30-FT07NIC320S501-PJ76F58

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 speed and smooth switching
- Low gate charge
- Very low collector emitter saturation voltage

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

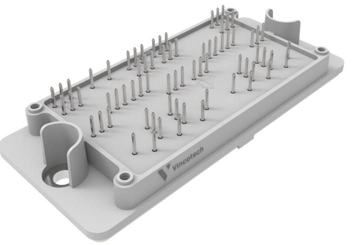
Target applications

Energy Storage Systems; Solar Inverters; UPS

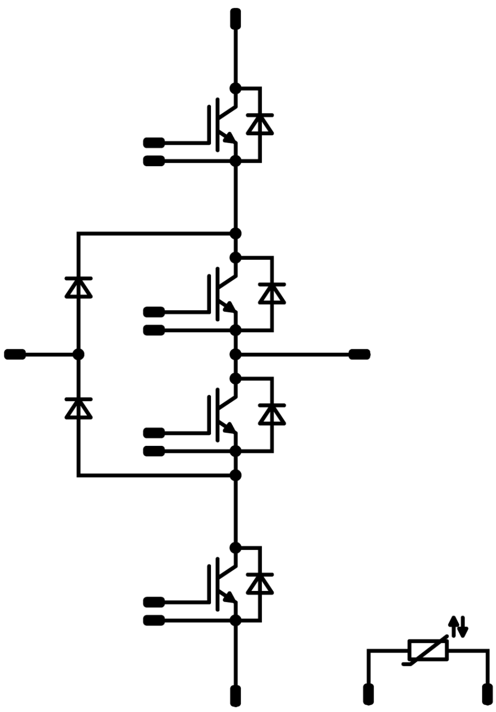
Types

- 30-FT07NIC320S501-PJ76F58

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	285	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	444	W
Gate-emitter voltage	V_{GES}			±20	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	237	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}		900	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	285	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	444	W
Gate-emitter voltage	V_{GES}			±20	V
Maximum junction temperature	T_{jmax}			175	°C

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions		Value	Unit
Boost Diode					
Peak repetitive reverse voltage	V_{RRM}			650	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s = 80 °C	254	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}		720	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	363	W
Maximum junction temperature	T_{jmax}			175	°C
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	254	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}		720	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	363	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
Isolation voltage	V_{isol}	AC Voltage	t_p = 1 min	2500	V
Creepage distance				>12,7	mm
Clearance				>12,7	mm
Comparative Tracking Index	CTI			≥ 600	

*100 % tested in production

Characteristic Values

Parameter	Symbol	Conditions	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	Unit
Buck Switch										
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,0032	25	3,2	4	4,8	V
Collector-emitter saturation voltage	V_{CEsat}		15		320	25 125 150		1,43 1,57 1,6	1,75(1)	V
Collector-emitter cut-off current	I_{CES}		0	650		25			400	µA
Gate-emitter leakage current	I_{GES}		20	0		25			800	nA
Internal gate resistance	r_g							None		Ω
Input capacitance	C_{ies}	f = 1 Mhz	0	25		25		20000		pF
Reverse transfer capacitance	C_{res}							72		pF
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,21		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 2 Ω R_{goff} = 2 Ω	±15	350	300	25 125 150		79,3 80,7 81,4		ns
Rise time	t_r					25 125 150		16,42 17,79 18,12		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		87,43 104,41 108,52		ns
Fall time	t_f					25 125 150		13,44 27,73 31,76		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=7,07 µC Q_{rFWD}=14,99 µC Q_{rFWD}=17,5 µC				25 125 150		3,48 4,73 4,95		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		3,11 4,8 5,25		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				300	25 125 150		1,66 1,63 1,6	1,92(1)	V
Reverse leakage current	I_R	V_r = 650 V				25			15,2	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}	d*i*/d*t*=13959 A/µs d*i*/d*t*=14408 A/µs d*i*/d*t*=12703 A/µs	±15	350	300	25 125 150		191,8 271,69 298,08		A
Reverse recovery time	t_{rr}					25 125 150		67,23 94,75 104,81		ns
Recovered charge	Q_r					25 125 150		7,07 14,99 17,5		µC
Reverse recovered energy	E_{rec}					25 125 150		1,48 3,43 4,07		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		3480,89 3373,08 3580,7		A/µs

Characteristic Values

Parameter	Symbol	Conditions	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	Unit
Boost Switch										
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$	V_{CE} = V_{GE}			0,0032	25	3,2	4	4,8	V
Collector-emitter saturation voltage	V_{CEsat}		15		320	25 125 150		1,43 1,57 1,6	1,75(1)	V
Collector-emitter cut-off current	I_{CES}		0	650		25			400	µA
Gate-emitter leakage current	I_{GES}		20	0		25			800	nA
Internal gate resistance	r_g							None		Ω
Input capacitance	C_{ies}	f = 1 Mhz	0	25		25		20000		pF
Reverse transfer capacitance	C_{res}	f = 1 Mhz	0	25		25		72		pF
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,21		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 2 Ω R_{goff} = 2 Ω	±15	350	300	25 125 150		82,7 84,2 84,57		ns
Rise time	t_r	R_{gon} = 2 Ω R_{goff} = 2 Ω	±15	350	300	25 125 150		16,2 18,21 18,69		ns
Turn-off delay time	$t_{d(off)}$	R_{gon} = 2 Ω R_{goff} = 2 Ω	±15	350	300	25 125 150		84,7 101,39 105,95		ns
Fall time	t_f	R_{gon} = 2 Ω R_{goff} = 2 Ω	±15	350	300	25 125 150		13,31 26,53 30,31		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=7,13 µC Q_{rFWD}=14,14 µC Q_{rFWD}=16,24 µC	±15	350	300	25 125 150		2,3 2,76 2,86		mWs
Turn-off energy (per pulse)	E_{off}		±15	350	300	25 125 150		3,59 5,57 6,02		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				240	25 125 150		1,53 1,46 1,43	1,92(1)	V
Reverse leakage current	I_R	V_r = 650 V				25			12,8	µA
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j\text{-}s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,26		K/W
Dynamic										
Peak recovery current	I_{RM}	d*i*/d*t*=14869 A/µs d*i*/d*t*=13339 A/µs d*i*/d*t*=13176 A/µs	±15	350	300	25 125 150		189,35 250,58 267,71		A
Reverse recovery time	t_{rr}					25 125 150		68,76 105,57 117,78		ns
Recovered charge	Q_r					25 125 150		7,13 14,14 16,24		µC
Reverse recovered energy	E_{rec}					25 125 150		1,53 3,14 3,6		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		3043,21 2513,7 2618,43		A/µs

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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				240	25 125 150		1,53 1,46 1,43	1,92[1]	V
Reverse leakage current	I_R	V_r = 650 V				25			12,8	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	

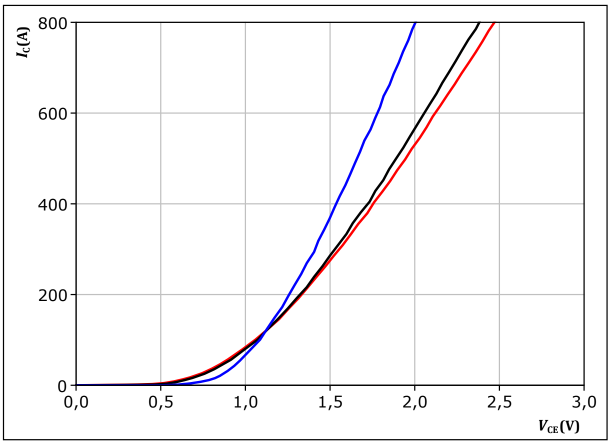
(1) Value at chip level
(2) Only valid with pre-applied Vincotech thermal interface material.

