Vincotech

30-FT07NIC320RG01-PJ76F88
datasheet

***flow*NPC 2** **650 V / 320 A**

Topology features

- Kelvin Emitter for improved switching performance
- Neutral Point Clamped Topology (I-Type)
- Temperature sensor

Component features

- High efficiency in hard switching and resonant topologies
- High speed switching
- Low gate charge

Housing features

- Base isolation: Al_2O_3
- Convex shaped baseplate for superior thermal contact
- Cu baseplate
- Thermo-mechanical push-and-pull force relief
- Solder pin

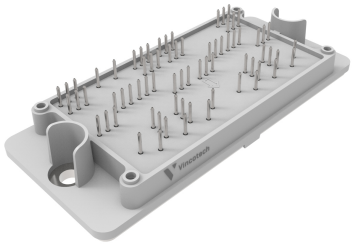
Target applications

- Energy Storage Systems
- Solar Inverters
- UPS

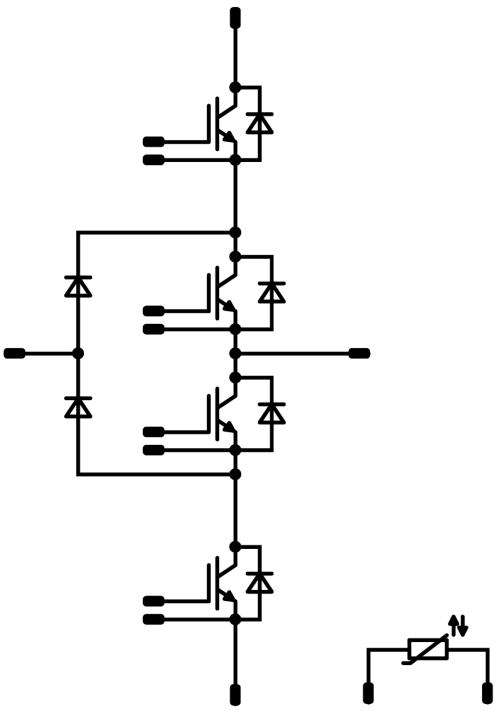
Types

- 30-FT07NIC320RG01-PJ76F88

flow 2 13 mm housing



Schematic



Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
Buck Switch				
Collector-emitter voltage	V_{CES}		650	V
Collector current (DC current)	I_C	T_j = T_{jmax} T_s = 80 °C	244	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	960	A
Total power dissipation	P_{tot}	T_j = T_{jmax} T_s = 80 °C	423	W
Gate-emitter voltage	V_{GES}		±30	V
Maximum junction temperature	T_{jmax}		175	°C
Buck Diode				
Peak repetitive reverse voltage	V_{RRM}		650	V
Forward current (DC current)	I_F	T_j = T_{jmax} T_s = 80 °C	263	A
Total power dissipation	P_{tot}	T_j = T_{jmax} T_s = 80 °C	346	W
Maximum junction temperature	T_{jmax}		175	°C
Boost Switch				
Collector-emitter voltage	V_{CES}		650	V
Collector current (DC current)	I_C	T_j = T_{jmax} T_s = 80 °C	244	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	960	A
Total power dissipation	P_{tot}	T_j = T_{jmax} T_s = 80 °C	423	W
Gate-emitter voltage	V_{GES}		±30	V
Maximum junction temperature	T_{jmax}		175	°C
Boost Diode				
Peak repetitive reverse voltage	V_{RRM}		650	V
Forward current (DC current)	I_F	T_j = T_{jmax} T_s = 80 °C	266	A
Total power dissipation	P_{tot}	T_j = T_{jmax} T_s = 80 °C	365	W
Maximum junction temperature	T_{jmax}		175	°C

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
Boost Sw. Inv. Diode				
Peak repetitive reverse voltage	V_{RRM}		650	V
Forward current (DC current)	I_F	T_j = T_{jmax} T_s = 80 °C	266	A
Total power dissipation	P_{tot}	T_j = T_{jmax} T_s = 80 °C	365	W
Maximum junction temperature	T_{jmax}		175	°C
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
Creepage distance			>12,7	mm
Clearance			>12,7	mm
Comparative Tracking Index	CTI		≥ 600	

*100 % tested in production

Characteristic Values

Parameter	Symbol	Conditions					Values			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	
Buck Switch										
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$			5	0,16	25	5	6	7	V
Collector-emitter saturation voltage	V_{CEsat}		15		240	25 125 150		1,46 1,64 1,69	1,9(1)	V
Collector-emitter cut-off current	I_{CES}		0	650		25			0,08	mA
Gate-emitter leakage current	I_{GES}		30	0		25			1,6	µA
Internal gate resistance	r_g							None		Ω
Input capacitance	C_{ies}	f = 1 Mhz	0	30		25		20240		pF
Output capacitance	C_{oes}							520		pF
Reverse transfer capacitance	C_{res}							368		pF
Gate charge	Q_g		15	400	240	25		672		nC
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,22		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 2 Ω R_{goff} = 2 Ω	-5/15	350	240	25 125 150		43,31 42,13 41,71		ns
Rise time	t_r					25 125 150		18,34 18,87 19,28		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		103,95 114,83 116,12		ns
Fall time	t_f					25 125 150		28,84 37,39 36,87		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=3,89 µC Q_{rFWD}=10,4 µC Q_{rFWD}=11,66 µC				25 125 150		2,21 3,44 3,61		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		3,97 5,57 5,49		mWs

Characteristic Values

Parameter	Symbol	Conditions					Values			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	
Buck Diode										
Static										
Forward voltage	V_F				280	25 125 150		1,73 1,45 1,41	2,5[1]	V
Reverse leakage current	I_R	V_r = 650 V				25			60	µA
Thermal										
Thermal resistance junction to sink[2]	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,27		K/W
Dynamic										
Peak recovery current	I_{RM}	di/dt=11894 A/µs di/dt=12779 A/µs di/dt=11700 A/µs	-5/15	350	240	25 125 150		194,92 283,97 295,73		A
Reverse recovery time	t_{rr}					25 125 150		36,06 63,71 68,04		ns
Recovered charge	Q_r					25 125 150		3,89 10,4 11,66		µC
Reverse recovered energy	E_{rec}					25 125 150		0,717 2,15 2,44		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		12233,52 12977,28 14322,07		A/µs

Characteristic Values

Parameter	Symbol	Conditions					Values			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 Switch										
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$			5	0,16	25	5	6	7	V
Collector-emitter saturation voltage	V_{CEsat}		15		240	25 125 150		1,46 1,64 1,69	1,9(1)	V
Collector-emitter cut-off current	I_{CES}		0	650		25			0,08	mA
Gate-emitter leakage current	I_{GES}		30	0		25			1,6	µA
Internal gate resistance	r_g							None		Ω
Input capacitance	C_{ies}	f = 1 Mhz	0	30		25		20240		pF
Output capacitance	C_{oes}							520		pF
Reverse transfer capacitance	C_{res}							368		pF
Gate charge	Q_g		15	400	240	25		672		nC
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,22		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 2 Ω R_{goff} = 2 Ω	-5/15	350	240	25 125 150		43,55 42,53 42,23		ns
Rise time	t_r					25 125 150		16,03 16,71 16,92		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		102,31 111,97 115,2		ns
Fall time	t_f					25 125 150		26,59 33,74 35,99		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=4,74 µC Q_{rFWD}=9,84 µC Q_{rFWD}=12,05 µC				25 125 150		1,13 1,63 1,78		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		3,7 4,82 5,04		mWs

Characteristic Values

Parameter	Symbol	Conditions					Values			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				40	25 125 150		1,31 0,9 0,82	1,8(1)	V
Reverse leakage current	I_R	V_r = 650 V				25			40	µA
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,26		K/W
Dynamic										
Peak recovery current	I_{RM}	di/dt=16950 A/µs di/dt=16282 A/µs di/dt=15023 A/µs	-5/15	350	240	25 125 150		248,95 351,51 386,49		A
Reverse recovery time	t_{rr}					25 125 150		33,98 51,83 57,75		ns
Recovered charge	Q_r					25 125 150		4,74 9,84 12,05		µC
Reverse recovered energy	E_{rec}					25 125 150		1,24 2,31 2,75		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		15460,15 17460,62 17275,09		A/µs

Characteristic Values

Parameter	Symbol	Conditions					Values			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 Sw. Inv. Diode										
Static										
Forward voltage	V_F				40	25 125 150		1,31 0,9 0,82	1,8(1)	V
Reverse leakage current	I_R	V_r = 650 V				25			40	µA
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,26		K/W
Thermistor										
Static										
Rated resistance	R					25		22		kΩ
Deviation of R100	$\Delta_{R/R}$	R_{100} = 1484 Ω				100	-5		5	%
Power dissipation	P					25		130		mW
Power dissipation constant	d					25		1,5		mW/K
B-value	$B_{(25/50)}$	Tol. ±1 %						3962		K
B-value	$B_{(25/100)}$	Tol. ±1 %						4000		K
Vincotech Thermistor Reference									I	

(1) Value at chip level

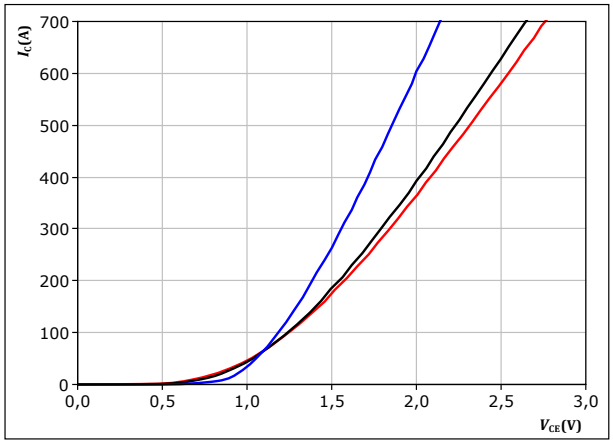
(2) Only valid with pre-applied Vincotech thermal interface material.

