Vincotech

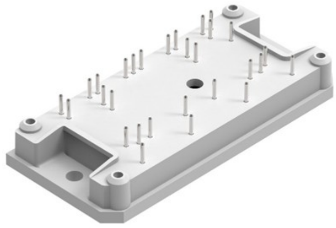
# 10-FY12S2A080N3-L860L28
datasheet

***flow*BOOST 1 symmetric dual** **1200 V / 80 A**

### Features

- Symmetric Boost for 1500Vdc applications
- Latest IGBT technology for high speed frequencies
- Low inductance package
- Integrated NTC
- Cost effective alternative to L869L08
- Same package and pin-out as L869L08

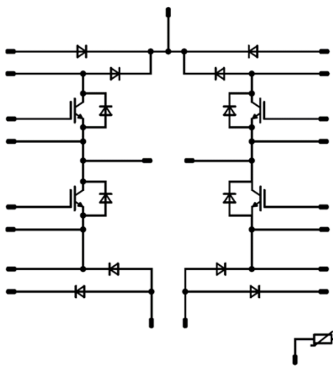
### *flow* 1 12 mm housing



### Target applications

- Solar Inverters

### Schematic



### Types

- 10-FY12S2A080N3-L860L28

## Maximum Ratings

$T_j$ = 25 °C, unless otherwise specified

| Parameter | Symbol | Condition | | Value | Unit |
|---|---|---|---|---|---|
| **Boost Switch** | | | | | |
| Collector-emitter voltage | $V_{CES}$ | | | 1200 | V |
| Collector current | $I_C$ | $T_j = T_{jmax}$ | $T_s$ = 80 °C | 68 | A |
| Repetitive peak collector current | $I_{CRM}$ | $t_p$ limited by $T_{jmax}$ | | 320 | A |
| Total power dissipation | $P_{tot}$ | $T_j = T_{jmax}$ | $T_s$ = 80 °C | 138 | W |
| Gate-emitter voltage | $V_{GES}$ | | | ±20 | V |
| Maximum junction temperature | $T_{jmax}$ | | | 175 | °C |

10-FY12S2A080N3-L860L28
datasheet

Vincotech

# Maximum Ratings

$T_j$ = 25 °C, unless otherwise specified

| Parameter | Symbol | Condition | | Value | Unit |
|---|---|---|---|---|---|
| **Boost Diode** | | | | | |
| Peak repetitive reverse voltage | $V_{RRM}$ | | | 1200 | V |
| Continuous (direct) forward current | $I_F$ | $T_j = T_{jmax}$ | $T_s$ = 80 °C | 28 | A |
| Repetitive peak forward current | $I_{FRM}$ | | | 92 | A |
| Total power dissipation | $P_{tot}$ | $T_j = T_{jmax}$ | $T_s$ = 80 °C | 87 | W |
| Maximum junction temperature | $T_{jmax}$ | | | 175 | °C |
| **Boost Sw. Protection Diode** | | | | | |
| Peak repetitive reverse voltage | $V_{RRM}$ | | | 1600 | V |
| Continuous (direct) forward current | $I_F$ | $T_j = T_{jmax}$ | $T_s$ = 80 °C | 25 | A |
| Surge (non-repetitive) forward current | $I_{FSM}$ | 50 Hz Single Half Sine Wave<br>$t_p$ = 10 ms | $T_j$ = 150 °C | 200 | A |
| Surge current capability | $I^2t$ | | | 200 | $A^2s$ |
| Total power dissipation | $P_{tot}$ | $T_j = T_{jmax}$ | $T_s$ = 80 °C | 37 | W |
| Maximum junction temperature | $T_{jmax}$ | | | 150 | °C |
| **ByPass Diode** | | | | | |
| Peak repetitive reverse voltage | $V_{RRM}$ | | | 1600 | V |
| Continuous (direct) forward current | $I_F$ | $T_j = T_{jmax}$ | $T_s$ = 80 °C | 38 | A |
| Surge (non-repetitive) forward current | $I_{FSM}$ | 50 Hz Single Half Sine Wave<br>$t_p$ = 10 ms | $T_j$ = 150 °C | 270 | A |
| Surge current capability | $I^2t$ | | | 370 | $A^2s$ |
| Total power dissipation | $P_{tot}$ | $T_j = T_{jmax}$ | $T_s$ = 80 °C | 47 | W |
| Maximum junction temperature | $T_{jmax}$ | | | 150 | °C |

# Maximum Ratings

$T_j$ = 25 °C, unless otherwise specified

| Parameter | Symbol | Condition | | Value | Unit |
|---|---|---|---|---|---|
| **Module Properties** | | | | | |
| **Thermal Properties** | | | | | |
| Storage temperature | $T_{stg}$ | | | -40…+125 | °C |
| Operation temperature under switching condition | $T_{jop}$ | | | -40…($T_{jmax}$ - 25) | °C |
| **Isolation Properties** | | | | | |
| Isolation voltage | $V_{isol}$ | DC Test Voltage* | $t_p$ = 2 s | 6000 | V |
| | | AC Voltage | $t_p$ = 1 min | 2500 | V |
| Creepage distance | | | | min. 12,7 | mm |
| Clearance | | | | 9,6 | mm |
| Comparative Tracking Index | CTI | | | > 200 | |

*100 % tested in production

# Characteristic Values

| Parameter | Symbol | Conditions | | | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | $V_{GE}$ [V]<br>$V_{GS}$ [V] | $V_{CE}$ [V]<br>$V_{DS}$ [V]<br>$V_F$ [V] | $I_C$ [A]<br>$I_D$ [A]<br>$I_F$ [A] | $T_j$ [°C] | Min | Typ | Max | |
| **Boost Switch** | | | | | | | | | | |
| **Static** | | | | | | | | | | |
| Gate-emitter threshold voltage | $V_{GE(th)}$ | $V_{GE} = V_{CE}$ | | | 0,0008 | 25 | 4,5 | 5,5 | 6,5 | V |
| Collector-emitter saturation voltage | $V_{CEsat}$ | | 15 | | 80 | 25<br>125<br>150 | | 1,89<br>2,05<br>2,11 | 1,95 | V |
| Collector-emitter cut-off current | $I_{CES}$ | | 0 | 1200 | | 25 | | | 800 | μA |
| Gate-emitter leakage current | $I_{GES}$ | | 20 | 0 | | 25 | | | 400 | nA |
| Internal gate resistance | $r_g$ | | | | | | | none | | Ω |
| Input capacitance | $C_{ies}$ | $f$ = 1 Mhz | 0 | 20 | | 25 | | 9824 | | pF |
| Output capacitance | $C_{oes}$ | | | | | | | 280 | | |
| Reverse transfer capacitance | $C_{res}$ | | | | | | | 160 | | |
| Gate charge | $Q_g$ | | 15 | 600 | 80 | 25 | | 424 | | nC |
| **Thermal** | | | | | | | | | | |
| Thermal resistance junction to sink | $R_{th(j-s)}$ | $\lambda_{paste}$ = 3,4 W/mK<br>(PSX) | | | | | | 0,69 | | K/W |
| **Dynamic** | | | | | | | | | | |
| Turn-on delay time | $t_{d(on)}$ | $R_{gon}$ = 4 Ω<br>$R_{goff}$ = 4 Ω | 0 / 15 | 700 | 45 | 25<br>125<br>150 | | 26<br>24<br>24 | | ns |
| Rise time | $t_r$ | | | | | 25<br>125<br>150 | | 13<br>14<br>14 | | |
| Turn-off delay time | $t_{d(off)}$ | | | | | 25<br>125<br>150 | | 232<br>273<br>283 | | |
| Fall time | $t_f$ | | | | | 25<br>125<br>150 | | 22<br>95<br>81 | | |
| Turn-on energy (per pulse) | $E_{on}$ | $Q_{rFWD}$ = 0,4 μC<br>$Q_{rFWD}$ = 0,3 μC<br>$Q_{rFWD}$ = 0,3 μC | | | | 25<br>125<br>150 | | 0,842<br>0,917<br>0,944 | | mWs |
| Turn-off energy (per pulse) | $E_{off}$ | | | | | 25<br>125<br>150 | | 0,980<br>1,867<br>2,173 | | |

