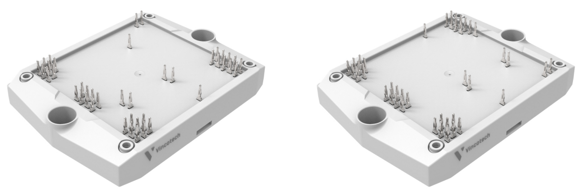
B0-SP07NIB300S5-LT82F58T
B0-SP07NIC300S5-LT92F58T
datasheet

***flow*NPC S3 split** **650 V / 300 A**

Features

- Split NPC topology
- Optimized for 1200 Vdc applications
- Split topology for improved thermal performance
- Low inductive mid-power package

flow S3 12 mm housing



LT82F58T LT92F58T

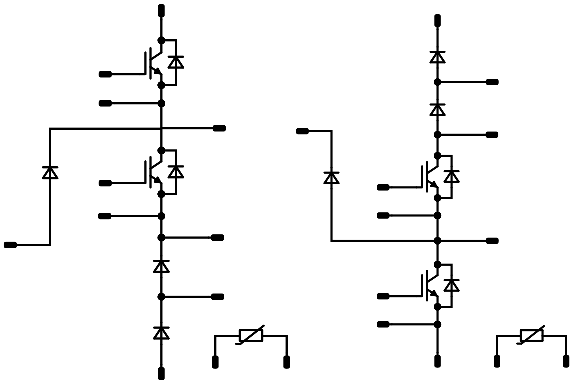
Target applications

- Solar Inverters

Types

- B0-SP07NIB300S5-LT82F58T
- B0-SP07NIC300S5-LT92F58T

Schematic



LT82F58T LT92F58T

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	217	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}		900	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	302	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	230	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}		600	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	301	W
Maximum junction temperature	T_{jmax}			175	°C
Buck Sw. Protection Diode					
Peak repetitive reverse voltage	V_{RRM}			650	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s = 80 °C	38	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}		60	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	64	W
Maximum junction temperature	T_{jmax}			175	°C

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions		Value	Unit
Boost Switch					
Collector-emitter voltage	V_{CES}			650	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$	T_s = 80 °C	217	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}		900	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	302	W
Gate-emitter voltage	V_{GES}			±20	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	230	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}		600	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	301	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	230	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}		600	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	301	W
Maximum junction temperature	T_{jmax}			175	°C

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions		Value	Unit
Boost Sw. Protection Diode					
Peak repetitive reverse voltage	V_{RRM}			650	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s = 80 °C	38	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}		60	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	64	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				8,83	mm
Clearance				7,46	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	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,003	25	3,2	4	4,8	V
Collector-emitter saturation voltage	V_{CEsat}		15		300	25 125 150		1,43 1,52 1,55	1,75(1)	V
Collector-emitter cut-off current	I_{CES}		0	650		25			200	µA
Gate-emitter leakage current	I_{GES}		20	0		25			400	nA
Internal gate resistance	r_g							None		Ω
Input capacitance	C_{ies}	f = 1 Mhz	0	25		25		18000		pF
Output capacitance	C_{oes}							520		pF
Reverse transfer capacitance	C_{res}							68		pF
Gate charge	Q_g	V_{CC} = 520 V	15		300	25		656		nC
Thermal										
Thermal resistance junction to sink (2)	$R_{th(j-s)}$	λ_{paste} = 4,4 W/mK (PTM)						0,31		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 8 Ω R_{goff} = 8 Ω	±15	350	220	25 125 150		293,76 293,44 294,08		ns
Rise time	t_r					25 125 150		35,2 38,08 39,04		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		224 248,96 255,04		ns
Fall time	t_f					25 125 150		21,88 26,84 28,49		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=5,38 µC Q_{rFWD}=11,16 µC Q_{rFWD}=13,13 µC				25 125 150		3,63 4,42 4,53		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		4,34 5,69 6,19		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		1,53 1,49 1,46	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} = 4,4 W/mK (PTM)						0,32		K/W
Dynamic										
Peak recovery current	I_{RRM}	d*i*/d*t*=5295 A/µs d*i*/d*t*=5576 A/µs d*i*/d*t*=5507 A/µs	±15	350	220	25 125 150		115,89 177,54 194,11		A
Reverse recovery time	t_{rr}					25 125 150		69,23 93,57 101,22		ns
Recovered charge	Q_r					25 125 150		5,38 11,16 13,13		µC
Reverse recovered energy	E_{rec}					25 125 150		1,43 3,05 3,64		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		5288 7000 6218		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	
Buck Sw. Protection Diode										
Static										
Forward voltage	V_{F}				30	25 125	1,23	1,7 1,59	1,87(1)	V
Reverse leakage current	I_{R}	V_{r} = 650 V				25			0,36	µA
Thermal										
Thermal resistance junction to sink (2)	$R_{th(j-s)}$	λ_{paste} = 4,4 W/mK (PTM)						1,49		K/W

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	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,003	25	3,2	4	4,8	V
Collector-emitter saturation voltage	V_{CEsat}		15		300	25 125 150		1,43 1,52 1,55	1,75(1)	V
Collector-emitter cut-off current	I_{CES}		0	650		25			200	µA
Gate-emitter leakage current	I_{GES}		20	0		25			400	nA
Internal gate resistance	r_g							None		Ω
Input capacitance	C_{ies}	f = 1 Mhz	0	25		25		18000		pF
Output capacitance	C_{oes}							520		pF
Reverse transfer capacitance	C_{res}							68		pF
Gate charge	Q_g	V_{CC} = 520 V	15		300	25		656		nC
Thermal										
Thermal resistance junction to sink (2)	$R_{th(j-s)}$	λ_{paste} = 4,4 W/mK (PTM)						0,31		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 8 Ω R_{goff} = 8 Ω	±15	350	220	25 125 150		295 295 295		ns
Rise time	t_r					25 125 150		32,6 35,8 37,1		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		210 228 239		ns
Fall time	t_f					25 125 150		19,5 22,1 25,5		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=4,91 µC Q_{rFWD}=9,22 µC Q_{rFWD}=13,8 µC				25 125 150		3,69 4,29 4,34		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		4,12 5,37 5,77		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				300	25 125 150		1,53 1,49 1,46	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} = 4,4 W/mK (PTM)						0,32		K/W
Dynamic										
Peak recovery current	I_{RRM}	d*i*/d*t*=5670 A/µs d*i*/d*t*=5710 A/µs d*i*/d*t*=5580 A/µs	±15	350	220	25 125 150		90,59 142,36 137,12		A
Reverse recovery time	t_{rr}					25 125 150		119 144 147		ns
Recovered charge	Q_r					25 125 150		4,91 9,22 13,8		µC
Reverse recovered energy	E_{rec}					25 125 150		0,608 1,18 2,07		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		2260 1230 1620		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 Sw. Inv. Diode										
Static										
Forward voltage	V_F				300	25 125 150		1,53 1,49 1,46	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} = 4,4 W/mK (PTM)						0,32		K/W
Boost Sw. Protection Diode										
Static										
Forward voltage	V_F				30	25 125	1,23	1,7 1,59	1,87(1)	V
Reverse leakage current	I_R	V_r = 650 V				25			0,36	µA
Thermal										
Thermal resistance junction to sink (2)	$R_{th(j-s)}$	λ_{paste} = 4,4 W/mK (PTM)						1,49		K/W

Vincotech

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	
Thermistor										
Static										
Rated resistance	R					25		22		kΩ
Deviation of R_{100}	$\Delta_{R/R}$	R_{100} = 1484 Ω				100	-5		5	%
Power dissipation	P							5		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	

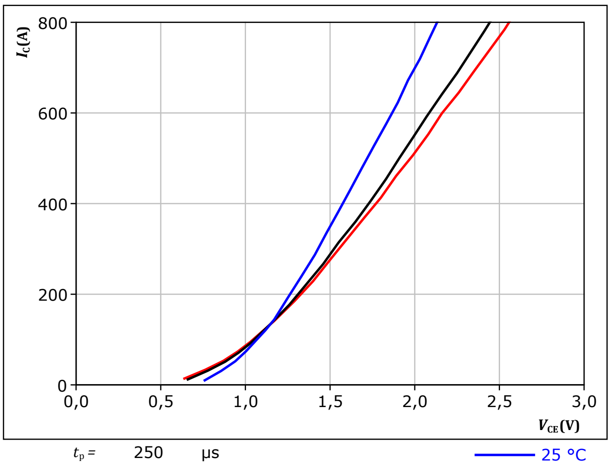
(1) Value at chip level
(2) Only valid with pre-applied Vincotech thermal interface material.