Buck Switch Characteristics

figure 1. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$

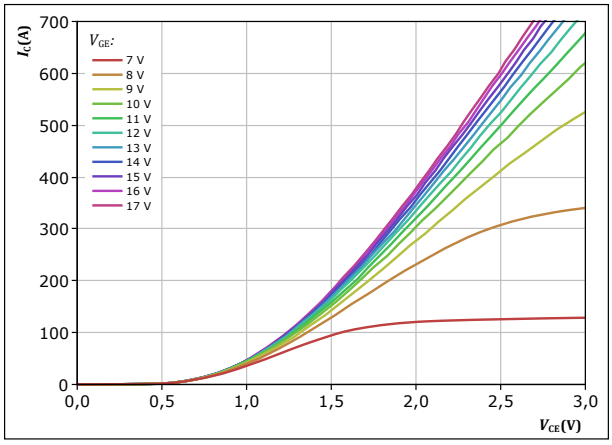


t_p =	250	µs		
V_{GE} =	15	V	T_j:	25 °C
				125 °C
				150 °C

figure 2. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$



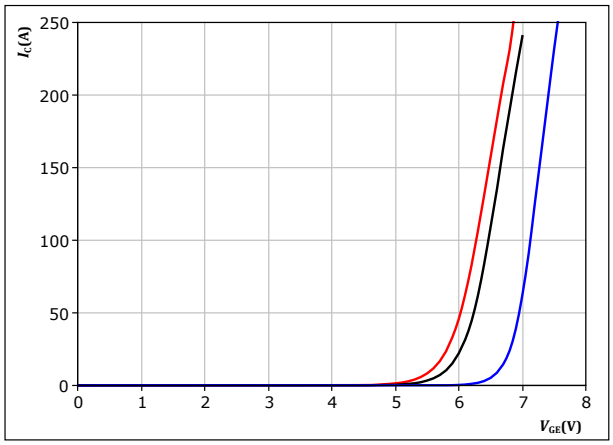
t_p =	250	µs
T_j =	150	°C

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

figure 3. **IGBT**

Typical transfer characteristics

$I_C = f(V_{GE})$

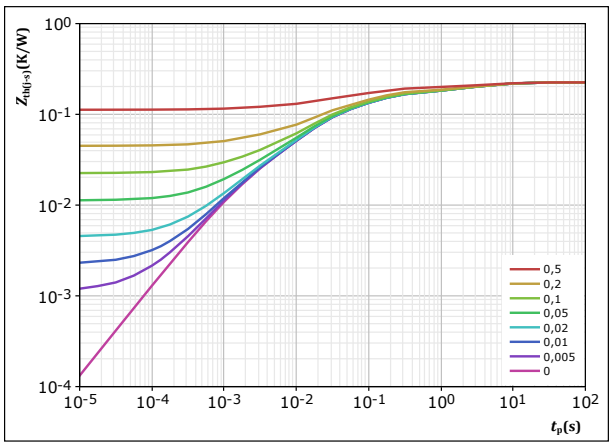


t_p =	250	µs		
V_{CE} =	57	V	T_j:	25 °C
				125 °C
				150 °C

figure 4. **IGBT**

Transient thermal impedance as a function of pulse width

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



D =	t_p / T	
$R_{th(j-s)}$ =	0,225	K/W

IGBT thermal model values

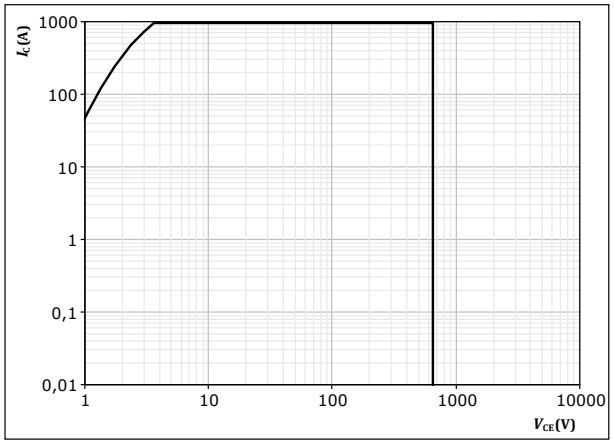
R (K/W)	τ (s)
2,17E-02	7,24E+00
3,72E-02	2,15E+00
8,07E-02	1,15E-01
7,19E-02	1,79E-02
1,33E-02	1,58E-03

Buck Switch Characteristics

figure 5. **IGBT**

Safe operating area

$I_C = f(V_{CE})$



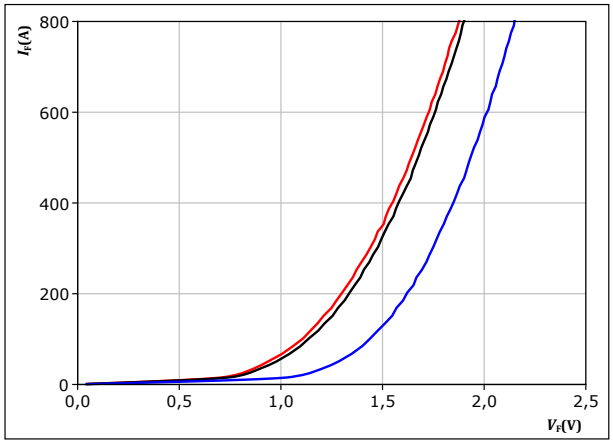
D =	single pulse	
T_s =	80	°C
V_{GE} =	15	V
T_j =	T_{jmax}	

Buck Diode Characteristics

figure 6. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



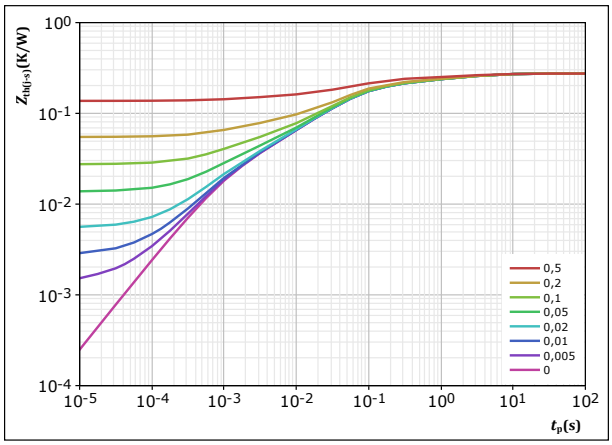
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 7. **FWD**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 0,274 K/W

FWD thermal model values

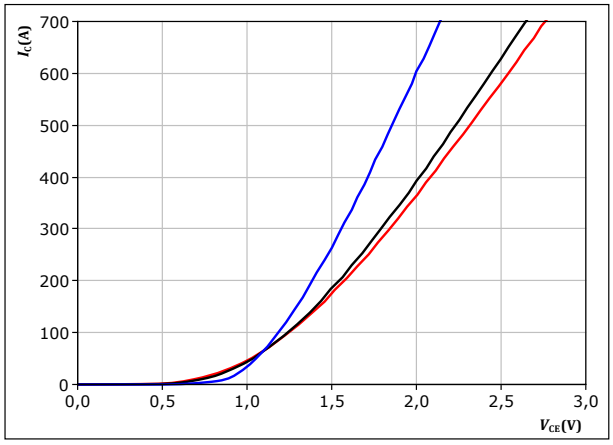
R (K/W)	τ (s)
3,10E-02	4,56E+00
4,68E-02	7,14E-01
1,40E-01	6,19E-02
3,67E-02	9,74E-03
2,04E-02	1,08E-03

