30-PT07NIC320S501-PJ76F58Y

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
- Press-fit pin
- Reliable cold welding connection

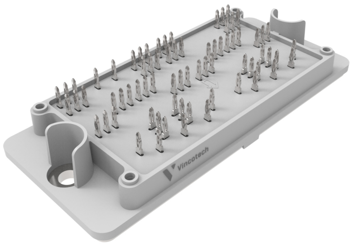
Target applications

Energy Storage Systems; Solar Inverters; UPS

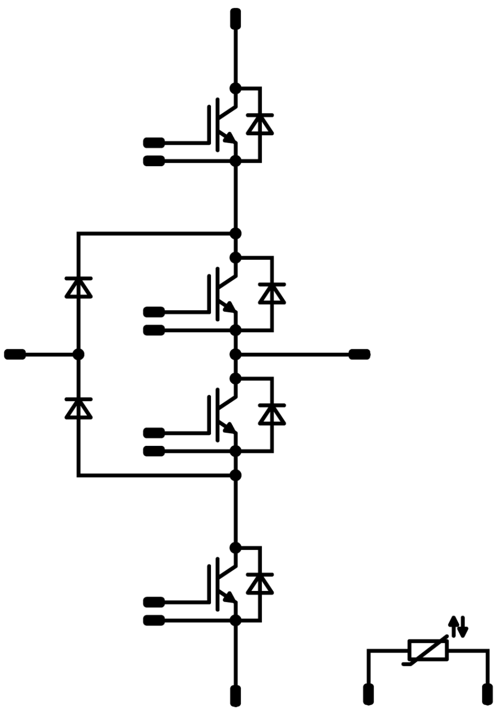
Types

- 30-PT07NIC320S501-PJ76F58Y

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			960	nA
Internal gate resistance	r_g							None		Ω
Input capacitance	C_{ies}	f = 1 Mhz	0	25		25		20000		pF
Output capacitance	C_{oes}							568		pF
Reverse transfer capacitance	C_{res}							72		pF
Gate charge	Q_g	V_{CC} = 520 V	15		320	25		760		nC
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}	di/dt=13959 A/µs di/dt=14408 A/µs di/dt=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]	Values 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			960	nA
Internal gate resistance	r_g							None		Ω
Input capacitance	C_{ies}	f = 1 Mhz	0	25		25		20000		pF
Output capacitance	C_{oes}							568		pF
Reverse transfer capacitance	C_{res}							72		pF
Gate charge	Q_g	V_{CC} = 520 V	15		320	25		760		nC
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					25 125 150		16,2 18,21 18,69		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		84,7 101,39 105,95		ns
Fall time	t_f					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				25 125 150		2,3 2,76 2,86		mWs
Turn-off energy (per pulse)	E_{off}					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)	$R_{th(j-s)}$	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

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	

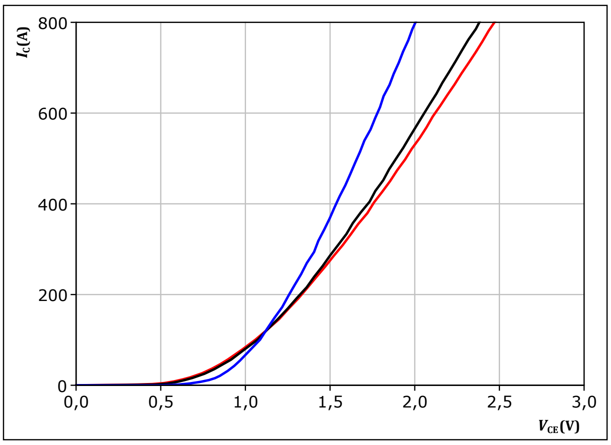
(1) Value at chip level
(2) Only valid with pre-applied Vincotech thermal interface material.

Buck Switch Characteristics

figure 1. **IGBT**

Typical output characteristics

I_C = f(V_{CE})

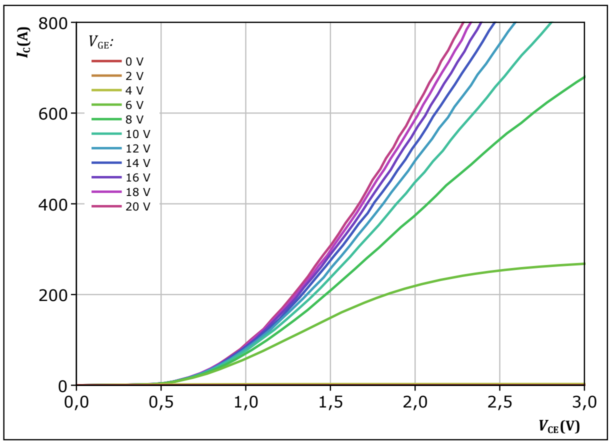


t_p =	250	µs		25 °C
V_{GE} =	14	V	T_j:	125 °C
				150 °C

figure 2. **IGBT**

Typical output characteristics

I_C = f(V_{CE})



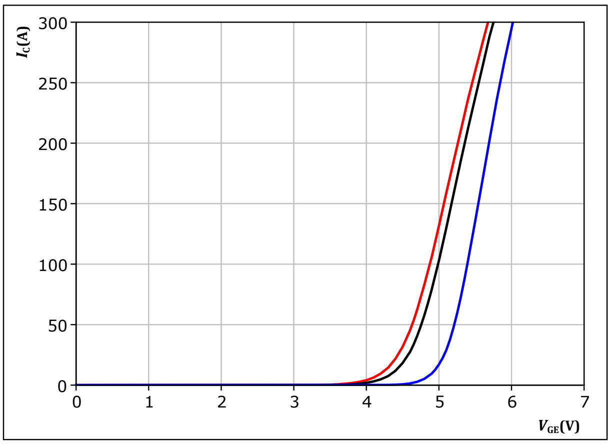
t_p =	250	µs
T_j =	150	°C

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

figure 3. **IGBT**

Typical transfer characteristics

I_C = f(V_{GE})

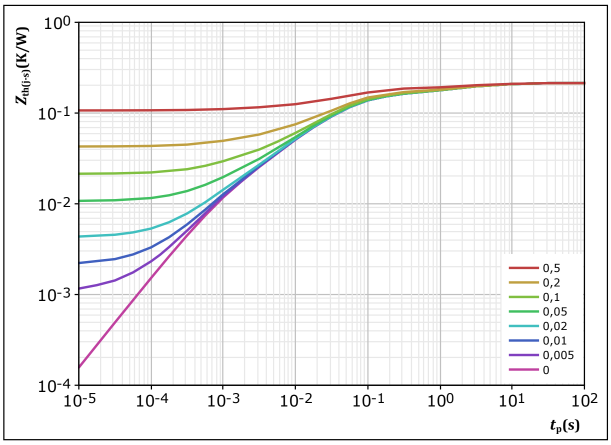


t_p =	250	µs		25 °C
V_{CE} =	55	V	T_j:	125 °C
				150 °C

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

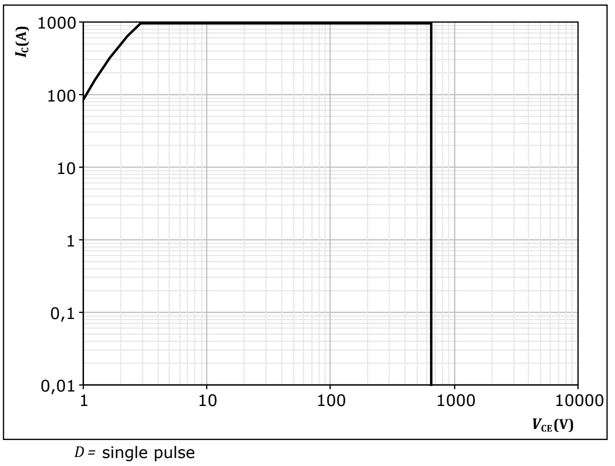
R (K/W)	τ (s)
2,36E-02	6,25E+00
3,62E-02	1,16E+00
1,05E-01	5,88E-02
3,87E-02	1,02E-02
1,00E-02	9,95E-04