Buck Switch Characteristics

figure 1. **IGBT**

Typical output characteristics

I_C = f(V_{CE})

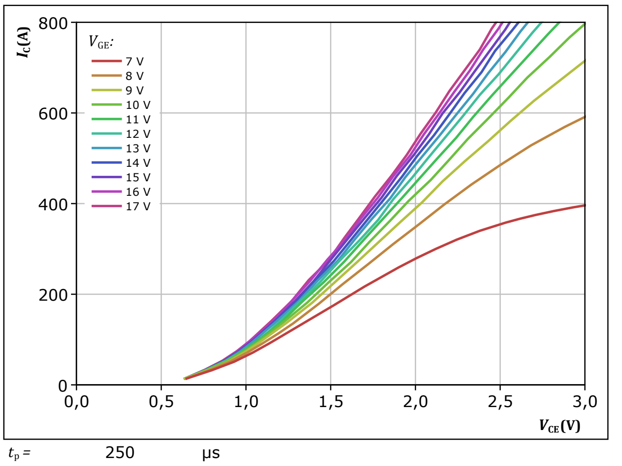


t_p =	250	µs		25 °C
V_{GE} =	15	V	T_j:	125 °C
				150 °C

figure 2. **IGBT**

Typical output characteristics

I_C = f(V_{CE})



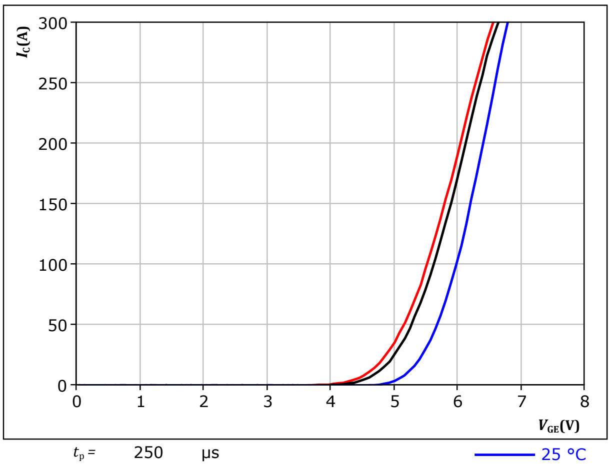
t_p =	250	µs
T_j =	150	°C

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

figure 3. **IGBT**

Typical transfer characteristics

I_C = f(V_{GE})

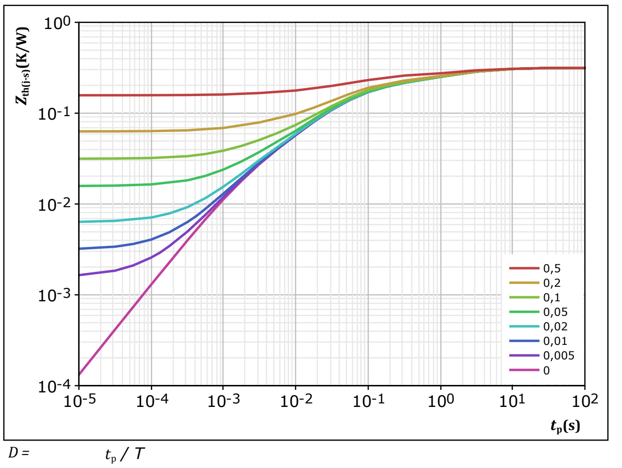


t_p =	250	µs		25 °C
V_{CE} =	10	V	T_j:	125 °C
				150 °C

figure 4. **IGBT**

Transient thermal impedance as a function of pulse width

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



D =	t_p / T	
$R_{th(j-s)}$ =	0,315	K/W

IGBT thermal model values

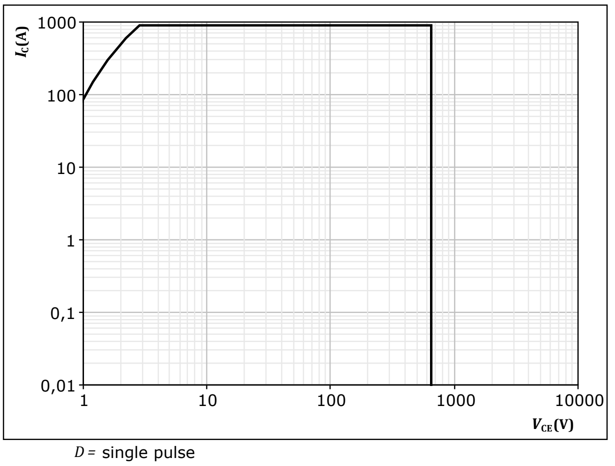
R (K/W)	τ (s)
4,24E-02	6,04E+00
8,01E-02	9,42E-01
1,23E-01	7,13E-02
5,43E-02	1,58E-02
1,49E-02	1,87E-03

Buck Switch Characteristics

figure 5.	IGBT

Safe operating area

I_C = f(V_{CE})



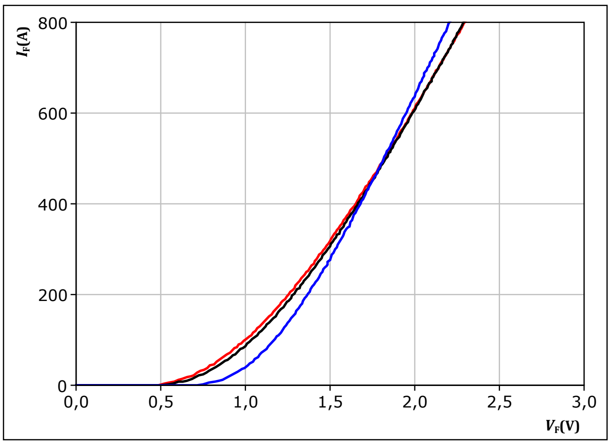
D =	single pulse	
T_s =	80	°C
V_{GE} =	15	V
T_j =	T_{jmax}	

Buck Diode Characteristics

figure 6. **FWD**

Typical forward characteristics

I_F = f(V_F)



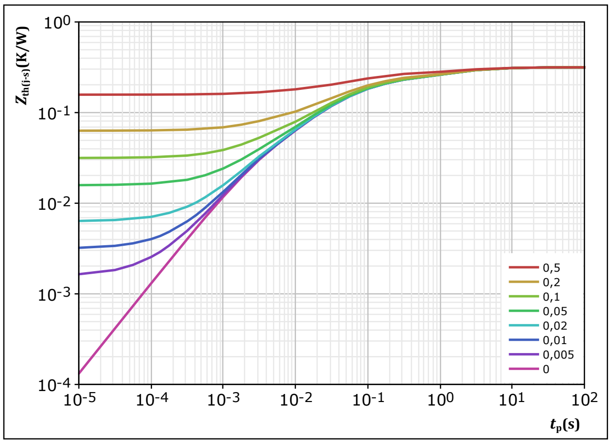
t_p = 250 μs

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

$R_{th(j-s)}$ = 0,315 K/W

FWD thermal model values

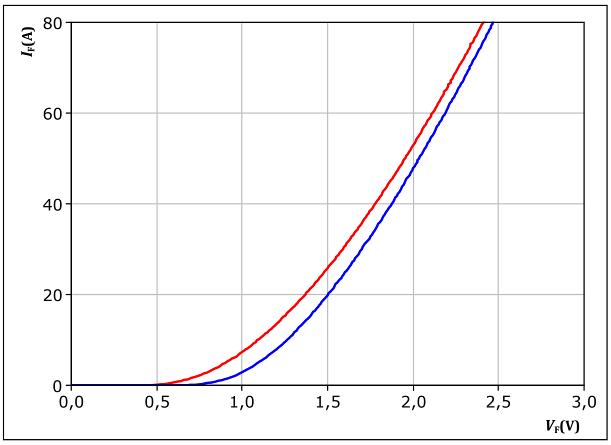
R (K/W)	τ (s)
2,42E-02	6,44E+00
7,11E-02	1,30E+00
1,03E-01	1,08E-01
9,25E-02	2,52E-02
2,42E-02	2,86E-03

Buck Sw. Protection Diode Characteristics

figure 8. **FWD**

Typical forward characteristics

I_F = f(V_F)



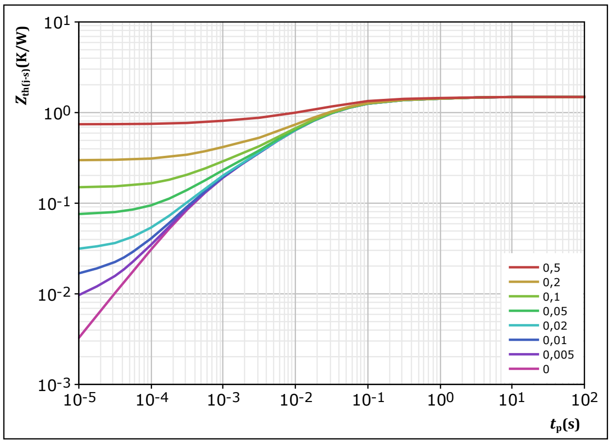
t_p = 250 µs

T_j: 25 °C, 125 °C

figure 9. **FWD**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 1,487 K/W

FWD thermal model values

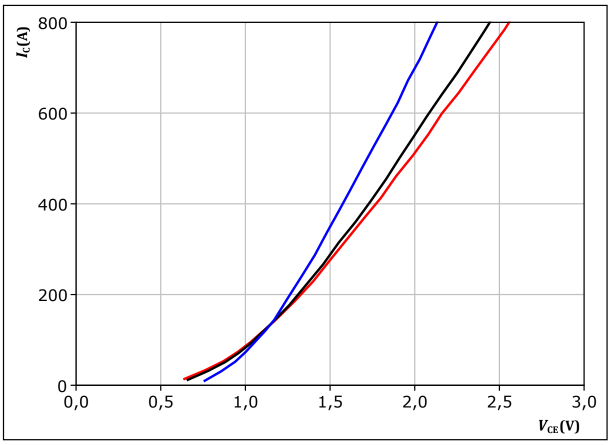
R (K/W)	τ (s)
1,05E-01	1,88E+00
2,50E-01	1,34E-01
6,86E-01	2,59E-02
3,22E-01	4,94E-03
1,24E-01	5,27E-04

Boost Switch Characteristics

figure 10. **IGBT**

Typical output characteristics

I_C = f(V_{CE})

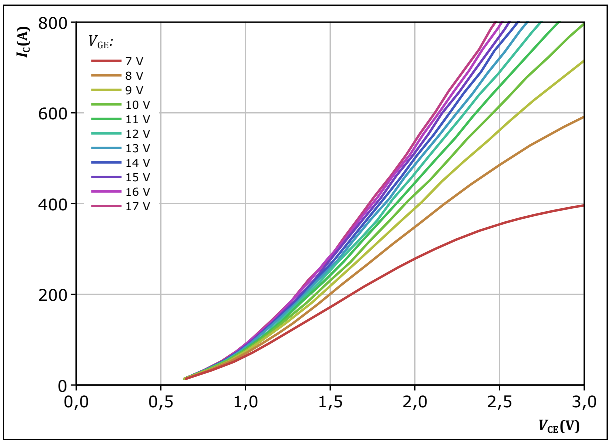


t_p = 250 µs
V_{GE} = 15 V
T_j: 25 °C / 125 °C / 150 °C

figure 11. **IGBT**

Typical output characteristics

I_C = f(V_{CE})