Boost Switch Characteristics

figure 8. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$

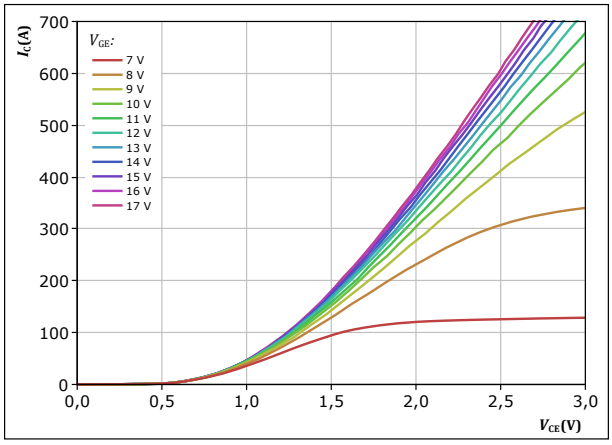


t_p =	250	µs		
V_{GE} =	15	V	T_j:	25 °C
				125 °C
				150 °C

figure 9. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$



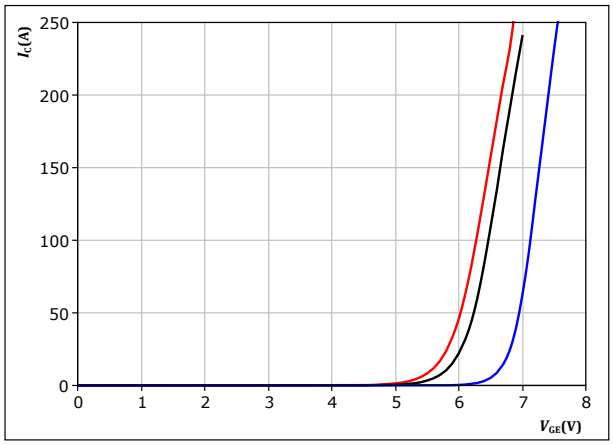
t_p =	250	µs
T_j =	150	°C

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

figure 10. **IGBT**

Typical transfer characteristics

$I_C = f(V_{GE})$

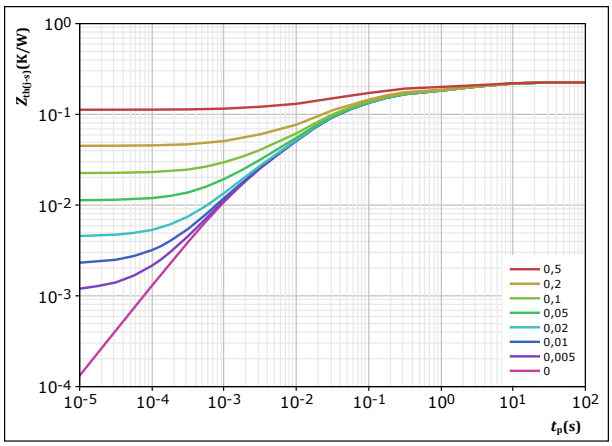


t_p =	250	µs		
V_{CE} =	57	V	T_j:	25 °C
				125 °C
				150 °C

figure 11. **IGBT**

Transient thermal impedance as a function of pulse width

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



D =	t_p / T	
$R_{th(j-s)}$ =	0,225	K/W

IGBT thermal model values

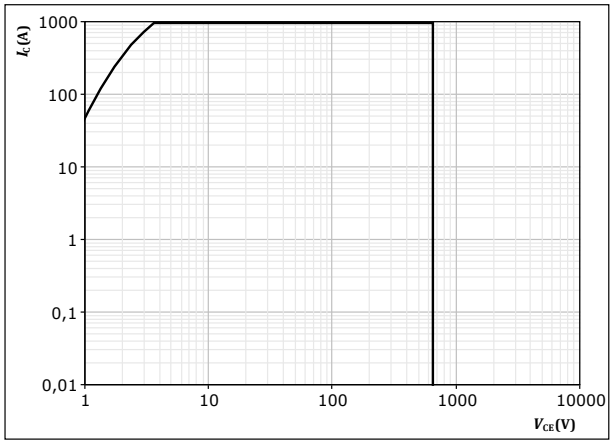
R (K/W)	τ (s)
2,17E-02	7,24E+00
3,72E-02	2,15E+00
8,07E-02	1,15E-01
7,19E-02	1,79E-02
1,33E-02	1,58E-03

Boost Switch Characteristics

figure 12. **IGBT**

Safe operating area

$I_C = f(V_{CE})$



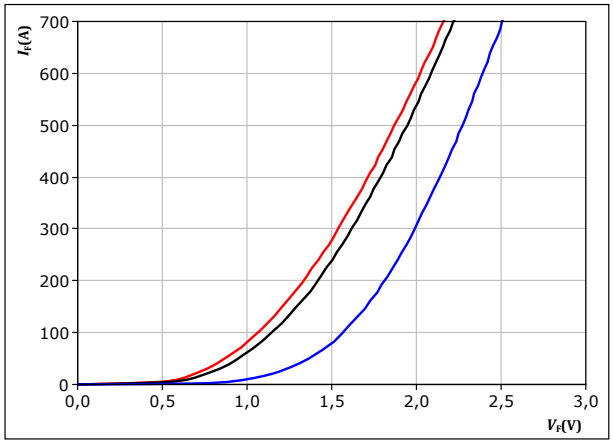
D =	single pulse	
T_s =	80	°C
V_{GE} =	15	V
T_j =	T_{jmax}	

Boost Diode Characteristics

figure 13. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



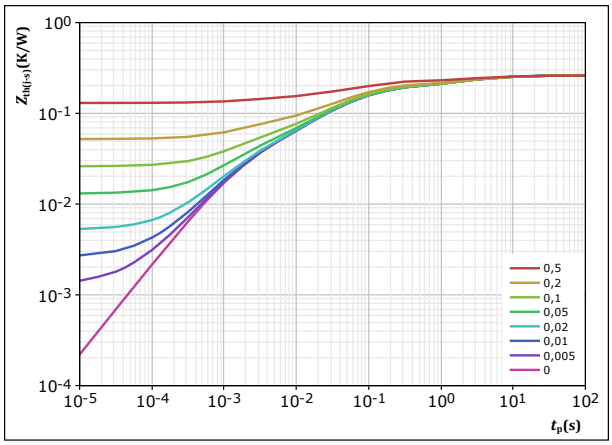
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 14. **FWD**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 0,26 K/W

FWD thermal model values

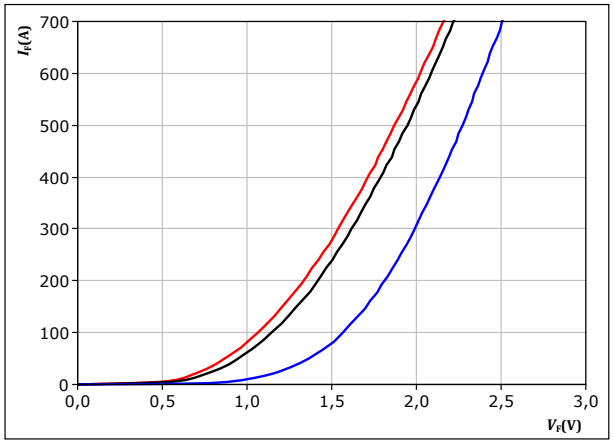
R (K/W)	τ (s)
3,03E-02	6,78E+00
4,52E-02	1,40E+00
1,12E-01	7,61E-02
4,81E-02	1,32E-02
2,47E-02	1,47E-03

Boost Sw. Inv. Diode Characteristics

figure 15. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



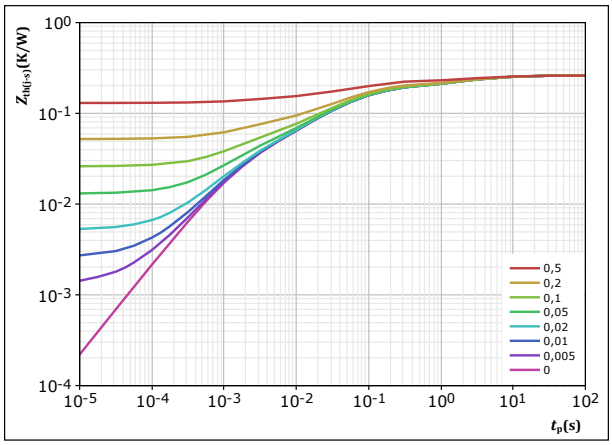
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 16. **FWD**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 0,26 K/W

FWD thermal model values

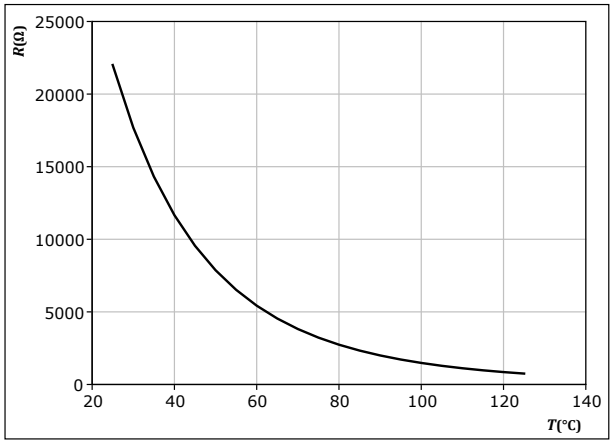
R (K/W)	τ (s)
3,03E-02	6,78E+00
4,52E-02	1,40E+00
1,12E-01	7,61E-02
4,81E-02	1,32E-02
2,47E-02	1,47E-03

