | V |
| Gateladung<br>Gate charge | $V_{GE}$ = -15 V ... +15 V | | $Q_G$ | | 1,00 | | µC |
| Interner Gatewiderstand<br>Internal gate resistor | $T_{vj}$ = 25°C | | $R_{Gint}$ | | 2,0 | | Ω |
| Eingangskapazität<br>Input capacitance | f = 1 MHz, $T_{vj}$ = 25°C, $V_{CE}$ = 25 V, $V_{GE}$ = 0 V | | $C_{ies}$ | | 6,20 | | nF |
| Rückwirkungskapazität<br>Reverse transfer capacitance | f = 1 MHz, $T_{vj}$ = 25°C, $V_{CE}$ = 25 V, $V_{GE}$ = 0 V | | $C_{res}$ | | 0,19 | | nF |
| Kollektor-Emitter-Reststrom<br>Collector-emitter cut-off current | $V_{CE}$ = 650 V, $V_{GE}$ = 0 V, $T_{vj}$ = 25°C | | $I_{CES}$ | | | 1,0 | mA |
| Gate-Emitter-Reststrom<br>Gate-emitter leakage current | $V_{CE}$ = 0 V, $V_{GE}$ = 20 V, $T_{vj}$ = 25°C | | $I_{GES}$ | | | 100 | nA |
| Einschaltverzögerungszeit, induktive Last<br>Turn-on delay time, inductive load | $I_C$ = 100 A, $V_{CE}$ = 400 V<br>$V_{GE}$ = ±15 V<br>$R_{Gon}$ = 3,3 Ω | $T_{vj}$ = 25°C<br>$T_{vj}$ = 125°C<br>$T_{vj}$ = 150°C | $t_{d\,on}$ | | 0,055<br>0,06<br>0,065 | | µs<br>µs<br>µs |
| Anstiegszeit, induktive Last<br>Rise time, inductive load | $I_C$ = 100 A, $V_{CE}$ = 400 V<br>$V_{GE}$ = ±15 V<br>$R_{Gon}$ = 3,3 Ω | $T_{vj}$ = 25°C<br>$T_{vj}$ = 125°C<br>$T_{vj}$ = 150°C | $t_r$ | | 0,025<br>0,03<br>0,03 | | µs<br>µs<br>µs |
| Abschaltverzögerungszeit, induktive Last<br>Turn-off delay time, inductive load | $I_C$ = 100 A, $V_{CE}$ = 400 V<br>$V_{GE}$ = ±15 V<br>$R_{Goff}$ = 3,3 Ω | $T_{vj}$ = 25°C<br>$T_{vj}$ = 125°C<br>$T_{vj}$ = 150°C | $t_{d\,off}$ | | 0,25<br>0,27<br>0,28 | | µs<br>µs<br>µs |
| Fallzeit, induktive Last<br>Fall time, inductive load | $I_C$ = 100 A, $V_{CE}$ = 400 V<br>$V_{GE}$ = ±15 V<br>$R_{Goff}$ = 3,3 Ω | $T_{vj}$ = 25°C<br>$T_{vj}$ = 125°C<br>$T_{vj}$ = 150°C | $t_f$ | | 0,035<br>0,05<br>0,06 | | µs<br>µs<br>µs |
| Einschaltverlustenergie pro Puls<br>Turn-on energy loss per pulse | $I_C$ = 100 A, $V_{CE}$ = 400 V, $L_S$ = 25 nH<br>$V_{GE}$ = ±15 V, di/dt = 3800 A/µs ($T_{vj}$ = 150°C)<br>$R_{Gon}$ = 3,3 Ω | $T_{vj}$ = 25°C<br>$T_{vj}$ = 125°C<br>$T_{vj}$ = 150°C | $E_{on}$ | | 1,85<br>2,80<br>3,30 | | mJ<br>mJ<br>mJ |
| Abschaltverlustenergie pro Puls<br>Turn-off energy loss per pulse | $I_C$ = 100 A, $V_{CE}$ = 400 V, $L_S$ = 25 nH<br>$V_{GE}$ = ±15 V, du/dt = 4600 V/µs ($T_{vj}$ = 150°C)<br>$R_{Goff}$ = 3,3 Ω | $T_{vj}$ = 25°C<br>$T_{vj}$ = 125°C<br>$T_{vj}$ = 150°C | $E_{off}$ | | 3,10<br>4,10<br>4,60 | | mJ<br>mJ<br>mJ |
| Kurzschlußverhalten<br>SC data | $V_{GE} \leq$ 15 V, $V_{CC}$ = 360 V<br>$V_{CEmax}$ = $V_{CES}$ -$L_{sCE}$ ·di/dt | $t_P \leq$ 8 µs, $T_{vj}$ = 25°C<br>$t_P \leq$ 6 µs, $T_{vj}$ = 150°C | $I_{SC}$ | | 700<br>500 | | A<br>A |
| Wärmewiderstand, Chip bis Gehäuse<br>Thermal resistance, junction to case | pro IGBT / per IGBT | | $R_{thJC}$ | | 0,500 | 0,600 | K/W |
| Wärmewiderstand, Gehäuse bis Kühlkörper<br>Thermal resistance, case to heatsink | pro IGBT / per IGBT<br>$\lambda_{Paste}$ = 1 W/(m·K) / $\lambda_{grease}$ = 1 W/(m·K) | | $R_{thCH}$ | | 0,500 | | K/W |
| Temperatur im Schaltbetrieb<br>Temperature under switching conditions | | | $T_{vj\,op}$ | -40 | | 150 | °C |

| | |
|---|---|
| prepared by: CM | date of publication: 2016-04-04 |
| approved by: AKDA | revision: V3.1 |

## Diode, D1 / D4 / Diode, D1 / D4

### Höchstzulässige Werte / Maximum Rated Values

| | | | | |
|---|---|---|---|---|
| Periodische Spitzensperrspannung<br>Repetitive peak reverse voltage | $T_{vj}$ = 25°C | $V_{RRM}$ | 1200 | V |
| Dauergleichstrom<br>Continuous DC forward current | | $I_F$ | 75 | A |
| Periodischer Spitzenstrom<br>Repetitive peak forward current | $t_P$ = 1 ms | $I_{FRM}$ | 150 | A |
| Grenzlastintegral<br>I²t - value | $V_R$ = 0 V, $t_P$ = 10 ms, $T_{vj}$ = 125°C<br>$V_R$ = 0 V, $t_P$ = 10 ms, $T_{vj}$ = 150°C | I²t | 1050<br>985 | A²s<br>A²s |