# Characteristic Values

| Parameter | Symbol | Conditions | | | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | $V_{GE}$ [V] $V_{GS}$ [V] | $V_{CE}$ [V] $V_{DS}$ [V] $V_F$ [V] | $I_C$ [A] $I_D$ [A] $I_F$ [A] | $T_j$ [°C] | Min | Typ | Max | |
| **Boost Diode** | | | | | | | | | | |
| **Static** | | | | | | | | | | |
| Forward voltage | $V_F$ | | | | 20 | 25<br>125<br>150 | | 1,43<br>1,74<br>1,85 | 1,6 | V |
| Reverse leakage current | $I_R$ | | | 1200 | | 25<br>150 | | | 400 | µA |
| **Thermal** | | | | | | | | | | |
| Thermal resistance junction to sink | $R_{th(j-s)}$ | $\lambda_{paste}$ = 3,4 W/mK (PSX) | | | | | | 1,09 | | K/W |
| **Dynamic** | | | | | | | | | | |
| Peak recovery current | $I_{RRM}$ | $di/dt$ = 3376 A/µs<br>$di/dt$ = 3376 A/µs<br>$di/dt$ = 3479 A/µs | 0 / 15 | 700 | 45 | 25<br>125<br>150 | | 20<br>20<br>20 | | A |
| Reverse recovery time | $t_{rr}$ | | | | | 25<br>125<br>150 | | 12<br>12<br>12 | | ns |
| Recovered charge | $Q_r$ | | | | | 25<br>125<br>150 | | 0,362<br>0,340<br>0,318 | | µC |
| Reverse recovered energy | $E_{rec}$ | | | | | 25<br>125<br>150 | | 0,153<br>0,138<br>0,121 | | mWs |
| Peak rate of fall of recovery current | $(di_{rf}/dt)_{max}$ | | | | | 25<br>125<br>150 | | 4988<br>4928<br>4745 | | A/µs |
| **Boost Sw. Protection Diode** | | | | | | | | | | |
| **Static** | | | | | | | | | | |
| Forward voltage | $V_F$ | | | | 18 | 25<br>125 | | 1,12<br>1,03 | 1,5 | V |
| Reverse leakage current | $I_R$ | | | 1600 | | 25<br>150 | | | 100<br>1000 | µA |
| **Thermal** | | | | | | | | | | |
| Thermal resistance junction to sink | $R_{th(j-s)}$ | $\lambda_{paste}$ = 3,4 W/mK (PSX) | | | | | | 1,87 | | K/W |

# Characteristic Values

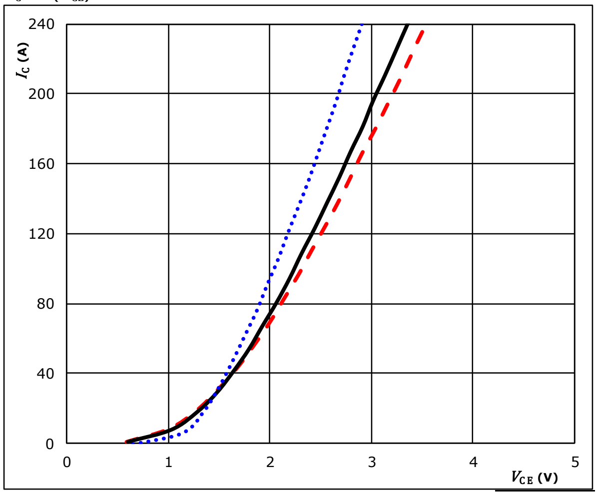
| Parameter | Symbol | Conditions | | | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | $V_{GE}$ [V] $V_{GS}$ [V] | $V_{CE}$ [V] $V_{DS}$ [V] $V_F$ [V] | $I_C$ [A] $I_D$ [A] $I_F$ [A] | $T_j$ [°C] | Min | Typ | Max | |
| **ByPass Diode** | | | | | | | | | | |
| **Static** | | | | | | | | | | |
| Forward voltage | $V_F$ | | | | 28 | 25<br>125 | | 1,15<br>1,10 | 1,5 | V |
| Reverse leakage current | $I_R$ | | | 1600 | | 25<br>150 | | | 100<br>1000 | µA |
| **Thermal** | | | | | | | | | | |
| Thermal resistance junction to sink | $R_{th(j-s)}$ | $\lambda_{paste}$ = 3,4 W/mK (PSX) | | | | | | 1,50 | | K/W |
| **Thermistor** | | | | | | | | | | |
| Rated resistance | $R$ | | | | | 25 | | 22 | | kΩ |
| Deviation of $R_{100}$ | $\Delta_{R/R}$ | $R_{100}$ = 1484 Ω | | | | 100 | -5 | | 5 | % |
| Power dissipation | $P$ | | | | | 25 | | 5 | | mW |
| Power dissipation constant | | | | | | 25 | | 1,5 | | mW/K |
| B-value | $B_{(25/50)}$ | Tol. ±1 % | | | | 25 | | 3962 | | K |
| B-value | $B_{(25/100)}$ | Tol. ±1 % | | | | 25 | | 4000 | | K |
| Vincotech NTC Reference | | | | | | | | | I | |

# Boost Switch Characteristics

**figure 1.** **IGBT**

**Typical output characteristics**

$I_C = f(V_{CE})$

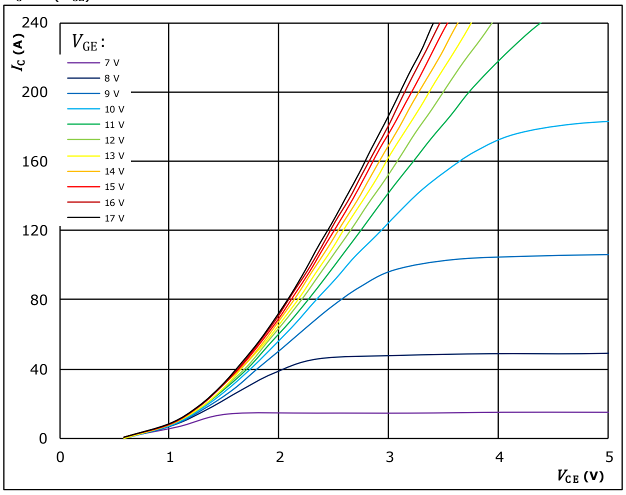



| | | | | | |
|---|---|---|---|---|---|
| $t_p$ = | 250 | µs | | 25 | °C |
| $V_{GE}$ = | 15 | V | $T_j$: | 125 | °C |
| | | | | 150 | °C |

**figure 2.** **IGBT**

**Typical output characteristics**

$I_C = f(V_{CE})$

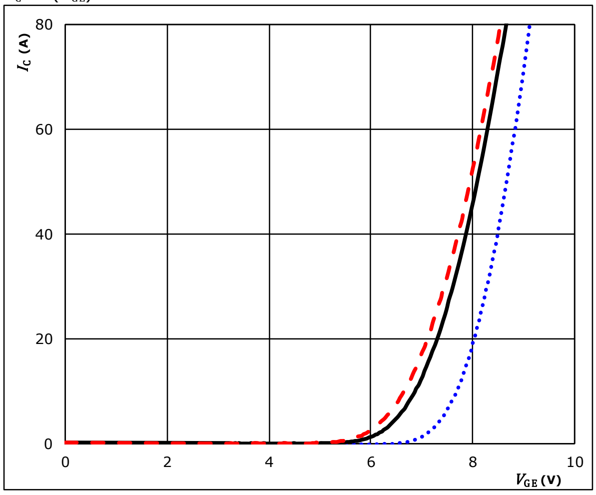



| | | |
|---|---|---|
| $t_p$ = | 250 | µs |
| $T_j$ = | 125 | °C |
| $V_{GE}$ from | 7 V to 17 V in steps of 1 V | |