Thermistor Characteristics

figure 17. **Thermistor**

Typical NTC characteristic as function of temperature

$R_T = f(T)$

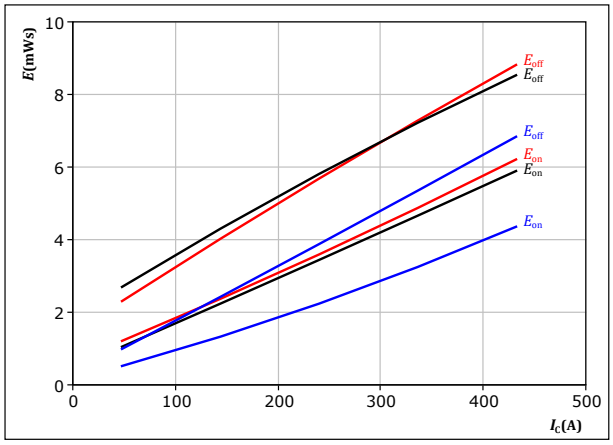


Buck Switching Characteristics

figure 18. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



With an inductive load at

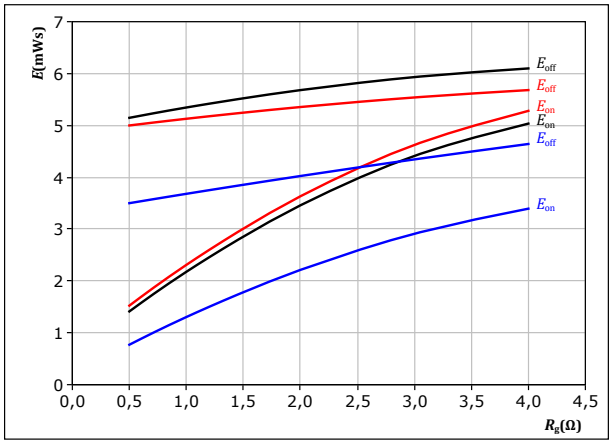
V_{CE} =	350	V	
V_{GE} =	-5/15	V	
R_{gon} =	2	Ω	
R_{goff} =	2	Ω	

T_j: 25 °C, 125 °C, 150 °C

figure 19. **IGBT**

Typical switching energy losses as a function of IGBT turn on gate resistor

$E = f(R_g)$



With an inductive load at

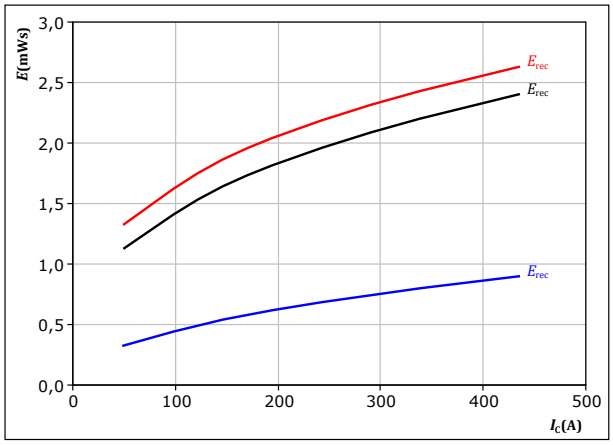
V_{CE} =	350	V	
V_{GE} =	-5/15	V	
I_C =	240	A	

T_j: 25 °C, 125 °C, 150 °C

figure 20. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



With an inductive load at

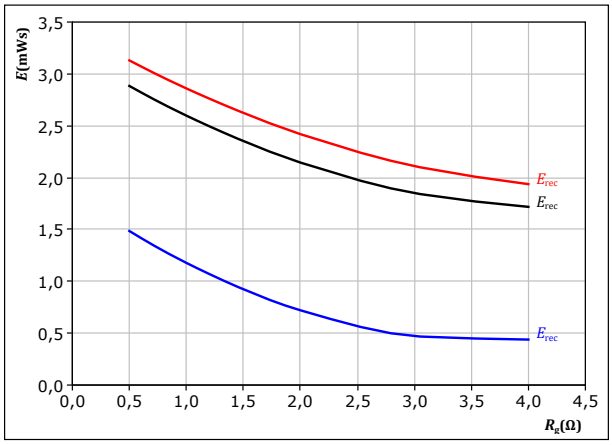
V_{CE} =	350	V	
V_{GE} =	-5/15	V	
R_{gon} =	2	Ω	

T_j: 25 °C, 125 °C, 150 °C

figure 21. **FWD**

Typical reverse recovered energy loss as a function of IGBT turn on gate resistor

$E_{rec} = f(R_g)$



With an inductive load at

V_{CE} =	350	V	
V_{GE} =	-5/15	V	
I_C =	240	A	

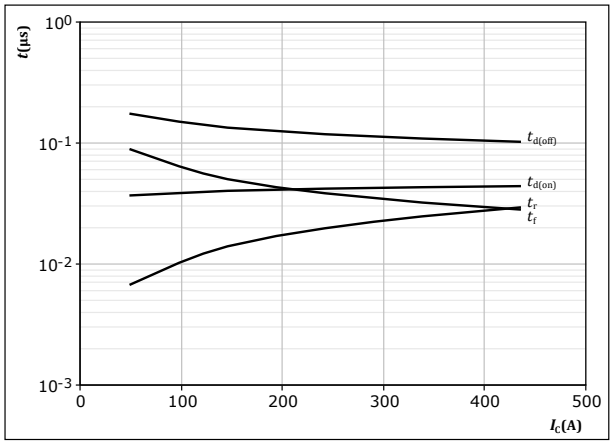
T_j: 25 °C, 125 °C, 150 °C

Buck Switching Characteristics

figure 22. **IGBT**

Typical switching times as a function of collector current

$t = f(I_C)$



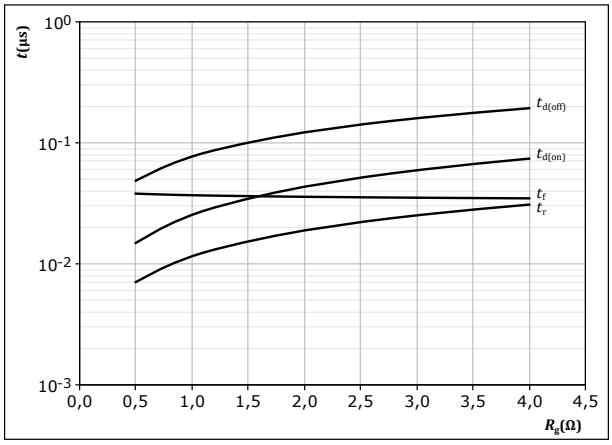
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	-5/15	V
R_{gon} =	2	Ω
R_{goff} =	2	Ω

figure 23. **IGBT**

Typical switching times as a function of IGBT turn on gate resistor

$t = f(R_g)$



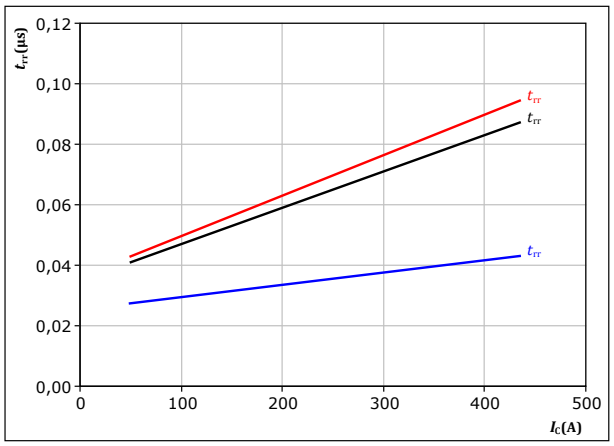
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	-5/15	V
I_C =	240	A

figure 24. **FWD**

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_C)$



With an inductive load at

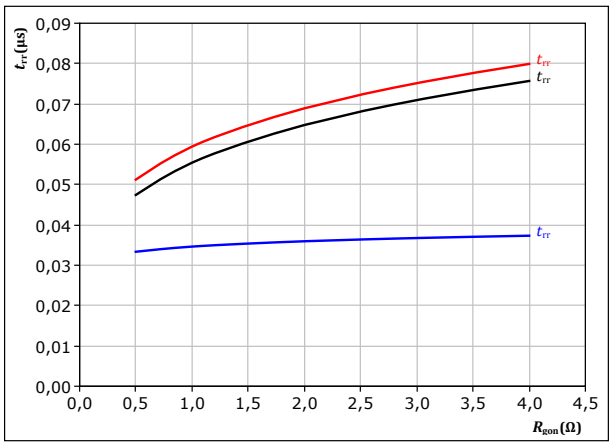
V_{CE} =	350	V
V_{GE} =	-5/15	V
R_{gon} =	2	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 25. **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} =	350	V
V_{GE} =	-5/15	V
I_C =	240	A