Buck Switch Characteristics

figure 1. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$



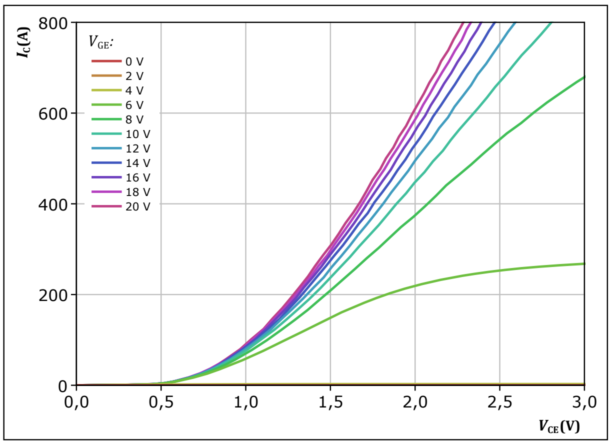
t_p = 250 µs
V_{GE} = 14 V

T_j: 25 °C, 125 °C, 150 °C

figure 2. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$

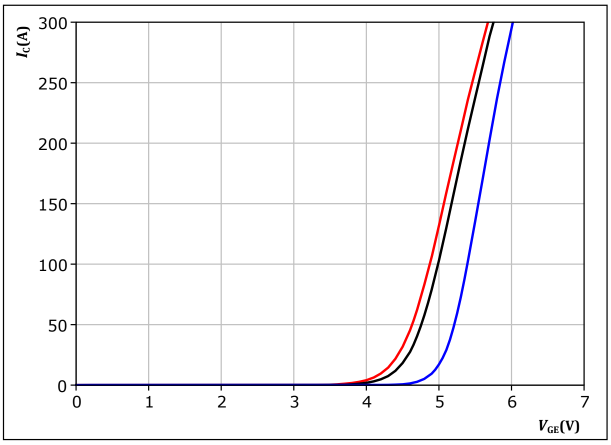


t_p = 250 µs
T_j = 150 °C
V_{GE} from 0 V to 20 V in steps of 2 V

figure 3. **IGBT**

Typical transfer characteristics

$I_C = f(V_{GE})$



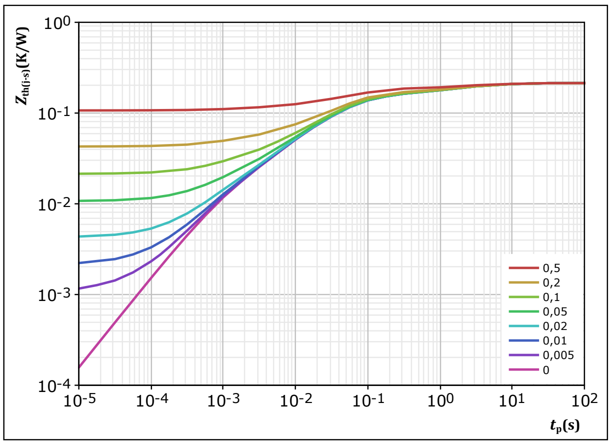
t_p = 250 µs
V_{CE} = 55 V

T_j: 25 °C, 125 °C, 150 °C

figure 4. **IGBT**

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$
$R_{th(j-s)}$ = 0,214 K/W

IGBT thermal model values

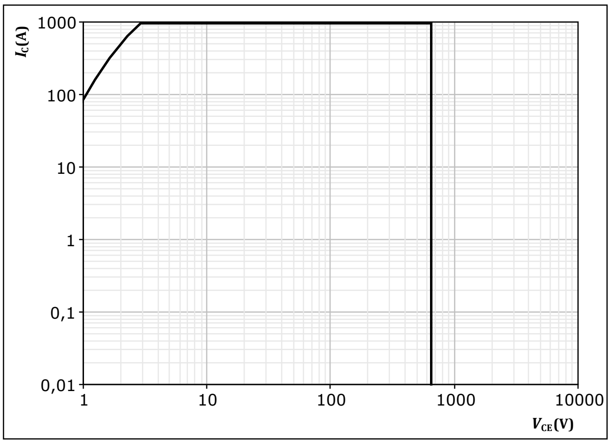
R (K/W)	τ (s)
2,36E-02	6,25E+00
3,62E-02	1,16E+00
1,05E-01	5,88E-02
3,87E-02	1,02E-02
1,00E-02	9,95E-04

Buck Switch Characteristics

figure 5. **IGBT**

Safe operating area

I_C = f(V_{CE})



D = single pulse

T_s = 80 °C

V_{GE} = 14 V

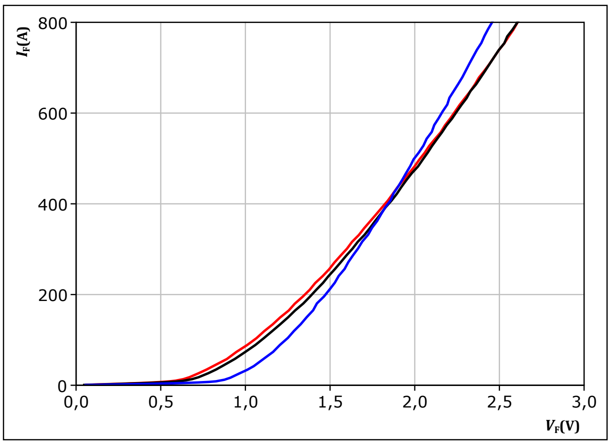
T_j = T_{jmax}

Buck Diode Characteristics

figure 6. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



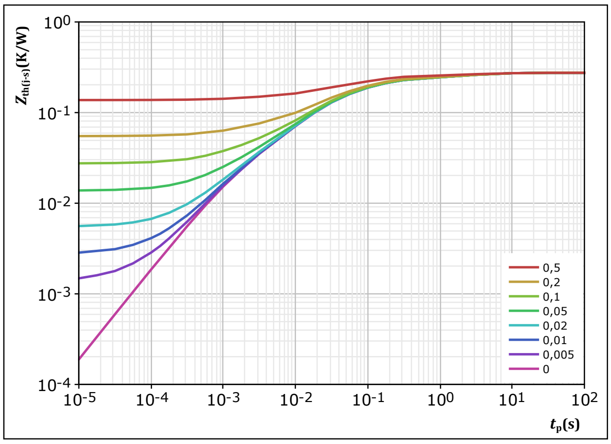
t_p = 250 µs

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

$R_{th(j-s)}$ = 0,275 K/W

FWD thermal model values

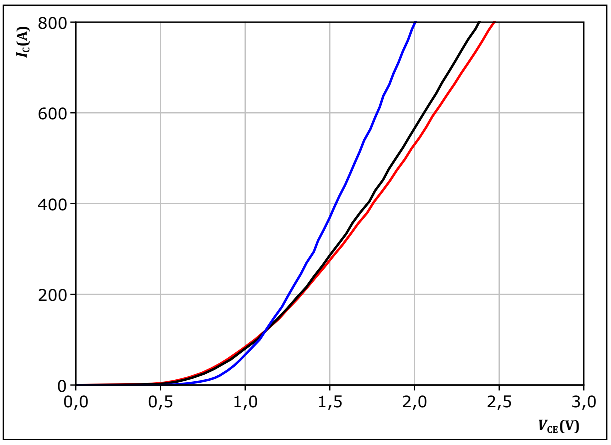
R (K/W)	τ (s)
2,62E-02	4,51E+00
2,75E-02	8,53E-01
1,18E-01	8,44E-02
8,67E-02	1,56E-02
1,65E-02	1,38E-03

Boost Switch Characteristics

figure 8. **IGBT**

Typical output characteristics

I_C = f(V_{CE})

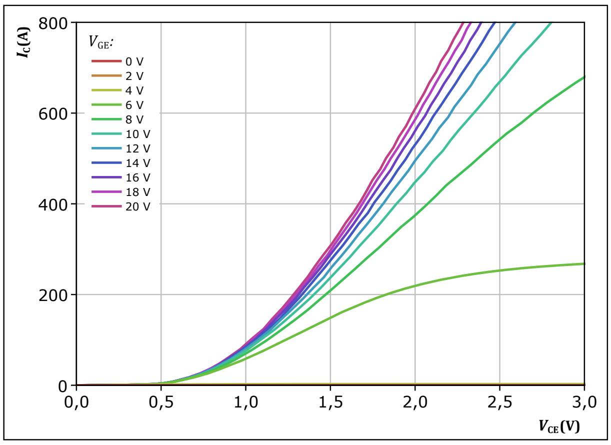


t_p =	250	µs	
V_{GE} =	14	V	
T_j:			25 °C
			125 °C
			150 °C

figure 9. **IGBT**

Typical output characteristics

I_C = f(V_{CE})