Buck Switch Characteristics

figure 5. **IGBT**

Safe operating area

I_C = f(V_{CE})

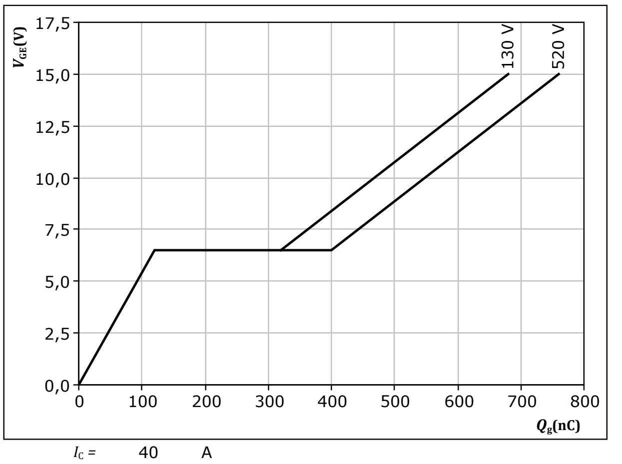


D =	single pulse	
T_s =	80	°C
V_{GE} =	14	V
T_j =	T_{jmax}	

figure 6. **IGBT**

Gate voltage vs gate charge

V_{GE} = f(Q_g)



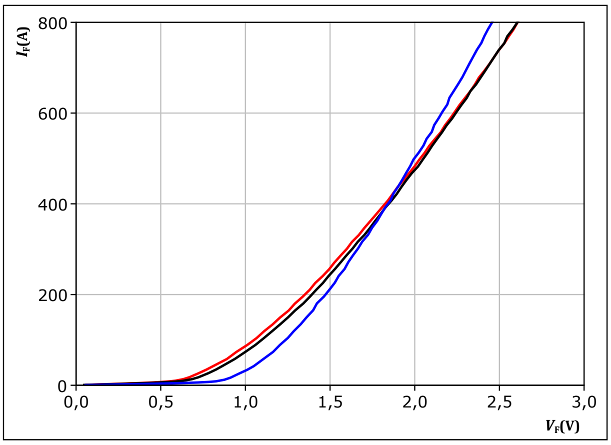
I_C =	40	A
T_j =	25	°C

Buck Diode Characteristics

figure 7. **FWD**

Typical forward characteristics

I_F = f(V_F)



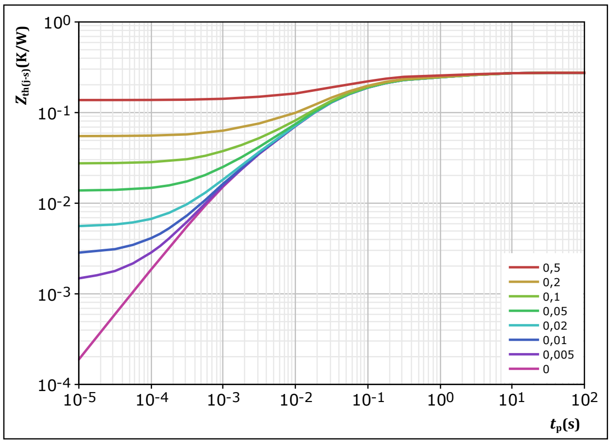
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 8. **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

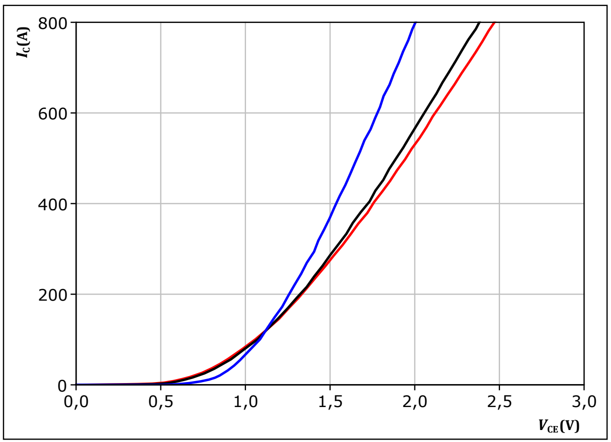
R (K/W)	τ (s)
2,62E-02	4,51E+00
2,75E-02	8,53E-01
1,18E-01	8,44E-02
8,67E-02	1,56E-02
1,65E-02	1,38E-03

Boost Switch Characteristics

figure 9. **IGBT**

Typical output characteristics

I_C = f(V_{CE})

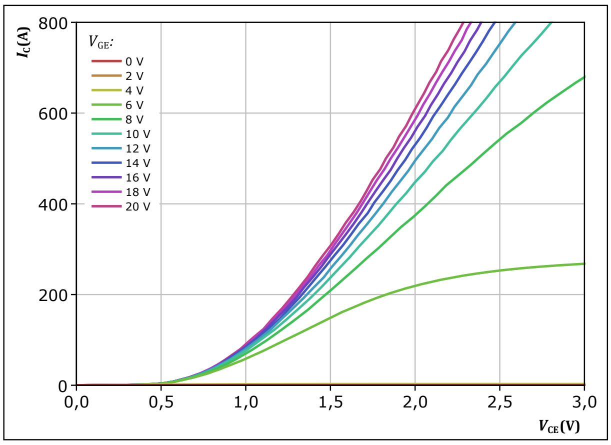


t_p = 250 µs
V_{GE} = 14 V
T_j: 25 °C, 125 °C, 150 °C

figure 10. **IGBT**

Typical output characteristics

I_C = f(V_{CE})

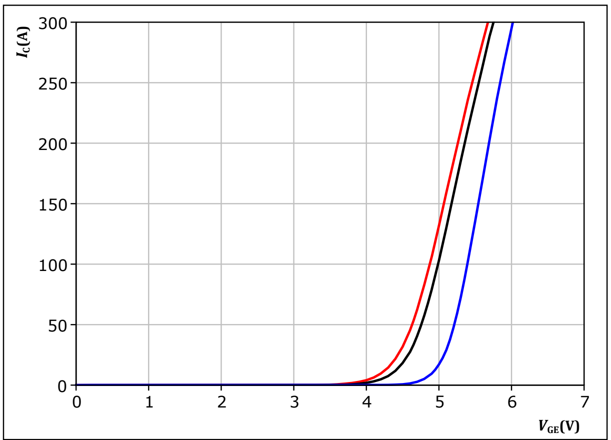


t_p = 250 µs
T_j = 150 °C
V_{GE} from 0 V to 20 V in steps of 2 V

figure 11. **IGBT**

Typical transfer characteristics

I_C = f(V_{GE})