### Charakteristische Werte / Characteristic Values

| | | | | min. | typ. | max. | |
|---|---|---|---|---|---|---|---|
| Durchlassspannung<br>Forward voltage | $I_F$ = 75 A, $V_{GE}$ = 0 V<br>$I_F$ = 75 A, $V_{GE}$ = 0 V<br>$I_F$ = 75 A, $V_{GE}$ = 0 V | $T_{vj}$ = 25°C<br>$T_{vj}$ = 125°C<br>$T_{vj}$ = 150°C | $V_F$ | | 1,65<br>1,65<br>1,65 | 2,15 | V<br>V<br>V |
| Rückstromspitze<br>Peak reverse recovery current | $I_F$ = 75 A, - $di_F/dt$ = 3500 A/µs ($T_{vj}$=150°C)<br>$V_R$ = 400 V<br>$V_{GE}$ = -15 V | $T_{vj}$ = 25°C<br>$T_{vj}$ = 125°C<br>$T_{vj}$ = 150°C | $I_{RM}$ | | 120<br>140<br>150 | | A<br>A<br>A |
| Sperrverzögerungsladung<br>Recovered charge | $I_F$ = 75 A, - $di_F/dt$ = 3500 A/µs ($T_{vj}$=150°C)<br>$V_R$ = 400 V<br>$V_{GE}$ = -15 V | $T_{vj}$ = 25°C<br>$T_{vj}$ = 125°C<br>$T_{vj}$ = 150°C | $Q_r$ | | 8,50<br>17,0<br>19,0 | | µC<br>µC<br>µC |
| Abschaltenergie pro Puls<br>Reverse recovery energy | $I_F$ = 75 A, - $di_F/dt$ = 3500 A/µs ($T_{vj}$=150°C)<br>$V_R$ = 400 V<br>$V_{GE}$ = -15 V | $T_{vj}$ = 25°C<br>$T_{vj}$ = 125°C<br>$T_{vj}$ = 150°C | $E_{rec}$ | | 2,85<br>5,70<br>6,30 | | mJ<br>mJ<br>mJ |
| Wärmewiderstand, Chip bis Gehäuse<br>Thermal resistance, junction to case | pro Diode / per diode | | $R_{thJC}$ | | 0,550 | 0,600 | K/W |
| Wärmewiderstand, Gehäuse bis Kühlkörper<br>Thermal resistance, case to heatsink | pro Diode / per diode<br>$\lambda_{Paste}$ = 1 W/(m·K) / $\lambda_{grease}$ = 1 W/(m·K) | | $R_{thCH}$ | | 0,500 | | K/W |
| Temperatur im Schaltbetrieb<br>Temperature under switching conditions | | | $T_{vj\ op}$ | -40 | | 150 | °C |

## Modul / Module

| | | | | |
|---|---|---|---|---|
| Isolations-Prüfspannung<br>Isolation test voltage | RMS, f = 50 Hz, t = 1 min. | $V_{ISOL}$ | 3,0 | kV |
| Innere Isolation<br>Internal isolation | Basisisolierung (Schutzklasse 1, EN61140)<br>basic insulation (class 1, IEC 61140) | | $Al_2O_3$ | |
| Kriechstrecke<br>Creepage distance | Kontakt - Kühlkörper / terminal to heatsink<br>Kontakt - Kontakt / terminal to terminal | | 11,5<br>6,3 | mm |
| Luftstrecke<br>Clearance | Kontakt - Kühlkörper / terminal to heatsink<br>Kontakt - Kontakt / terminal to terminal | | 10,0<br>5,0 | mm |
| Vergleichszahl der Kriechwegbildung<br>Comperative tracking index | | CTI | > 200 | |

| | | | min. | typ. | max. | |
|---|---|---|---|---|---|---|
| Modulstreuinduktivität<br>Stray inductance module | | $L_{sCE}$ | | 14 | | nH |
| Lagertemperatur<br>Storage temperature | | $T_{stg}$ | -40 | | 125 | °C |
| Anpresskraft für mech. Bef. pro Feder<br>mountig force per clamp | | F | 40 | - | 80 | N |
| Gewicht<br>Weight | | G | | 36 | | g |

Der Strom im Dauerbetrieb ist auf 25A effektiv pro Anschlusspin begrenzt.
The current under continuous operation is limited to 25A rms per connector pin.

| | |
|---|---|
| prepared by: CM | date of publication: 2016-04-04 |
| approved by: AKDA | revision: V3.1 |

## NTC-Widerstand / NTC-Thermistor

### Charakteristische Werte / Characteristic Values

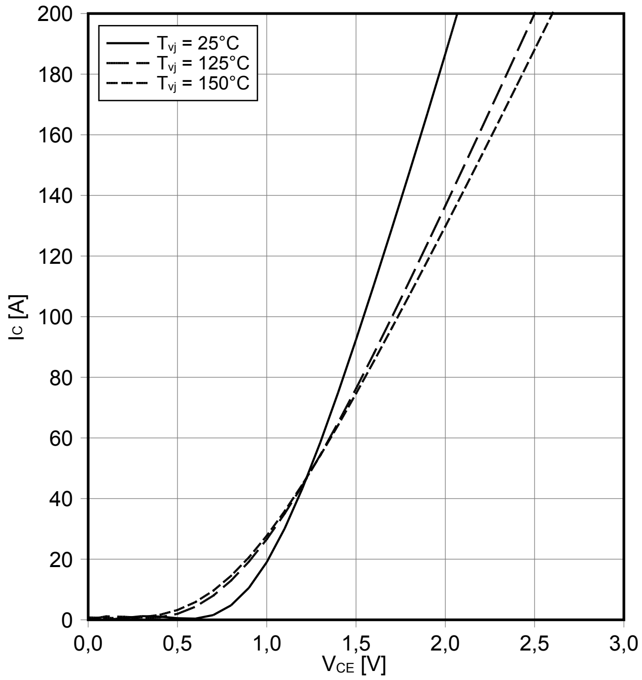
| | | | min. | typ. | max. | |
|---|---|---|---|---|---|---|
| Nennwiderstand<br>Rated resistance | $T_{NTC}$ = 25°C | $R_{25}$ | | 5,00 | | kΩ |
| Abweichung von R100<br>Deviation of R100 | $T_{NTC}$ = 100°C, $R_{100}$ = 493 Ω | ΔR/R | -5 | | 5 | % |
| Verlustleistung<br>Power dissipation | $T_{NTC}$ = 25°C | $P_{25}$ | | | 20,0 | mW |
| B-Wert<br>B-value | $R_2 = R_{25} \exp [B_{25/50}(1/T_2 - 1/(298,15\ K))]$ | $B_{25/50}$ | | 3375 | | K |
| B-Wert<br>B-value | $R_2 = R_{25} \exp [B_{25/80}(1/T_2 - 1/(298,15\ K))]$ | $B_{25/80}$ | | 3411 | | K |
| B-Wert<br>B-value | $R_2 = R_{25} \exp [B_{25/100}(1/T_2 - 1/(298,15\ K))]$ | $B_{25/100}$ | | 3433 | | K |

Angaben gemäß gültiger Application Note.
Specification according to the valid application note.

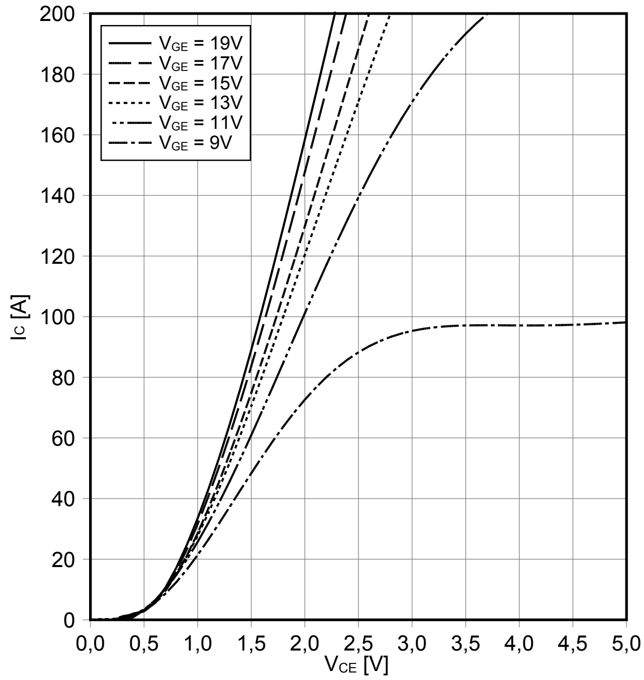


| | |
|---|---|
| prepared by: CM | date of publication: 2016-04-04 |
| approved by: AKDA | revision: V3.1 |