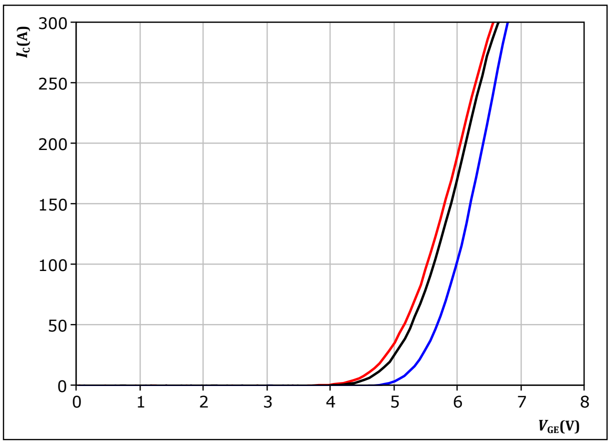


t_p = 250 µs
T_j = 150 °C
V_{GE} from 7 V to 17 V in steps of 1 V

figure 12. **IGBT**

Typical transfer characteristics

I_C = f(V_{GE})

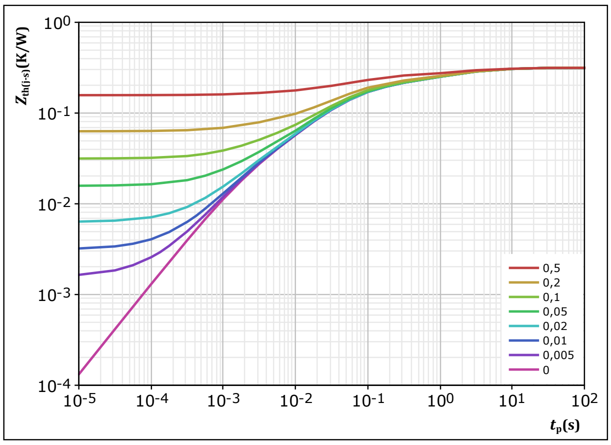


t_p = 250 µs
V_{CE} = 10 V
T_j: 25 °C / 125 °C / 150 °C

figure 13. **IGBT**

Transient thermal impedance as a function of pulse width

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



D = t_p / T
$R_{th(j-s)}$ = 0,315 K/W

IGBT thermal model values

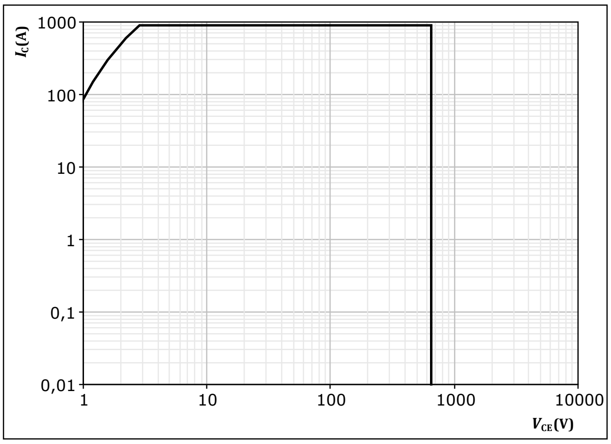
R (K/W)	τ (s)
4,24E-02	6,04E+00
8,01E-02	9,42E-01
1,23E-01	7,13E-02
5,43E-02	1,58E-02
1,49E-02	1,87E-03

Boost Switch Characteristics

figure 14. **IGBT**

Safe operating area

I_C = f(V_{CE})



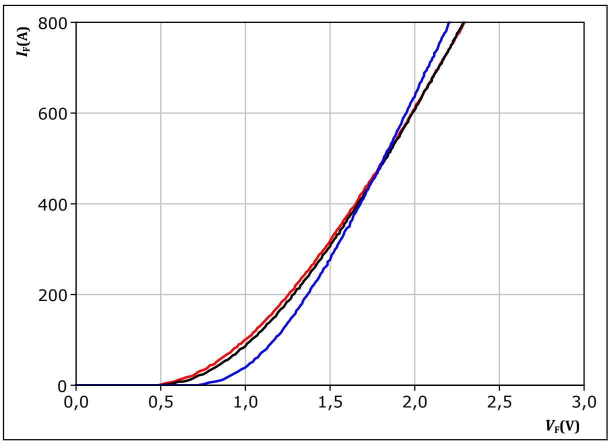
D =	single pulse	
T_s =	80	°C
V_{GE} =	15	V
T_j =	T_{jmax}	

Boost Diode Characteristics

figure 15. FWD

Typical forward characteristics

$I_F = f(V_F)$



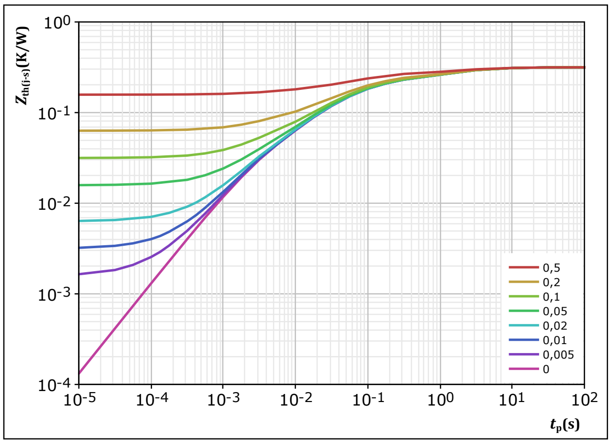
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 16. FWD

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$

$R_{th(j-s)}$ = 0,315 K/W

FWD thermal model values

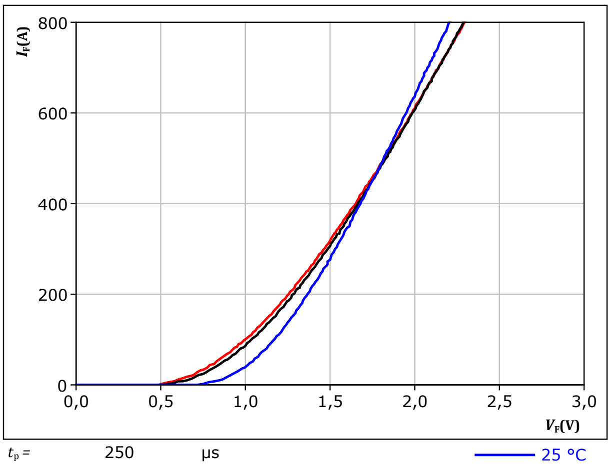
R (K/W)	τ (s)
2,42E-02	6,44E+00
7,11E-02	1,30E+00
1,03E-01	1,08E-01
9,25E-02	2,52E-02
2,42E-02	2,86E-03

Boost Sw. Inv. Diode Characteristics

figure 17. FWD

Typical forward characteristics

I_F = f(V_F)



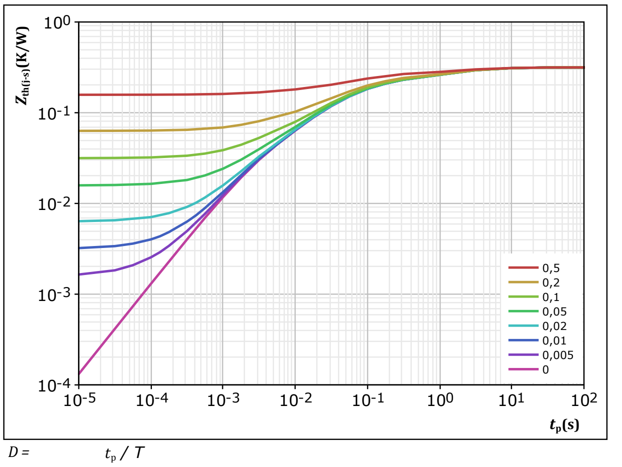
t_p = 250 µs

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

$R_{th(j-s)}$ = 0,315 K/W

FWD thermal model values

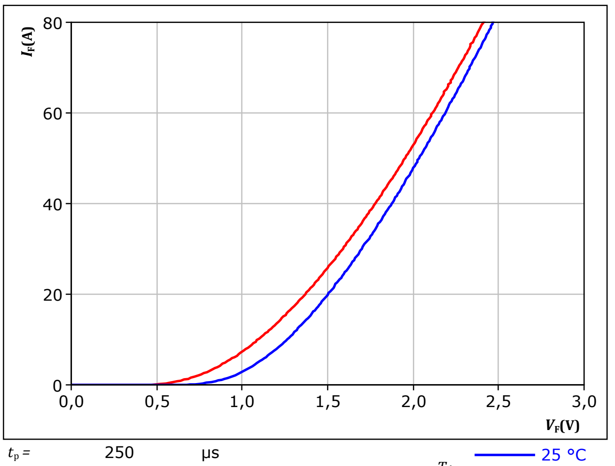
R (K/W)	τ (s)
2,42E-02	6,44E+00
7,11E-02	1,30E+00
1,03E-01	1,08E-01
9,25E-02	2,52E-02
2,42E-02	2,86E-03

Boost Sw. Protection Diode Characteristics

figure 19. **FWD**

Typical forward characteristics

I_F = f(V_F)



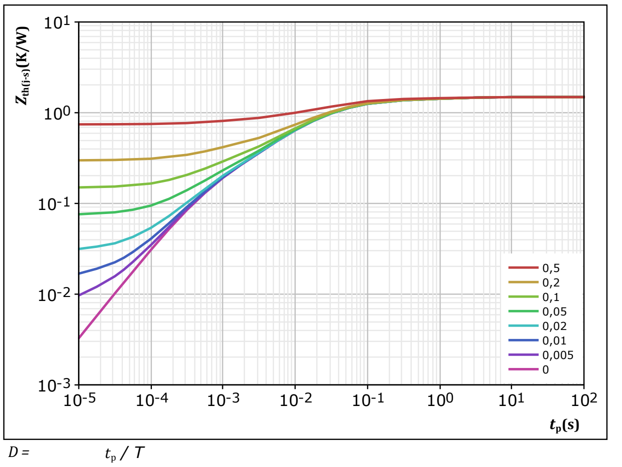
t_p = 250 µs

T_j: 25 °C, 125 °C

figure 20. **FWD**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 1,487 K/W