**figure 3.** **IGBT**

**Typical transfer characteristics**

$I_C = f(V_{GE})$

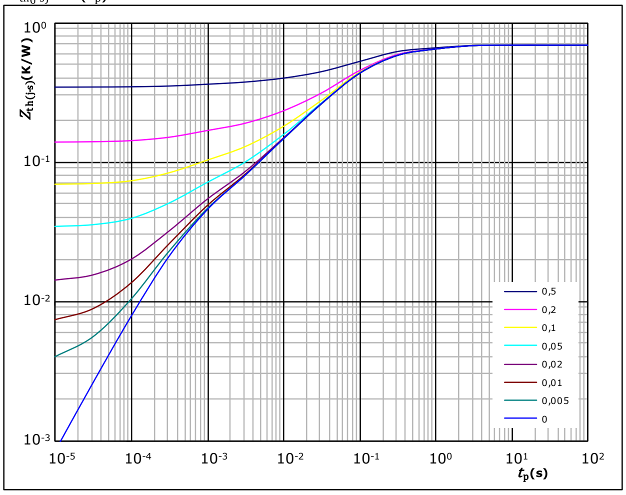



| | | | | | |
|---|---|---|---|---|---|
| $t_p$ = | 100 | µs | | 25 | °C |
| $V_{CE}$ = | 10 | V | $T_j$: | 125 | °C |
| | | | | 150 | °C |

**figure 4.** **IGBT**

**Transient thermal impedance as function of pulse duration**

$Z_{th(j\text{-}s)} = f(t_p)$




$D$ = $t_p / T$

$R_{th(j\text{-}s)}$ = 0,69 K/W

IGBT thermal model values

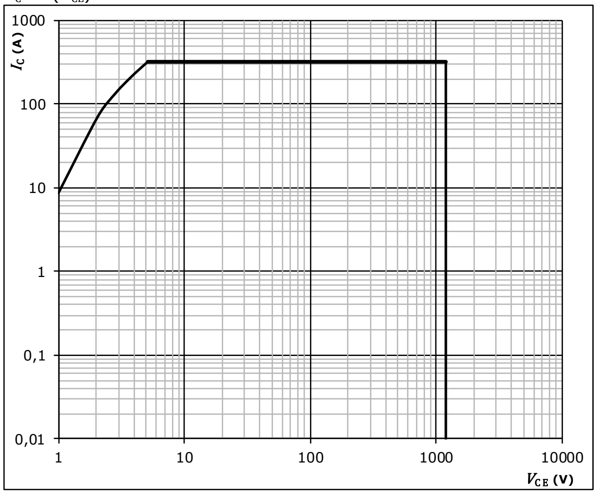
| $R$ (K/W) | $\tau$ (s) |
|---|---|
| 1,16E-01 | 1,00E+00 |
| 3,47E-01 | 1,15E-01 |
| 1,38E-01 | 3,11E-02 |
| 5,25E-02 | 5,14E-03 |
| 3,27E-02 | 4,97E-04 |

# Boost Switch Characteristics

**figure 5.** **IGBT**

**Safe operating area**

$I_C = f(V_{CE})$



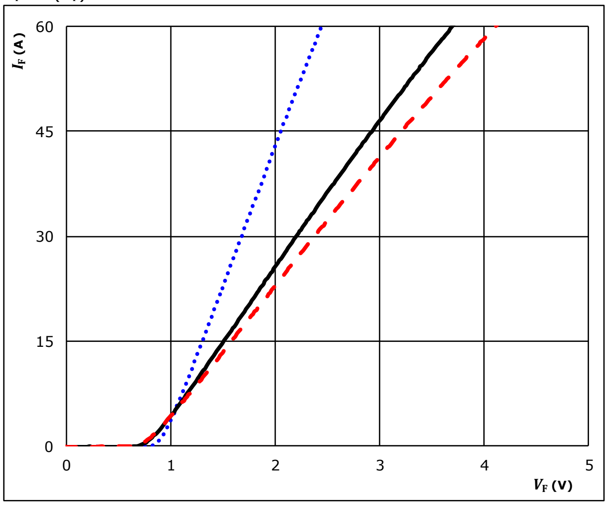

| | | |
|---|---|---|
| $D$ = | single pulse | |
| $T_s$ = | 80 | ºC |
| $V_{GE}$ = | 0 | V |
| $T_j$ = | $T_{jmax}$ | |

# Boost Diode Characteristics

**figure 1.** **FWD**

**Typical forward characteristics**

$I_F = f(V_F)$

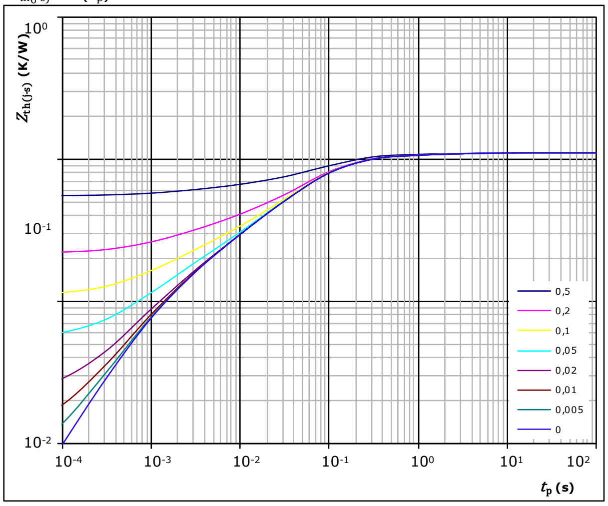



| | | | | |
|---|---|---|---|---|
| $t_p$ = | 250 | µs | $T_j$: | 25 °C |
| | | | | 125 °C |
| | | | | 150 °C |

**figure 2.** **FWD**

**Transient thermal impedance as a function of pulse width**

$Z_{th(j\text{-}s)} = f(t_p)$




$D = t_p / T$

$R_{th(j\text{-}s)} =$ 1,09 K/W

FWD thermal model values

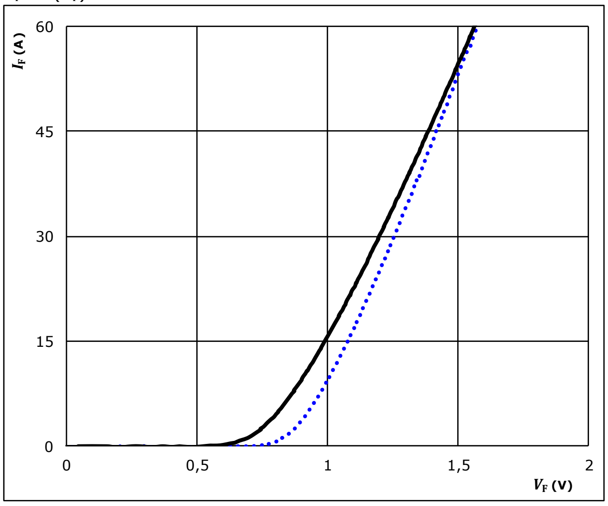
| $R$ (K/W) | $\tau$ (s) |
|---|---|
| 4,73E-02 | 2,07E+00 |
| 1,05E-01 | 2,95E-01 |
| 5,77E-01 | 5,82E-02 |
| 1,79E-01 | 1,86E-02 |
| 1,16E-01 | 3,85E-03 |
| 6,86E-02 | 7,48E-04 |

