30-PT07NIA600S501-PD60F58Y
datasheet

***flow*NPC 2** | **650 V / 600 A**

Topology features

- Integrated DC capacitor
- Kelvin Emitter for improved switching performance
- Neutral Point Clamped Topology (I-Type)
- Split topology
- 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

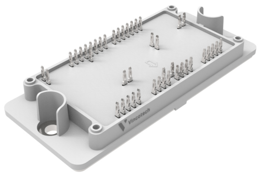
Target applications

- Industrial Drives
- Solar Inverters
- UPS

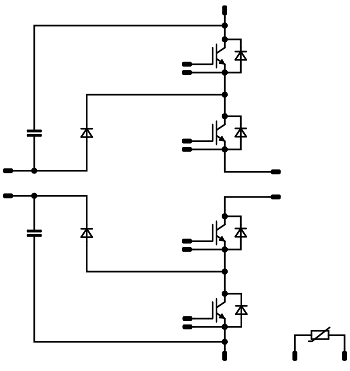
Types

- 30-PT07NIA600S501-PD60F58Y

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	336	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}		1200	A
Turn off safe operating area		T_j = 150°C, V_{CE} = 1200 V		1200	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	500	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	250	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}		750	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	311	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}		1350	A
Turn off safe operating area		T_j = 150°C, V_{CE} = 1200 V		1350	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	403	W
Gate-emitter voltage	V_{GES}			±20	V
Short circuit ratings	t_{SC}	V_{GE} = 15 V, V_{CC} = 400 V	T_j = 150 °C	3	μs
Maximum junction temperature	T_{jmax}			175	°C

Vincotech

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	204	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	255	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	204	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	255	W
Maximum junction temperature	T_{jmax}			175	°C
Capacitor (DC)					
Maximum DC voltage	V_{MAX}			630	V
Operation Temperature	T_{op}			-55 ... 150	°C

Module Properties

Parameter	Symbol	Conditions		Value	Unit
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]	Values Min	Values Typ	Values Max	Unit
Buck Switch										
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,006	25	3,25	4	4,75	V
Collector-emitter saturation voltage	V_{CEsat}		15		600	25 125 150	1,15	1,24 1,7 1,75	1,8(1)	V
Collector-emitter cut-off current	I_{CES}		0	650		25			150	µA
Gate-emitter leakage current	I_{GES}		20	0		25			600	nA
Internal gate resistance	r_{g}							None		Ω
Input capacitance	C_{ies}							34200		pF
Output capacitance	C_{oes}	f = 1 Mhz	0	25		25		990		pF
Reverse transfer capacitance	C_{res}							115,8		pF
Gate charge	Q_{g}	V_{CC} = 400 V	±15		600	25		2520		nC
Thermal										
Thermal resistance junction to sink (2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,19		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 8 Ω R_{goff} = 16 Ω	±15	350	475	25 125 150		478,53 540,72 474,65		ns
Rise time	t_{r}					25 125 150		92,33 94,24 95,2		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		592,34 619,14 626,24		ns
Fall time	t_{f}					25 125 150		59,4 54,48 51,64		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=6,1 µC Q_{rFWD}=10,84 µC Q_{rFWD}=13,24 µC				25 125 150		9,91 10,16 10,35		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		19,65 19,44 19,81		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				375	25 125 150		1,53 1,48 1,46	1,92(1)	V
Reverse leakage current	I_R	V_r = 650 V				25			19	µA
Thermal										
Thermal resistance junction to sink (2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,3		K/W
Dynamic										
Peak recovery current	I_{RM}	di/dt=3922 A/µs di/dt=3987 A/µs di/dt=3684 A/µs	±15	350	475	25 125 150		107,47 147,5 166,49		A
Reverse recovery time	t_{rr}					25 125 150		86,78 108,36 118,17		ns
Recovered charge	Q_r					25 125 150		6,1 10,84 13,24		µC
Reverse recovered energy	E_{rec}					25 125 150		1,29 2,34 2,91		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		3339,33 4487,66 4481,07		A/µs