FWD thermal model values

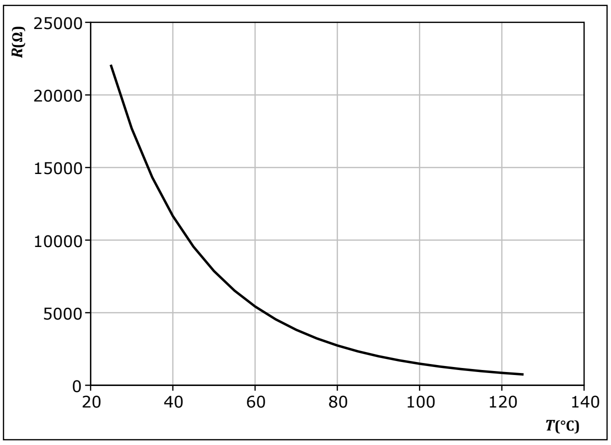
R (K/W)	τ (s)
1,05E-01	1,88E+00
2,50E-01	1,34E-01
6,86E-01	2,59E-02
3,22E-01	4,94E-03
1,24E-01	5,27E-04

Thermistor Characteristics

figure 21. **Thermistor**

Typical NTC characteristic as function of temperature

R_T = f(T)

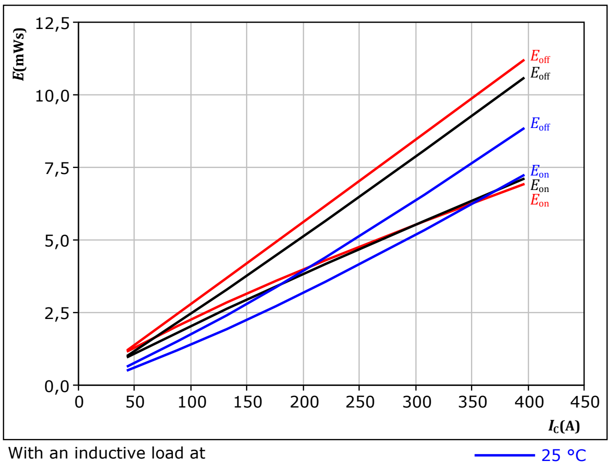


Buck Switching Characteristics

figure 22. IGBT

Typical switching energy losses as a function of collector current

$E = f(I_C)$



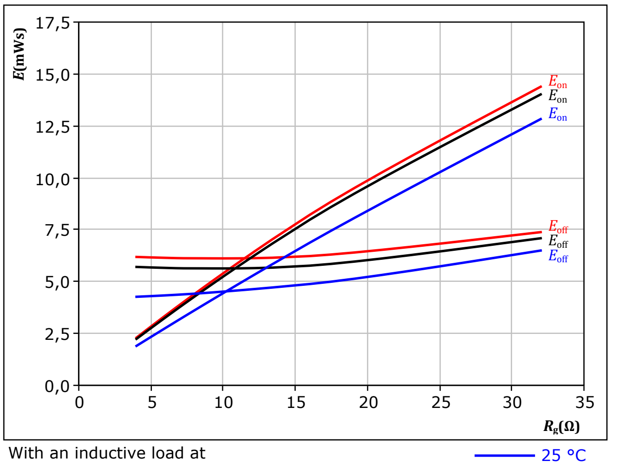
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	8	Ω		150 °C
R_{goff} =	8	Ω		

figure 23. IGBT

Typical switching energy losses as a function of gate resistor

$E = f(R_g)$



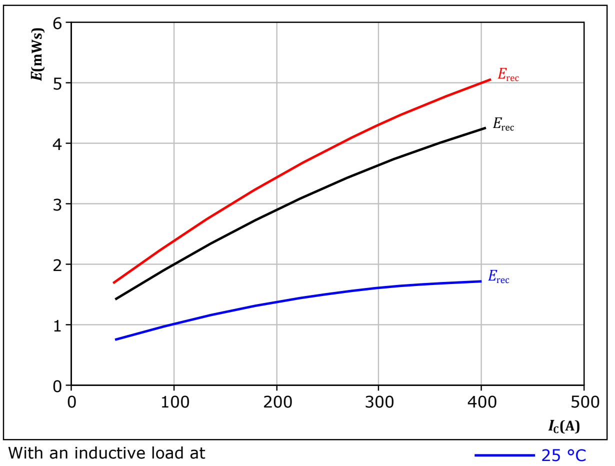
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	220	A		150 °C

figure 24. FWD

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



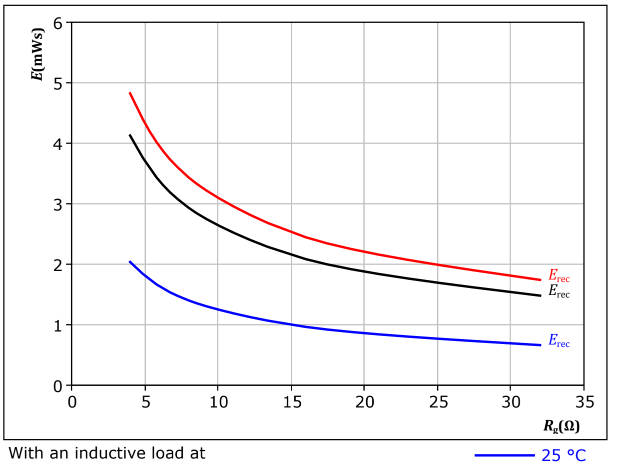
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	8	Ω		150 °C

figure 25. FWD

Typical reverse recovered energy loss as a function of gate resistor

$E_{rec} = f(R_g)$



With an inductive load at

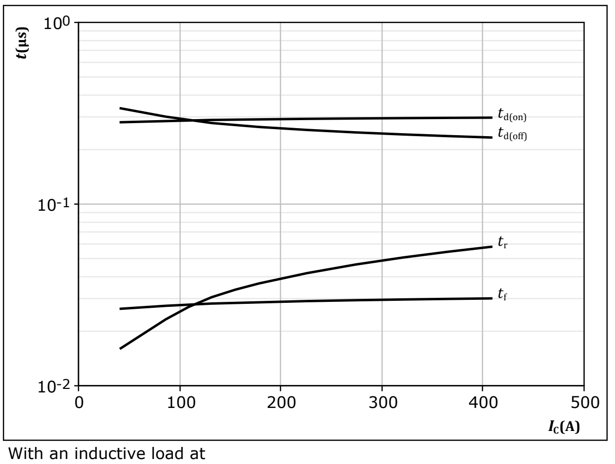
V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	220	A		150 °C

Buck Switching Characteristics

figure 26. IGBT

Typical switching times as a function of collector current

$t = f(I_C)$



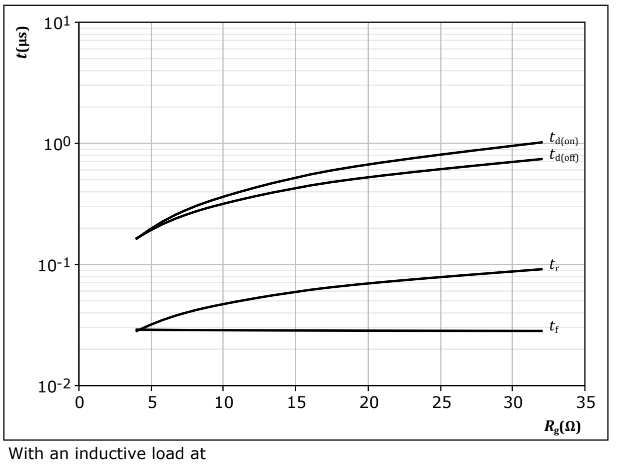
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	8	Ω
R_{goff} =	8	Ω

figure 27. IGBT

Typical switching times as a function of gate resistor

$t = f(R_g)$



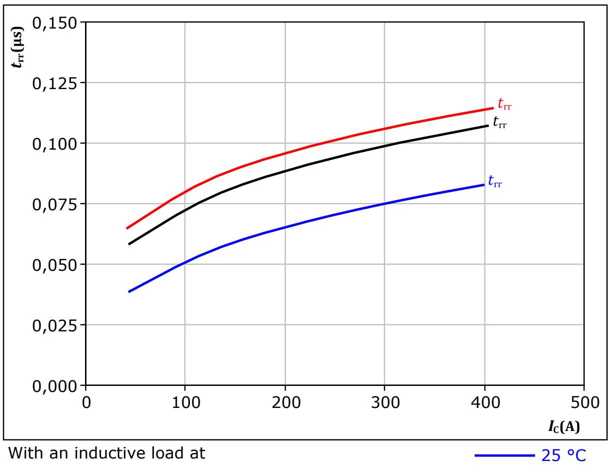
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	±15	V
I_C =	220	A

figure 28. FWD

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_C)$



With an inductive load at

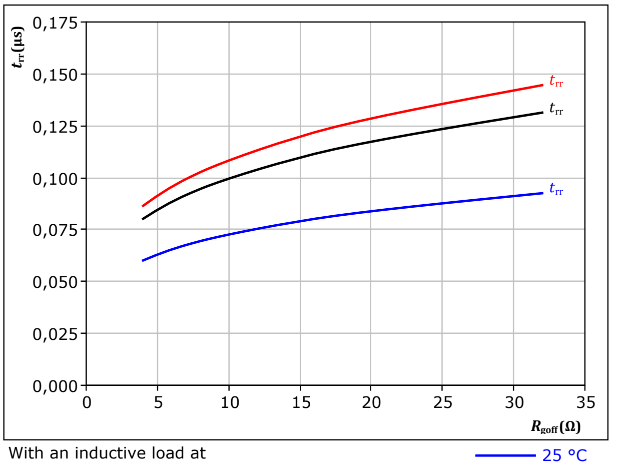
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	8	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 29. FWD