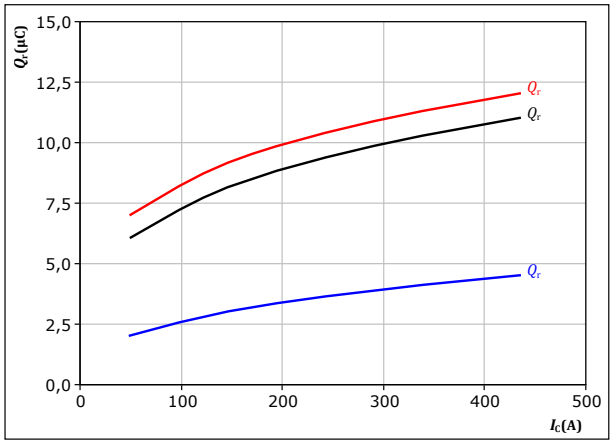
T_j: 25 °C, 125 °C, 150 °C

Buck Switching Characteristics

figure 26. **FWD**

Typical recovered charge as a function of collector current

$Q_r = f(I_C)$



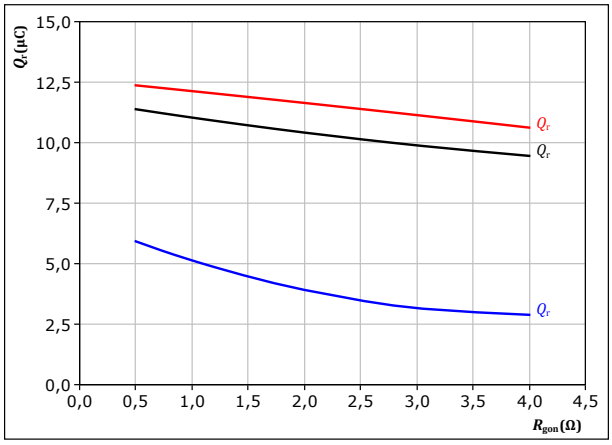
With an inductive load at

V_{CE} =	350	V	T_j: 25 °C
V_{GE} =	-5/15	V	125 °C
R_{gon} =	2	Ω	150 °C

figure 27. **FWD**

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

$Q_r = f(R_{gon})$



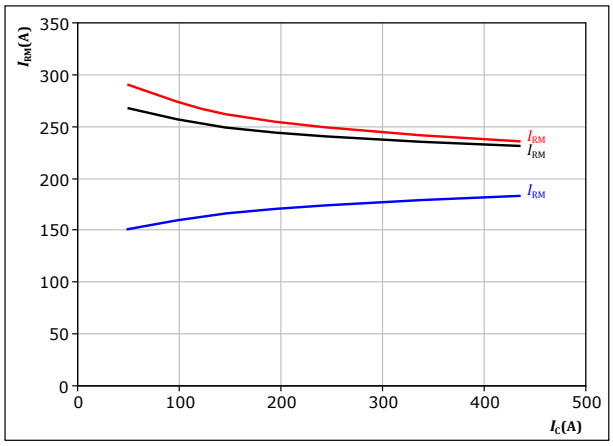
With an inductive load at

V_{CE} =	350	V	T_j: 25 °C
V_{GE} =	-5/15	V	125 °C
I_C =	240	A	150 °C

figure 28. **FWD**

Typical peak reverse recovery current as a function of collector current

$I_{RM} = f(I_C)$



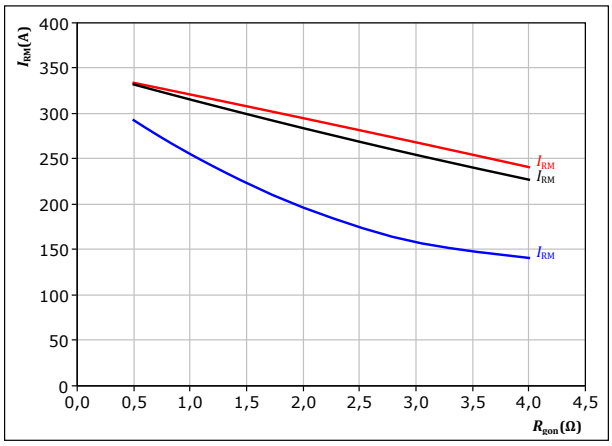
With an inductive load at

V_{CE} =	350	V	T_j: 25 °C
V_{GE} =	-5/15	V	125 °C
R_{gon} =	2	Ω	150 °C

figure 29. **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

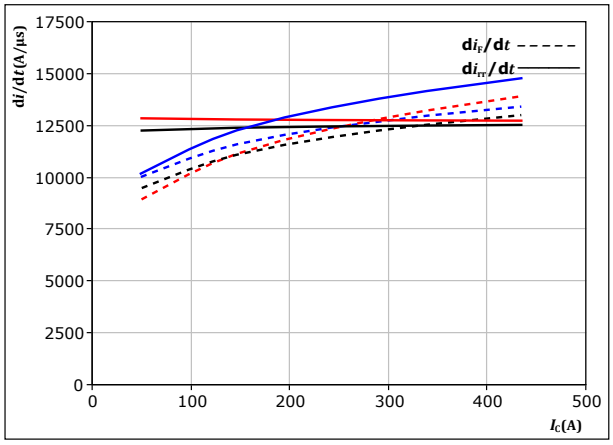
V_{CE} =	350	V	T_j: 25 °C
V_{GE} =	-5/15	V	125 °C
I_C =	240	A	150 °C

Buck Switching Characteristics

figure 30. **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

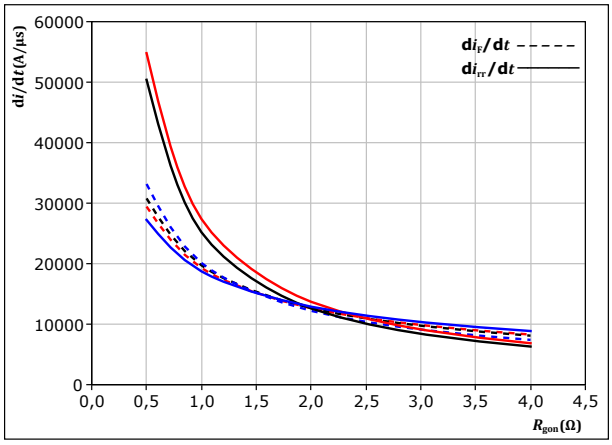
V_{CE} =	350	V
V_{GE} =	-5/15	V
R_{gon} =	2	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 31. **FWD**

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

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



With an inductive load at

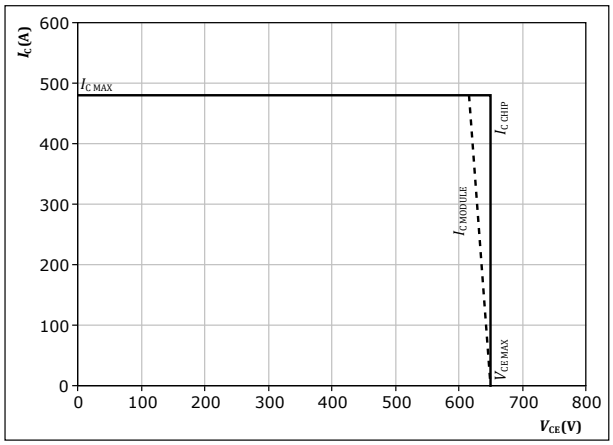
V_{CE} =	350	V
V_{GE} =	-5/15	V
I_C =	240	A

T_j: 25 °C, 125 °C, 150 °C

figure 32. **IGBT**

Reverse bias safe operating area

I_C = f(V_{CE})



At

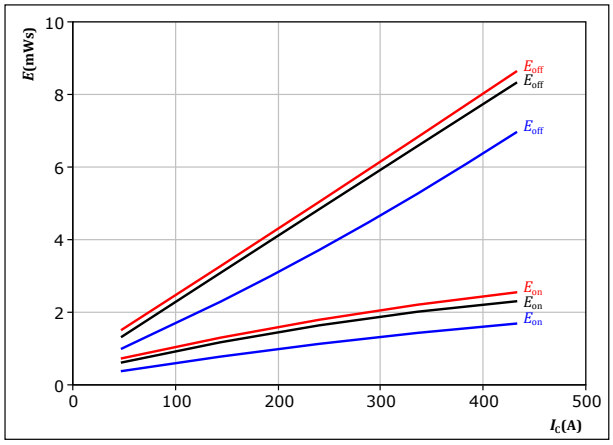
T_j =	150	°C
R_{gon} =	2	Ω
R_{goff} =	2	Ω