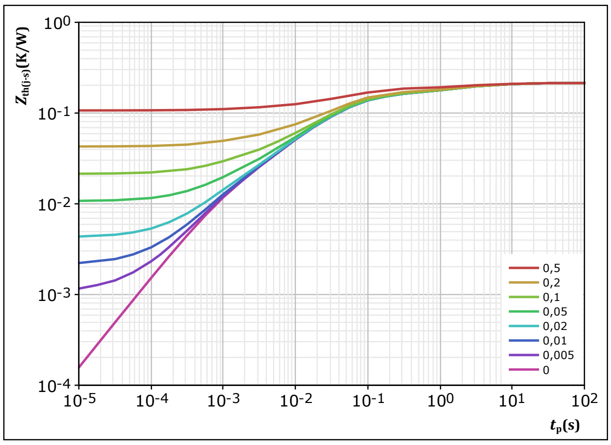


t_p = 250 µs
V_{CE} = 55 V
T_j: 25 °C, 125 °C, 150 °C

figure 12. **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

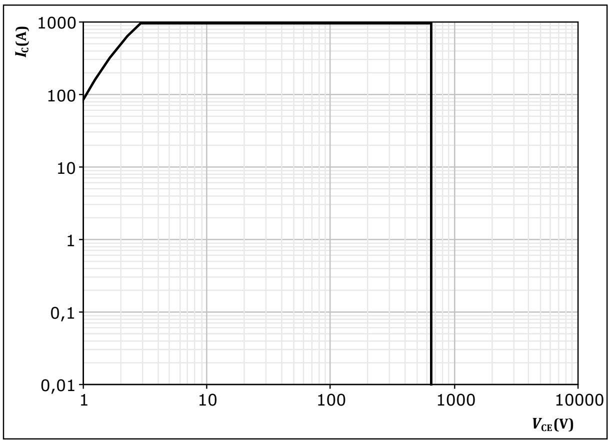
R (K/W)	τ (s)
2,36E-02	6,25E+00
3,62E-02	1,16E+00
1,05E-01	5,88E-02
3,87E-02	1,02E-02
1,00E-02	9,95E-04

Boost Switch Characteristics

figure 13. **IGBT**

Safe operating area

I_C = f(V_{CE})

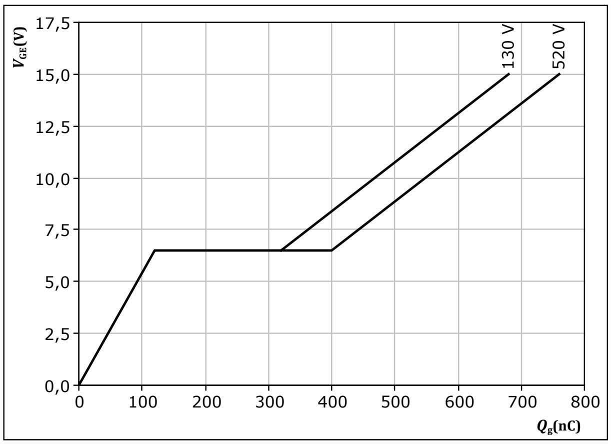


D =	single pulse	
T_s =	80	°C
V_{GE} =	14	V
T_j =	T_{jmax}	

figure 14. **IGBT**

Gate voltage vs gate charge

V_{GE} = f(Q_g)



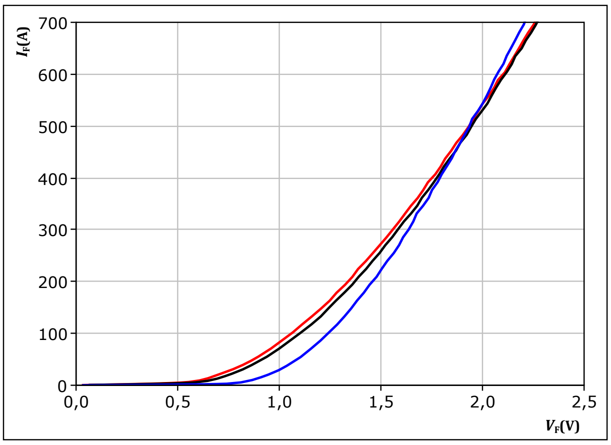
I_C =	40	A
T_j =	25	°C

Boost Diode Characteristics

figure 15. **FWD**

Typical forward characteristics

I_F = f(V_F)



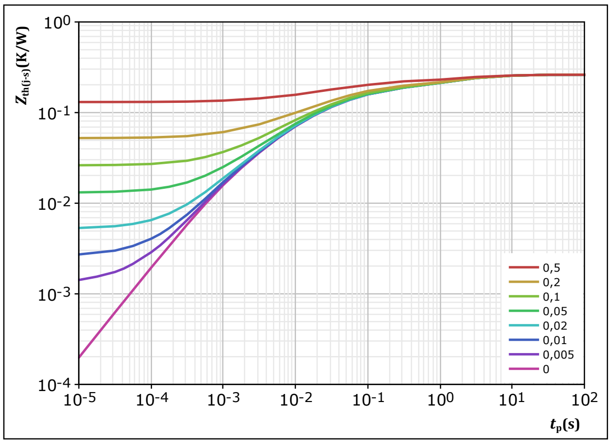
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 16. **FWD**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

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

FWD thermal model values

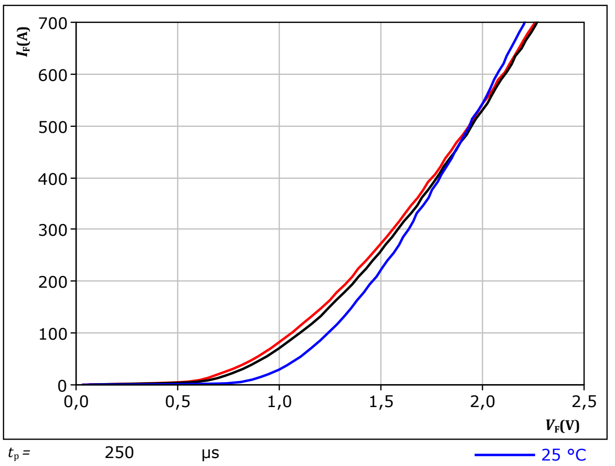
R (K/W)	τ (s)
2,89E-02	6,06E+00
5,91E-02	1,13E+00
9,21E-02	6,58E-02
6,69E-02	9,86E-03
1,45E-02	1,25E-03

Boost Sw. Inv. Diode Characteristics

figure 17. FWD

Typical forward characteristics

I_F = f(V_F)



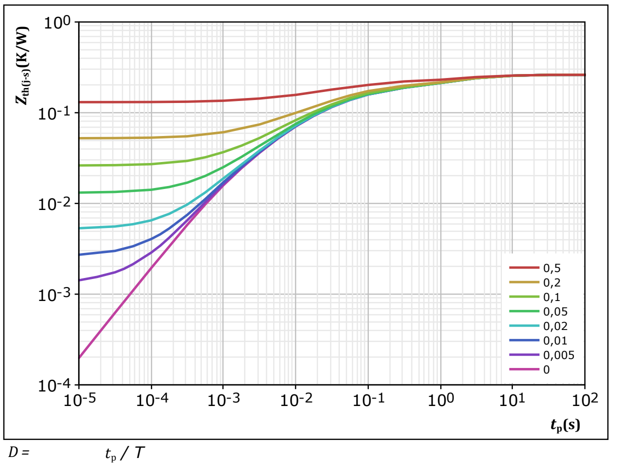
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 18. 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

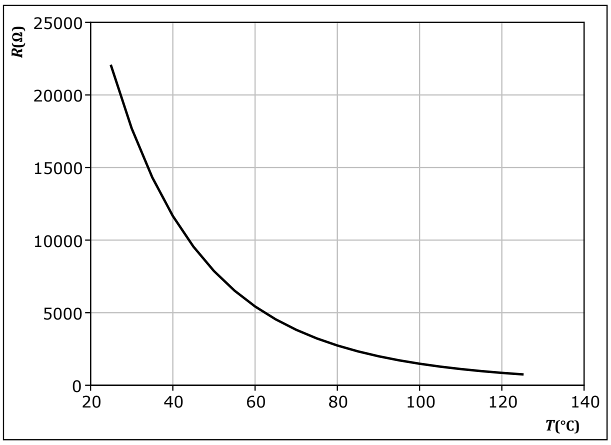
R (K/W)	τ (s)
2,89E-02	6,06E+00
5,91E-02	1,13E+00
9,21E-02	6,58E-02
6,69E-02	9,86E-03
1,45E-02	1,25E-03

Thermistor Characteristics

figure 19.	Thermistor

Typical NTC characteristic as function of temperature

R_T = f(T)