Characteristic Values

Parameter	Symbol	Conditions					Values			Unit
			V_{GE} [V] V_{GS} [V]	V_{CE} [V] V_{DS} [V] V_F [V]	I_C [A] I_D [A] I_F [A]	T_j [°C]	Min	Typ	Max	
Boost Switch										
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,0045	25	4,35	5	5,65	V
Collector-emitter saturation voltage	V_{CEsat}		15		450	25 125 150		1,52 1,7 1,75	1,65(1)	V
Collector-emitter cut-off current	I_{CES}		0	650		25			120	µA
Gate-emitter leakage current	I_{GES}		20	0		25			600	nA
Internal gate resistance	r_g							None		Ω
Input capacitance	C_{ies}	f = 1 Mhz	0	25		25		26760		pF
Output capacitance	C_{oes}							810		pF
Reverse transfer capacitance	C_{res}							276		pF
Gate charge	Q_g	V_{CC} = 520 V	15		450	25		2610		nC
Thermal										
Thermal resistance junction to sink (2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,24		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 5,82 Ω R_{goff} = 12,8 Ω	±15	350	475	25 125 150		575,24 580,24 582,18		ns
Rise time	t_r					25 125 150		173,65 171,84 171,92		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		1026,85 1095,12 1114,91		ns
Fall time	t_f					25 125 150		123,94 101,33 96,85		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=4,52 µC Q_{rFWD}=12,43 µC Q_{rFWD}=14,87 µC				25 125 150		20,62 23,57 23,96		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		35,99 35,41 35,94		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} = 3,4 W/mK (PSX)						0,37		K/W
Dynamic										
Peak recovery current	I_{RM}	d*i*/d*t*=2550 A/µs d*i*/d*t*=2549 A/µs d*i*/d*t*=2605 A/µs	±15	350	475	25 125 150		70,72 127,6 138,83		A
Reverse recovery time	t_{rr}					25 125 150		95,49 147,5 162,77		ns
Recovered charge	Q_r					25 125 150		4,52 12,43 14,87		µC
Reverse recovered energy	E_{rec}					25 125 150		0,788 2,25 2,72		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		1894,85 2463,13 1956,79		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} = 3,4 W/mK (PSX)						0,37		K/W
Capacitor (DC)										
Static										
Capacitance	C	DC bias voltage = 0 V				25		33		nF
Tolerance							-5		5	%
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					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	

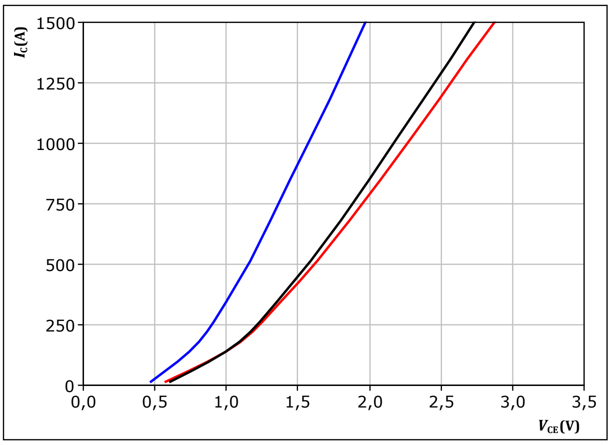
(1) Value at chip level
(2) Only valid with pre-applied Vincotech thermal interface material.

Buck Switch Characteristics

figure 1. **IGBT**

Typical output characteristics

I_C = f(V_{CE})

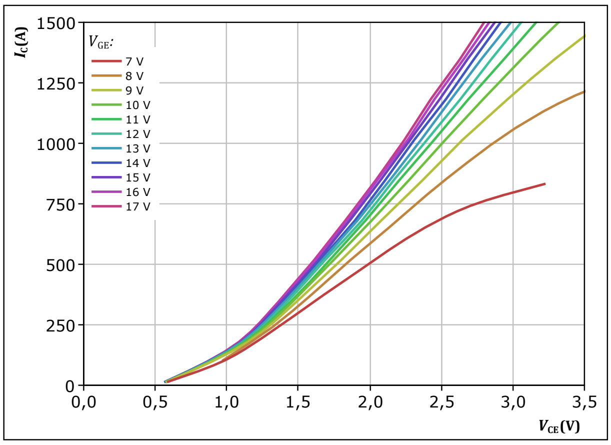


t_p =	250	µs		25 °C
V_{GE} =	15	V	T_j:	125 °C
				150 °C

figure 2. **IGBT**

Typical output characteristics

I_C = f(V_{CE})