Boost Switching Characteristics

figure 33. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



With an inductive load at

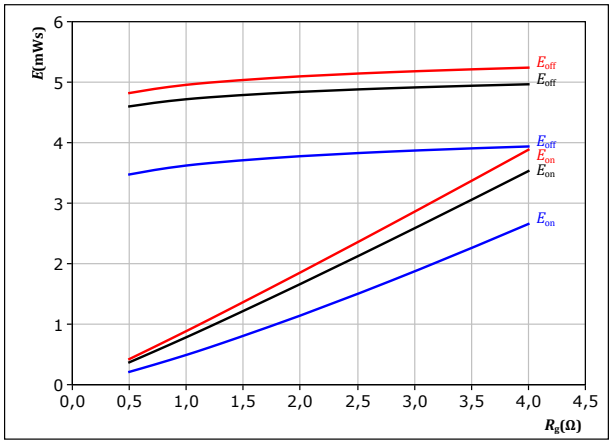
V_{CE} =	350	V	
V_{GE} =	-5/15	V	
R_{gon} =	2	Ω	
R_{goff} =	2	Ω	

T_j: 25 °C, 125 °C, 150 °C

figure 34. **IGBT**

Typical switching energy losses as a function of IGBT turn on gate resistor

$E = f(R_g)$



With an inductive load at

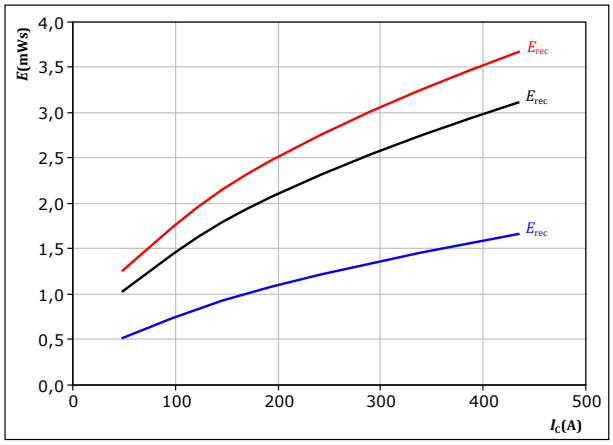
V_{CE} =	350	V	
V_{GE} =	-5/15	V	
I_C =	240	A	

T_j: 25 °C, 125 °C, 150 °C

figure 35. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



With an inductive load at

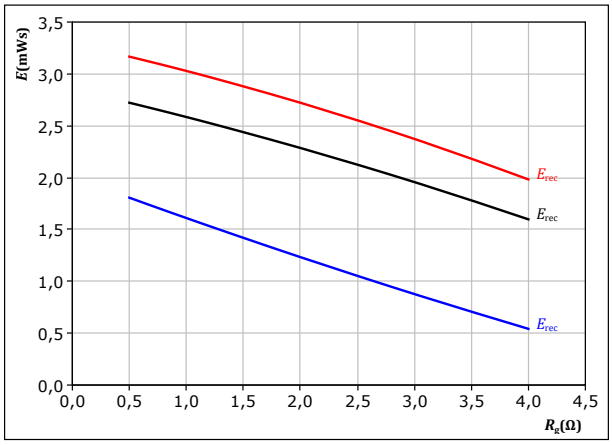
V_{CE} =	350	V	
V_{GE} =	-5/15	V	
R_{gon} =	2	Ω	

T_j: 25 °C, 125 °C, 150 °C

figure 36. **FWD**

Typical reverse recovered energy loss as a function of IGBT turn on gate resistor

$E_{rec} = f(R_g)$



With an inductive load at

V_{CE} =	350	V	
V_{GE} =	-5/15	V	
I_C =	240	A	

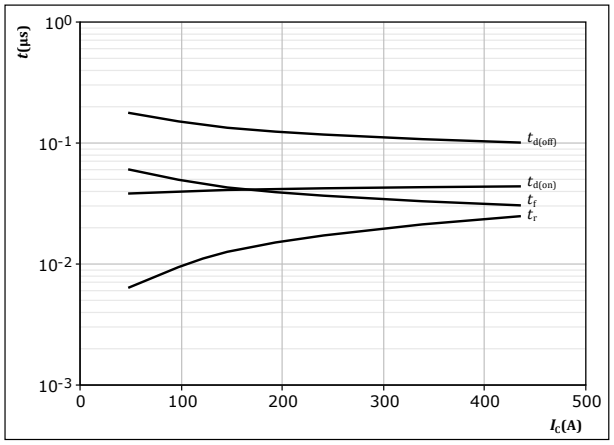
T_j: 25 °C, 125 °C, 150 °C

Boost Switching Characteristics

figure 37. **IGBT**

Typical switching times as a function of collector current

$t = f(I_C)$



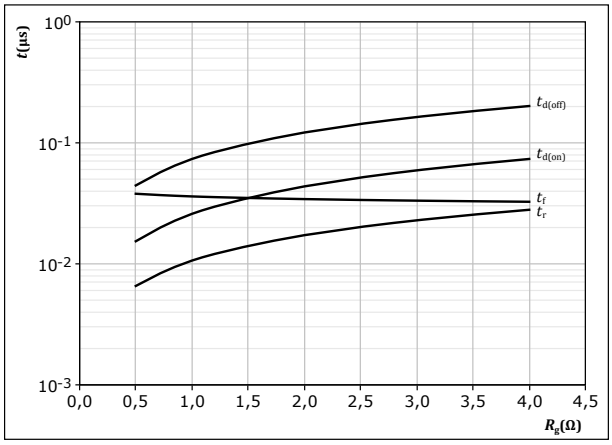
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	-5/15	V
R_{gon} =	2	Ω
R_{goff} =	2	Ω

figure 38. **IGBT**

Typical switching times as a function of IGBT turn on gate resistor

$t = f(R_g)$



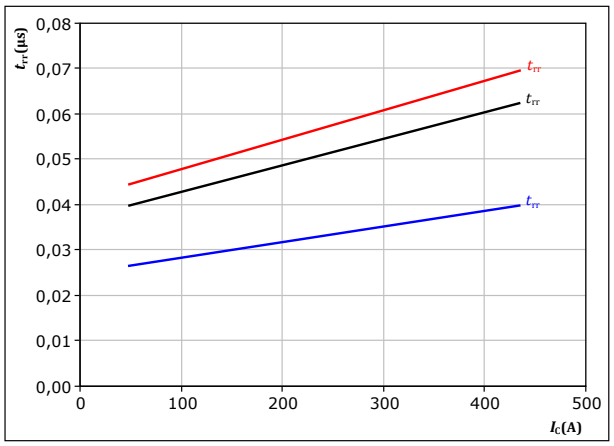
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	-5/15	V
I_C =	240	A

figure 39. **FWD**

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_C)$



With an inductive load at

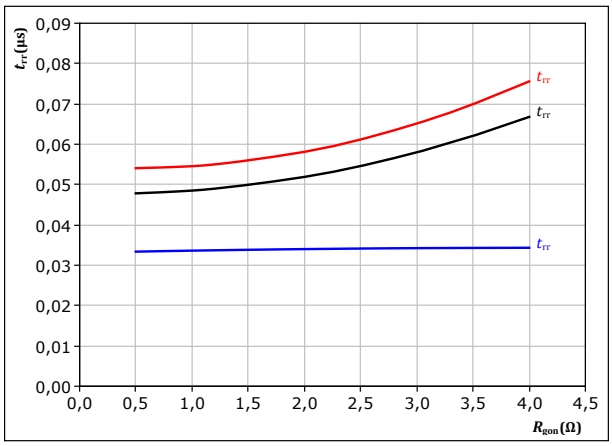
V_{CE} =	350	V
V_{GE} =	-5/15	V
R_{gon} =	2	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 40. **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} =	350	V
V_{GE} =	-5/15	V
I_C =	240	A

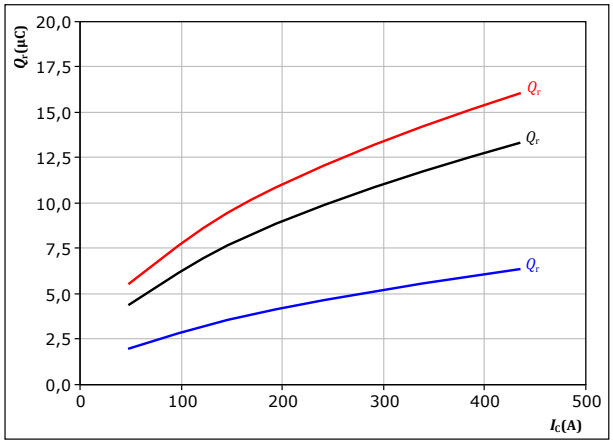
T_j: 25 °C, 125 °C, 150 °C

Boost Switching Characteristics

figure 41. **FWD**

Typical recovered charge as a function of collector current

$Q_r = f(I_C)$



With an inductive load at

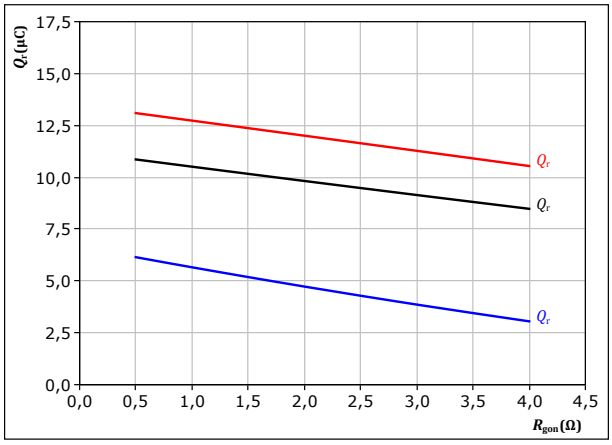
V_{CE} =	350	V
V_{GE} =	-5/15	V
R_{gon} =	2	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 42. **FWD**