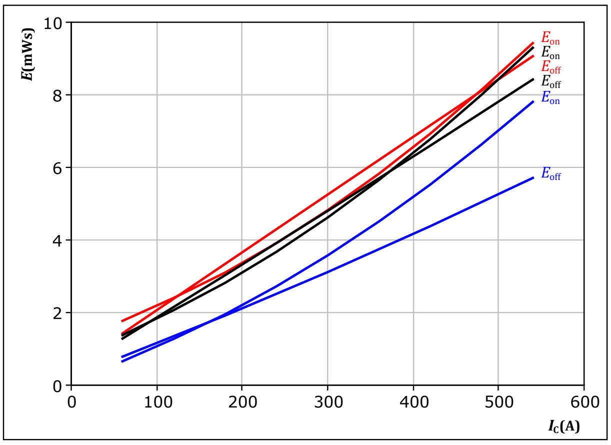


Buck Switching Characteristics

figure 20. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



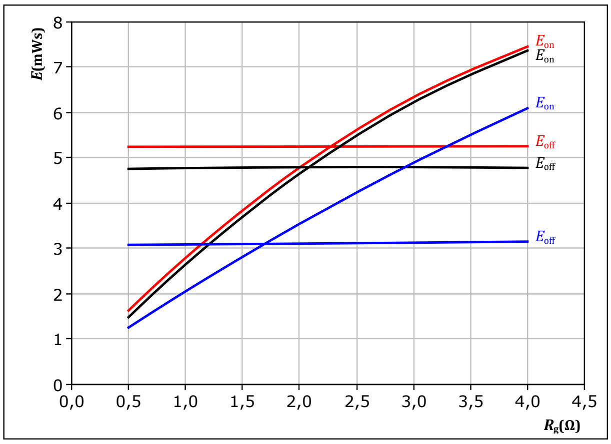
With an inductive load at

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 21. **IGBT**

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

$E = f(R_g)$



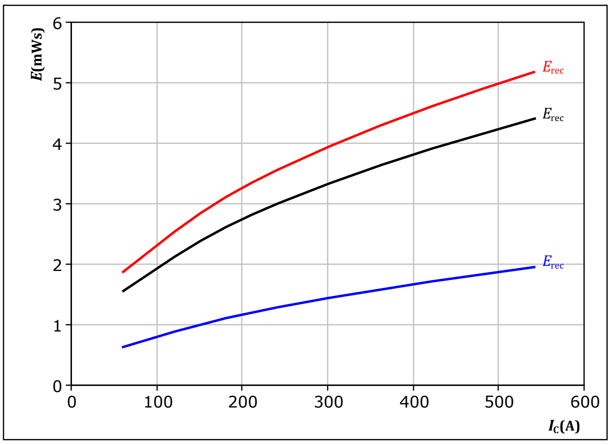
With an inductive load at

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

figure 22. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



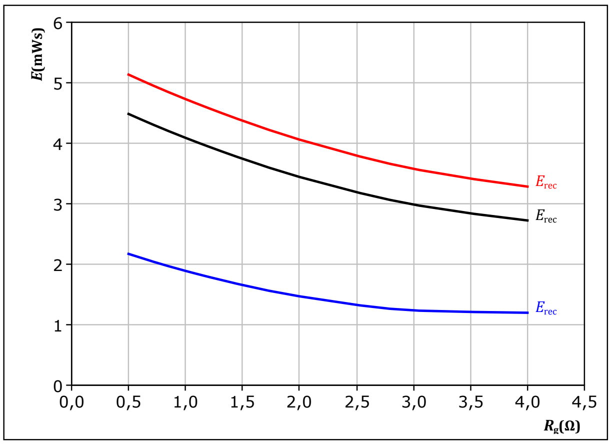
With an inductive load at

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

figure 23. **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

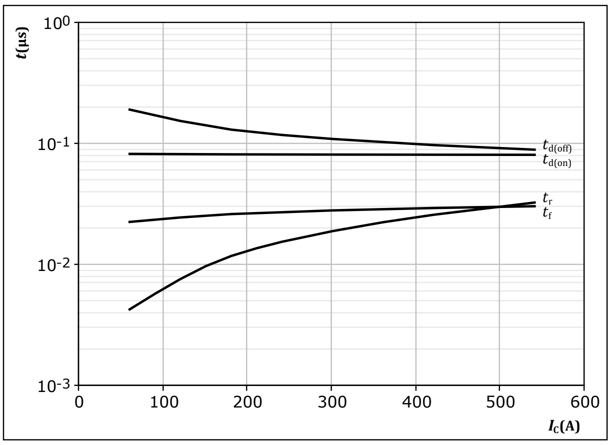
V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	300	A		150 °C

Buck Switching Characteristics

figure 24. **IGBT**

Typical switching times as a function of collector current

$t = f(I_C)$



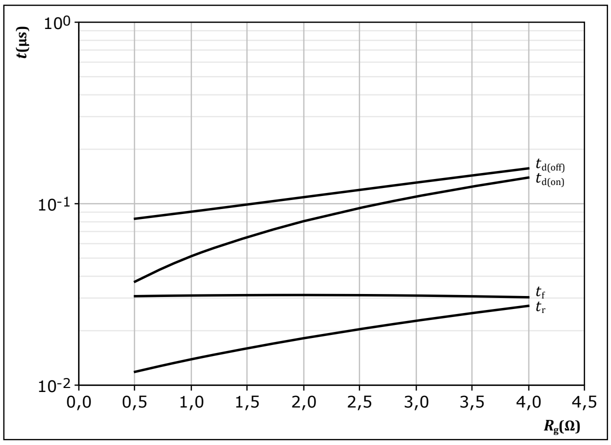
With an inductive load at

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

figure 25. **IGBT**

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

$t = f(R_g)$



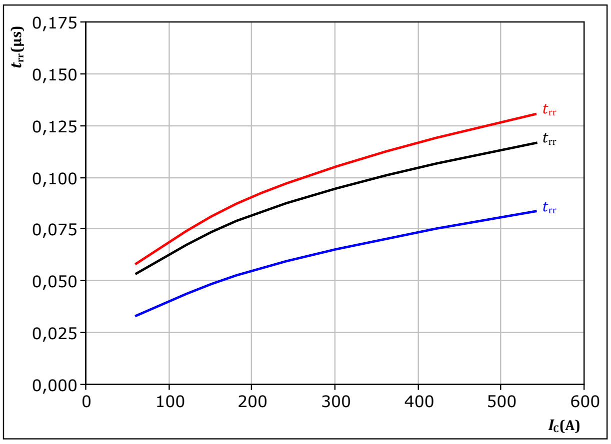
With an inductive load at

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

figure 26. **FWD**

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_C)$



With an inductive load at

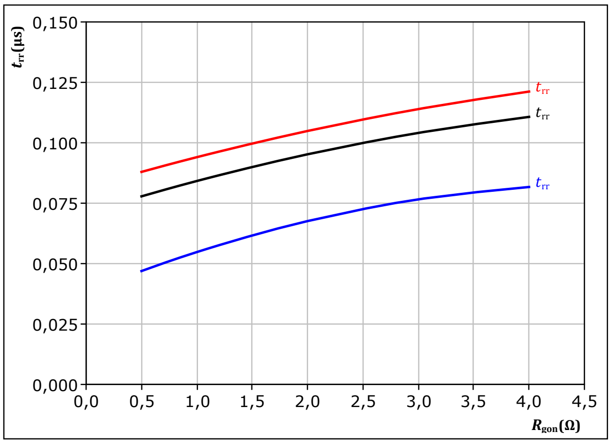
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	2	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 27. **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