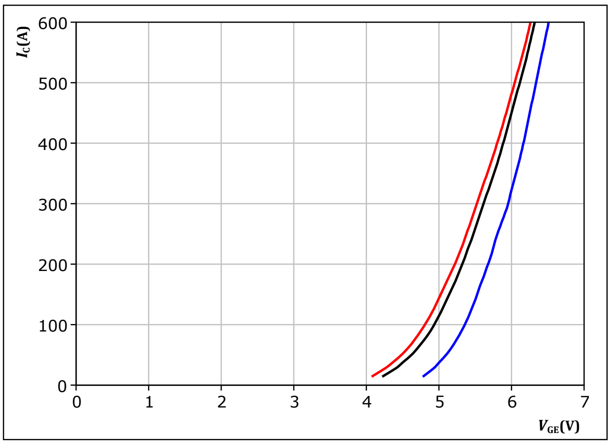
t_p =	250	µs
T_j =	150	°C

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

figure 3. **IGBT**

Typical transfer characteristics

I_C = f(V_{GE})

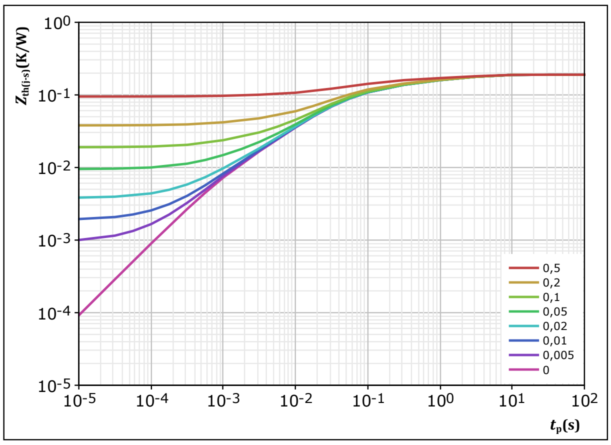


t_p =	250	µs		25 °C
V_{CE} =	10	V	T_j:	125 °C
				150 °C

figure 4. **IGBT**

Transient thermal impedance as a function of pulse width

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



D =	t_p / T	
$R_{th(j-s)}$ =	0,19	K/W

IGBT thermal model values

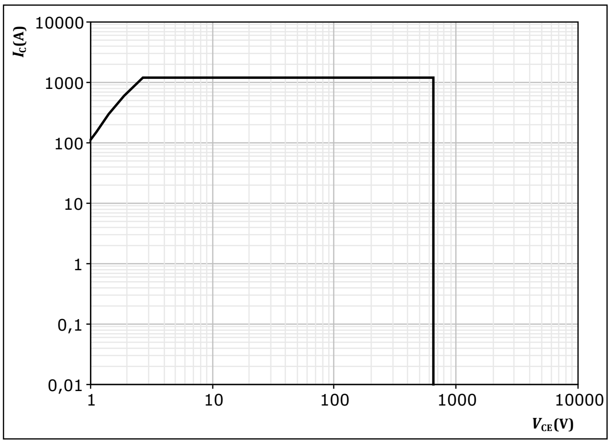
R (K/W)	τ (s)
3,23E-02	3,19E+00
3,92E-02	5,61E-01
7,54E-02	6,82E-02
3,68E-02	1,46E-02
6,28E-03	1,14E-03

Buck Switch Characteristics

figure 5.	IGBT

Safe operating area

I_C = f(V_{CE})