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

$Q_r = f(R_{gon})$



With an inductive load at

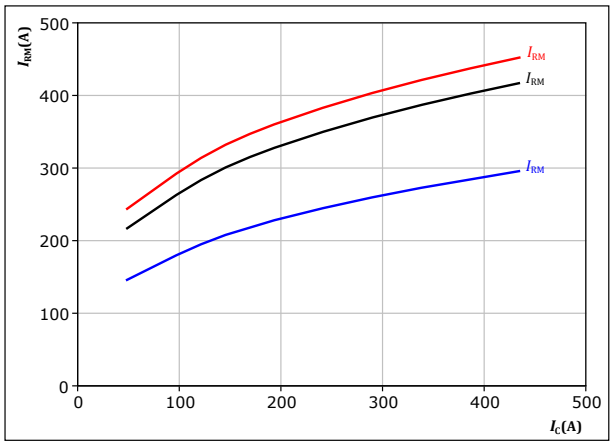
V_{CE} =	350	V
V_{GE} =	-5/15	V
I_C =	240	A

T_j: 25 °C, 125 °C, 150 °C

figure 43. **FWD**

Typical peak reverse recovery current as a function of collector current

$I_{RM} = f(I_C)$



With an inductive load at

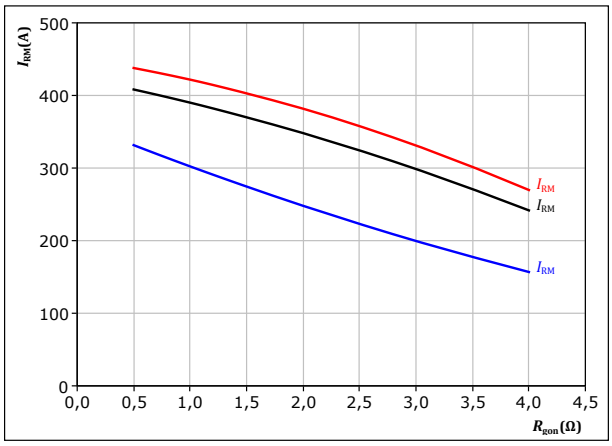
V_{CE} =	350	V
V_{GE} =	-5/15	V
R_{gon} =	2	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 44. **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} =	350	V
V_{GE} =	-5/15	V
I_C =	240	A

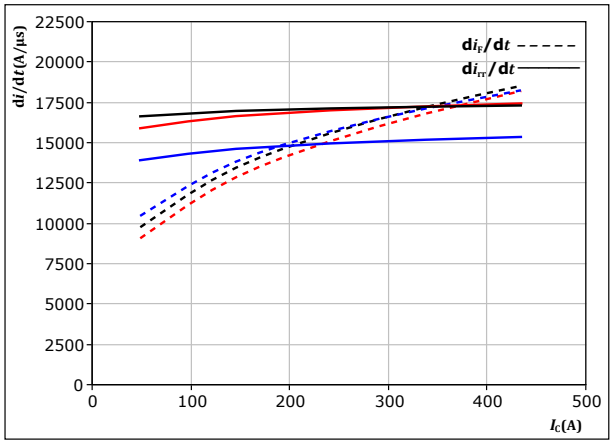
T_j: 25 °C, 125 °C, 150 °C

Boost Switching Characteristics

figure 45. **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

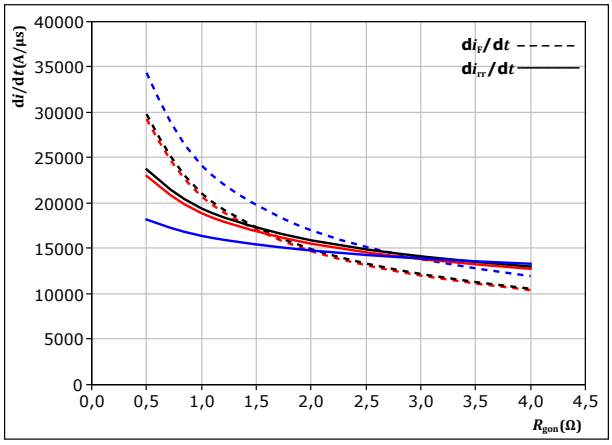
V_{CE} =	350	V
V_{GE} =	-5/15	V
R_{gon} =	2	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 46. **FWD**

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

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



With an inductive load at

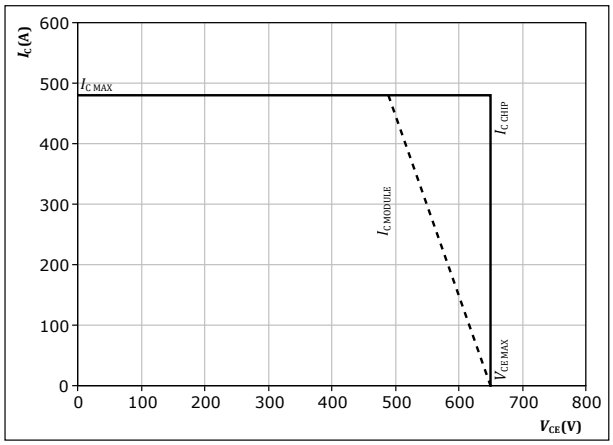
V_{CE} =	350	V
V_{GE} =	-5/15	V
I_C =	240	A

T_j: 25 °C, 125 °C, 150 °C

figure 47. **IGBT**

Reverse bias safe operating area

I_C = f(V_{CE})



At

T_j =	150	°C
R_{gon} =	2	Ω
R_{goff} =	2	Ω

Switching Definitions

figure 48. **IGBT**

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

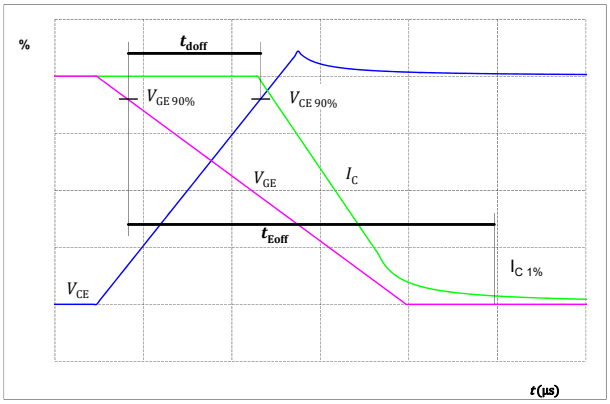


figure 49. **IGBT**

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

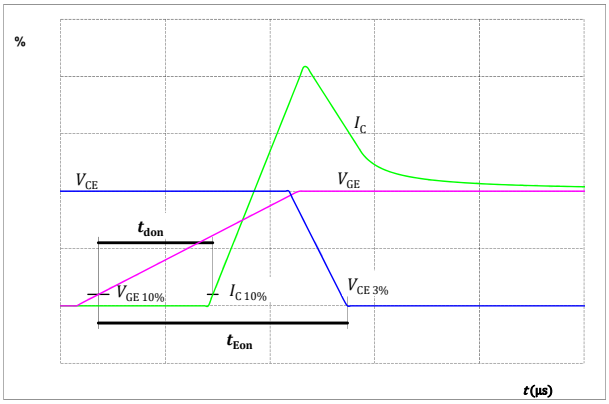


figure 50. **IGBT**

Turn-off Switching Waveforms & definition of t_f

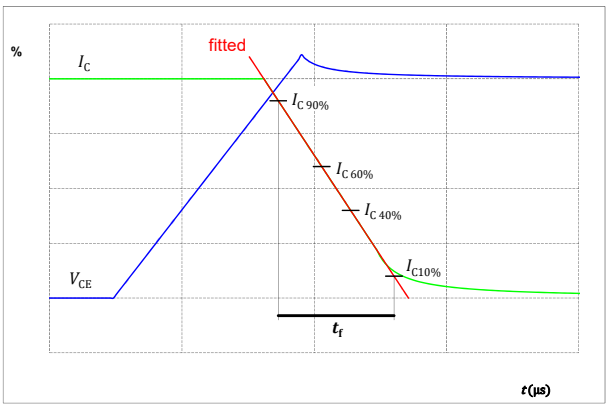
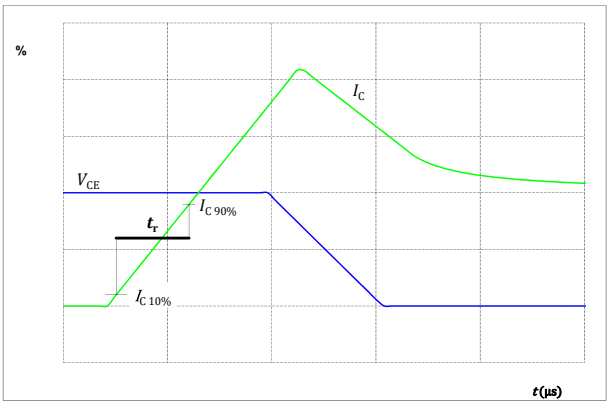