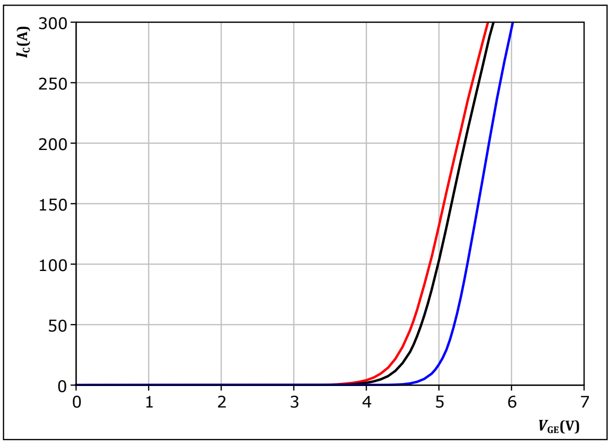
t_p =	250	µs
T_j =	150	°C

V_{GE} from 0 V to 20 V in steps of 2 V

figure 10. **IGBT**

Typical transfer characteristics

I_C = f(V_{GE})

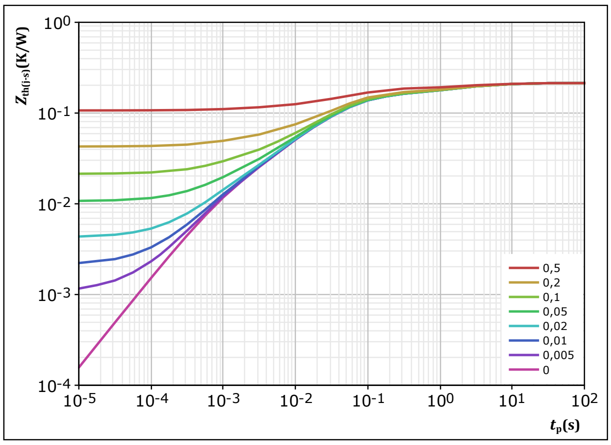


t_p =	250	µs	
V_{CE} =	55	V	
T_j:			25 °C
			125 °C
			150 °C

figure 11. **IGBT**

Transient thermal impedance as a function of pulse width

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



D =	t_p / T	
$R_{th(j-s)}$ =	0,214	K/W

IGBT thermal model values

R (K/W)	τ (s)
2,36E-02	6,25E+00
3,62E-02	1,16E+00
1,05E-01	5,88E-02
3,87E-02	1,02E-02
1,00E-02	9,95E-04

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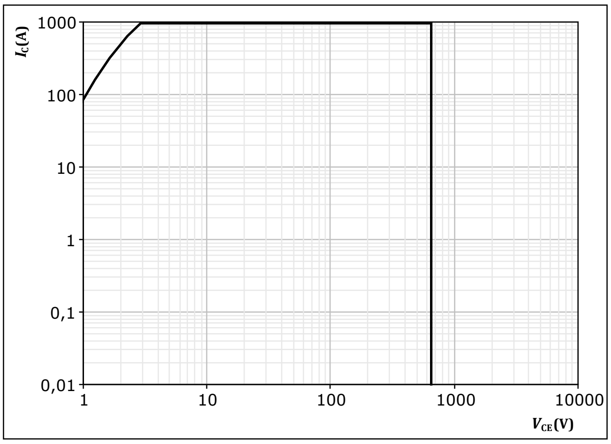
Boost Switch Characteristics

figure 12.	IGBT

Safe operating area

$I_C = f(V_{CE})$



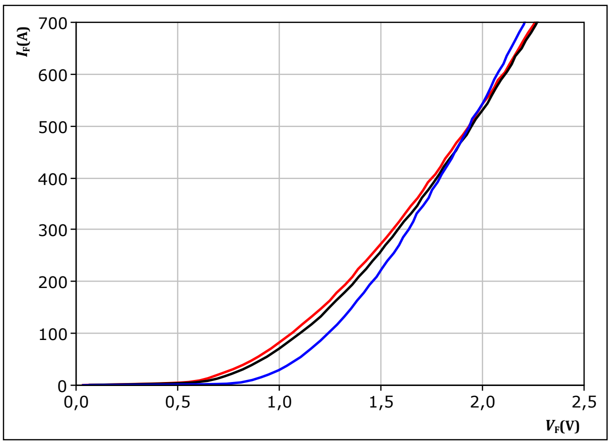
D = single pulse
T_s = 80 °C
V_{GE} = 14 V
T_j = T_{jmax}

Boost Diode Characteristics

figure 13. **FWD**

Typical forward characteristics

I_F = f(V_F)



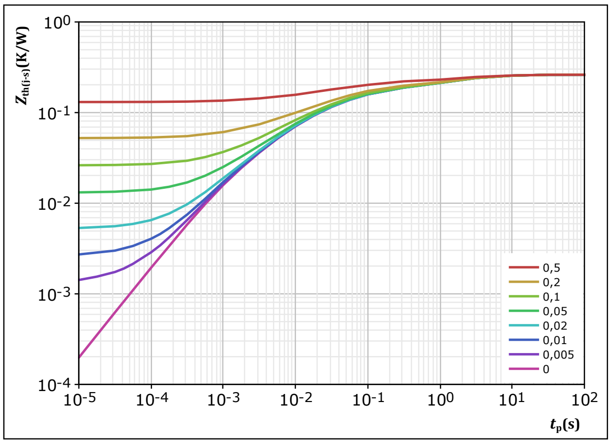
t_p = 250 µs

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

$R_{th(j-s)}$ = 0,262 K/W

FWD thermal model values

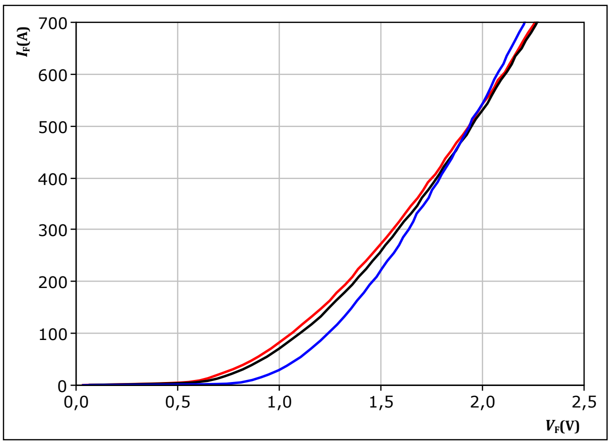
R (K/W)	τ (s)
2,89E-02	6,06E+00
5,91E-02	1,13E+00
9,21E-02	6,58E-02
6,69E-02	9,86E-03
1,45E-02	1,25E-03

Boost Sw. Inv. Diode Characteristics

figure 15. FWD

Typical forward characteristics

I_F = f(V_F)