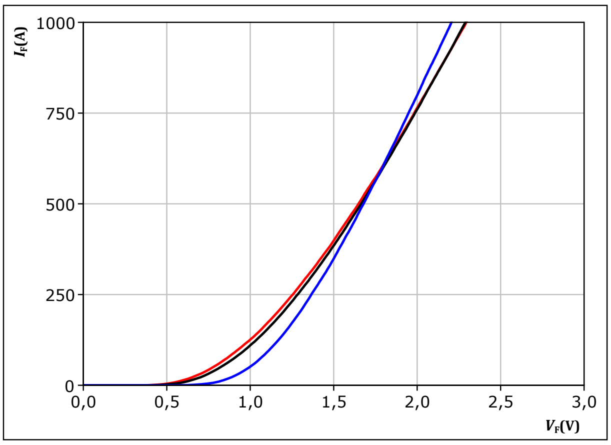
D =	single pulse	
T_s =	80	°C
V_{GE} =	15	V
T_j =	T_{jmax}	

Buck Diode Characteristics

figure 6. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



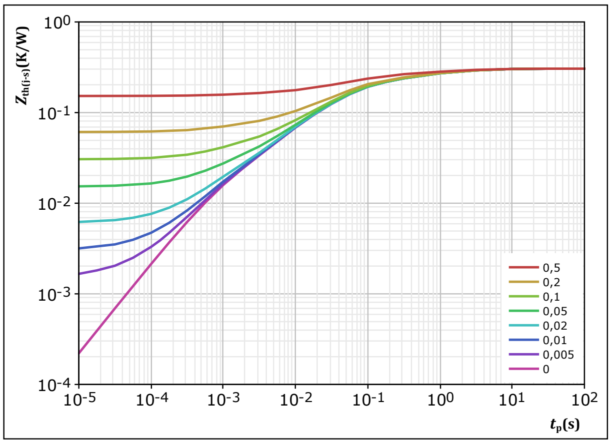
t_p = 250 µs

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

$R_{th(j-s)}$ = 0,305 K/W

FWD thermal model values

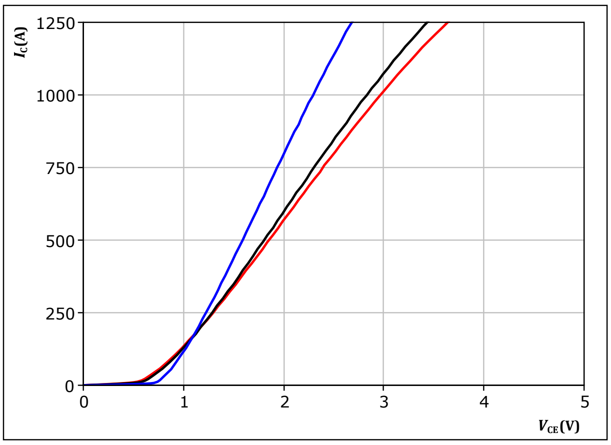
R (K/W)	τ (s)
2,75E-02	3,96E+00
7,11E-02	5,62E-01
1,43E-01	5,86E-02
5,15E-02	1,00E-02
1,23E-02	8,47E-04

Boost Switch Characteristics

figure 8. **IGBT**

Typical output characteristics

I_C = f(V_{CE})

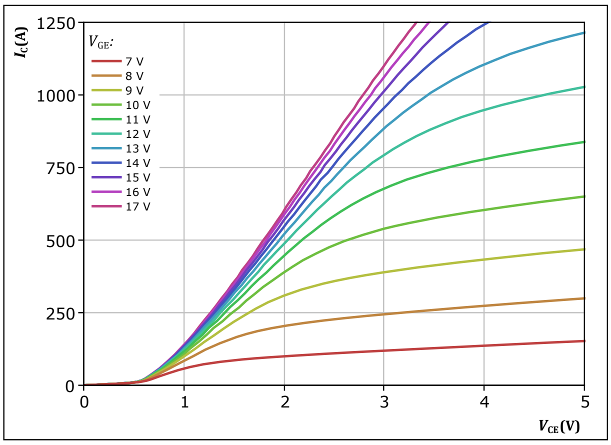


t_p =	250	µs		25 °C
V_{GE} =	15	V	T_j:	125 °C
				150 °C

figure 9. **IGBT**

Typical output characteristics

I_C = f(V_{CE})