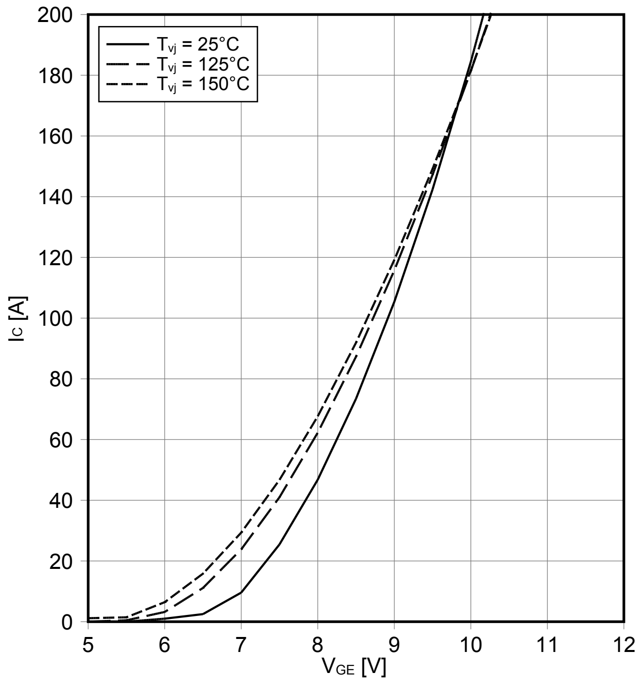
**Ausgangskennlinie IGBT, T1 / T4 (typisch)**
**output characteristic IGBT, T1 / T4 (typical)**
$I_C = f(V_{CE})$
$V_{GE} = 15$ V



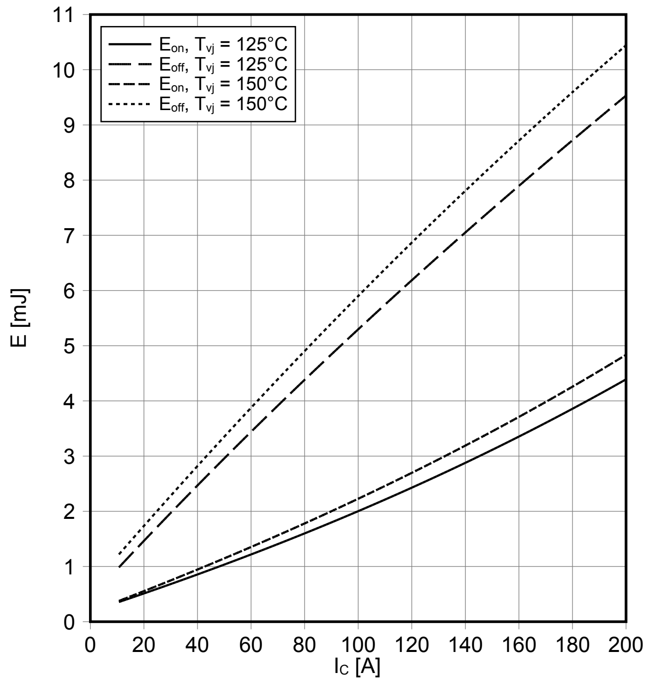

**Ausgangskennlinienfeld IGBT, T1 / T4 (typisch)**
**output characteristic IGBT, T1 / T4 (typical)**
$I_C = f(V_{CE})$
$T_{vj} = 150°C$




**Übertragungscharakteristik IGBT, T1 / T4 (typisch)**
**transfer characteristic IGBT, T1 / T4 (typical)**
$I_C = f(V_{GE})$
$V_{CE} = 20$ V

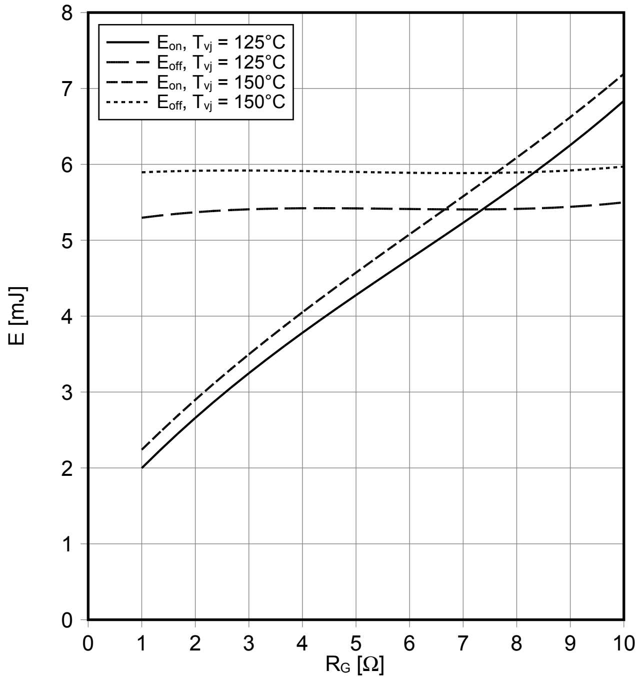



**Schaltverluste IGBT, T1 / T4 (typisch)**
**switching losses IGBT, T1 / T4 (typical)**
$E_{on} = f(I_C)$, $E_{off} = f(I_C)$
$V_{GE} = \pm15$ V, $R_{Gon} = 1.1\ \Omega$, $R_{Goff} = 1.1\ \Omega$, $V_{CE} = 400$ V

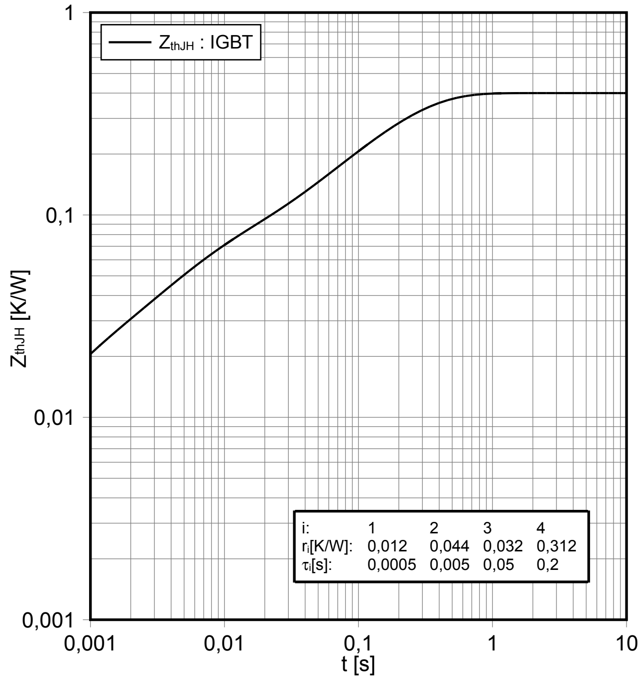



| | |
|---|---|
| prepared by: CM | date of publication: 2016-04-04 |
| approved by: AKDA | revision: V3.1 |