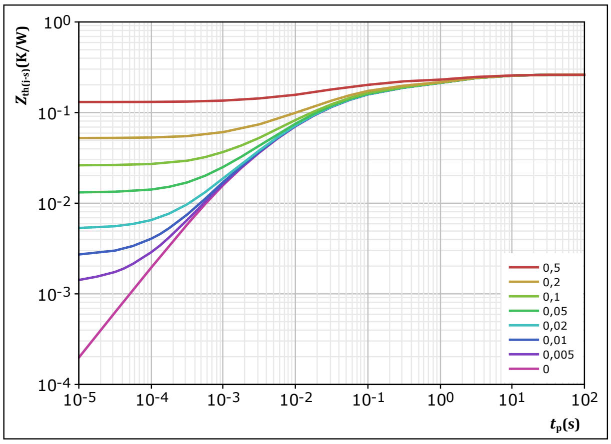
t_p = 250 µs

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

$R_{th(j-s)}$ = 0,262 K/W

FWD thermal model values

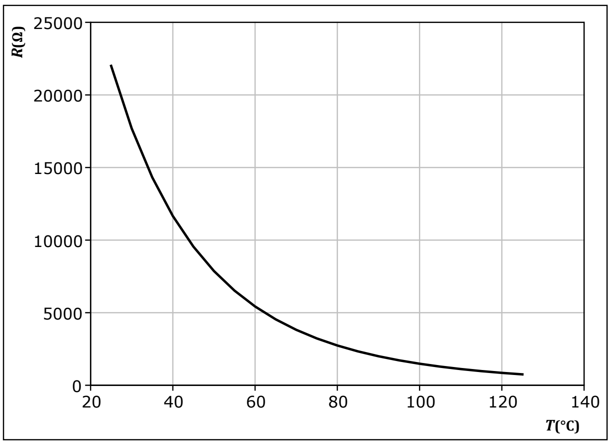
R (K/W)	τ (s)
2,89E-02	6,06E+00
5,91E-02	1,13E+00
9,21E-02	6,58E-02
6,69E-02	9,86E-03
1,45E-02	1,25E-03

Thermistor Characteristics

figure 17.	Thermistor

Typical NTC characteristic as function of temperature

R_T = f(T)

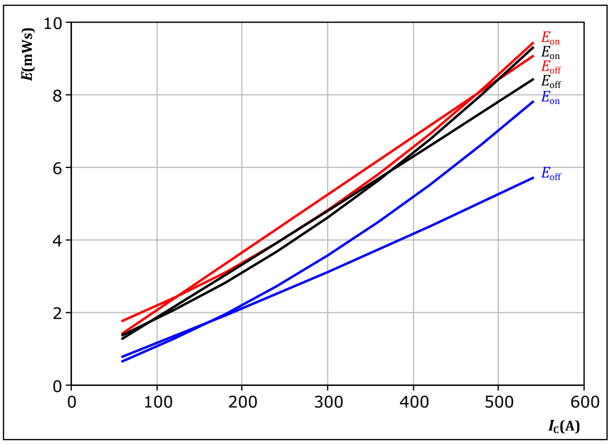


Buck Switching Characteristics

figure 18. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



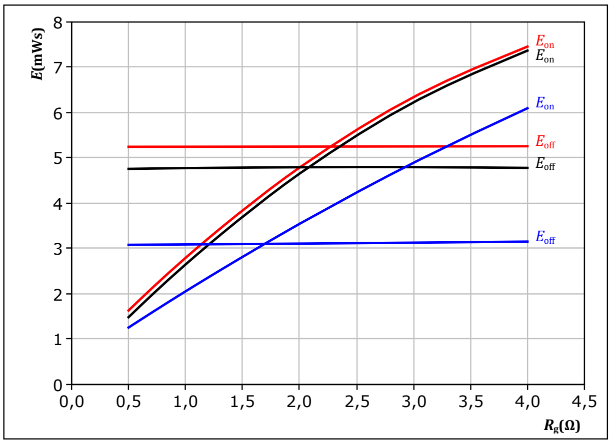
With an inductive load at

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

figure 19. **IGBT**

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

$E = f(R_g)$



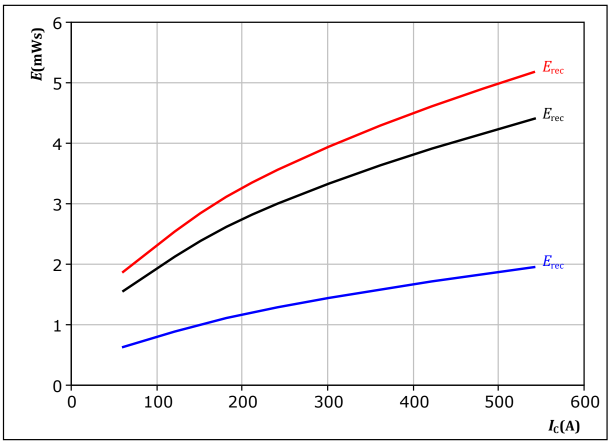
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	300	A		150 °C

figure 20. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



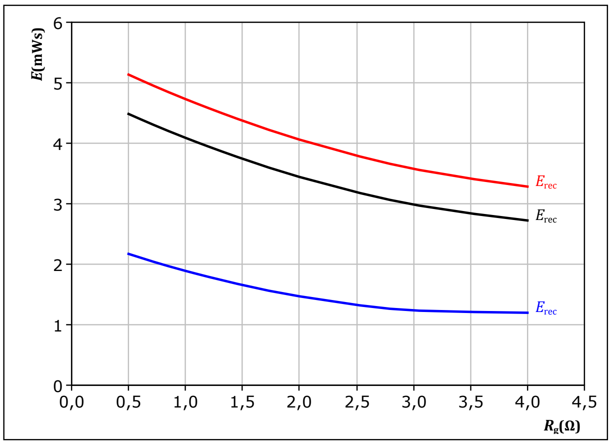
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	2	Ω		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

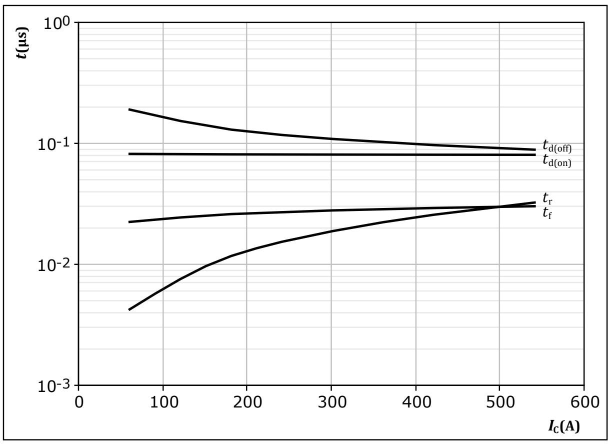
V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	300	A		150 °C

Buck Switching Characteristics

figure 22. **IGBT**

Typical switching times as a function of collector current

t = f(I_C)



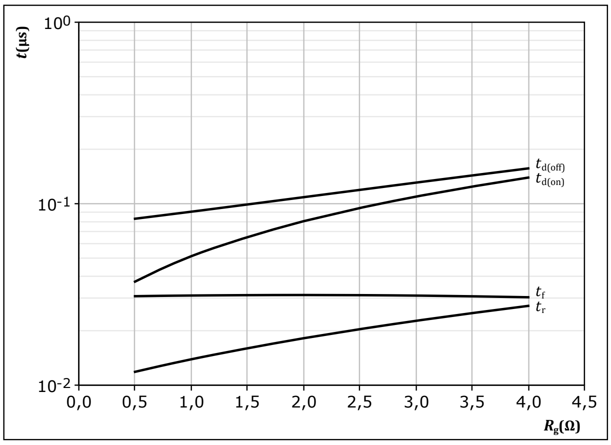
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	±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)



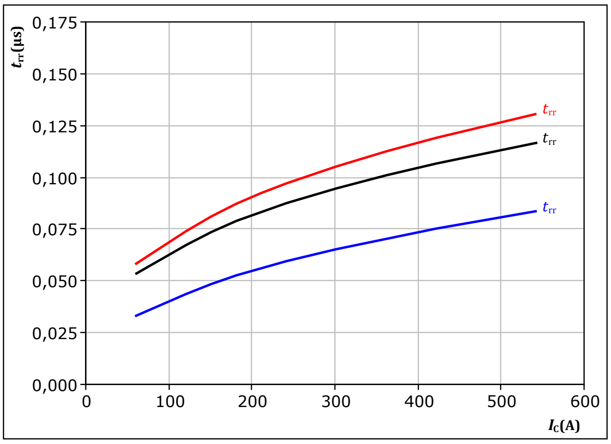
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	±15	V
I_C =	300	A

figure 24. **FWD**

Typical reverse recovery time as a function of collector current

t_{rr} = f(I_C)