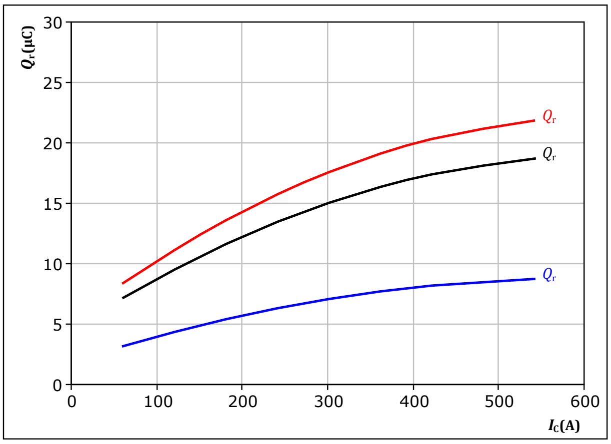
T_j: 25 °C, 125 °C, 150 °C

Buck Switching Characteristics

figure 28. FWD

Typical recovered charge as a function of collector current

Q_r = f(I_C)



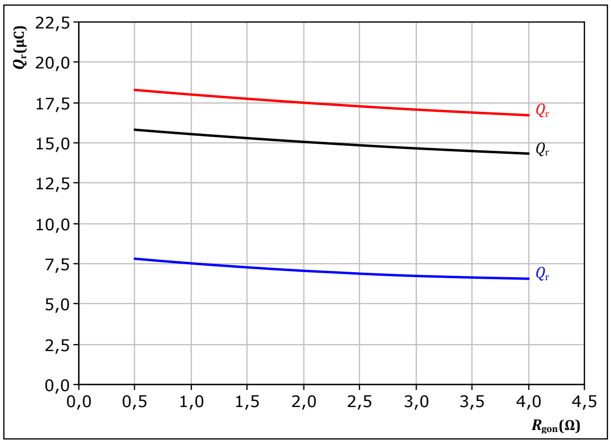
With an inductive load at

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

figure 29. FWD

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

Q_r = f(R_{gon})



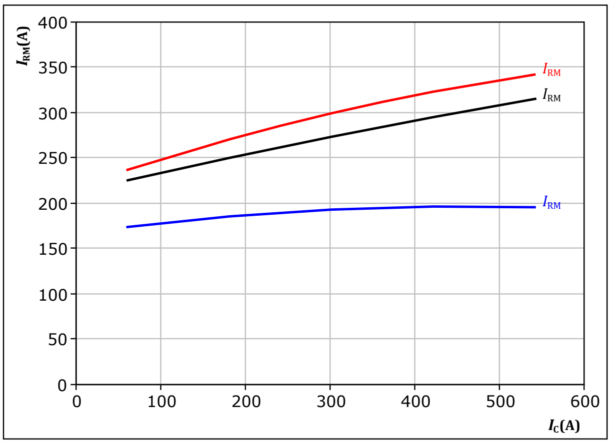
With an inductive load at

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

figure 30. FWD

Typical peak reverse recovery current as a function of collector current

I_{RM} = f(I_C)



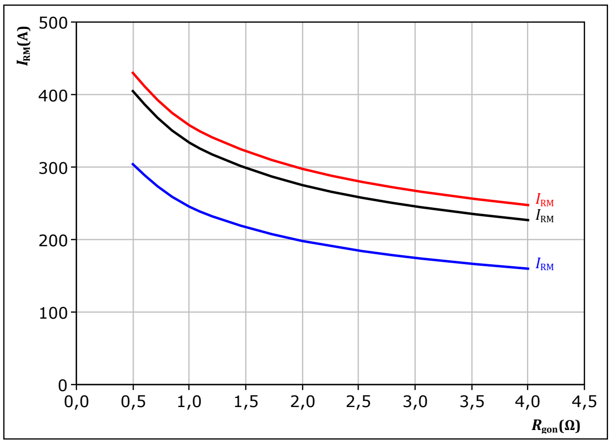
With an inductive load at

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

figure 31. 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

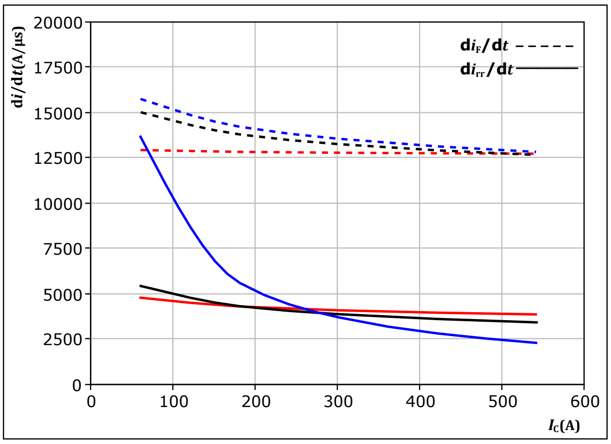
V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	300	A		150 °C

Buck Switching Characteristics

figure 32. **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)



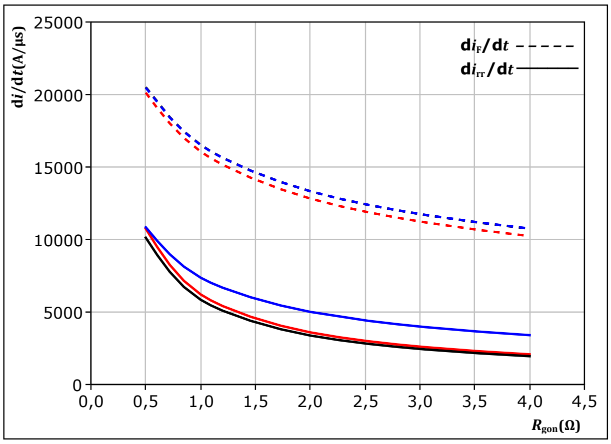
With an inductive load at

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

figure 33. **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})



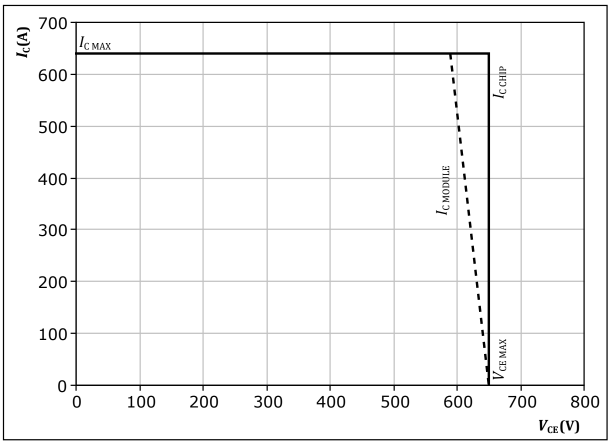
With an inductive load at

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

figure 34. **IGBT**

Reverse bias safe operating area

I_C = f(V_{CE})



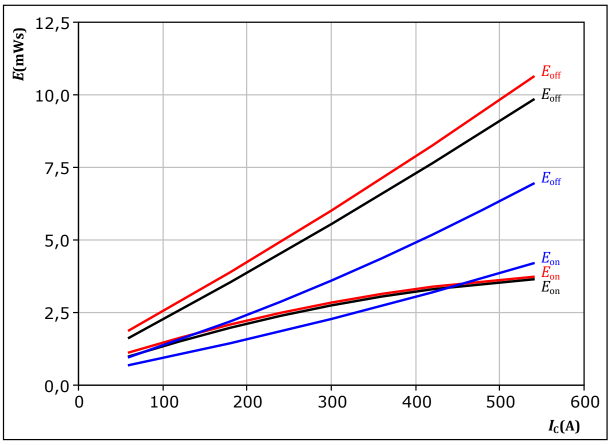
At	T_j =	150	°C
	R_{gon} =	2	Ω
	R_{goff} =	2	Ω