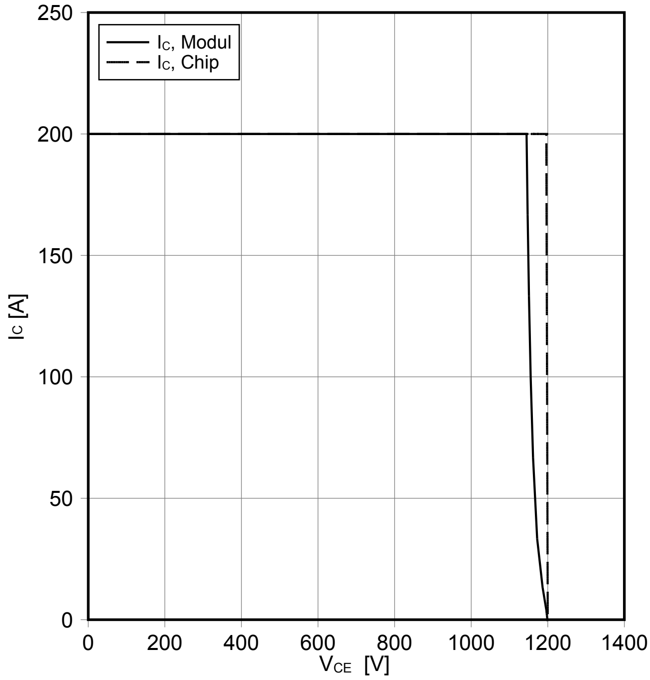
**Schaltverluste IGBT, T1 / T4 (typisch)**
**switching losses IGBT, T1 / T4 (typical)**
$E_{on} = f(R_G)$, $E_{off} = f(R_G)$
$V_{GE} = \pm 15$ V, $I_C = 100$ A, $V_{CE} = 400$ V



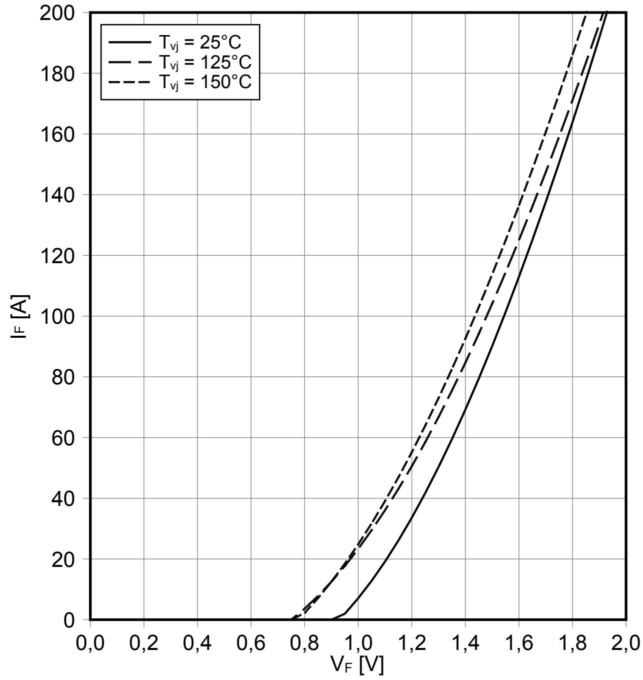

**Transienter Wärmewiderstand IGBT, T1 / T4**
**transient thermal impedance IGBT, T1 / T4**
$Z_{thJH} = f(t)$




**Sicherer Rückwärts-Arbeitsbereich IGBT, T1 / T4 (RBSOA)**
**reverse bias safe operating area IGBT, T1 / T4 (RBSOA)**
$I_C = f(V_{CE})$
$V_{GE} = \pm 15$ V, $R_{Goff} = 1.1\ \Omega$, $T_{vj} = 150$°C

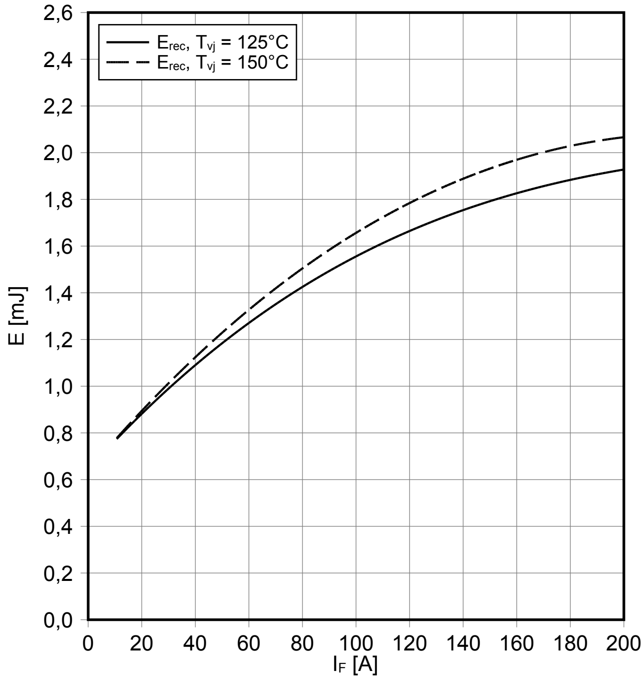



**Durchlasskennlinie der Diode, D2 / D3 (typisch)**
**forward characteristic of Diode, D2 / D3 (typical)**
$I_F = f(V_F)$

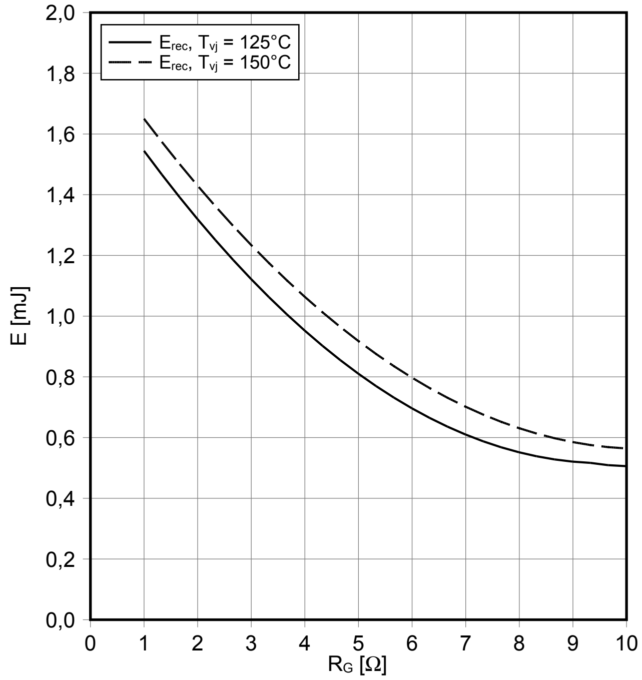



| | |
|---|---|
| prepared by: CM | date of publication: 2016-04-04 |
| approved by: AKDA | revision: V3.1 |

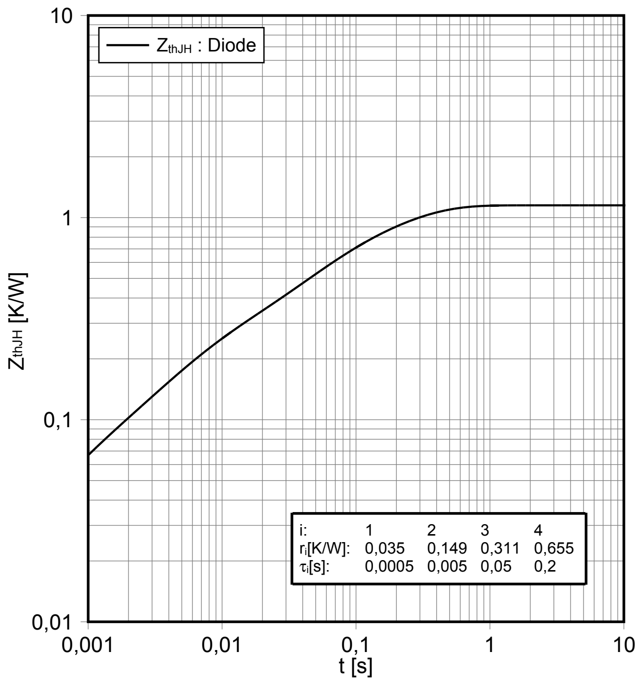
**Schaltverluste Diode, D2 / D3 (typisch)**
**switching losses Diode, D2 / D3 (typical)**
$E_{rec} = f(I_F)$
$R_{Gon} = 1.1\ \Omega$, $V_{CE} = 400$ V