With an inductive load at

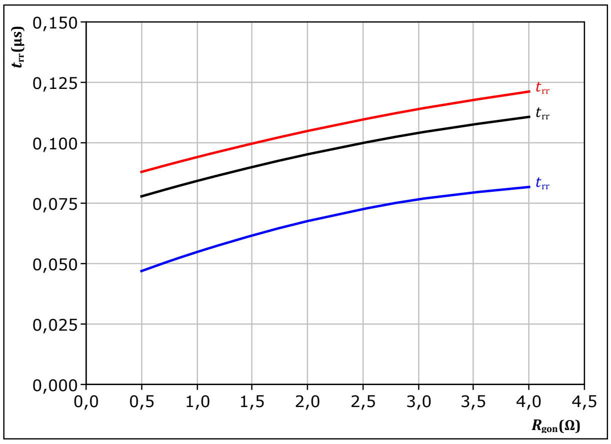
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	2	Ω

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} =	±15	V
I_C =	300	A

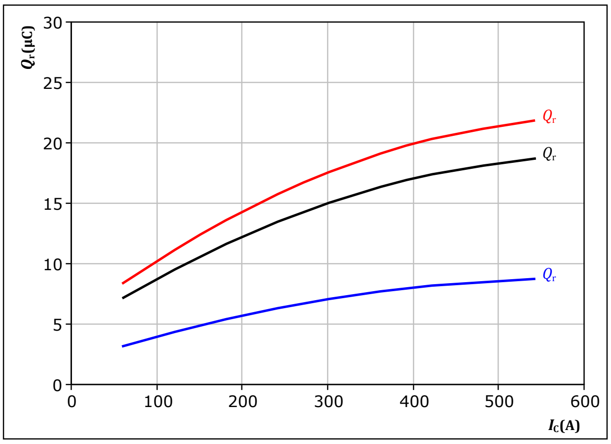
T_j: 25 °C, 125 °C, 150 °C

Buck Switching Characteristics

figure 26. **FWD**

Typical recovered charge as a function of collector current

Q_r = f(I_C)



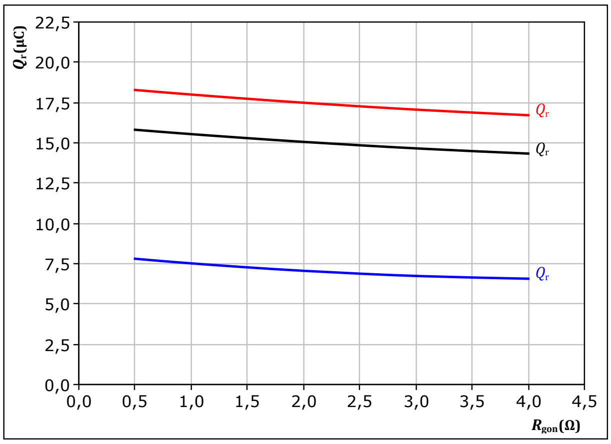
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±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})



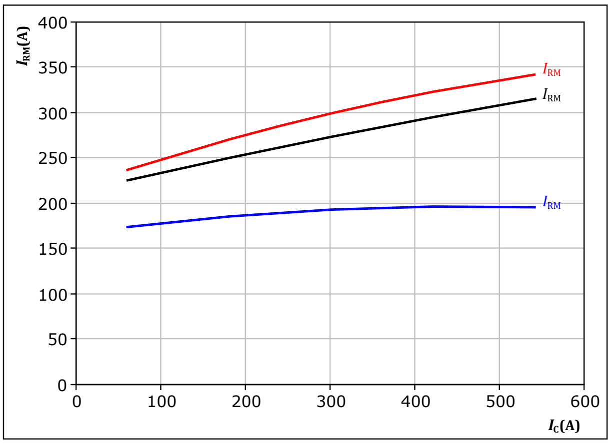
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	300	A		150 °C

figure 28. **FWD**

Typical peak reverse recovery current as a function of collector current

I_{RM} = f(I_C)



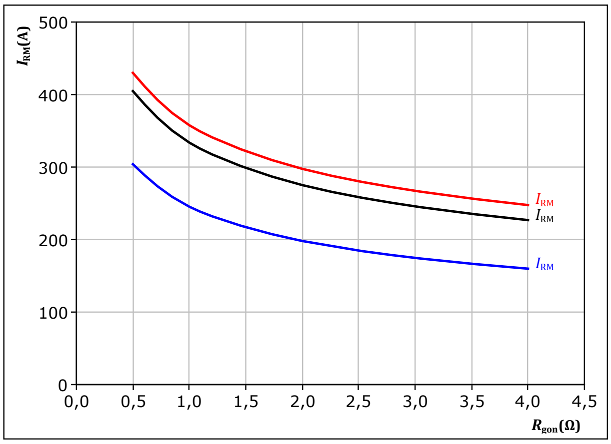
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±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

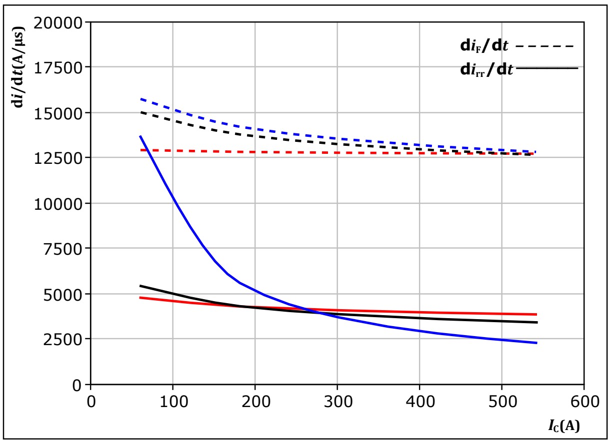
V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	300	A		150 °C

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)



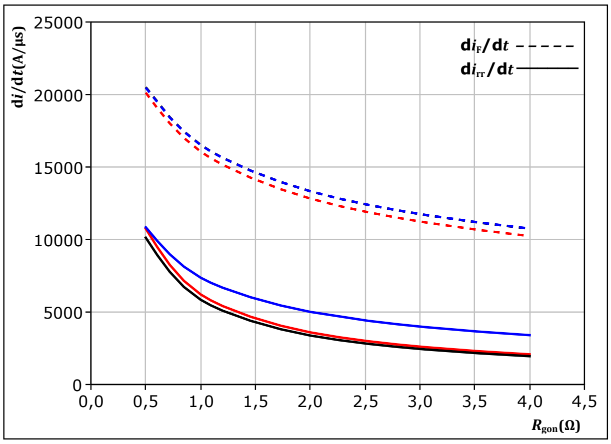
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	2	Ω		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})



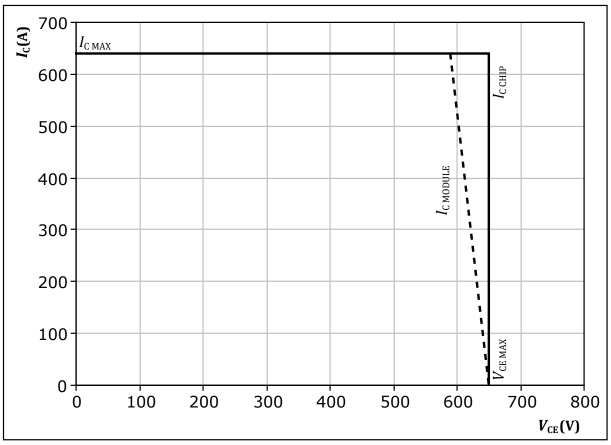
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	300	A		150 °C

figure 32. **IGBT**

Reverse bias safe operating area

I_C = f(V_{CE})