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

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



With an inductive load at

V_{CE} =	350	V
V_{GE} =	±15	V
I_C =	220	A

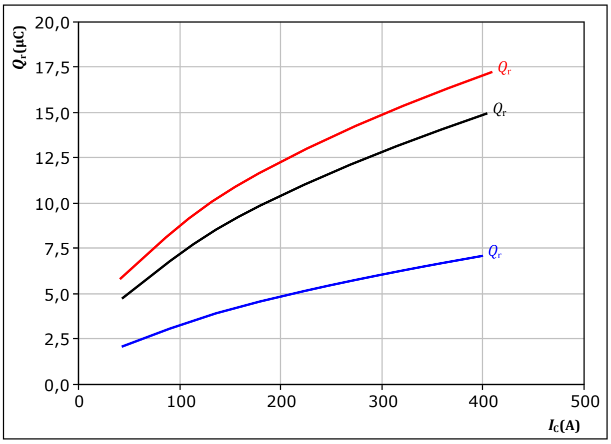
T_j: 25 °C, 125 °C, 150 °C

Buck Switching Characteristics

figure 30. **FWD**

Typical recovered charge as a function of collector current

Q_r = f(I_C)



With an inductive load at

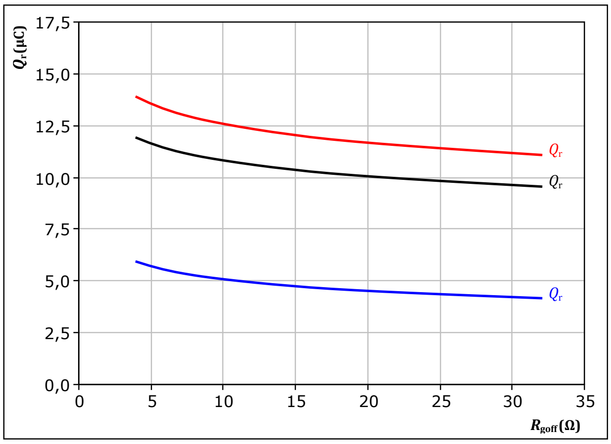
V_{CE} = 350 V
V_{GE} = ±15 V
R_{gon} = 8 Ω

T_j: 25 °C, 125 °C, 150 °C

figure 31. **FWD**

Typical recovered charge as a function of turn off gate resistor

Q_r = f(R_{goff})



With an inductive load at

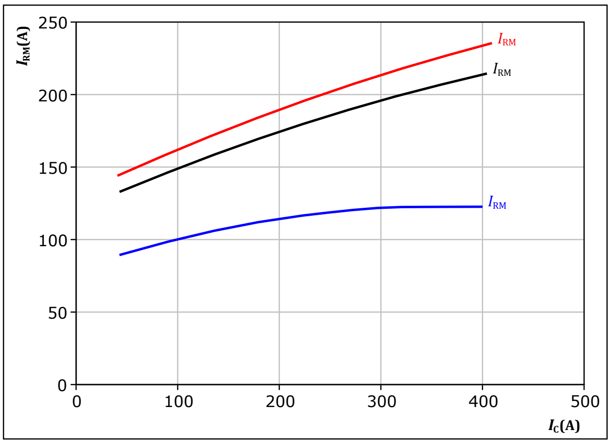
V_{CE} = 350 V
V_{GE} = ±15 V
I_C = 220 A

T_j: 25 °C, 125 °C, 150 °C

figure 32. **FWD**

Typical peak reverse recovery current as a function of collector current

I_{RM} = f(I_C)



With an inductive load at

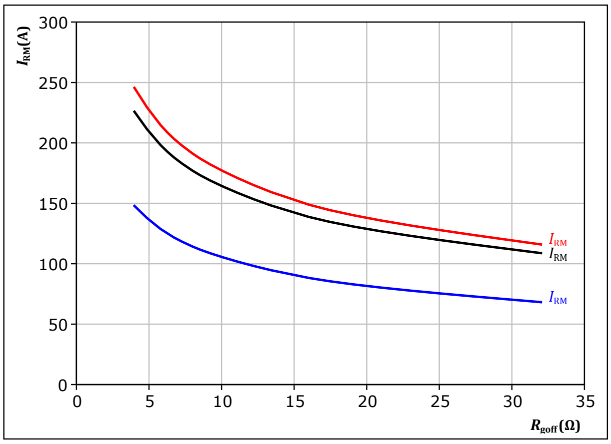
V_{CE} = 350 V
V_{GE} = ±15 V
R_{gon} = 8 Ω

T_j: 25 °C, 125 °C, 150 °C

figure 33. **FWD**

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

I_{RM} = f(R_{goff})



With an inductive load at

V_{CE} = 350 V
V_{GE} = ±15 V
I_C = 220 A

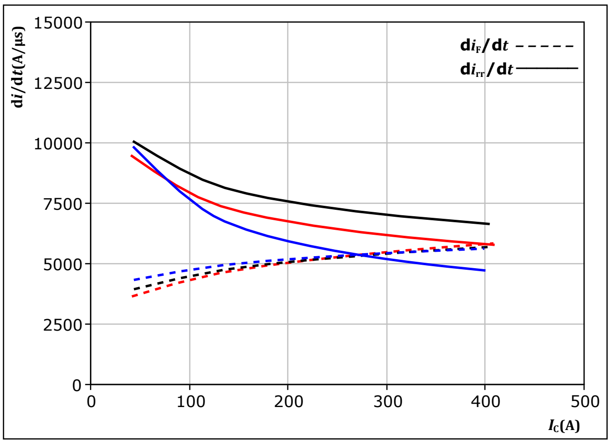
T_j: 25 °C, 125 °C, 150 °C

Buck Switching Characteristics

figure 34. **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)



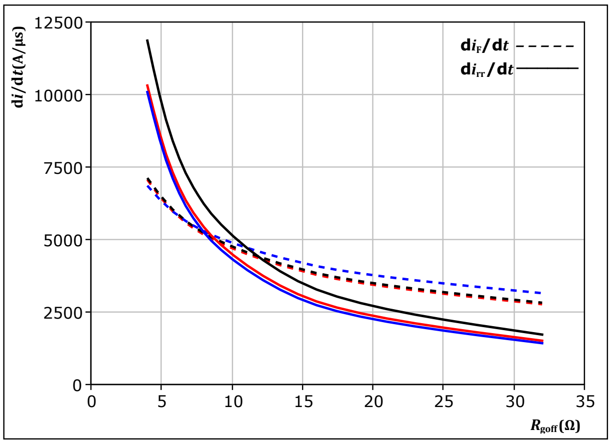
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	8	Ω		150 °C

figure 35. **FWD**

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

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



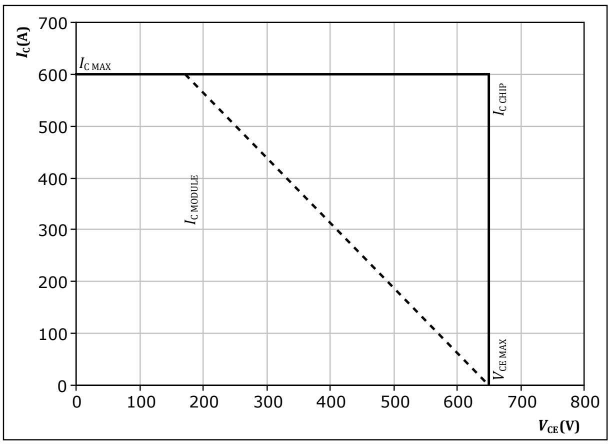
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	220	A		150 °C

figure 36. **IGBT**

Reverse bias safe operating area

I_C = f(V_{CE})



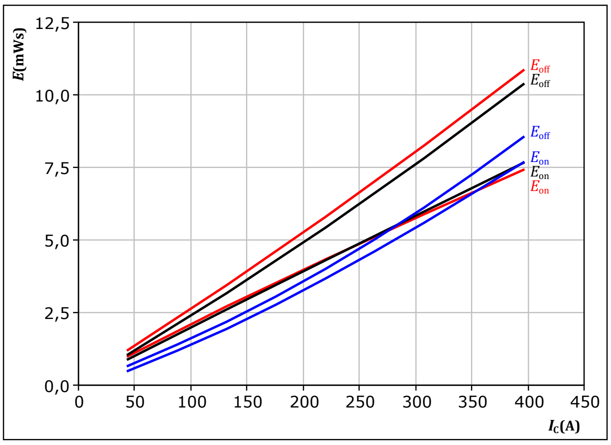
At	T_j =	150	°C
	R_{gon} =	8	Ω
	R_{goff} =	8	Ω