Boost Switching Characteristics

figure 35.	IGBT

Typical switching energy losses as a function of collector current

$E = f(I_C)$



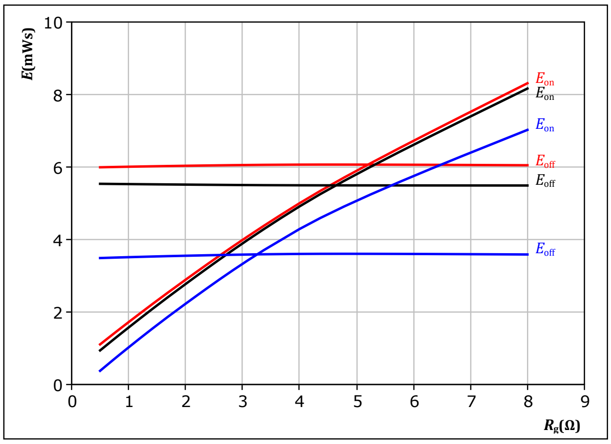
With an inductive load at

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 36.	IGBT

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

$E = f(R_g)$



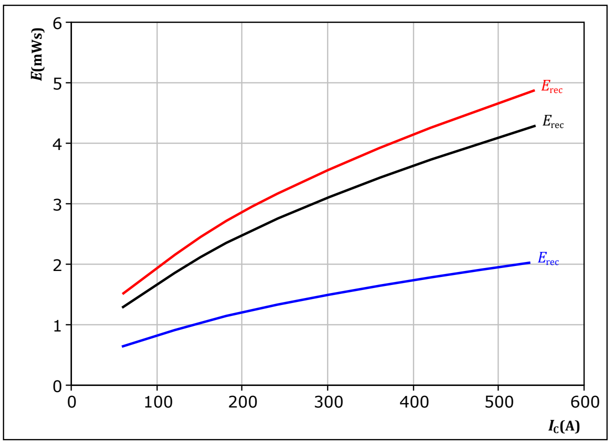
With an inductive load at

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

figure 37.	FWD

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



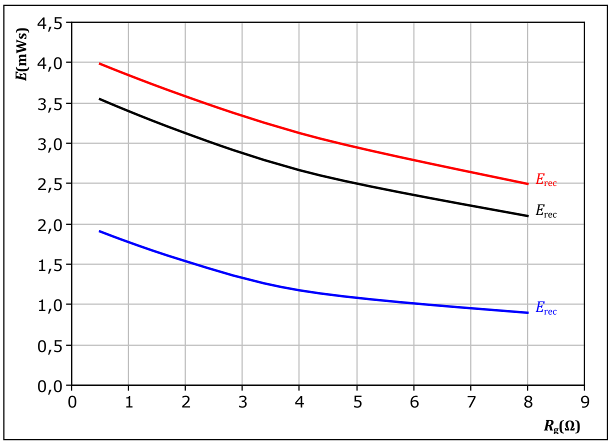
With an inductive load at

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

figure 38.	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

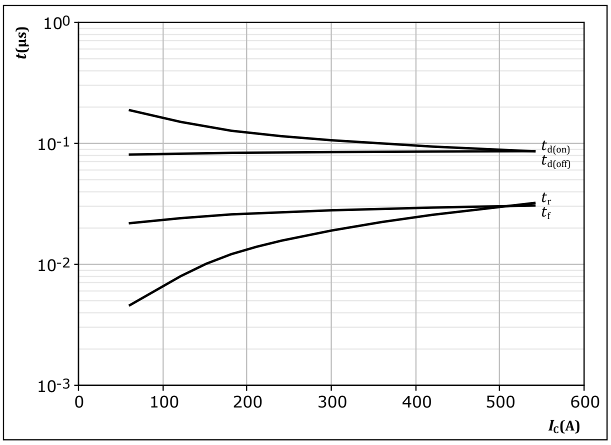
V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	300	A		150 °C

Boost Switching Characteristics

figure 39. **IGBT**

Typical switching times as a function of collector current

t = f(I_C)



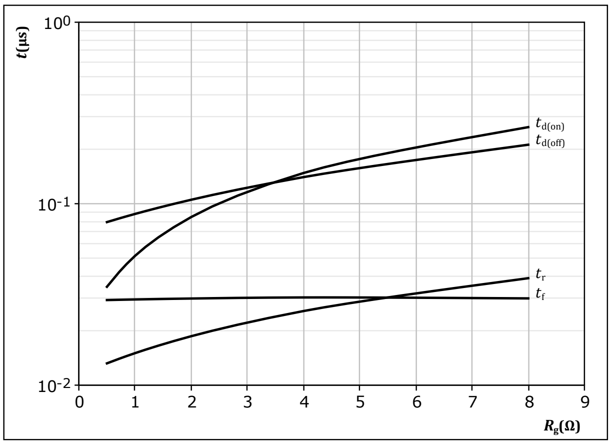
With an inductive load at

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

figure 40. **IGBT**

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

t = f(R_g)



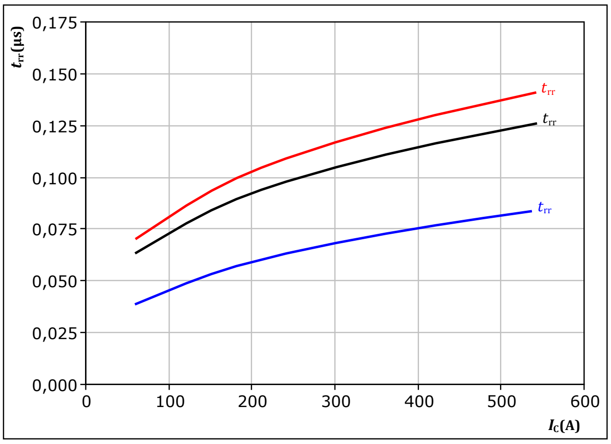
With an inductive load at

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

figure 41. **FWD**

Typical reverse recovery time as a function of collector current

t_{rr} = f(I_C)



With an inductive load at

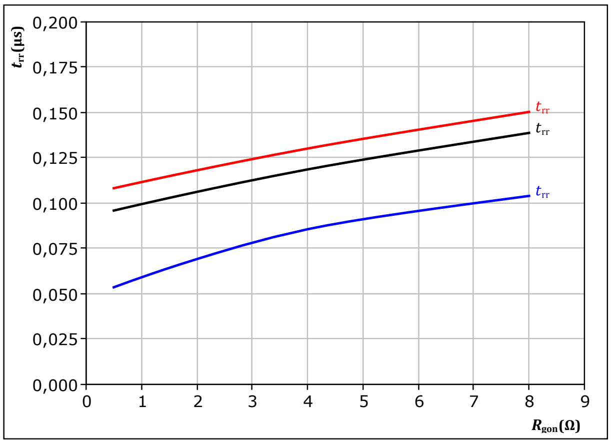
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	2	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 42. **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

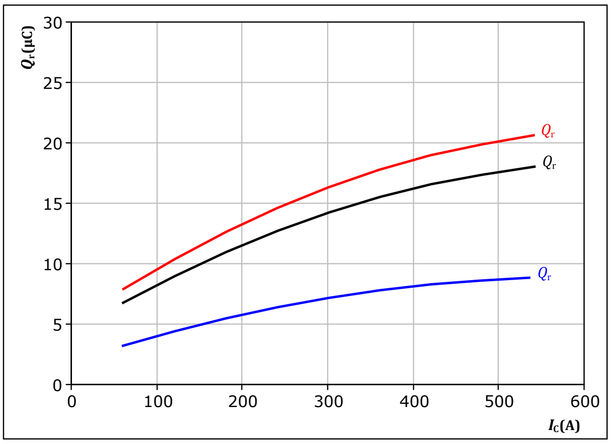
T_j: 25 °C, 125 °C, 150 °C

Boost Switching Characteristics

figure 43. FWD

Typical recovered charge as a function of collector current

Q_r = f(I_C)