**Schaltverluste Diode, D2 / D3 (typisch)**
**switching losses Diode, D2 / D3 (typical)**
$E_{rec} = f(R_G)$
$I_F = 100$ A, $V_{CE} = 400$ V

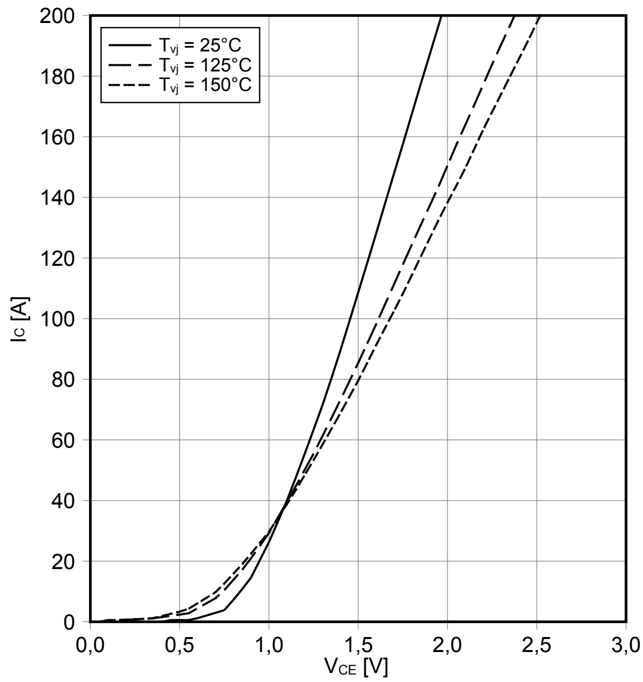



**Transienter Wärmewiderstand Diode, D2 / D3**
**transient thermal impedance Diode, D2 / D3**
$Z_{thJH} = f(t)$



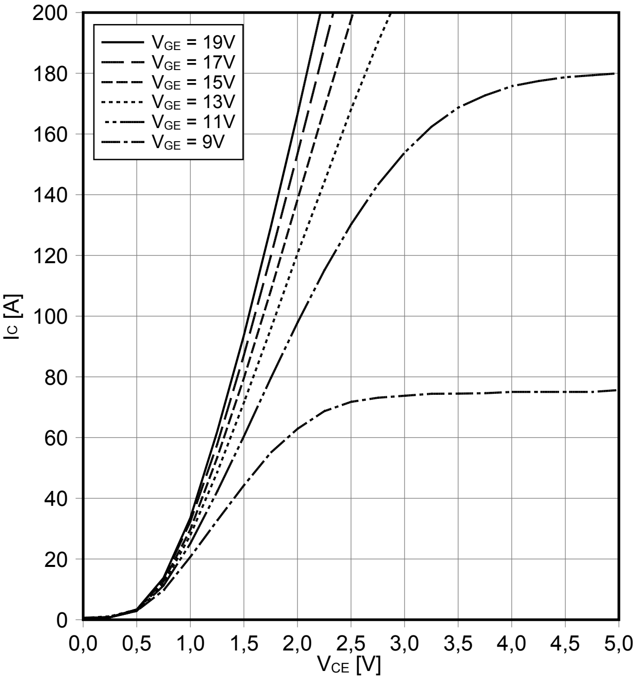

| i: | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| $r_i$[K/W]: | 0,035 | 0,149 | 0,311 | 0,655 |
| $\tau_i$[s]: | 0,0005 | 0,005 | 0,05 | 0,2 |

**Ausgangskennlinie IGBT, T2 / T3 (typisch)**
**output characteristic IGBT, T2 / T3 (typical)**
$I_C = f(V_{CE})$
$V_{GE} = 15$ V

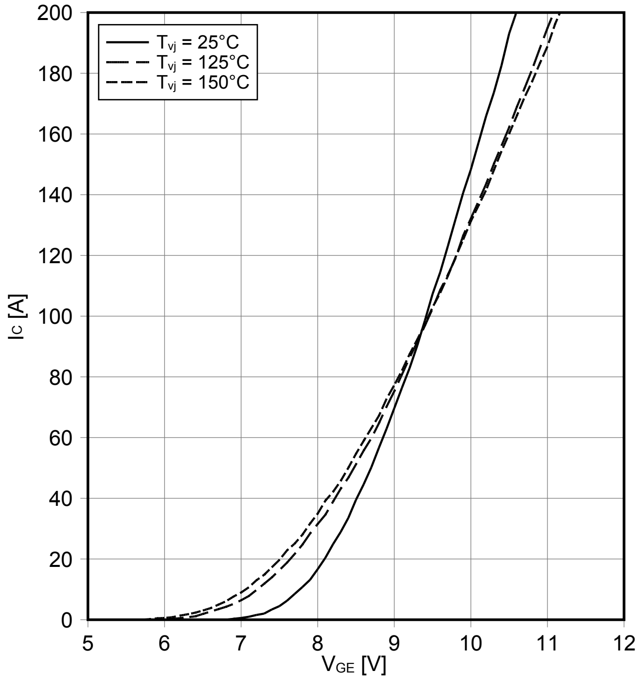



| prepared by: CM | date of publication: 2016-04-04 |
|---|---|
| approved by: AKDA | revision: V3.1 |

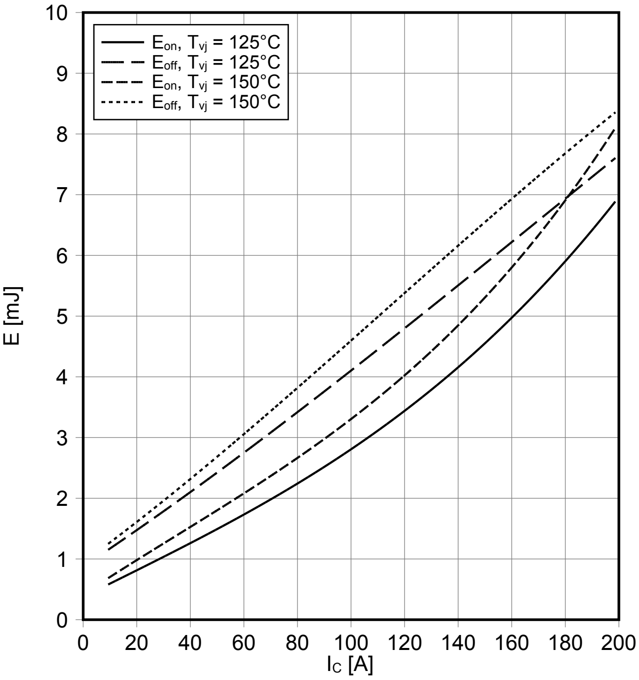
**Ausgangskennlinienfeld IGBT, T2 / T3 (typisch)**
**output characteristic IGBT, T2 / T3 (typical)**
$I_C = f(V_{CE})$
$T_{vj} = 150°C$