Boost Switching Characteristics

figure 37. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



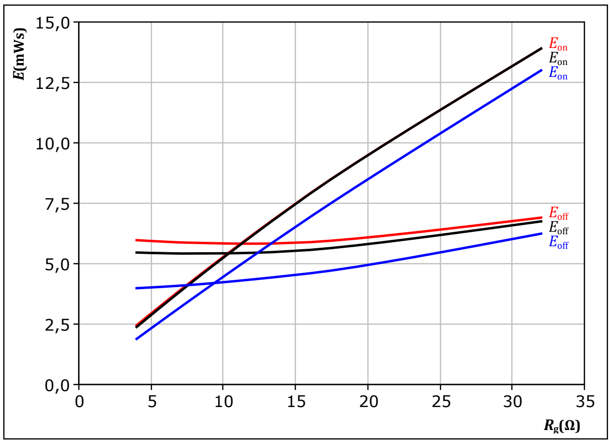
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	8	Ω		150 °C
R_{goff} =	8	Ω		

figure 38. **IGBT**

Typical switching energy losses as a function of gate resistor

$E = f(R_g)$



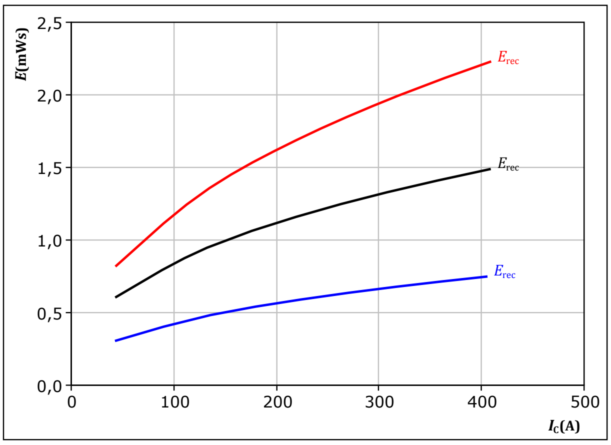
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	220	A		150 °C

figure 39. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



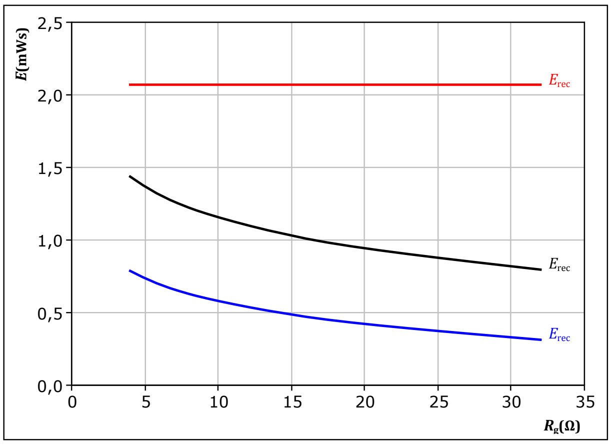
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	8	Ω		150 °C

figure 40. **FWD**

Typical reverse recovered energy loss as a function of gate resistor

$E_{rec} = f(R_g)$



With an inductive load at

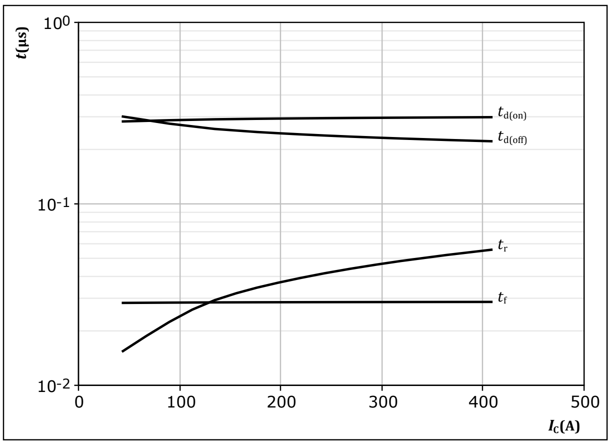
V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	220	A		150 °C

Boost Switching Characteristics

figure 41. **IGBT**

Typical switching times as a function of collector current

t = f(I_C)



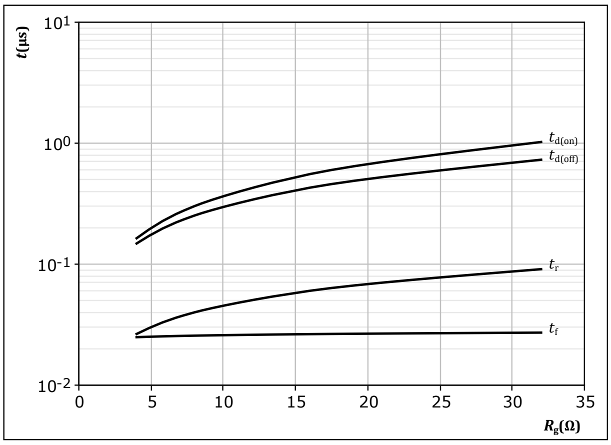
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	8	Ω
R_{goff} =	8	Ω

figure 42. **IGBT**

Typical switching times as a function of gate resistor

t = f(R_g)



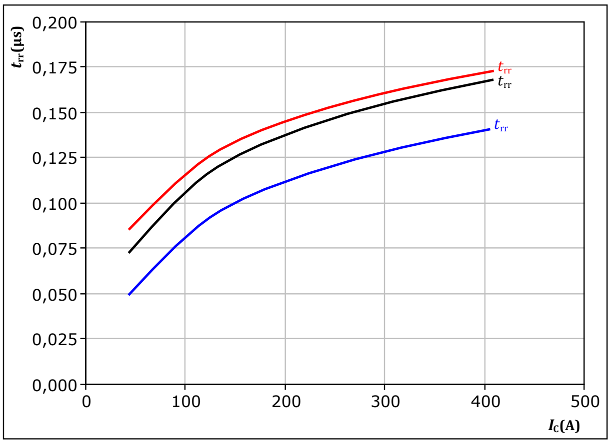
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	±15	V
I_C =	220	A

figure 43. **FWD**

Typical reverse recovery time as a function of collector current

t_{rr} = f(I_C)



With an inductive load at

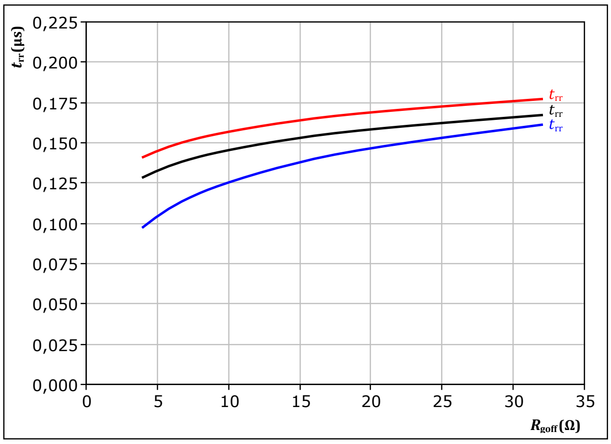
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	8	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 44. **FWD**

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

t_{rr} = f(R_{goff})



With an inductive load at

V_{CE} =	350	V
V_{GE} =	±15	V
I_C =	220	A

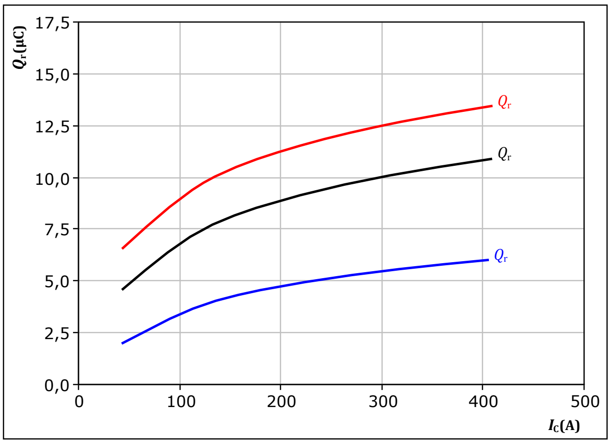
T_j: 25 °C, 125 °C, 150 °C

Boost Switching Characteristics

figure 45. **FWD**

Typical recovered charge as a function of collector current

Q_r = f(I_C)



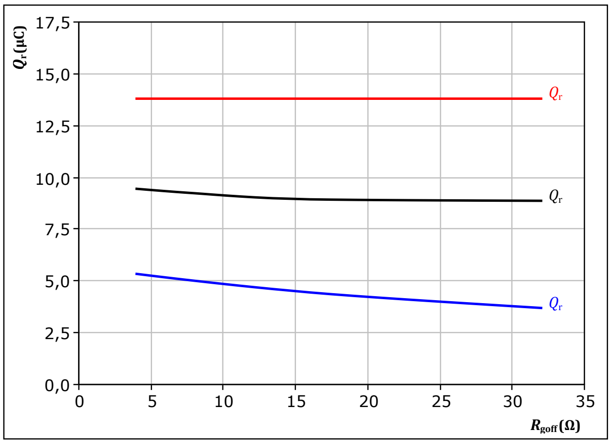
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C / 125 °C / 150 °C
V_{GE} =	±15	V		
R_{gon} =	8	Ω		

figure 46. **FWD**

Typical recovered charge as a function of turn off gate resistor

Q_r = f(R_{goff})



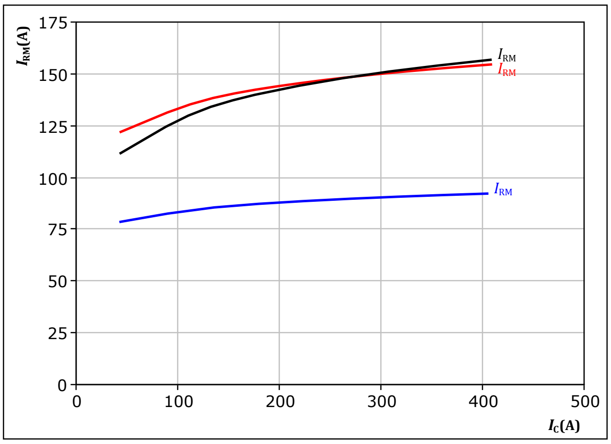
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C / 125 °C / 150 °C
V_{GE} =	±15	V		
I_C =	220	A		

figure 47. **FWD**

Typical peak reverse recovery current as a function of collector current

I_{RM} = f(I_C)



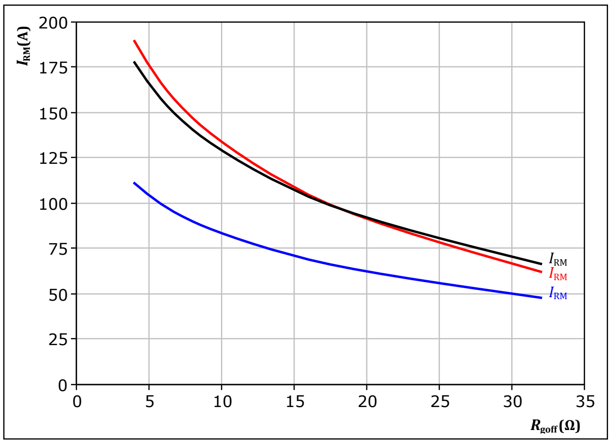
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C / 125 °C / 150 °C
V_{GE} =	±15	V		
R_{gon} =	8	Ω		

figure 48. **FWD**

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

I_{RM} = f(R_{goff})