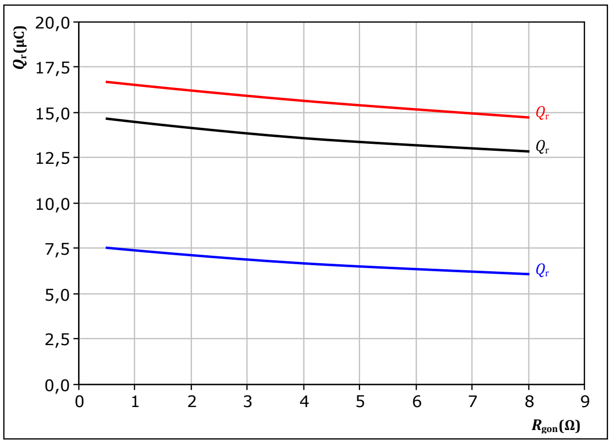
With an inductive load at

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

figure 44. FWD

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

Q_r = f(R_{gon})



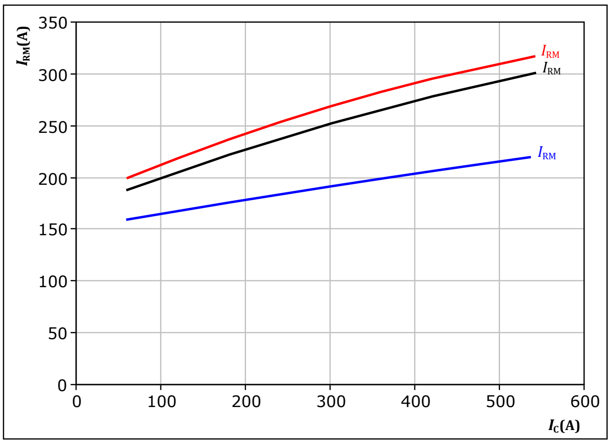
With an inductive load at

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

figure 45. FWD

Typical peak reverse recovery current as a function of collector current

I_{RM} = f(I_C)



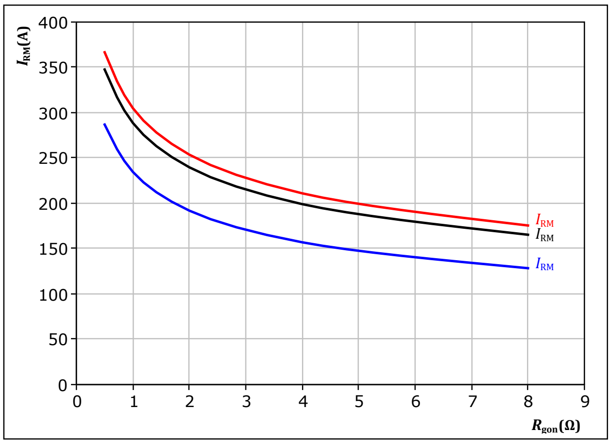
With an inductive load at

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

figure 46. 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

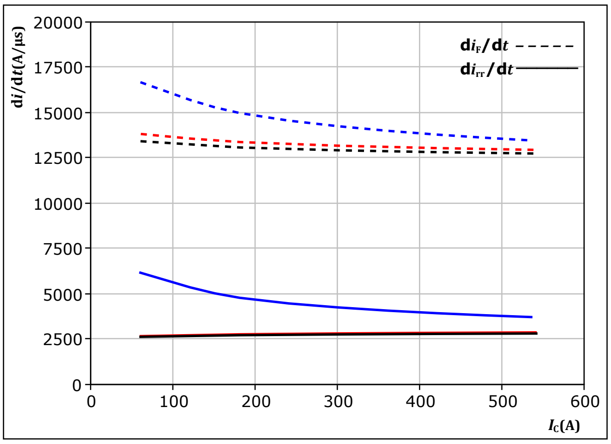
V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	300	A		150 °C

Boost Switching Characteristics

figure 47. **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

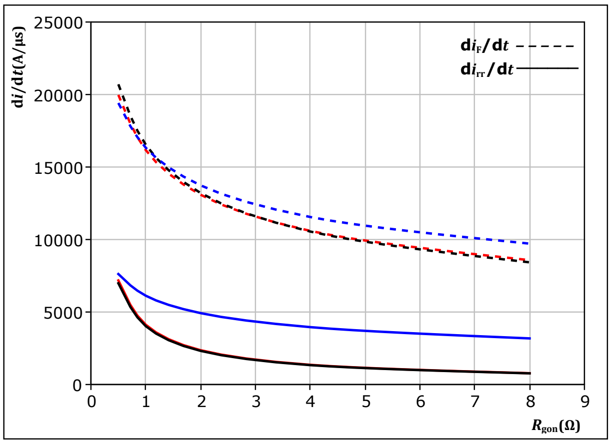
V_{CE} =	350	V	
V_{GE} =	±15	V	
R_{gon} =	2	Ω	

T_j: 25 °C, 125 °C, 150 °C

figure 48. **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

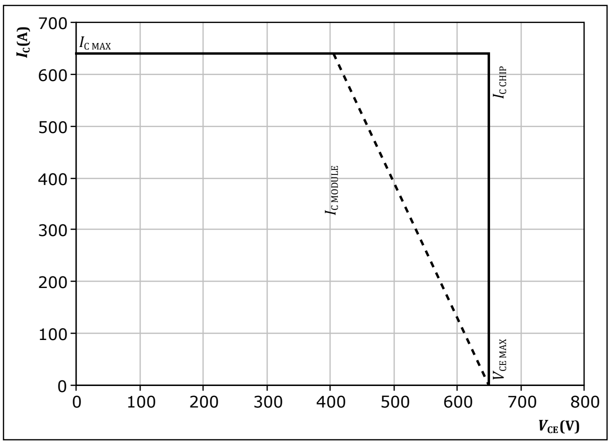
V_{CE} =	350	V	
V_{GE} =	±15	V	
I_C =	300	A	