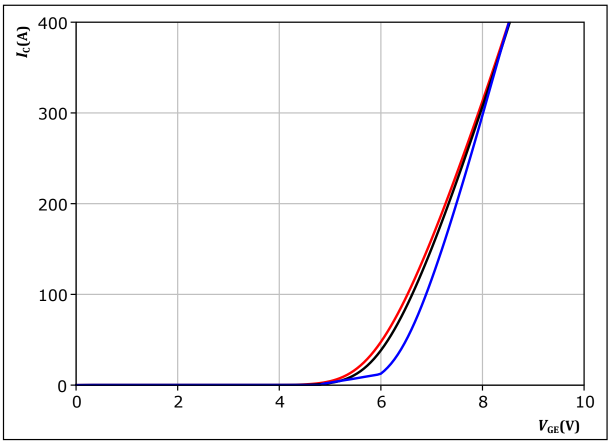
t_p =	250	µs
T_j =	150	°C

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

figure 10. **IGBT**

Typical transfer characteristics

I_C = f(V_{GE})

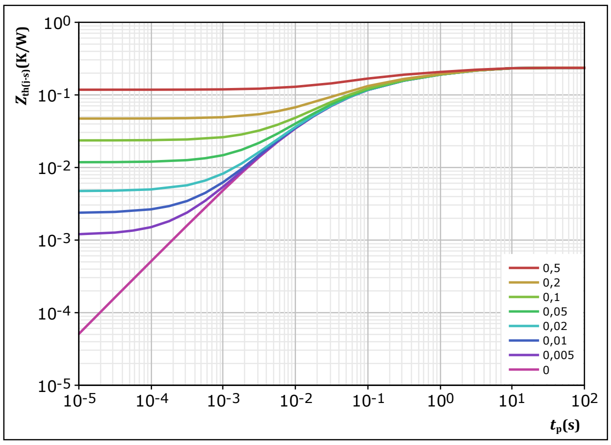


t_p =	250	µs		25 °C
V_{CE} =	54	V	T_j:	125 °C
				150 °C

figure 11. **IGBT**

Transient thermal impedance as a function of pulse width

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



D =	t_p / T	
$R_{th(j-s)}$ =	0,236	K/W

IGBT thermal model values

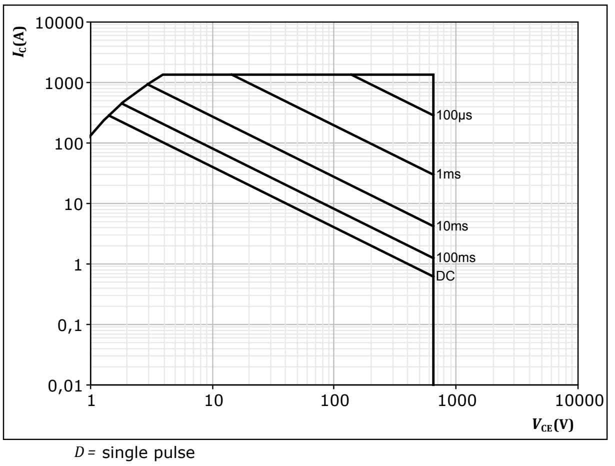
R (K/W)	τ (s)
4,49E-02	3,55E+00
5,32E-02	6,58E-01
6,22E-02	1,22E-01
6,22E-02	3,02E-02
1,35E-02	5,48E-03

Boost Switch Characteristics

figure 12. **IGBT**

Safe operating area

I_C = f(V_{CE})

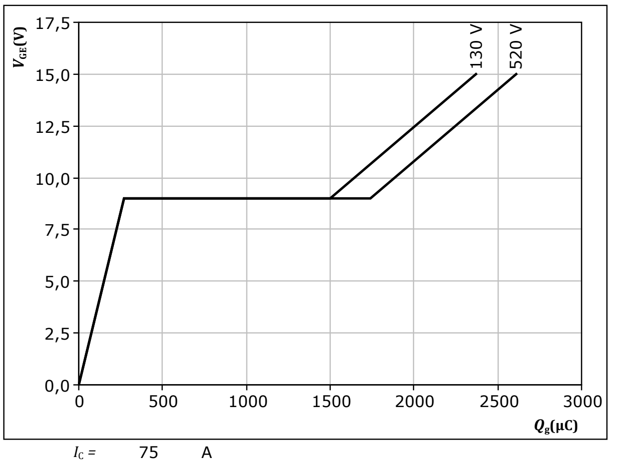


D =	single pulse	
T_s =	80	°C
V_{GE} =	15	V
T_j =	T_{jmax}	

figure 13. **IGBT**

Gate voltage vs gate charge

V_{GE} = f(Q_g)