With an inductive load at

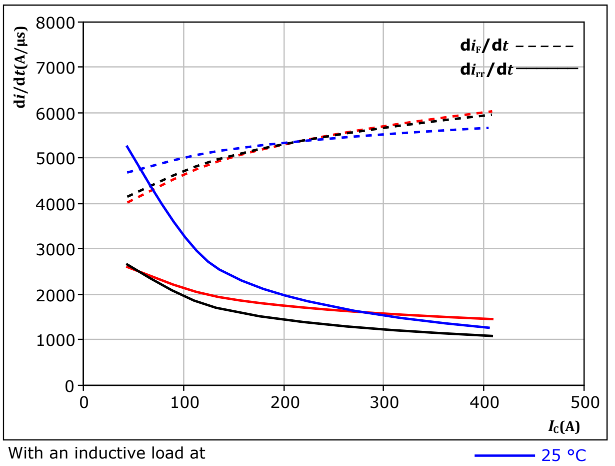
V_{CE} =	350	V	T_j:	25 °C / 125 °C / 150 °C
V_{GE} =	±15	V		
I_C =	220	A		

Boost Switching Characteristics

figure 49. **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

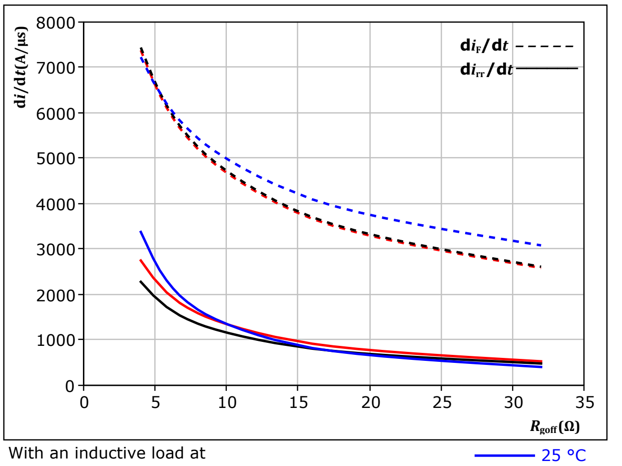
V_{CE} = 350 V
V_{GE} = ±15 V
R_{gon} = 8 Ω

T_j: 25 °C, 125 °C, 150 °C

figure 50. **FWD**

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

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



With an inductive load at

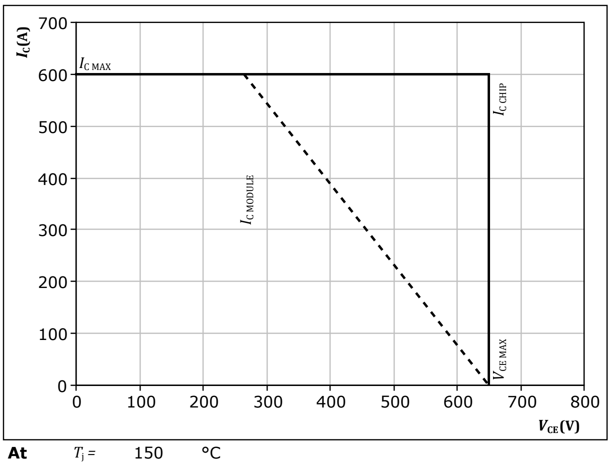
V_{CE} = 350 V
V_{GE} = ±15 V
I_C = 220 A

T_j: 25 °C, 125 °C, 150 °C

figure 51. **IGBT**

Reverse bias safe operating area

I_C = f(V_{CE})



At

T_j = 150 °C
R_{gon} = 8 Ω
R_{goff} = 8 Ω

Switching Definitions

figure 52.	IGBT

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

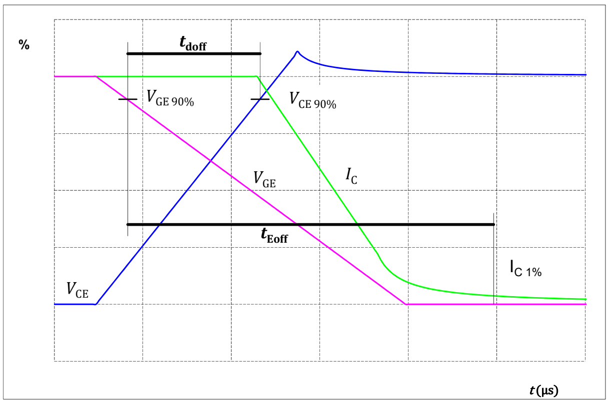


figure 53.	IGBT

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

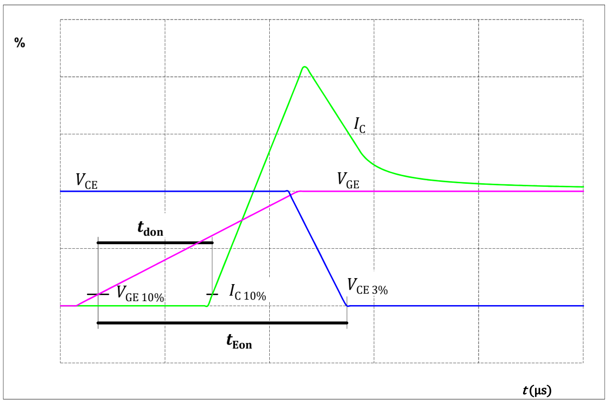


figure 54.	IGBT

Turn-off Switching Waveforms & definition of t_f

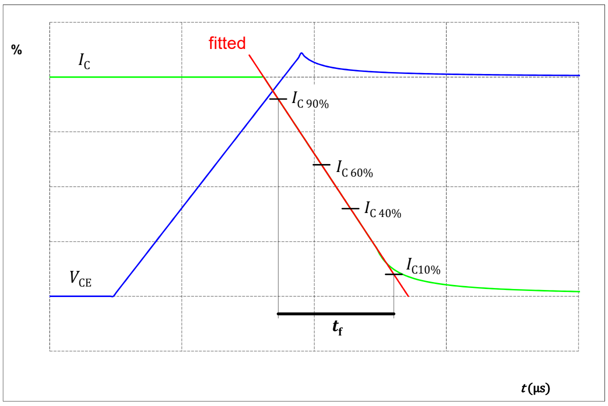
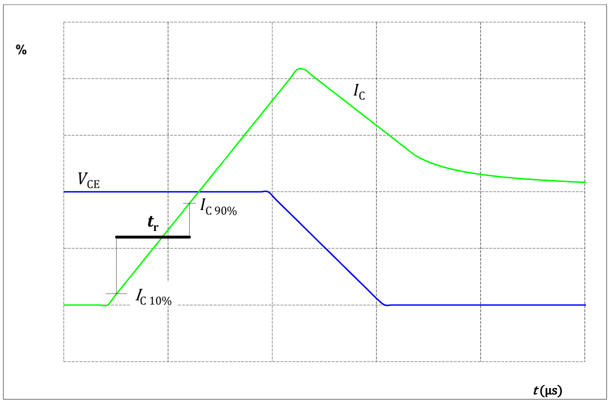


figure 55.	IGBT

Turn-on Switching Waveforms & definition of t_r



Switching Definitions

figure 56. **FWD**

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

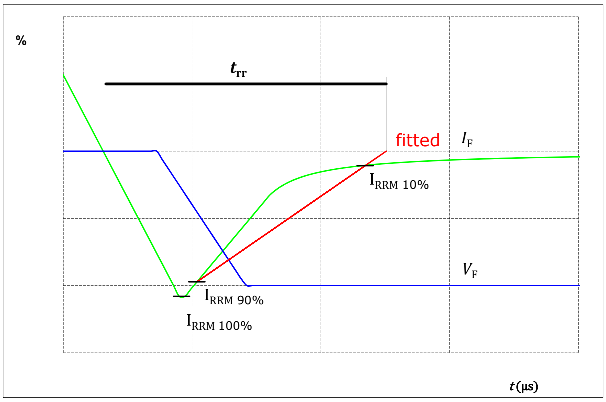
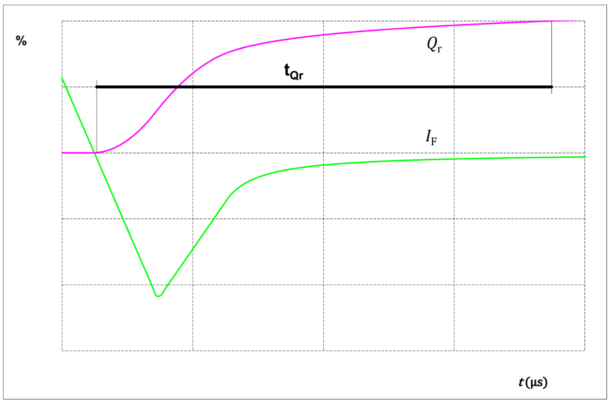


figure 57. **FWD**

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



Ordering Code

Version	Ordering Code
With thermal paste (4,4 W/mK, PTM6000)	B0-SP07NIB300S5-LT82F58T-/7/