figure 51. **IGBT**

Turn-on Switching Waveforms & definition of t_r



Switching Definitions

figure 52. **FWD**

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

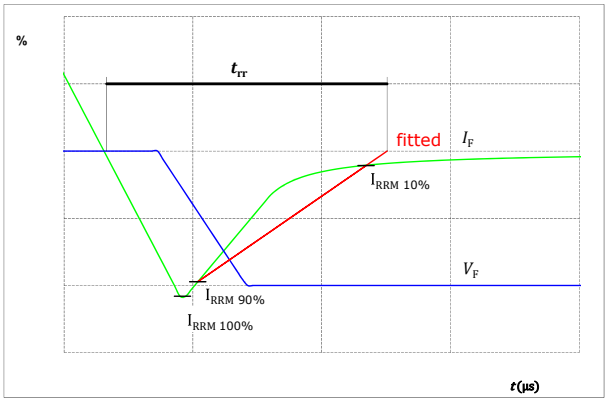
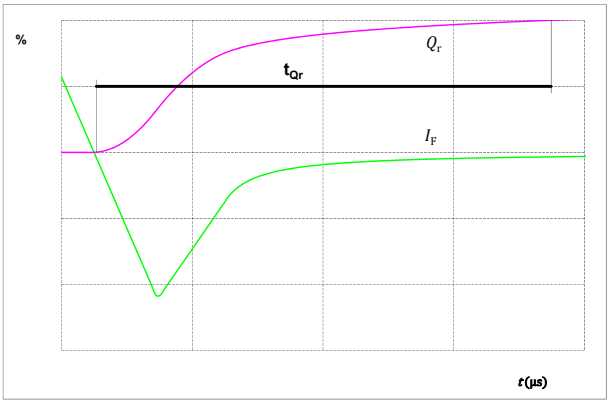


figure 53. **FWD**

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



Vincotech

30-FT07NIC320RG01-PJ76F88
datasheet

Ordering Code

Version	Ordering Code
Without thermal paste	30-FT07NIC320RG01-PJ76F88
With thermal paste (3,4 W/mK, PSX-P7)	30-FT07NIC320RG01-PJ76F88-/3/

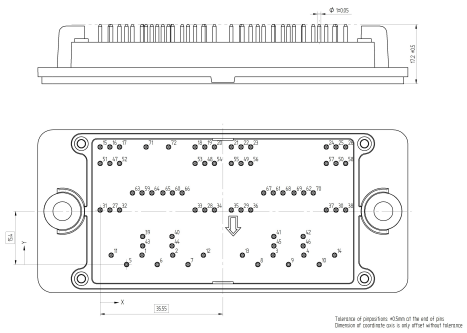
Marking

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

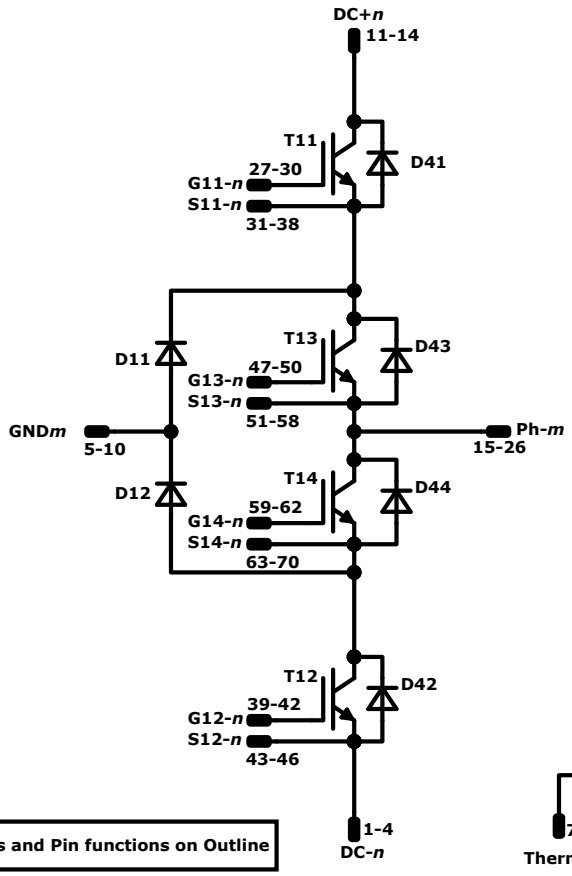
Outline

Pin table [mm]

Pin	X	Y	Function	37	65,5	15,75	S11-4
1	12,1	2,7	DC-1	38	71,1	15,75	S11-4
2	21	2,7	DC-2	39	12,3	8,1	G12-1
3	50,1	2,7	DC-3	40	20,8	8,1	G12-2
4	59	2,7	DC-4	41	50,3	8,1	G12-3
5	7,65	0	GND1	42	58,8	8,1	G12-4
6	16,55	0	GND1	43	12,3	5,4	S12-1
7	25,45	0	GND1	44	20,8	5,4	S12-2
8	45,65	0	GND2	45	50,3	5,4	S12-3
9	54,55	0	GND2	46	58,8	5,4	S12-4
10	63,45	0	GND2	47	2,8	29,2	G13-1
11	3,2	2,7	DC+1	48	30,3	29,2	G13-2
12	29,9	2,7	DC+2	49	40,8	29,2	G13-3
13	41,2	2,7	DC+3	50	68,3	29,2	G13-4
14	67,9	2,7	DC+4	51	0	29,2	S13-1
15	0	33,95	Ph-1	52	5,6	29,2	S13-1
16	2,8	33,95	Ph-1	53	27,5	29,2	S13-2
17	5,6	33,95	Ph-1	54	33,1	29,2	S13-2
18	27,5	33,95	Ph-1	55	38	29,2	S13-3
19	30,3	33,95	Ph-1	56	43,6	29,2	S13-3
20	33,1	33,95	Ph-1	57	65,5	29,2	S13-4
21	38	33,95	Ph-2	58	71,1	29,2	S13-4
22	40,8	33,95	Ph-2	59	12,15	20,7	G14-1
23	43,6	33,95	Ph-2	60	20,95	20,7	G14-2
24	65,5	33,95	Ph-2	61	50,15	20,7	G14-3
25	68,3	33,95	Ph-2	62	58,95	20,7	G14-4
26	71,1	33,95	Ph-2	63	9,35	20,7	S14-1
27	2,8	15,75	G11-1	64	14,95	20,7	S14-1
28	30,3	15,75	G11-2	65	18,15	20,7	S14-2
29	40,8	15,75	G11-3	66	23,75	20,7	S14-2
30	68,3	15,75	G11-4	67	47,35	20,7	S14-3
31	0	15,75	S11-1	68	52,95	20,7	S14-3
32	5,6	15,75	S11-1	69	56,15	20,7	S14-4
33	27,5	15,75	S11-2	70	61,75	20,7	S14-4
34	33,1	15,75	S11-2	71	13,3	33,95	Therm1
35	38	15,75	S11-3	72	19,8	33,95	Therm2
36	43,6	15,75	S11-3				



Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T11, T12	IGBT	650 V	240 A	Buck Switch	Parallel devices with separate control. Values apply to complete device.
D11, D12	FWD	650 V	280 A	Buck Diode	
T13, T14	IGBT	650 V	240 A	Boost Switch	Parallel devices with separate control. Values apply to complete device.
D42, D41	FWD	650 V	240 A	Boost Diode	
D44, D43	FWD	650 V	240 A	Boost Sw. Inv. Diode	
Rt	Thermistor			Thermistor	

Packaging instruction				
Standard packaging quantity (SPQ) 36	>SPQ	Standard	<SPQ	Sample

Handling instruction
Handling instructions for *flow* 2 packages see vincotech.com website.

Package data
Package data for *flow* 2 packages see vincotech.com website.

Vincotech thermistor reference
See Vincotech thermistor reference table at vincotech.com website.

UL recognition and file number
This device is UL 1557 recognized under E192116 up to a junction temperature under switching condition $T_{j,op}$=175°C and up to 3500VAC/1min isolation voltage. For more information see vincotech.com website.

Document No.:	Date:	Modification:	Pages
30-FT07NIC320RG01-PJ76F88-D1-14	29 May. 2024	Initial release	