# Boost Sw. Protection Diode Characteristics

**figure 1.** **Rectifier Diode**

**Typical forward characteristics**

$I_F = f(V_F)$



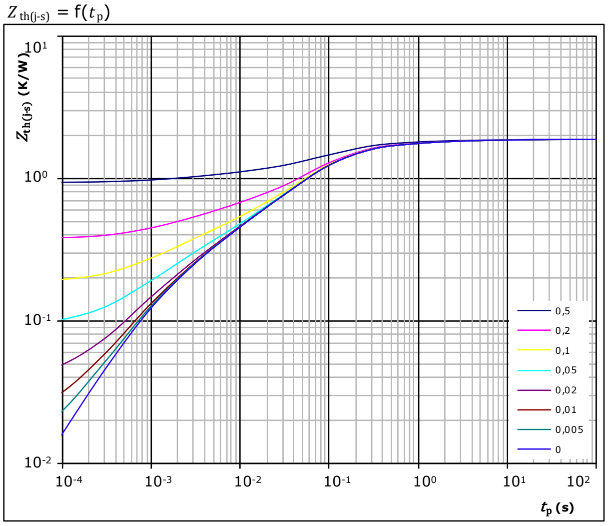

$t_p$ = 250 µs

$T_j$: 25 °C; 125 °C; 150 °C

**figure 2.** **Rectifier Diode**

**Transient thermal impedance as a function of pulse width**

$Z_{th(j-s)} = f(t_p)$




$D = t_p / T$

$R_{th(j-s)}$ = 1,87 K/W

Diode thermal model values

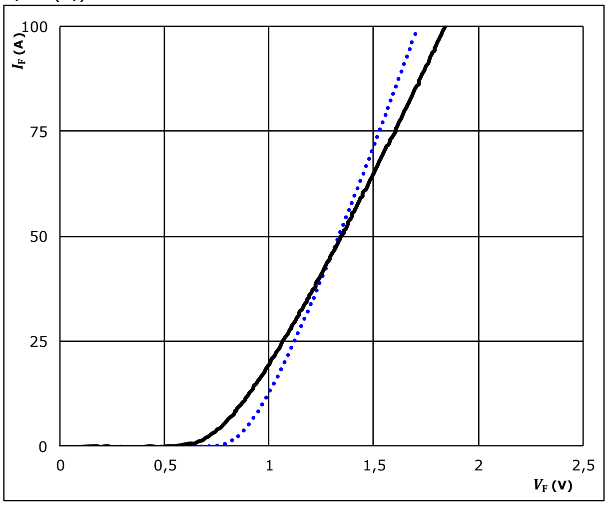
| $R$ (K/W) | $\tau$ (s) |
|---|---|
| 5,65E-02 | 8,90E+00 |
| 1,70E-01 | 1,08E+00 |
| 6,15E-01 | 1,58E-01 |
| 6,94E-01 | 5,21E-02 |
| 2,16E-01 | 6,16E-03 |
| 1,19E-01 | 1,06E-03 |

# ByPass Diode Characteristics

**figure 1.** **FWD**

**Typical forward characteristics**

$I_F = f(V_F)$

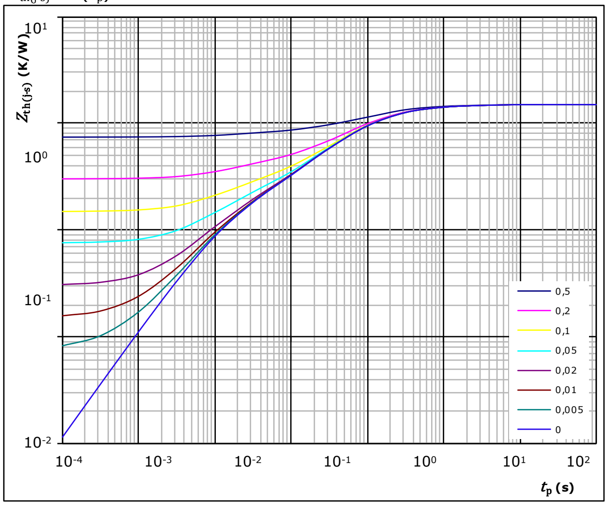



| | | | | | |
|---|---|---|---|---|---|
| $t_p$ = | 250 | μs | $T_j$: | 25 °C | |
| | | | | 125 °C | |

**figure 2.** **FWD**

**Transient thermal impedance as a function of pulse width**

$Z_{th(j-s)} = f(t_p)$




$D = t_p / T$

$R_{th(j-s)}$ = 1,50 K/W

FWD thermal model values

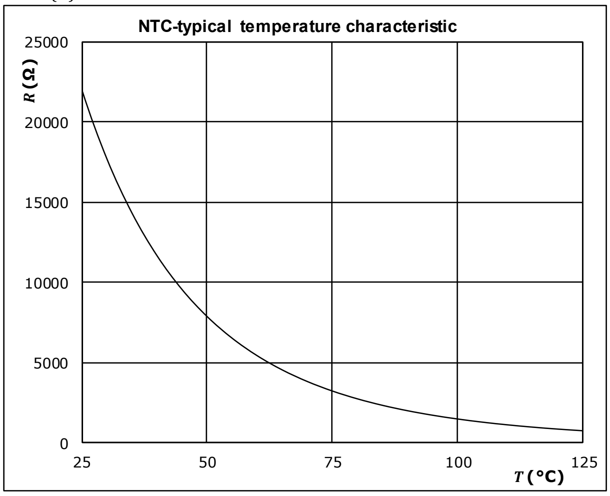
| $R$ (K/W) | $\tau$ (s) |
|---|---|
| 9,44E-02 | 2,48E+00 |
| 3,47E-01 | 3,51E-01 |
| 7,44E-01 | 7,63E-02 |
| 2,04E-01 | 1,21E-02 |
| 1,11E-01 | 1,25E-03 |

# Thermistor Characteristics

**figure 1.** **Thermistor**

**Typical NTC characteristic as a function of temperature**

$R = f(T)$

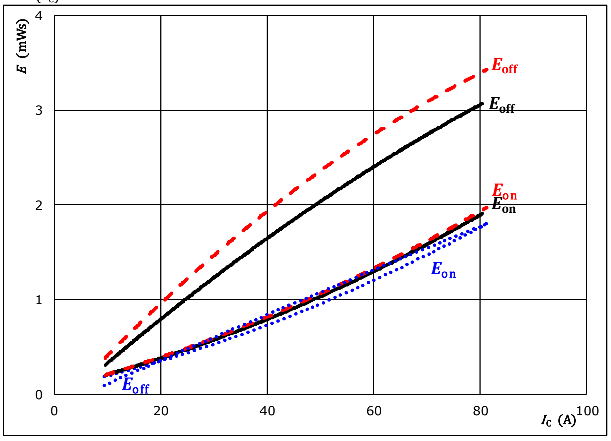


# Boost Switching Characteristics

**figure 1.** **IGBT**

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

$E = f(I_C)$



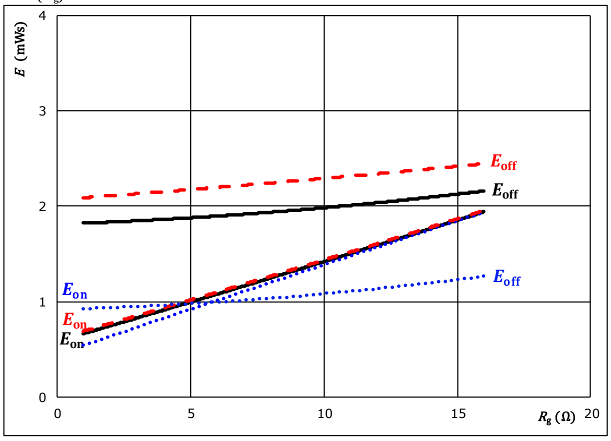

With an inductive load at

| | | | | |
|---|---|---|---|---|
| $V_{CE}$ = | 700 | V | $T_j$: | 25 °C |
| $V_{GE}$ = | 0 / 15 | V | | 125 °C |
| $R_{gon}$ = | 4 | Ω | | 150 °C |
| $R_{goff}$ = | 4 | Ω | | |

**figure 2.** **IGBT**

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

$E = f(R_g)$



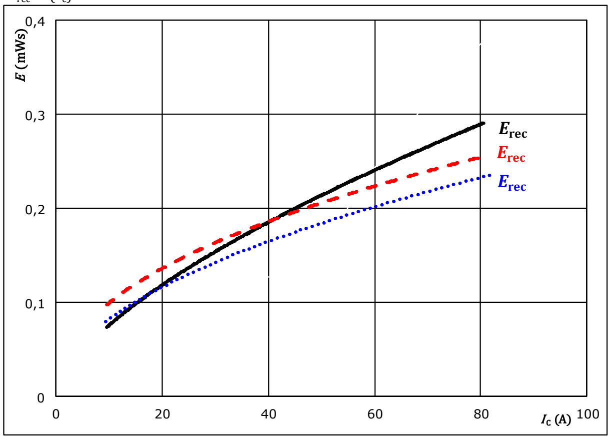

With an inductive load at

| | | | | |
|---|---|---|---|---|
| $V_{CE}$ = | 700 | V | $T_j$: | 25 °C |
| $V_{GE}$ = | 0 / 15 | V | | 125 °C |
| $I_C$ = | 45 | A | | 150 °C |