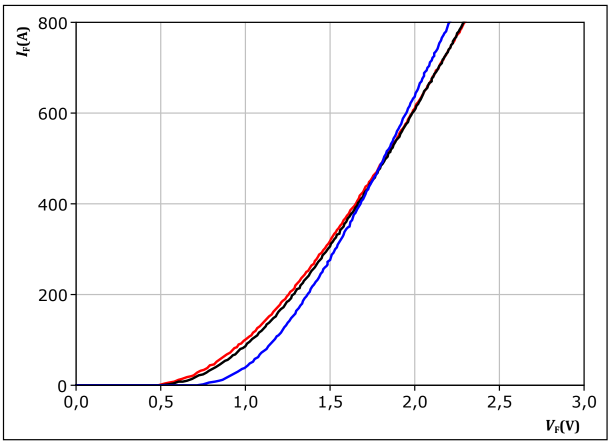
I_C =	75	A
T_j =	25	°C

Boost Diode Characteristics

figure 14. **FWD**

Typical forward characteristics

I_F = f(V_F)



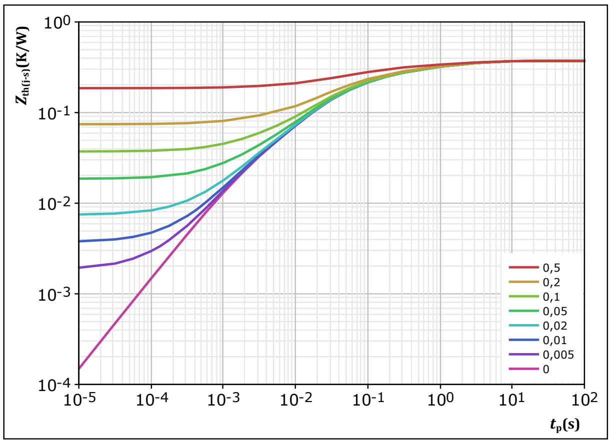
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 15. **FWD**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 0,372 K/W

FWD thermal model values

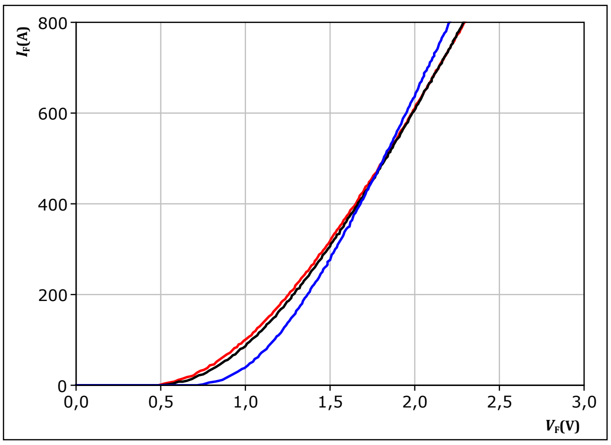
R (K/W)	τ (s)
4,80E-02	3,48E+00
8,21E-02	5,95E-01
1,26E-01	8,65E-02
9,93E-02	1,93E-02
1,63E-02	1,99E-03

Boost Sw. Inv. Diode Characteristics

figure 16. FWD

Typical forward characteristics

I_F = f(V_F)