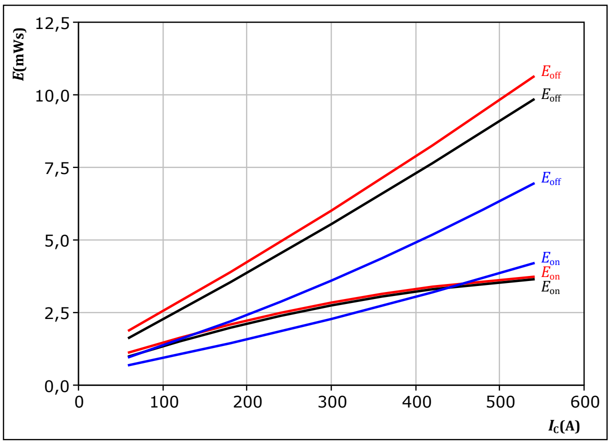
At	T_j =	150	°C
	R_{gon} =	2	Ω
	R_{goff} =	2	Ω

Boost Switching Characteristics

figure 33. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



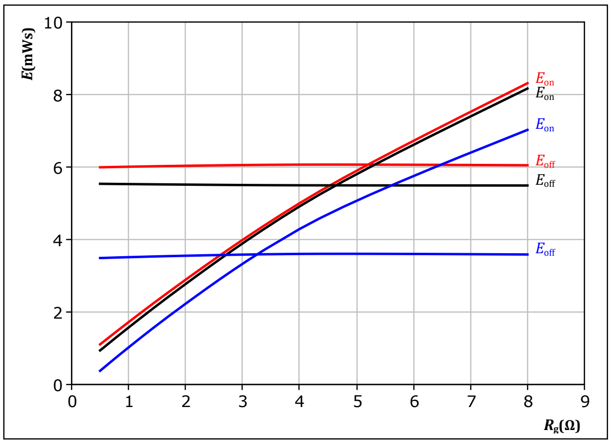
With an inductive load at

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

figure 34. **IGBT**

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

$E = f(R_g)$



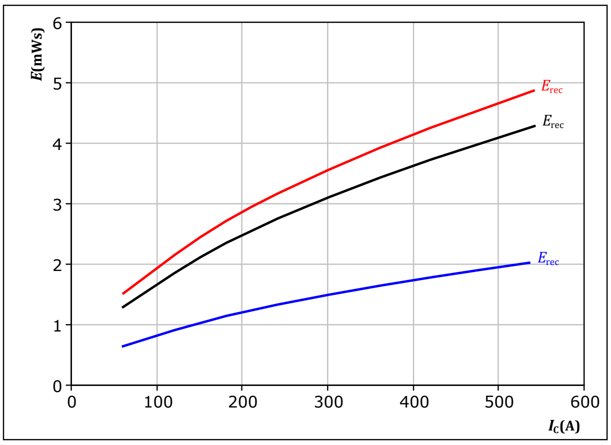
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	300	A		150 °C

figure 35. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



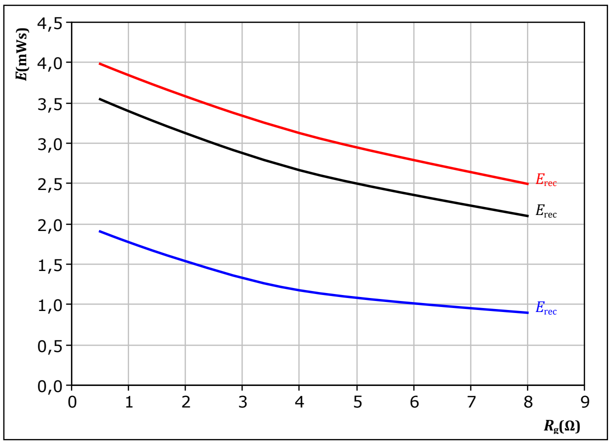
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	2	Ω		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

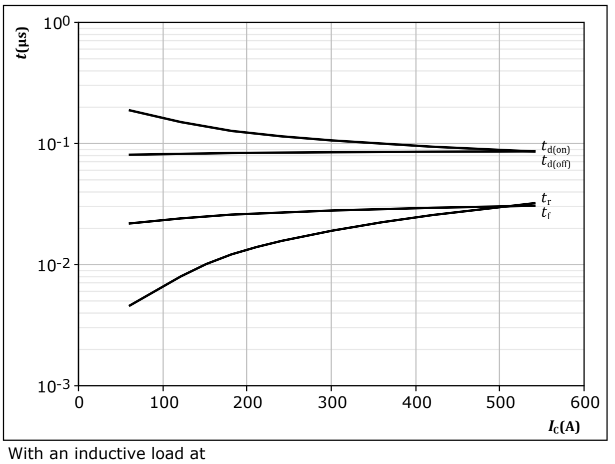
V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	300	A		150 °C

Boost Switching Characteristics

figure 37. **IGBT**

Typical switching times as a function of collector current

t = f(I_C)



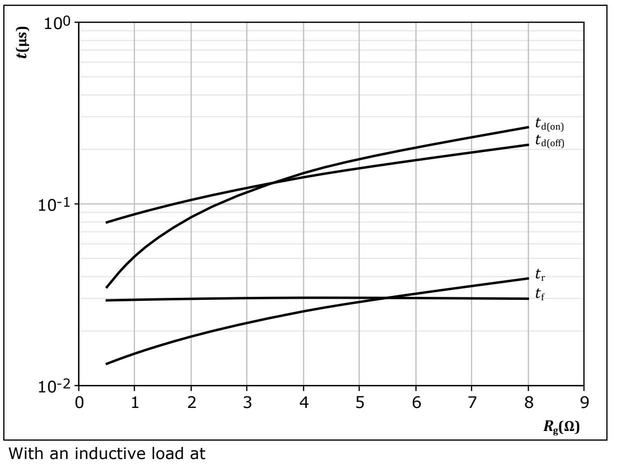
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	±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)



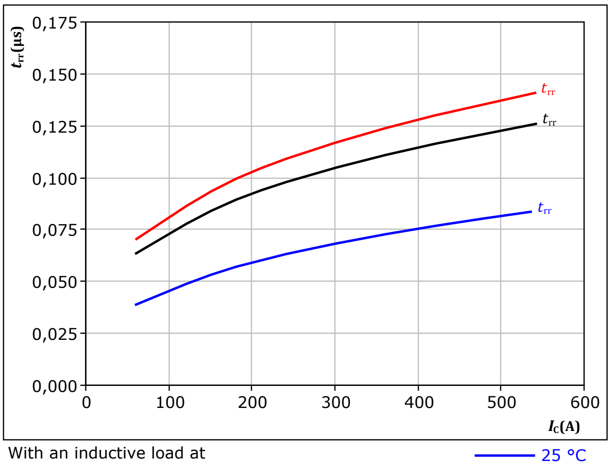
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	±15	V
I_C =	300	A

figure 39. **FWD**

Typical reverse recovery time as a function of collector current

t_{rr} = f(I_C)



With an inductive load at

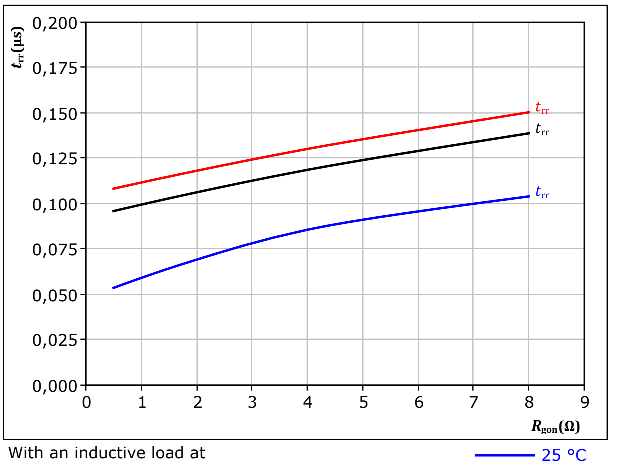
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	2	Ω