**figure 3.** **FWD**

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

$E_{rec} = f(I_c)$



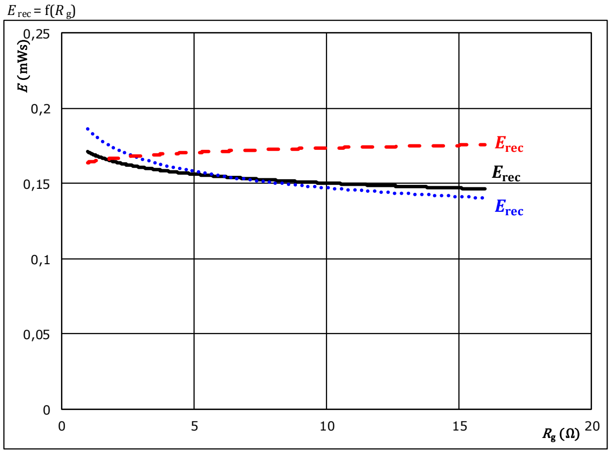

With an inductive load at

| | | | | |
|---|---|---|---|---|
| $V_{CE}$ = | 700 | V | $T_j$: | 25 °C |
| $V_{GE}$ = | 0 / 15 | V | | 125 °C |
| $R_{gon}$ = | 4 | Ω | | 150 °C |

**figure 4.** **FWD**

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

$E_{rec} = f(R_g)$




With an inductive load at

| | | | | |
|---|---|---|---|---|
| $V_{CE}$ = | 700 | V | $T_j$: | 25 °C |
| $V_{GE}$ = | 0 / 15 | V | | 125 °C |
| $I_C$ = | 45 | A | | 150 °C |

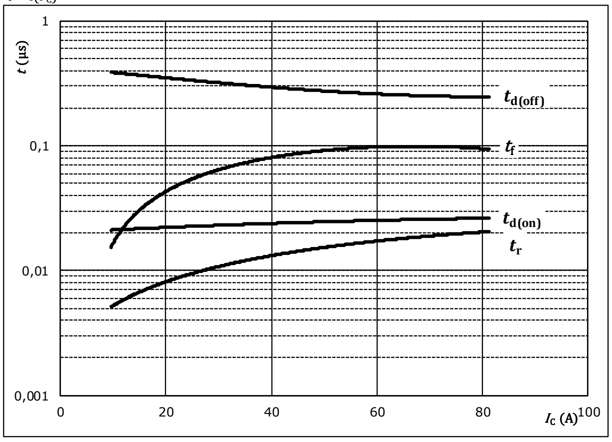
Vincotech

# Boost Switching Characteristics

**figure 5.** **IGBT**

**Typical switching times as a function of collector current**

$t = f(I_C)$



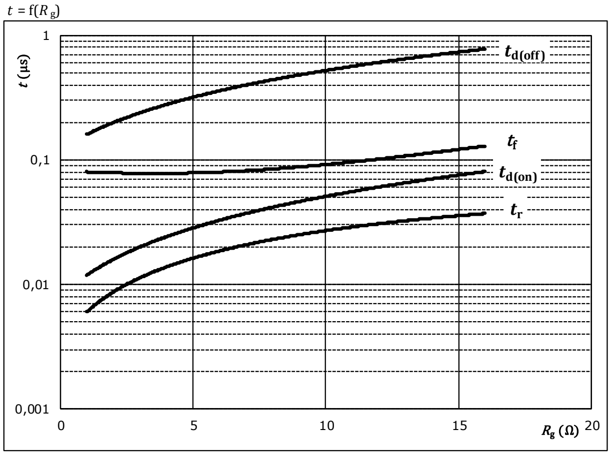

With an inductive load at

| | | |
|---|---|---|
| $T_j$ = | 150 | °C |
| $V_{CE}$ = | 700 | V |
| $V_{GE}$ = | 0 / 15 | V |
| $R_{gon}$ = | 4 | Ω |
| $R_{goff}$ = | 4 | Ω |

**figure 6.** **IGBT**

**Typical switching times as a function of gate resistor**

$t = f(R_g)$



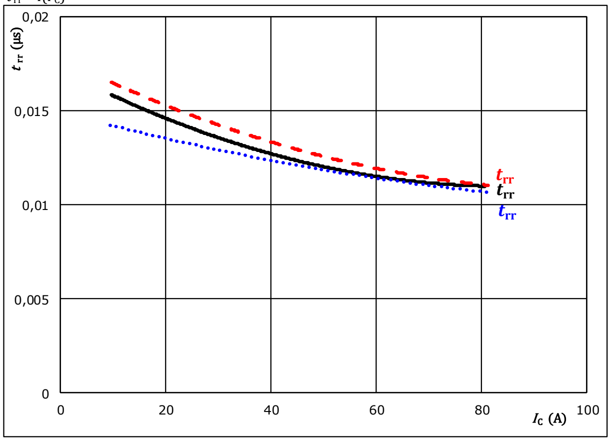

With an inductive load at

| | | |
|---|---|---|
| $T_j$ = | 150 | °C |
| $V_{CE}$ = | 700 | V |
| $V_{GE}$ = | 0 / 15 | V |
| $I_C$ = | 45 | A |

**figure 7.** **FWD**

**Typical reverse recovery time as a function of collector current**

$t_{rr} = f(I_C)$



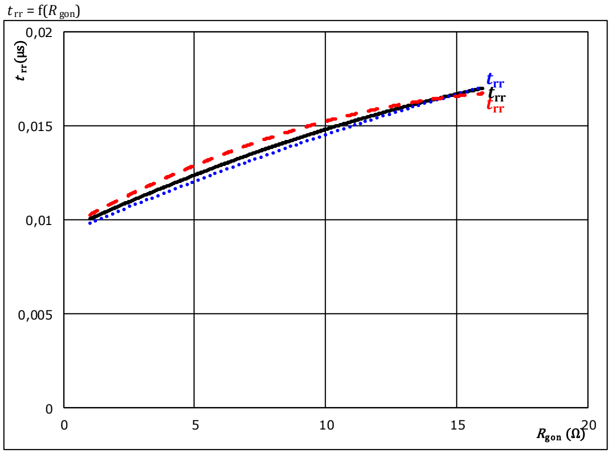

With an inductive load at

| | | | | |
|---|---|---|---|---|
| $V_{CE}$= | 700 | V | $T_j$: | 25 °C |
| $V_{GE}$ = | 0 / 15 | V | | 125 °C |
| $R_{gon}$ = | 4 | Ω | | 150 °C |

**figure 8.** **FWD**

**Typical reverse recovery time as a function of IGBT turn on gate resistor**

$t_{rr} = f(R_{gon})$




With an inductive load at

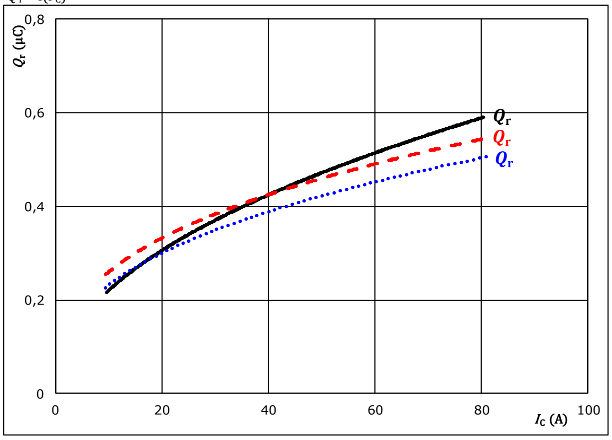
| | | | | |
|---|---|---|---|---|
| $V_{CE}$ = | 700 | V | $T_j$: | 25 °C |
| $V_{GE}$ = | 0 / 15 | V | | 125 °C |
| $I_C$ = | 45 | A | | 150 °C |