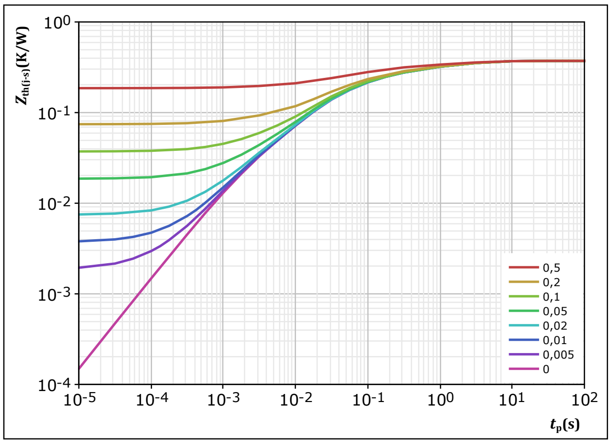
t_p = 250 μs

T_j: 25 °C, 125 °C, 150 °C

figure 17. FWD

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 0,372 K/W

FWD thermal model values

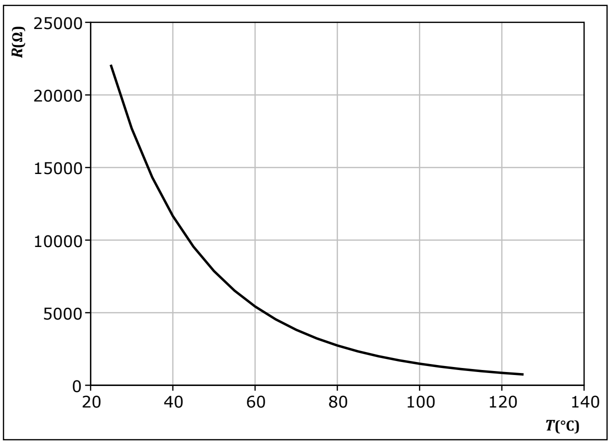
R (K/W)	τ (s)
4,80E-02	3,48E+00
8,21E-02	5,95E-01
1,26E-01	8,65E-02
9,93E-02	1,93E-02
1,63E-02	1,99E-03

Thermistor Characteristics

figure 18. **Thermistor**

Typical NTC characteristic as function of temperature

R_T = f(T)

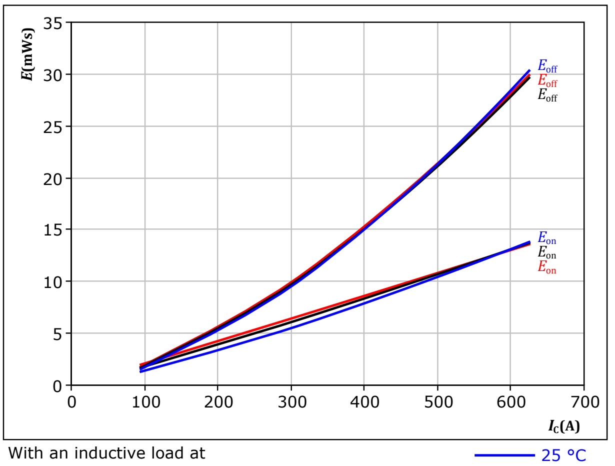


Buck Switching Characteristics

figure 19.	**IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



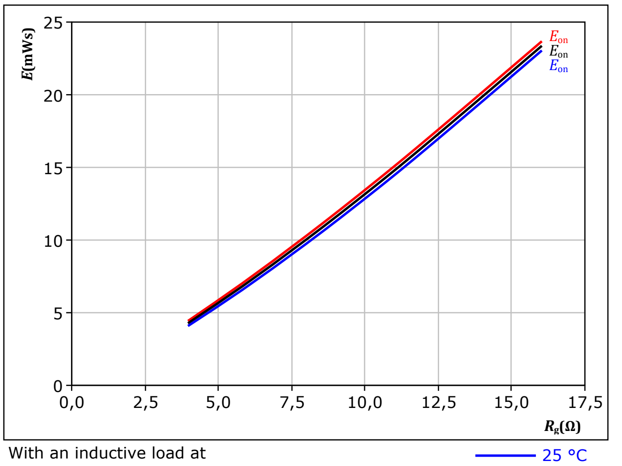
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	8	Ω		150 °C
R_{goff} =	16	Ω		