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} =	±15	V
I_C =	300	A

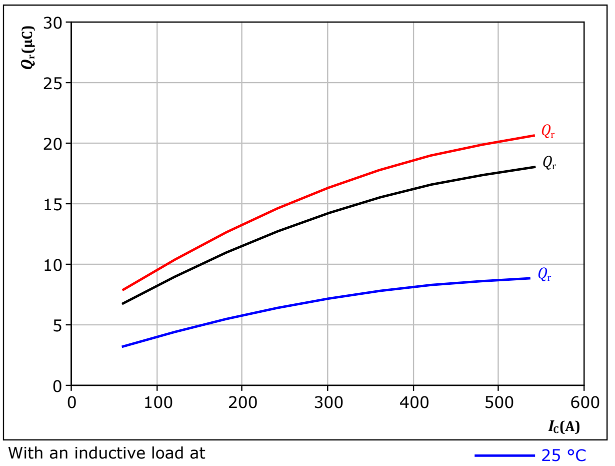
T_j: 25 °C, 125 °C, 150 °C

Boost Switching Characteristics

figure 41. FWD

Typical recovered charge as a function of collector current

Q_r = f(I_C)



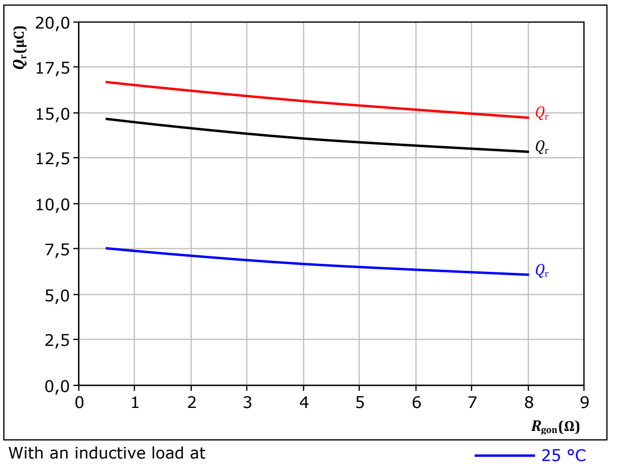
With an inductive load at

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

figure 42. FWD

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

Q_r = f(R_{gon})



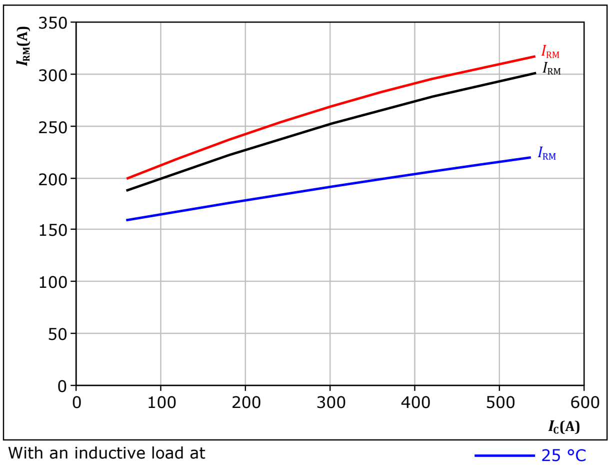
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	300	A		150 °C

figure 43. FWD

Typical peak reverse recovery current as a function of collector current

I_{RM} = f(I_C)



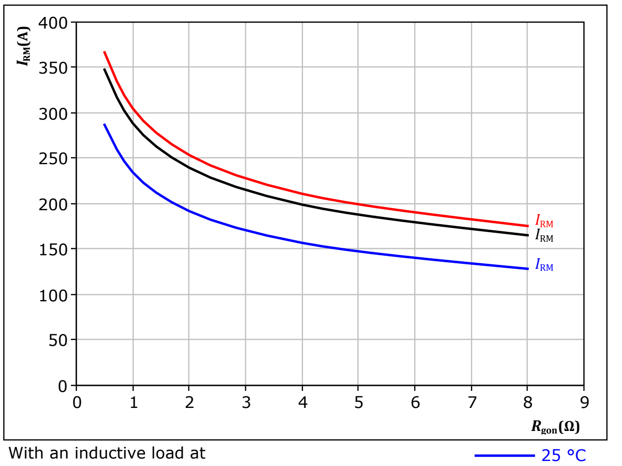
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	2	Ω		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

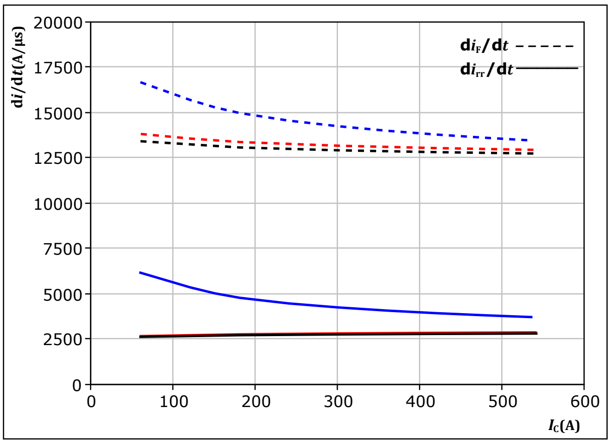
V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	300	A		150 °C

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)



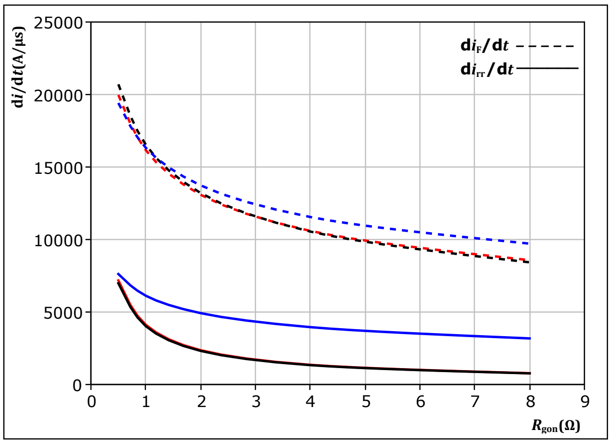
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	2	Ω		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})



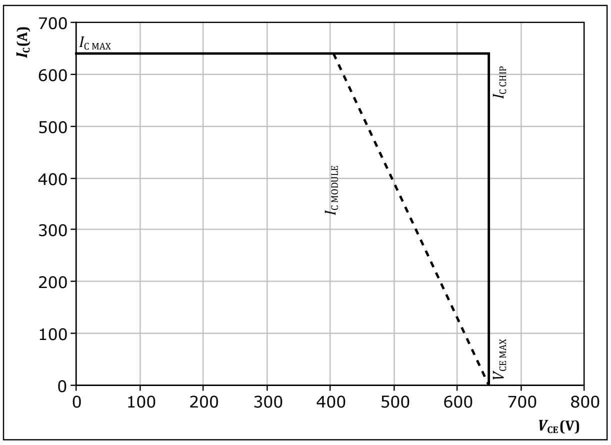
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	300	A		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})