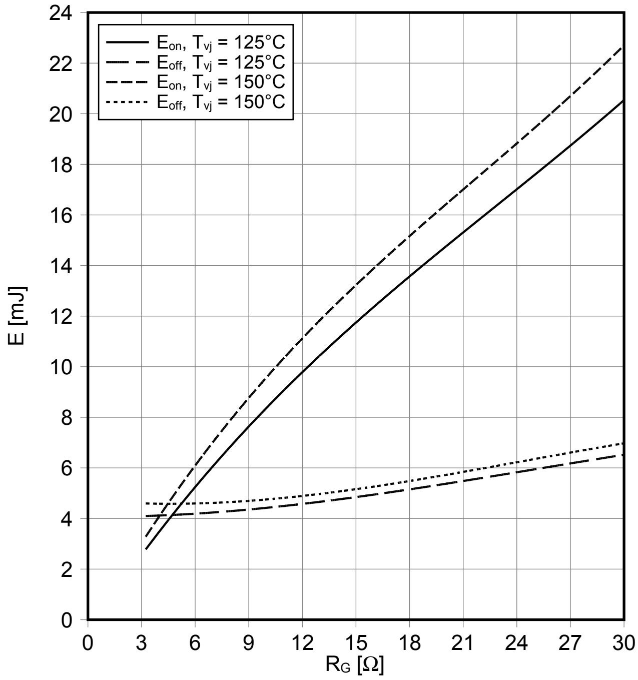

**Übertragungscharakteristik IGBT, T2 / T3 (typisch)**
**transfer characteristic IGBT, T2 / T3 (typical)**
$I_C = f(V_{GE})$
$V_{CE} = 20\ V$




**Schaltverluste IGBT, T2 / T3 (typisch)**
**switching losses IGBT, T2 / T3 (typical)**
$E_{on} = f(I_C)$, $E_{off} = f(I_C)$
$V_{GE} = \pm15\ V$, $R_{Gon} = 3.3\ \Omega$, $R_{Goff} = 3.3\ \Omega$, $V_{CE} = 400\ V$

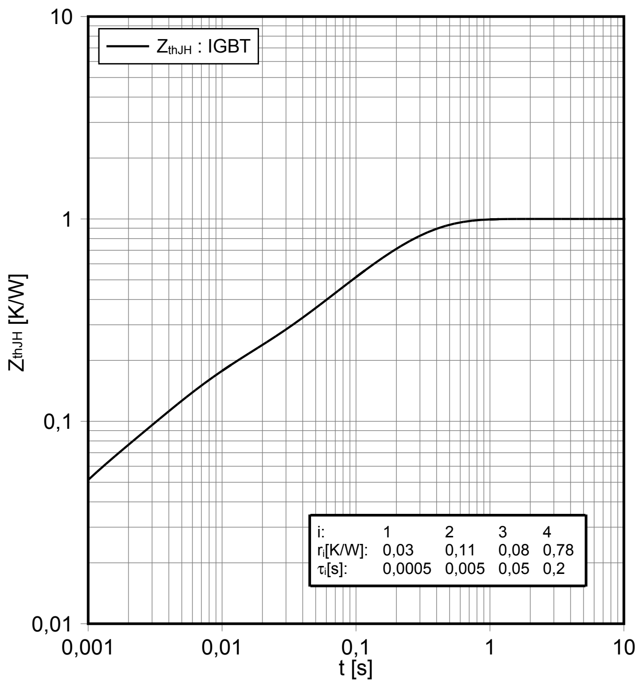



**Schaltverluste IGBT, T2 / T3 (typisch)**
**switching losses IGBT, T2 / T3 (typical)**
$E_{on} = f(R_G)$, $E_{off} = f(R_G)$
$V_{GE} = \pm15\ V$, $I_C = 100\ A$, $V_{CE} = 400\ V$

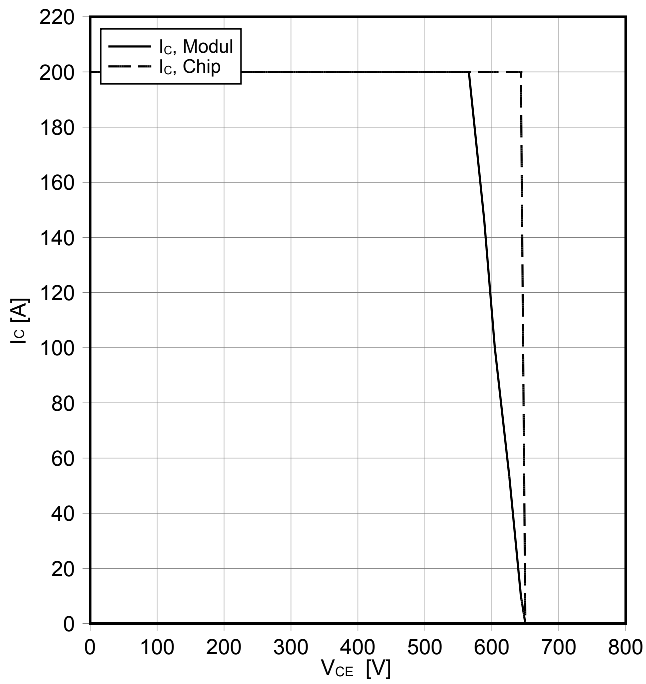



| prepared by: CM | date of publication: 2016-04-04 |
| --- | --- |
| approved by: AKDA | revision: V3.1 |

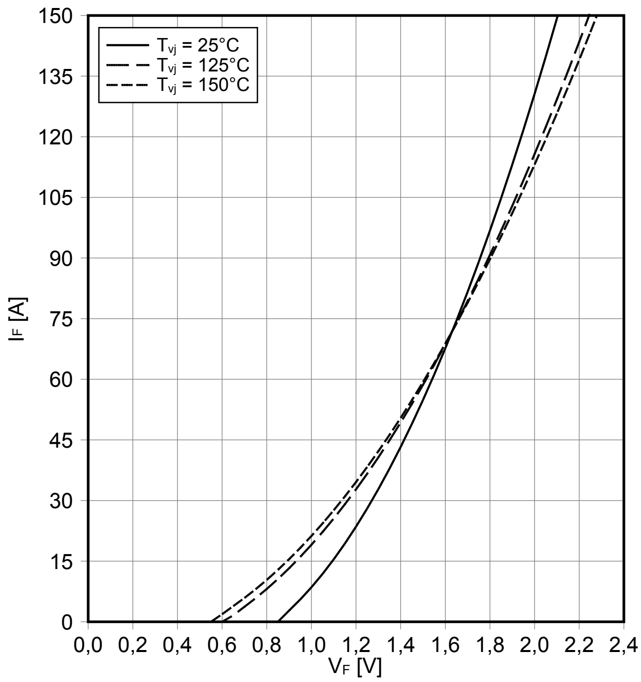
**Transienter Wärmewiderstand IGBT, T2 / T3**
**transient thermal impedance IGBT, T2 / T3**
$Z_{thJH} = f(t)$