# Boost Switching Characteristics

**figure 9.** **FWD**

Typical recovered charge as a function of collector current

$Q_r = f(I_C)$



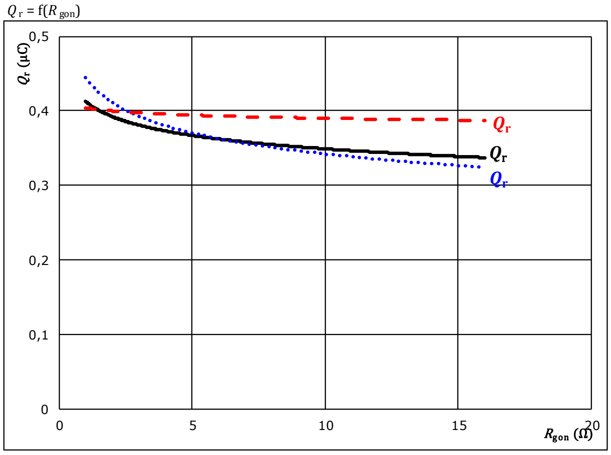

With an inductive load at

| | | | | | |
|---|---|---|---|---|---|
| $V_{CE}$ = | 700 | V | $T_j$: | 25 °C | ··········· |
| $V_{GE}$ = | 0 / 15 | V | | 125 °C | ——— |
| $R_{gon}$ = | 4 | Ω | | 150 °C | – – – |

**figure 10.** **FWD**

Typical recovered charge as a function of IGBT turn on gate resistor

$Q_r = f(R_{gon})$



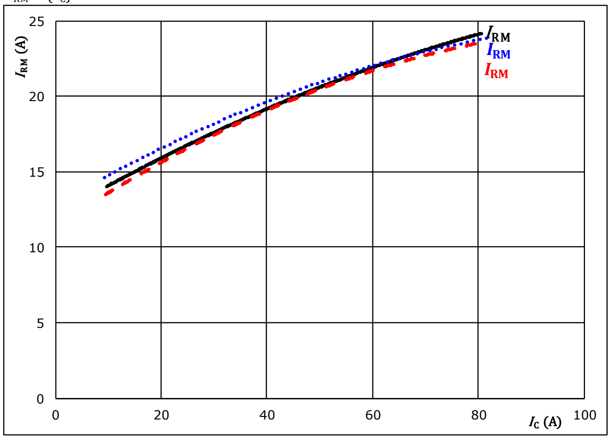

With an inductive load at

| | | | | | |
|---|---|---|---|---|---|
| $V_{CE}$ = | 700 | V | $T_j$: | 25 °C | ··········· |
| $V_{GE}$ = | 0 / 15 | V | | 125 °C | ——— |
| $I_C$ = | 45 | A | | 150 °C | – – – |

**figure 11.** **FWD**

Typical peak reverse recovery current current as a function of collector current

$I_{RM} = f(I_C)$



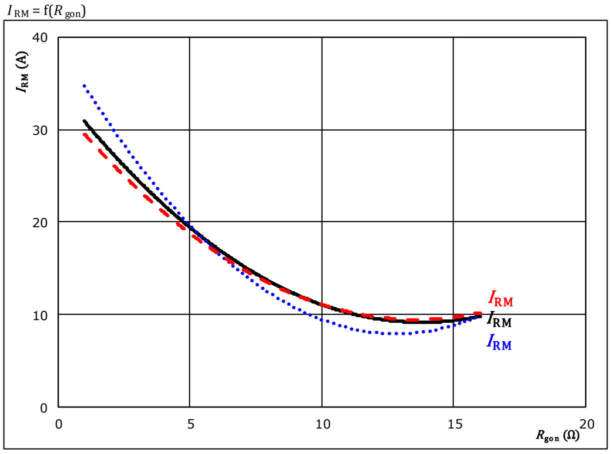

With an inductive load at

| | | | | | |
|---|---|---|---|---|---|
| $V_{CE}$ = | 700 | V | $T_j$: | 25 °C | ··········· |
| $V_{GE}$ = | 0 / 15 | V | | 125 °C | ——— |
| $R_{gon}$ = | 4 | Ω | | 150 °C | – – – |

**figure 12.** **FWD**

Typical peak reverse recovery current as a function of IGBT turn on gate resistor

$I_{RM} = f(R_{gon})$




With an inductive load at

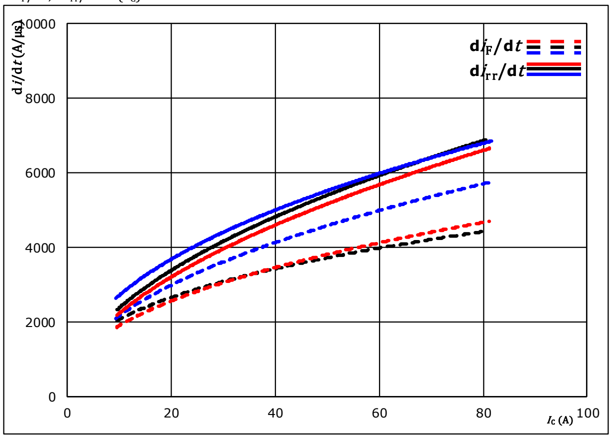
| | | | | | |
|---|---|---|---|---|---|
| $V_{CE}$ = | 700 | V | $T_j$: | 25 °C | ··········· |
| $V_{GE}$ = | 0 / 15 | V | | 125 °C | ——— |
| $I_C$ = | 45 | A | | 150 °C | – – – |

# Boost Switching Characteristics

**figure 13.** **FWD**

**Typical rate of fall of forward and reverse recovery current as a function of collector current**

$di_F/dt$, $di_{rr}/dt = f(I_C)$



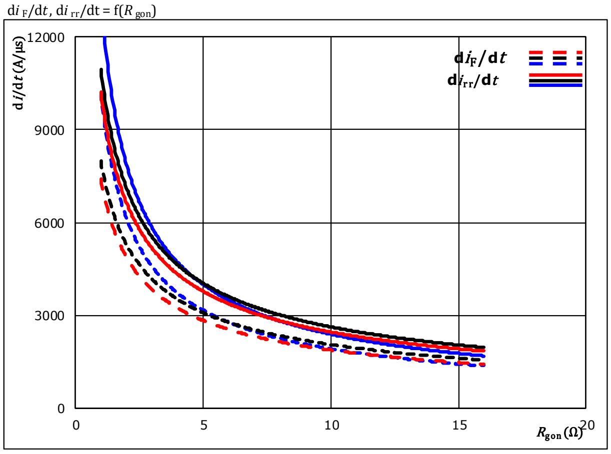

With an inductive load at

| | | | | |
|---|---|---|---|---|
| $V_{CE}$ = | 700 | V | $T_j$: | 25 °C |
| $V_{GE}$ = | 0 / 15 | V | | 125 °C |
| $R_{gon}$ = | 4 | Ω | | 150 °C |

**figure 14.** **FWD**

**Typical rate of fall of forward and reverse recovery current as a function of IGBT turn on gate resistor**

$di_F/dt$, $di_{rr}/dt = f(R_{gon})$



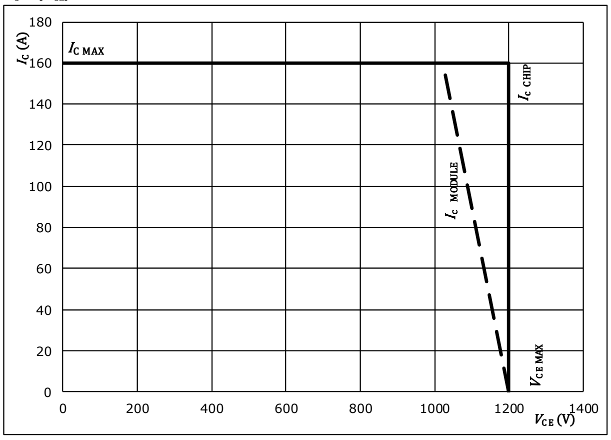

With an inductive load at

| | | | | |
|---|---|---|---|---|
| $V_{CE}$ = | 700 | V | $T_j$: | 25 °C |
| $V_{GE}$ = | 0 / 15 | V | | 125 °C |
| $I_C$= | 45 | A | | 150 °C |