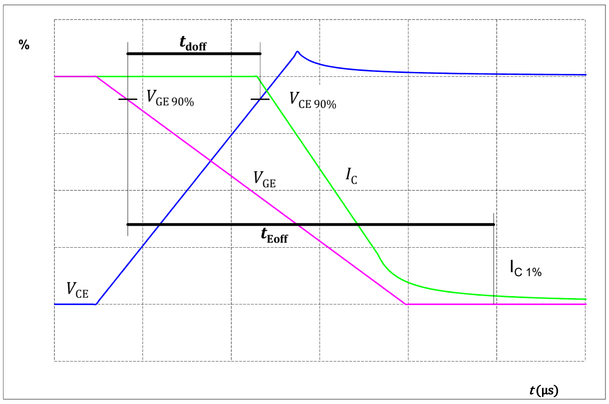


figure 49. **IGBT**

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

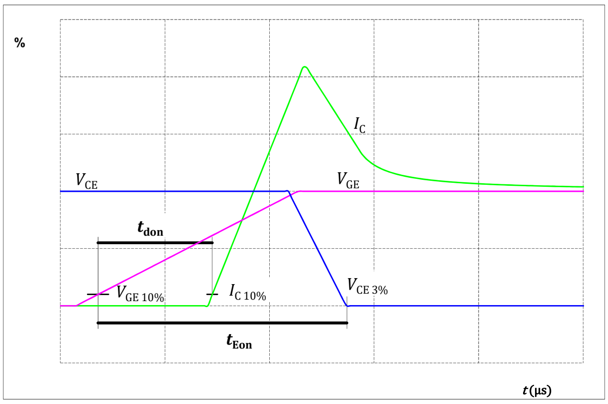


figure 50. **IGBT**

Turn-off Switching Waveforms & definition of t_f

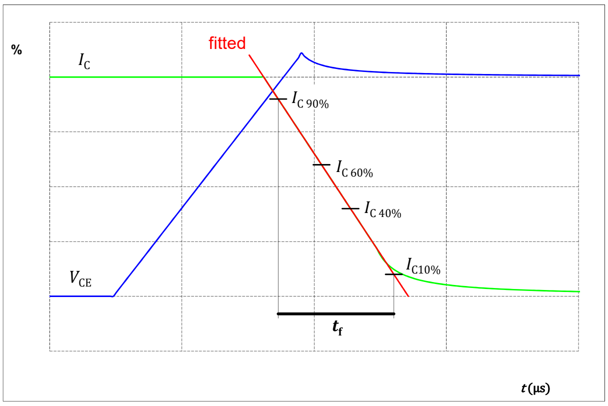
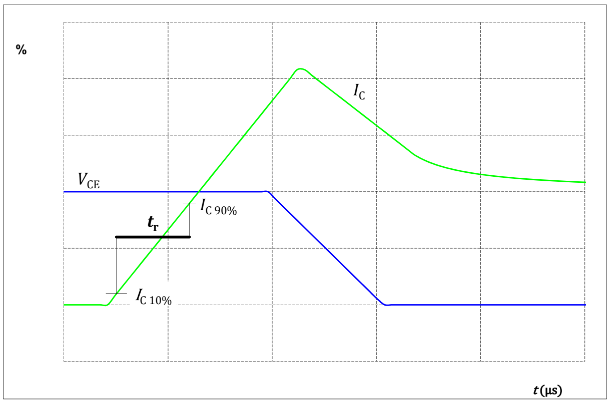


figure 51. **IGBT**

Turn-on Switching Waveforms & definition of t_r



Switching Definitions

figure 52. **FWD**

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

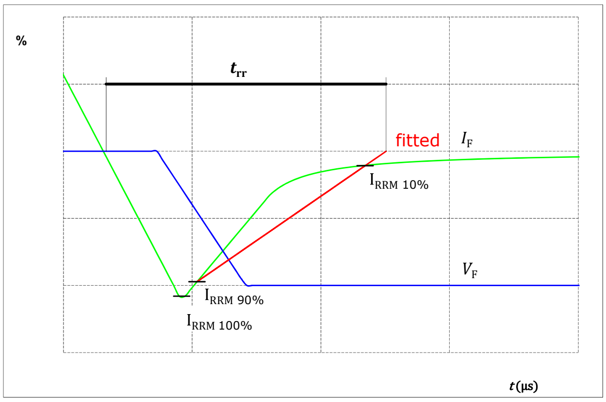
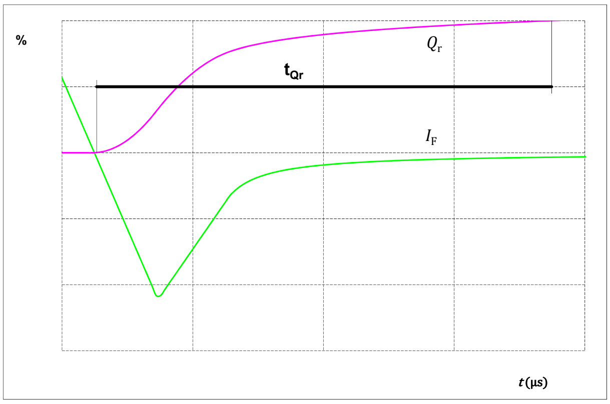


figure 53. **FWD**

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



Ordering Code

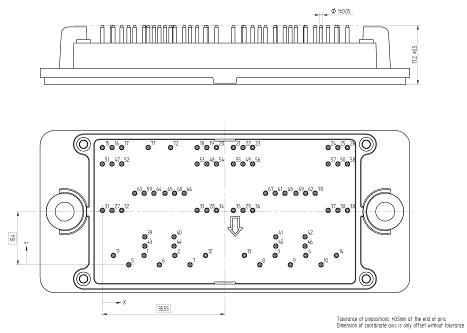
Version	Ordering Code
Without thermal paste	30-FT07NIC320S501-PJ76F58
With thermal paste (3,4 W/mK, PSX-P7)	30-FT07NIC320S501-PJ76F58-/3/

Marking

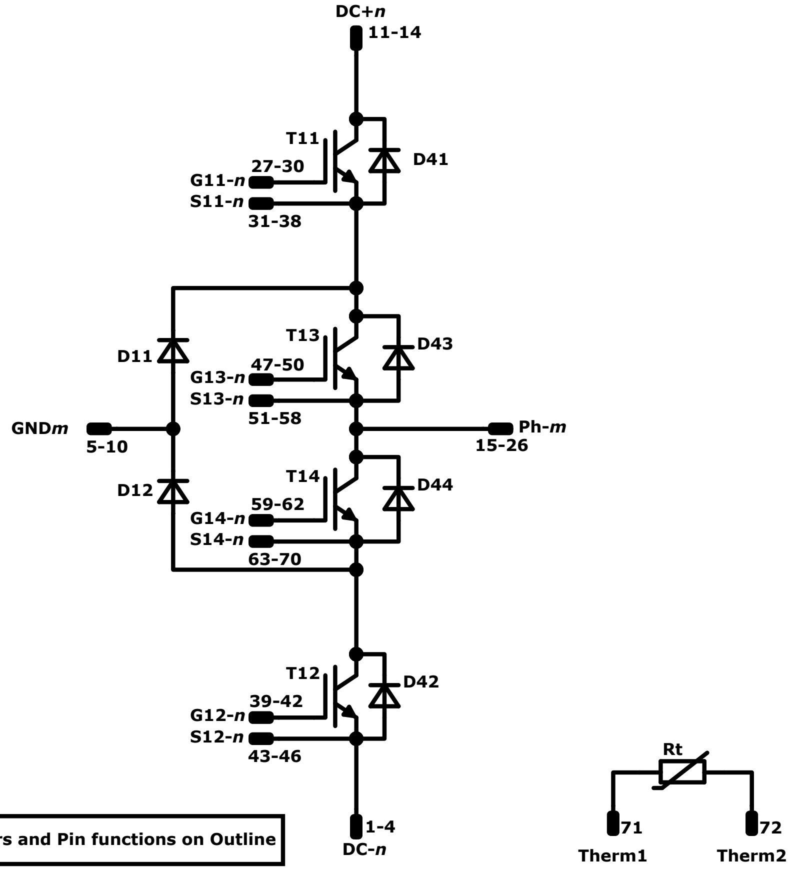
	**Text**	**Name**		**Date code**	**UL & VIN**	**Lot**	**Serial**
		NN-NNNNNNNNNNNNNN-TTTTTTVV		WWYY	UL VIN	LLLLL	SSSS
	Datamatrix	**Type&Ver**	**Lot number**	**Serial**	**Date code**		
		TTTTTTTVV	LLLLL	SSSS	WWYY		

Outline

Pin table [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	320 A	Buck Switch	Parallel devices with separate control. Values apply to complete device.
D11, D12	FWD	650 V	300 A	Buck Diode	
T13, T14	IGBT	650 V	320 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	

Vincotech

30-FT07NIC320S501-PJ76F58
datasheet

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 certified according to UL 1557 standard, UL file number E192116. For more information see vincotech.com website.

Document No.:	Date:	Modification:	Pages
30-FT07NIC320S501-PJ76F58-D1-14	24 Nov. 2023	Initial Release	

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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.