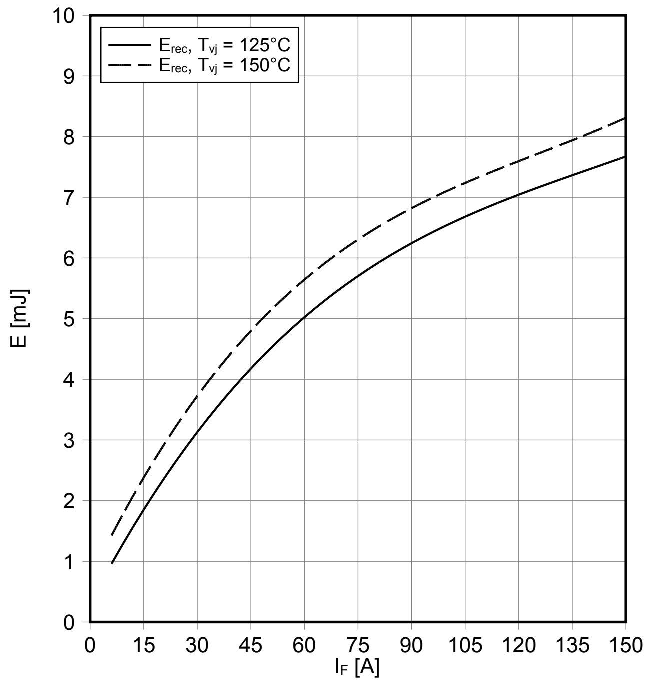

**Sicherer Rückwärts-Arbeitsbereich IGBT, T2 / T3 (RBSOA)**
**reverse bias safe operating area IGBT, T2 / T3 (RBSOA)**
$I_C = f(V_{CE})$
$V_{GE} = \pm 15$ V, $R_{Goff} = 3.3\ \Omega$, $T_{vj} = 150°C$




**Durchlasskennlinie der Diode, D1 / D4 (typisch)**
**forward characteristic of Diode, D1 / D4 (typical)**
$I_F = f(V_F)$

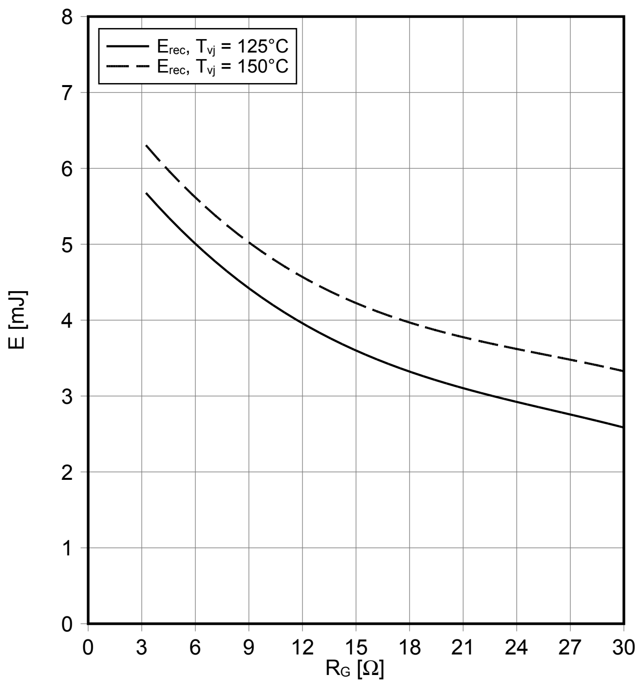



**Schaltverluste Diode, D1 / D4 (typisch)**
**switching losses Diode, D1 / D4 (typical)**
$E_{rec} = f(I_F)$
$R_{Gon} = 3.3\ \Omega$, $V_{CE} = 400$ V

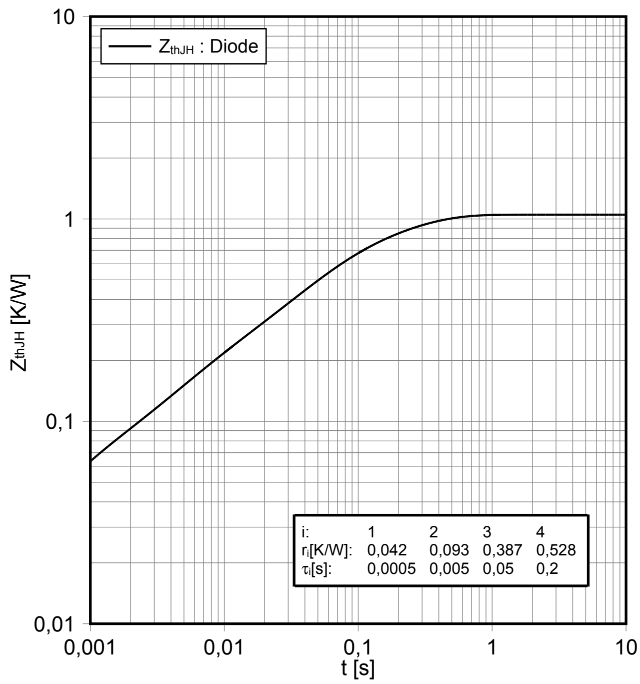



| | |
|---|---|
| prepared by: CM | date of publication: 2016-04-04 |
| approved by: AKDA | revision: V3.1 |

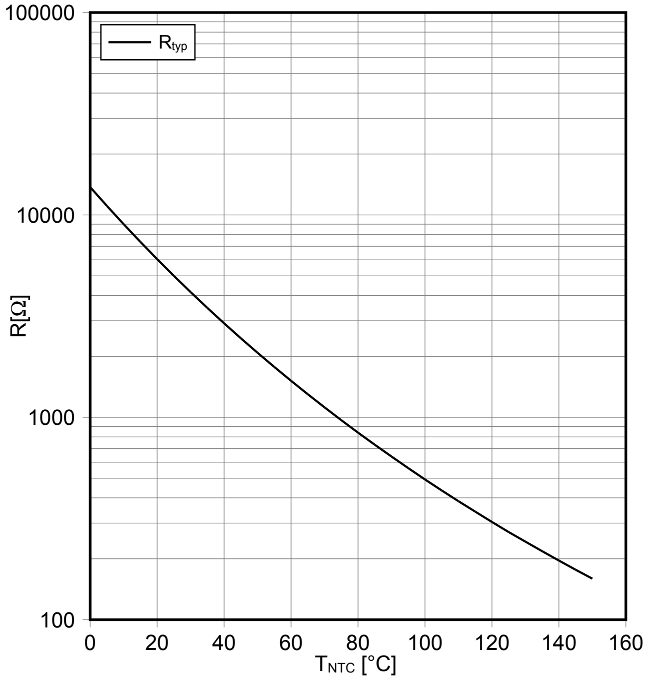
**Schaltverluste Diode, D1 / D4 (typisch)**
**switching losses Diode, D1 / D4 (typical)**
$E_{rec} = f(R_G)$
$I_F = 75$ A, $V_{CE} = 400$ V