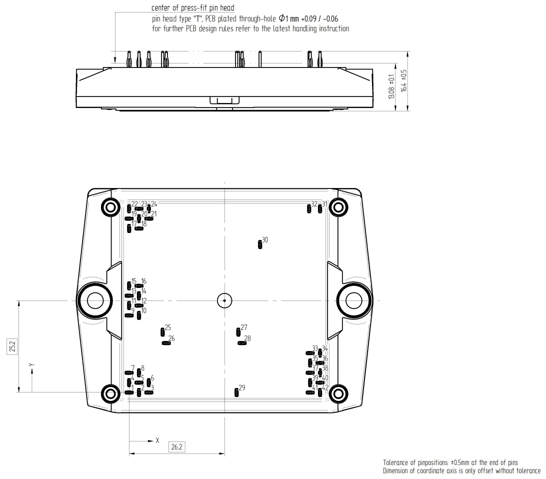
Marking

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

B0-SP07NIB300S5-LT82F58T

Outline

Pin table [mm]			
Pin	X	Y	Function
1	0	0	DC+
2	2,7	0	DC+
3	5,4	0	DC+
4	0	2,7	DC+
5	2,7	2,7	DC+
6	5,4	2,7	DC+
7	0	5,4	DC+
8	2,7	5,4	DC+
9	0	21,15	GND
10	2,7	21,15	GND
11	0	23,85	GND
12	2,7	23,85	GND
13	0	26,55	GND
14	2,7	26,55	GND
15	0	29,25	GND
16	2,7	29,25	GND
17	0	45	DC-
18	2,7	45	DC-
19	0	47,7	DC-
20	2,7	47,7	DC-
21	5,4	47,7	DC-
22	0	50,4	DC-
23	2,7	50,4	DC-
24	5,4	50,4	DC-
25	9,2	16,55	S11
26	10,2	13,55	G11
27	30	16,55	S13
28	31	13,55	G13
29	29,5	0	P
30	35,95	40,6	N
31	52,4	50,4	Therm1
32	49,4	50,4	Therm2
33	49,7	10,8	Ph
34	52,4	10,8	Ph
35	49,7	8,1	Ph
36	52,4	8,1	Ph
37	49,7	5,4	Ph
38	52,4	5,4	Ph
39	49,7	2,7	Ph
40	52,4	2,7	Ph
41	49,7	0	Ph
42	52,4	0	Ph



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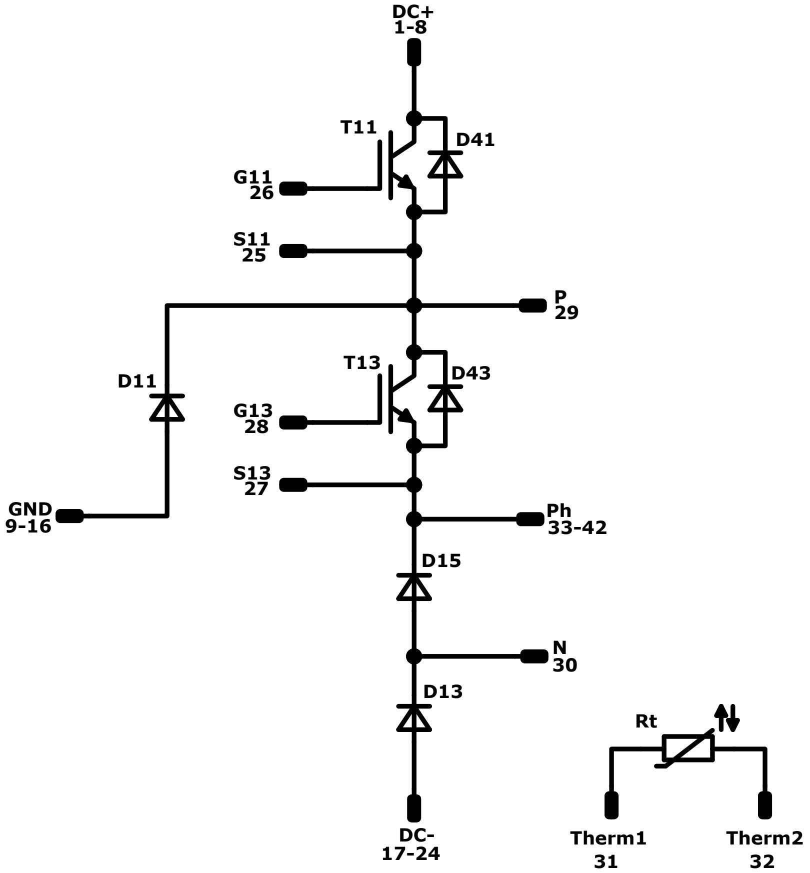
Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T11	IGBT	650 V	300 A	Buck Switch	
D11	FWD	650 V	300 A	Buck Diode	
D41	FWD	650 V	30 A	Buck Sw. Protection Diode	
T13	IGBT	650 V	300 A	Boost Switch	
D13	FWD	650 V	300 A	Boost Diode	
D15	FWD	650 V	300 A	Boost Sw. Inv. Diode	
D43	FWD	650 V	30 A	Boost Sw. Protection Diode	
Rt	Thermistor			Thermistor	

Ordering Code

Version	Ordering Code
With thermal paste (4,4 W/mK, PTM6000)	B0-SP07NIC300S5-LT92F58T-/7/

Marking

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

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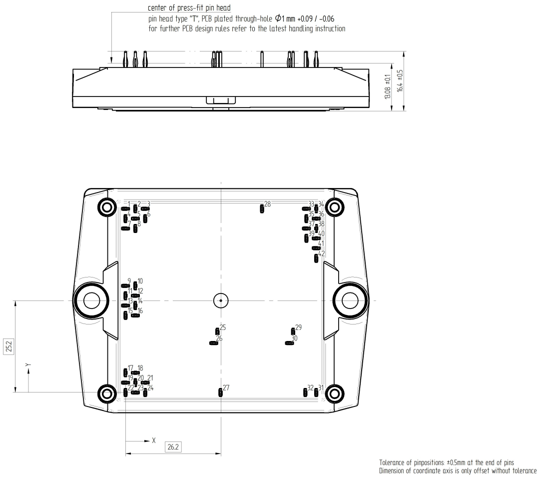
Outline

Pin table [mm]

Pin	X	Y	Function
1	0	50,4	DC+
2	2,7	50,4	DC+
3	5,4	50,4	DC+
4	0	47,7	DC+
5	2,7	47,7	DC+
6	5,4	47,7	DC+
7	0	45	DC+
8	2,7	45	DC+
9	0	29,25	GND
10	2,7	29,25	GND
11	0	26,55	GND
12	2,7	26,55	GND
13	0	23,85	GND
14	2,7	23,85	GND
15	0	21,15	GND
16	2,7	21,15	GND
17	0	5,4	DC-
18	2,7	5,4	DC-
19	0	2,7	DC-
20	2,7	2,7	DC-
21	5,4	2,7	DC-
22	0	0	DC-
23	2,7	0	DC-
24	5,4	0	DC-
25	25,25	16,55	S12
26	24,25	13,55	G12
27	26,1	0	N
28	37,5	50,4	P
29	46,05	16,55	S14
30	45,05	13,55	G14
31	52,4	0	Therm1
32	49,4	0	Therm2
33	49,7	50,4	Ph
34	52,4	50,4	Ph
35	49,7	47,7	Ph
36	52,4	47,7	Ph
37	49,7	45	Ph
38	52,4	45	Ph
39	49,7	42,3	Ph
40	52,4	42,3	Ph
41	52,4	39,6	Ph
42	52,4	36,8	Ph



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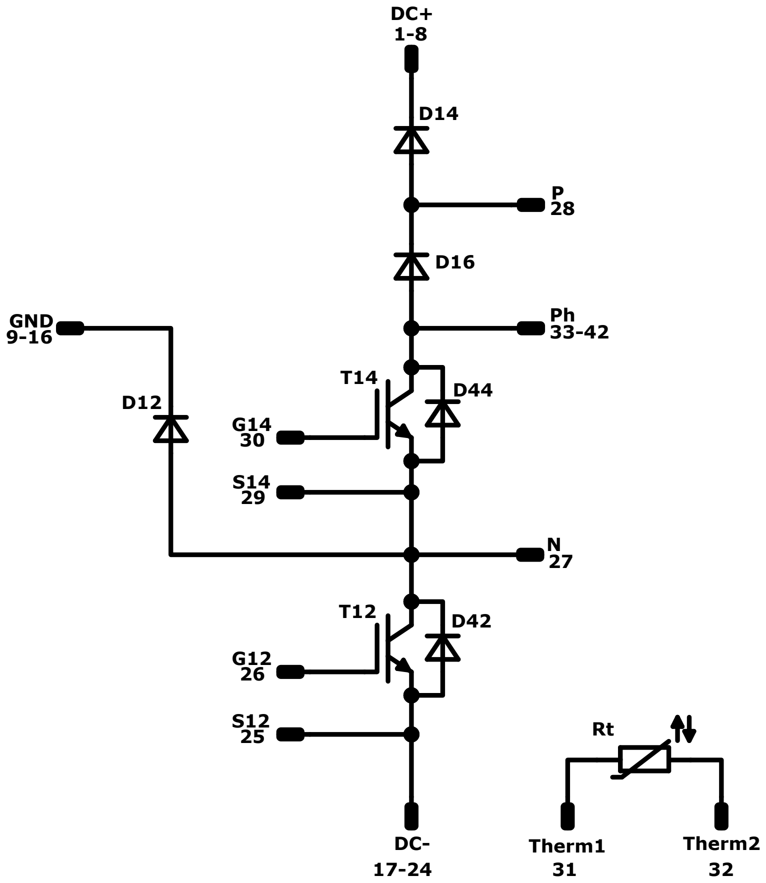
Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T12	IGBT	650 V	300 A	Buck Switch	
D12	FWD	650 V	300 A	Buck Diode	
D42	FWD	650 V	30 A	Buck Sw. Protection Diode	
T14	IGBT	650 V	300 A	Boost Switch	
D14	FWD	650 V	300 A	Boost Diode	
D16	FWD	650 V	300 A	Boost Sw. Inv. Diode	
D44	FWD	650 V	30 A	Boost Sw. Protection Diode	
Rt	Thermistor			Thermistor	

Packaging instruction				
Standard packaging quantity (SPQ) 45	>SPQ	Standard	<SPQ	Sample

Handling instruction
Handling instructions for *flow* S3 packages see vincotech.com website.

Package data
Package data for *flow* S3 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
B0-SP07NIB300S5-LT82F58T-D1-14	7 Oct. 2020		
B0-SP07NIB300S5-LT82F58T-D2-14	21 Jul. 2021	Module marking is updated with UL logo, product is unchanged	