**figure 15.** **IGBT**

**Reverse bias safe operating area**

$I_C = f(V_{CE})$




**At**

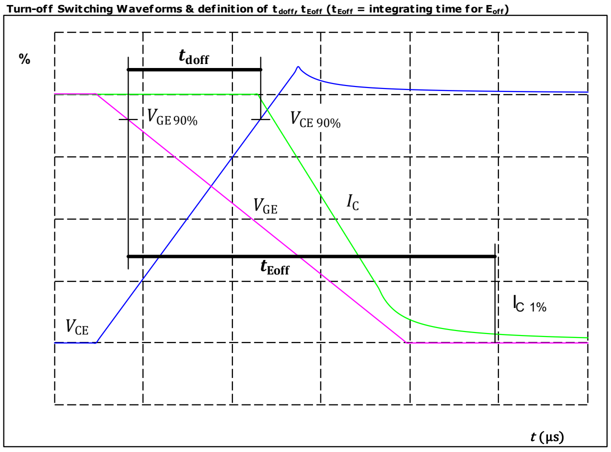
| | | |
|---|---|---|
| $T_j$ = | 150 | °C |
| $R_{gon}$ = | 4 | Ω |
| $R_{goff}$ = | 4 | Ω |

# Boost Switching Definitions

| General conditions | | |
|---|---|---|
| $T_j$ | = | 150 °C |
| $R_{gon}$ | = | 4 Ω |
| $R_{goff}$ | = | 4 Ω |

**figure 1.** IGBT

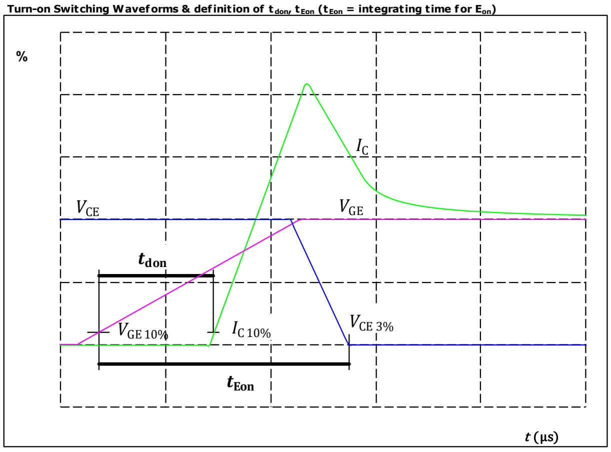
Turn-off Switching Waveforms & definition of $t_{doff}$, $t_{Eoff}$ ($t_{Eoff}$ = integrating time for $E_{off}$)




| | | |
|---|---|---|
| $V_{GE}(0\%)$ = | 0 | V |
| $V_{GE}(100\%)$ = | 15 | V |
| $V_C(100\%)$ = | 700 | V |
| $I_C(100\%)$ = | 45 | A |
| $t_{doff}$ = | 283 | ns |

**figure 2.** IGBT

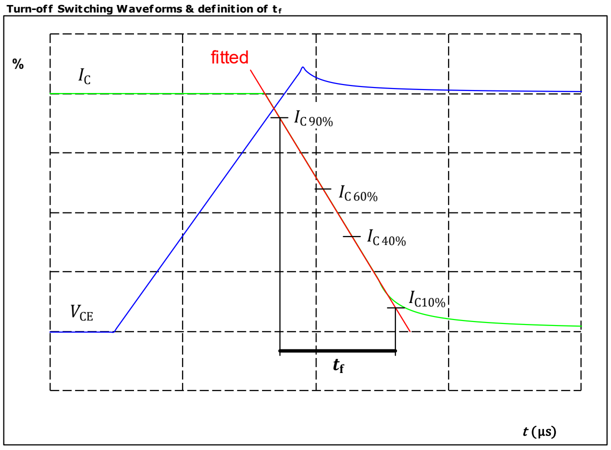
Turn-on Switching Waveforms & definition of $t_{don}$, $t_{Eon}$ ($t_{Eon}$ = integrating time for $E_{on}$)




| | | |
|---|---|---|
| $V_{GE}(0\%)$ = | 0 | V |
| $V_{GE}(100\%)$ = | 15 | V |
| $V_C(100\%)$ = | 700 | V |
| $I_C(100\%)$ = | 45 | A |
| $t_{don}$ = | 24 | ns |

**figure 3.** IGBT

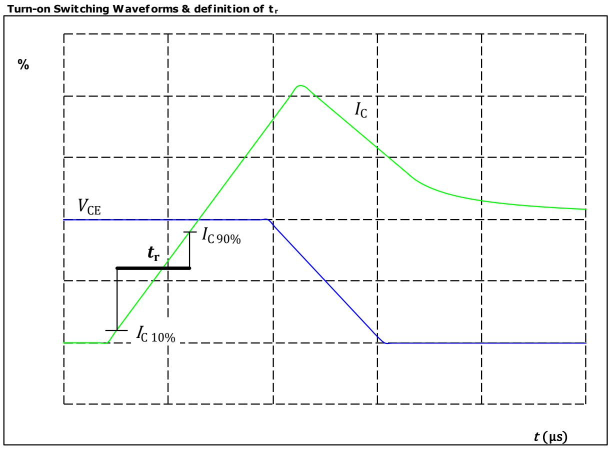
Turn-off Switching Waveforms & definition of $t_f$




| | | |
|---|---|---|
| $V_C(100\%)$ = | 700 | V |
| $I_C(100\%)$ = | 45 | A |
| $t_f$ = | 81 | ns |

**figure 4.** IGBT

Turn-on Switching Waveforms & definition of $t_r$

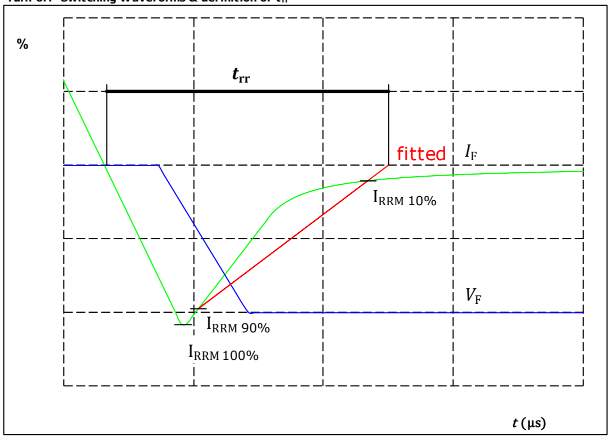



| | | |
|---|---|---|
| $V_C(100\%)$ = | 700 | V |
| $I_C(100\%)$ = | 45 | A |
| $t_r$ = | 14 | ns |

# Boost Switching Characteristics

| figure 5. | FWD |
|---|---|

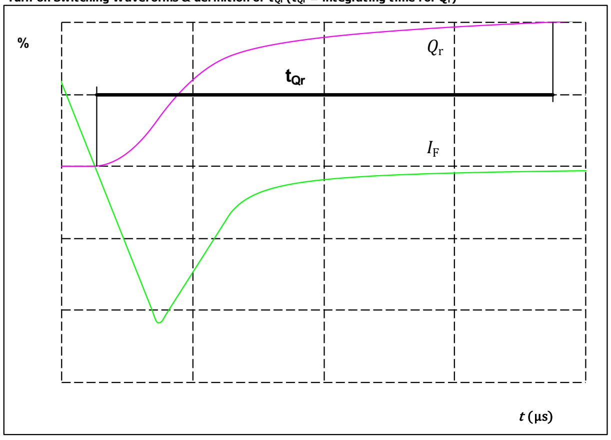
Turn-off Switching Waveforms & definition of $t_{rr}$




| | | |
|---|---|---|
| $V_F$ (100%) = | 700 | V |
| $I_F$ (100%) = | 45 | A |
| $I_{RRM}$ (100%) = | 20 | A |
| $t_{rr}$ = | 12 | ns |

| figure 6. | FWD |
|---|---|

Turn-on Switching Waveforms & definition of $t_{Qr}$ ($t_{Qr}$ = integrating time for $Q_r$)