**Transienter Wärmewiderstand Diode, D1 / D4**
**transient thermal impedance Diode, D1 / D4**
$Z_{thJH} = f(t)$

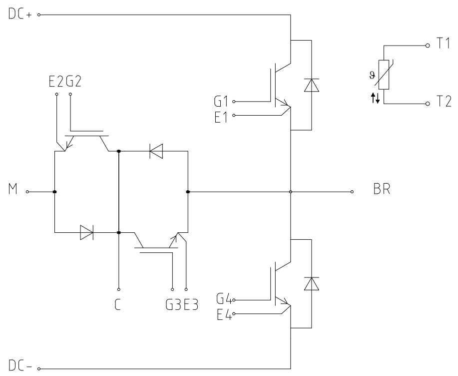



**NTC-Widerstand-Temperaturkennlinie (typisch)**
**NTC-Thermistor-temperature characteristic (typical)**
R = f (T)

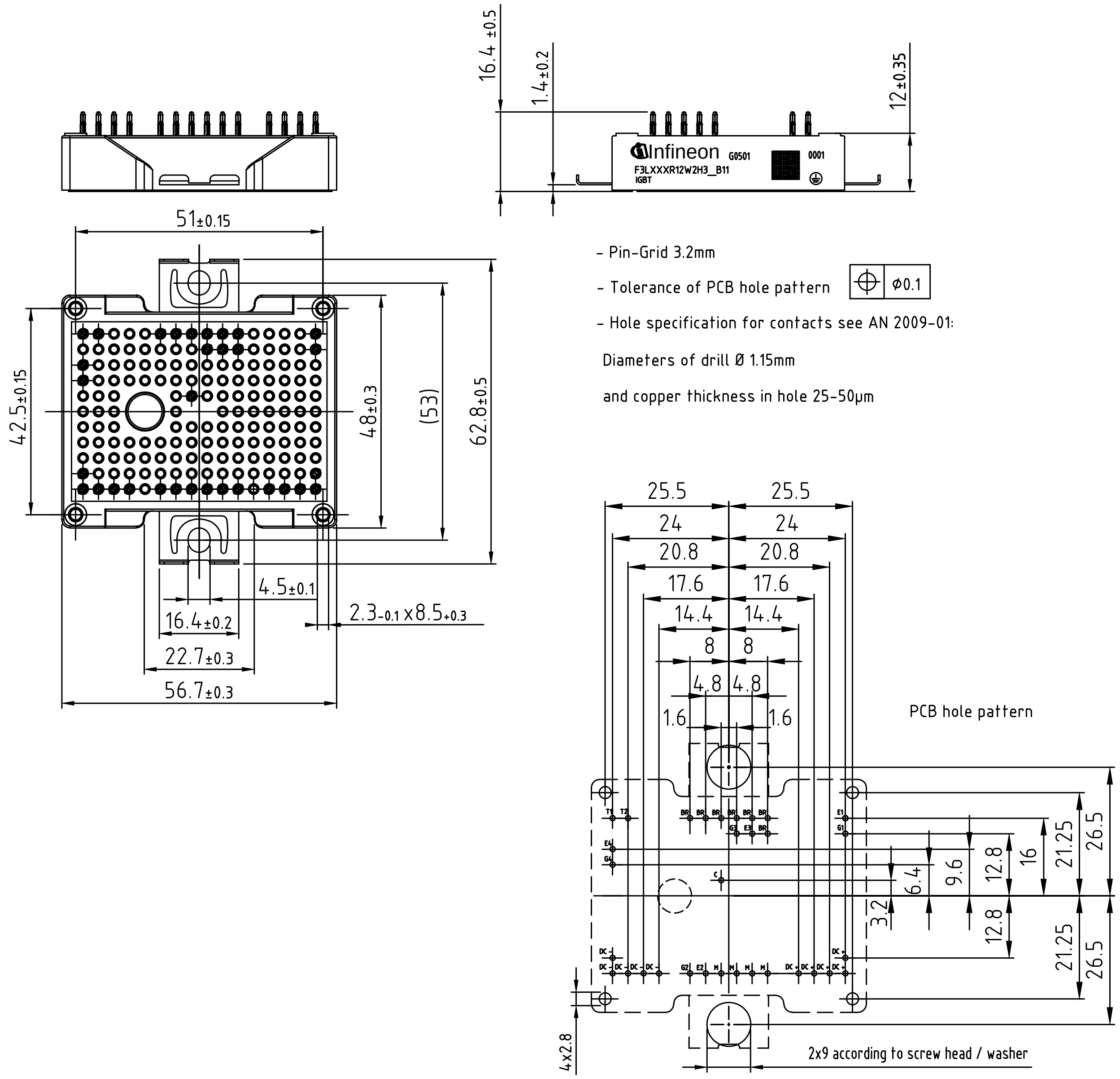



| prepared by: CM | date of publication: 2016-04-04 |
|---|---|
| approved by: AKDA | revision: V3.1 |

## Schaltplan / Circuit diagram




## Gehäuseabmessungen / Package outlines




| prepared by: CM | date of publication: 2016-04-04 |
| --- | --- |
| approved by: AKDA | revision: V3.1 |

**Published by**
**Infineon Technologies AG**
**81726 München, Germany**


## Nutzungsbedingungen

**WICHTIGER HINWEIS**

Die in diesem Dokument enthaltenen Angaben stellen keinesfalls Garantien für die Beschaffenheit oder Eigenschaften des Produktes ("Beschaffenheitsgarantie") dar. Für Beispiele, Hinweise oder typische Werte, die in diesem Dokument enthalten sind, und/oder Angaben, die sich auf die Anwendung des Produktes beziehen, ist jegliche Gewährleistung und Haftung von Infineon Technologies ausgeschlossen, einschließlich, ohne hierauf beschränkt zu sein, die Gewähr dafür, dass kein geistiges Eigentum Dritter verletzt ist.

Des Weiteren stehen sämtliche, in diesem Dokument enthaltenen Informationen, unter dem Vorbehalt der Einhaltung der in diesem Dokument festgelegten Verpflichtungen des Kunden sowie aller im Hinblick auf das Produkt des Kunden sowie die Nutzung des Infineon Produktes in den Anwendungen des Kunden anwendbaren gesetzlichen Anforderungen, Normen und Standards durch den Kunden.

Die in diesem Dokument enthaltenen Daten sind ausschließlich für technisch geschultes Fachpersonal bestimmt. Die Beurteilung der Eignung dieses Produktes für die beabsichtigte Anwendung sowie die Beurteilung der Vollständigkeit der in diesem Dokument enthaltenen Produktdaten für diese Anwendung obliegt den technischen Fachabteilungen des Kunden.

Sollten Sie von uns weitere Informationen im Zusammenhang mit dem Produkt, der Technologie, Lieferbedingungen bzw. Preisen benötigen, wenden Sie sich bitte an das nächste Vertriebsbüro von Infineon Technologies (www.infineon.com).

**WARNHINWEIS**

Aufgrund der technischen Anforderungen können Produkte gesundheitsgefährdende Substanzen enthalten. Bei Fragen zu den in diesem Produkt enthaltenen Substanzen, setzen Sie sich bitte mit dem nächsten Vertriebsbüro von Infineon Technologies in Verbindung.

Sofern Infineon Technologies nicht ausdrücklich in einem schriftlichen, von vertretungsberechtigten Infineon Mitarbeitern unterzeichneten Dokument zugestimmt hat, dürfen Produkte von Infineon Technologies nicht in Anwendungen eingesetzt werden, in welchen vernünftigerweise erwartet werden kann, dass ein Fehler des Produktes oder die Folgen der Nutzung des Produktes zu Personenverletzungen führen.

## Terms & Conditions of usage

**IMPORTANT NOTICE**

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics ("Beschaffenheitsgarantie"). With respect to any examples, hints or any typical values stated herein and/or any information regarding the application of the product, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

In addition, any information given in this document is subject to customer's compliance with its obligations stated in this document and any applicable legal requirements, norms and standards concerning customer's products and any use of the product of Infineon Technologies in customer's applications.

The data contained in this document is exclusively intended for technically trained staff. It is the responsibility of customer's technical departments to evaluate the suitability of the product for the intended application and the completeness of the product information given in this document with respect to such application.

For further information on the product, technology, delivery terms and conditions and prices please contact your nearest Infineon Technologies office (www.infineon.com).

**WARNINGS**

Due to technical requirements products may contain dangerous substances. For information on the types in question please contact your nearest Infineon Technologies office.

Except as otherwise explicitly approved by Infineon Technologies in a written document signed by authorized representatives of Infineon Technologies, Infineon Technologies' products may not be used in any applications where a failure of the product or any consequences of the use thereof can
reasonably be expected to result in personal injury.


| | |
|---|---|
| prepared by: CM | date of publication: 2016-04-04 |
| approved by: AKDA | revision: V3.1 |

单击下面可查看定价，库存，交付和生命周期等信息

>>Infineon Technologies(英飞凌)