T_j: 25 °C, 125 °C, 150 °C

figure 49. **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 50. **IGBT**

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

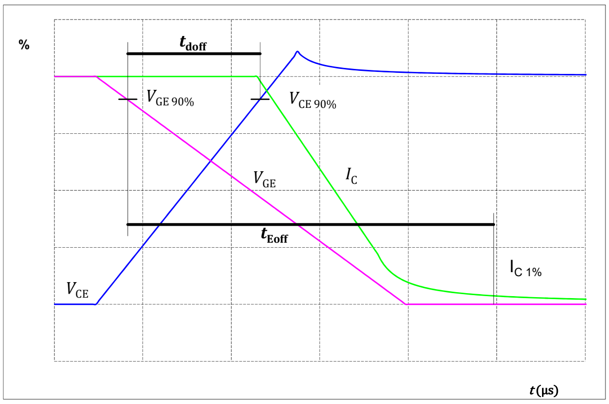


figure 51. **IGBT**

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

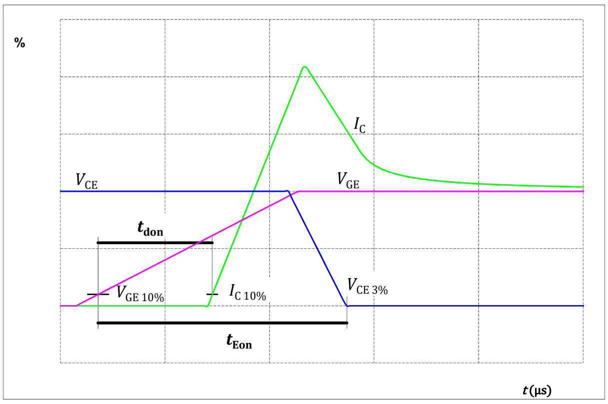


figure 52. **IGBT**

Turn-off Switching Waveforms & definition of t_f

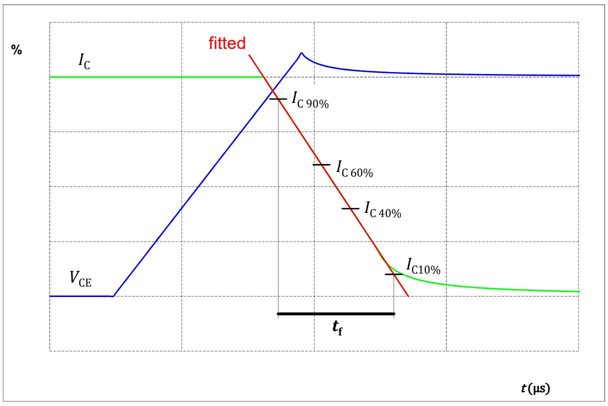
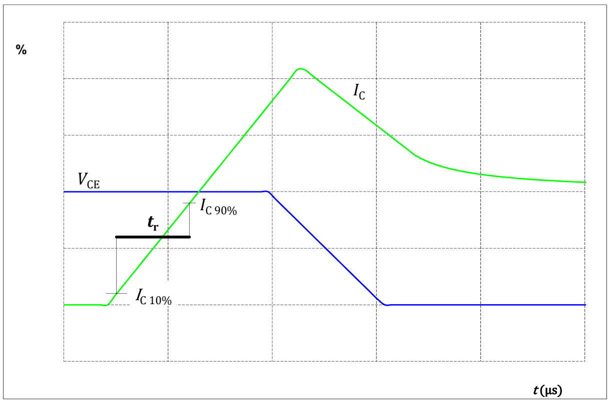


figure 53. **IGBT**

Turn-on Switching Waveforms & definition of t_r



Switching Definitions

figure 54. **FWD**

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

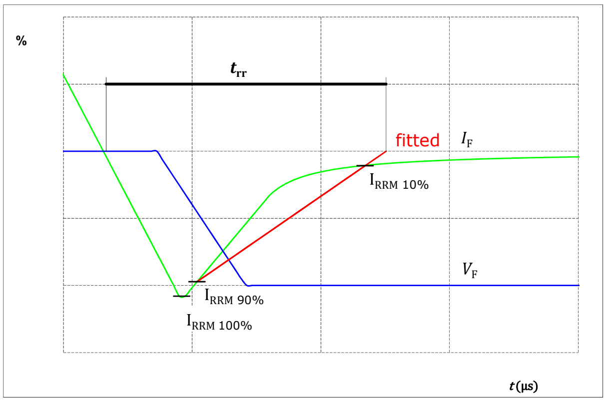
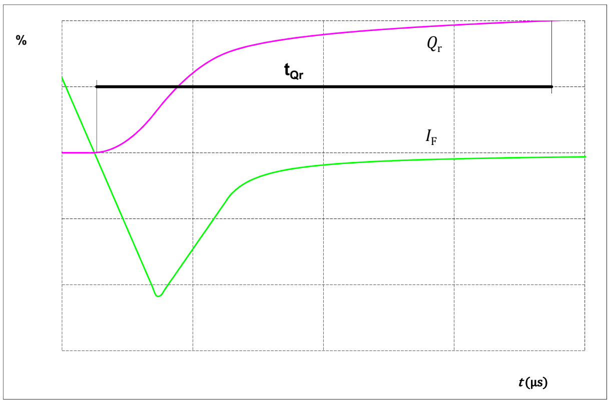


figure 55. **FWD**

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



30-PT07NIC320S501-PJ76F58Y
datasheet

Vincotech

Ordering Code

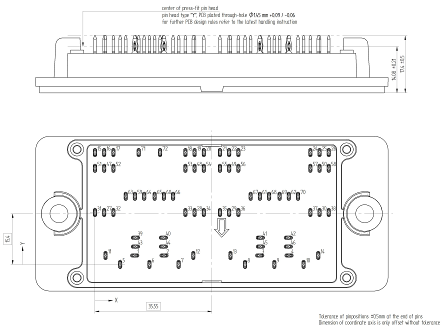
Version	Ordering Code
Without thermal paste	30-PT07NIC320S501-PJ76F58Y
With thermal paste (3,4 W/mK, PSX-P7)	30-PT07NIC320S501-PJ76F58Y-/3/

Marking

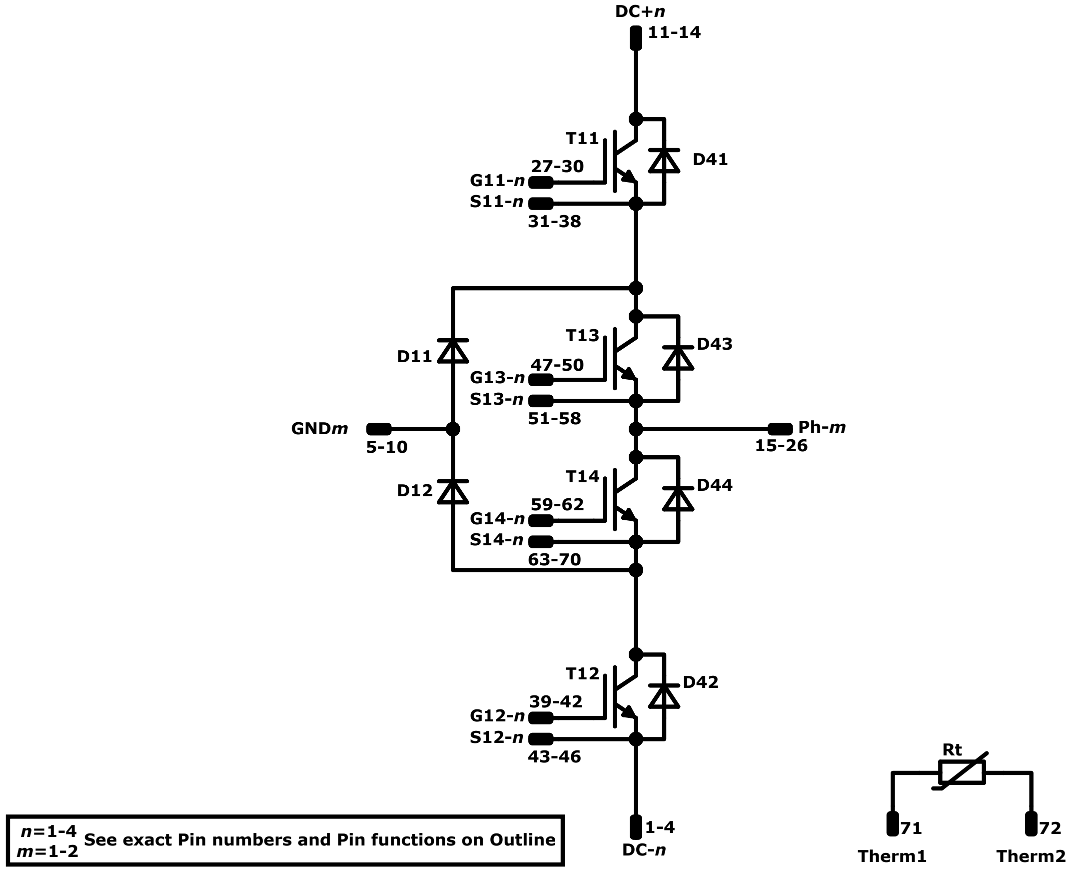
	Name		Date code	UL & VIN	Lot	Serial
Text	NN-NNNNNNNNNNNNNN-TTTTTTTVV		WWYY	UL VIN	LLLLL	SSSS
	Type&Ver	Lot number	Serial	Date code		
Datamatrix	TTTTTTTVV	LLLLL	SSSS	WWYY		

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	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	

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.

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