| | | |
|---|---|---|
| $I_F$ (100%) = | 45 | A |
| $Q_r$ (100%) = | 0,32 | µC |

## Ordering Code & Marking

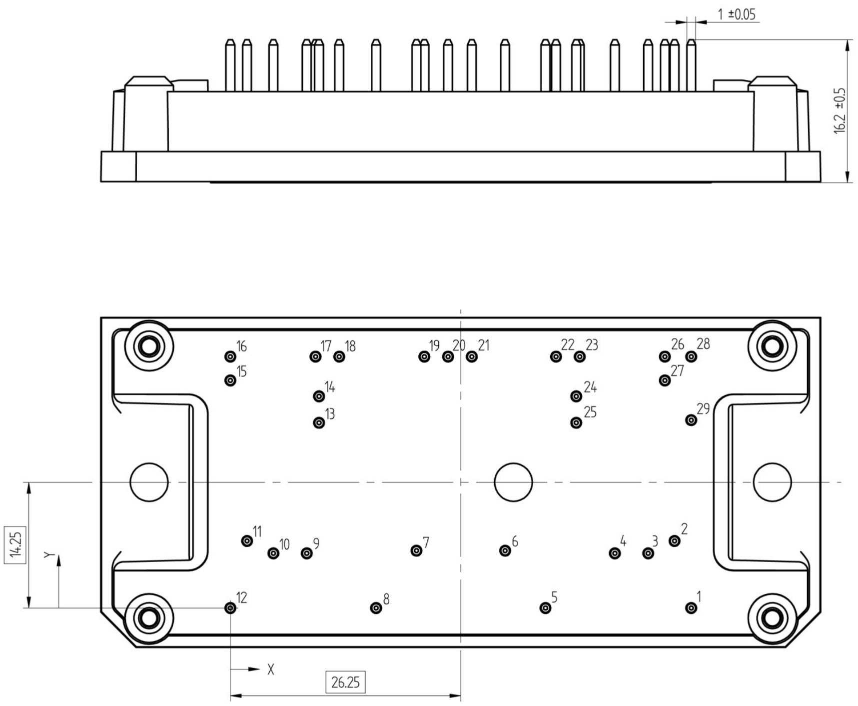
| Version | Ordering Code |
|---|---|
| without thermal paste 12 mm housing with Solder Pins | 10-FY12S2A080N3-L860L28 |
| with thermal paste 12 mm housing with Solder Pins | 10-FY12S2A080N3-L860L28-/3/ |
| | |
| | |

| Marking | | | | | | | |
|---|---|---|---|---|---|---|---|
| NN-NNNNNNNNNNNNNN TTTTTTVV WWYY UL VIN LLLLL SSSS | Text | Name | | Date code | UL & VIN | Lot | Serial |
| | | NN-NNNNNNNNNNNNNN-TTTTTTVV | | WWYY | UL VIN | LLLLL | SSSS |
| | Datamatrix | Type&Ver | Lot number | Serial | Date code | | |
| | | TTTTTTTVV | LLLLL | SSSS | WWYY | | |

## Outline

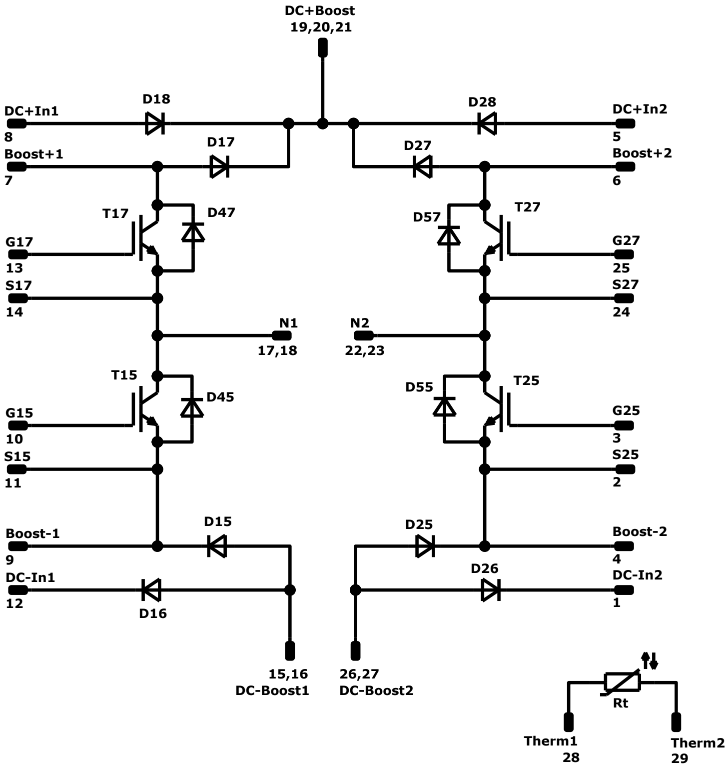
Pin table

| Pin | X | Y | Function |
|---|---|---|---|
| 1 | 52,5 | 0 | DC-In2 |
| 2 | 50,6 | 7,6 | S25 |
| 3 | 47,6 | 6,2 | G25 |
| 4 | 43,8 | 6,2 | Boost-2 |
| 5 | 35,9 | 0 | DC+In2 |
| 6 | 31,3 | 6,5 | Boost+2 |
| 7 | 21,2 | 6,5 | Boost+1 |
| 8 | 16,6 | 0 | DC+In1 |
| 9 | 8,7 | 6,2 | Boost-1 |
| 10 | 4,9 | 6,2 | G15 |
| 11 | 1,9 | 7,6 | S15 |
| 12 | 0 | 0 | DC-In1 |
| 13 | 10,1 | 21 | G17 |
| 14 | 10,1 | 24 | S17 |
| 15 | 0 | 25,8 | DC-Boost1 |
| 16 | 0 | 28,5 | DC-Boost1 |
| 17 | 9,7 | 28,5 | N1 |
| 18 | 12,4 | 28,5 | N1 |
| 19 | 22,1 | 28,5 | DC+Boost |
| 20 | 24,8 | 28,5 | DC+Boost |
| 21 | 27,5 | 28,5 | DC+Boost |
| 22 | 37,1 | 28,5 | N2 |
| 23 | 39,8 | 28,5 | N2 |
| 24 | 39,4 | 24 | S27 |
| 25 | 39,4 | 21 | G27 |
| 26 | 49,5 | 28,5 | DC-Boost2 |
| 27 | 49,5 | 25,8 | DC-Boost2 |
| 28 | 52,5 | 28,5 | Therm1 |
| 29 | 52,5 | 21,3 | Therm2 |




Tolerance of pinpositions: ±0,5mm at the end of pins
Dimension of coordinate axis is only offset without tolerance

## Pinout




## Identification

| ID | Component | Voltage | Current | Function | Comment |
|---|---|---|---|---|---|
| T15, T17, T25, T27 | IGBT | 1200 V | 80 A | Boost Switch | |
| D15, D17, D25, D27 | FWD | 1200 V | 20 A | Boost Diode | |
| D45, D47, D55, D57 | FWD | 1600 V | 18 A | Boost Sw. Protection Diode | |
| D16, D18, D26, D28 | FWD | 1600 V | 28 A | ByPass Diode | |
| Rt | NTC | | | Thermistor | |

| Packaging instruction | | | | |
|---|---|---|---|---|
| Standard packaging quantity (SPQ) 100 | >SPQ | Standard | <SPQ | Sample |

| Handling instruction |
|---|
| Handling instructions for *flow* 1 packages see vincotech.com website. |

| Package data |
|---|
| Package data for *flow* 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 |
|---|---|---|---|
| 10-FY12S2A080N3-L860L28-D1-14 | 27 Aug. 2019 | | |

**DISCLAIMER**

The information, specifications, procedures, methods and recommendations herein (together "information") are presented by Vincotech to reader in good faith, are believed to be accurate and reliable, but may well be incomplete and/or not applicable to all conditions or situations that may exist or occur. Vincotech reserves the right to make any changes without further notice to any products to improve reliability, function or design. No representation, guarantee or warranty is made to reader as to the accuracy, reliability or completeness of said information or that the application or use of any of the same will avoid hazards, accidents, losses, damages or injury of any kind to persons or property or that the same will not infringe third parties rights or give desired results. It is reader's sole responsibility to test and determine the suitability of the information and the product for reader's intended use.

**LIFE SUPPORT POLICY**

Vincotech products are not authorised for use as critical components in life support devices or systems without the express written approval of Vincotech.

As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in labelling can be reasonably expected to result in significant injury to the user.
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.