figure 20.	**IGBT**

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

$E = f(R_g)$



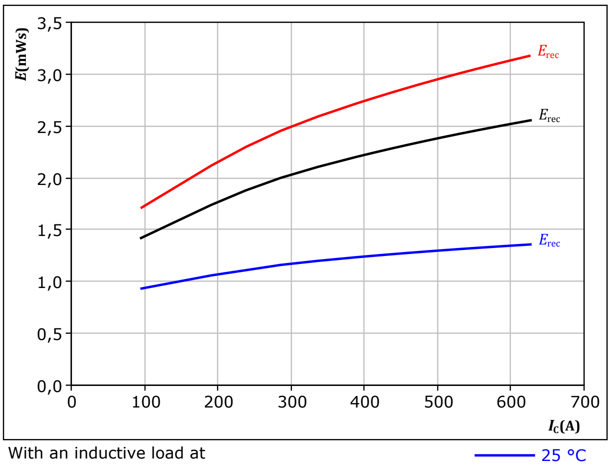
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	475	A		150 °C

figure 21.	**FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



With an inductive load at

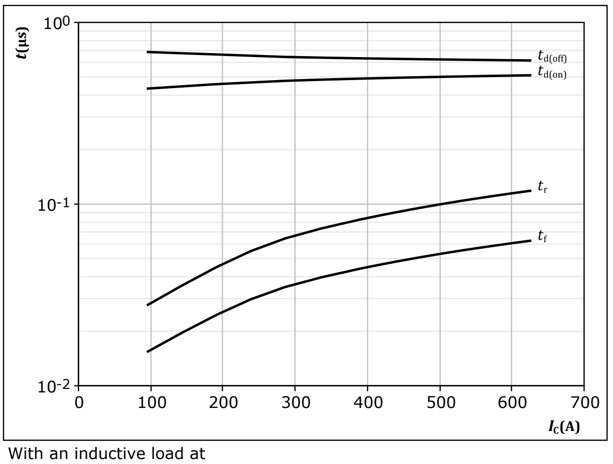
V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	8	Ω		150 °C

Buck Switching Characteristics

figure 23. **IGBT**

Typical switching times as a function of collector current

t = f(I_C)



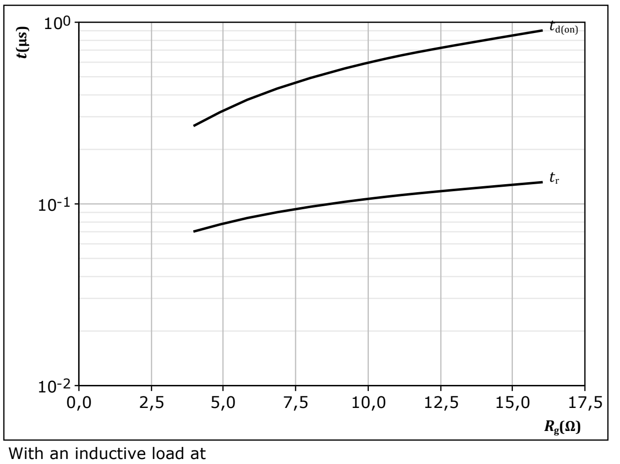
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	8	Ω
R_{goff} =	16	Ω

figure 24. **IGBT**

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

t = f(R_g)



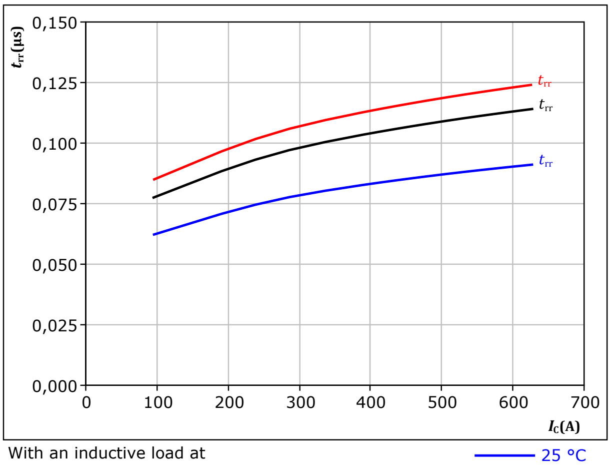
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	±15	V
I_C =	475	A

figure 25. **FWD**

Typical reverse recovery time as a function of collector current

t_{rr} = f(I_C)



With an inductive load at

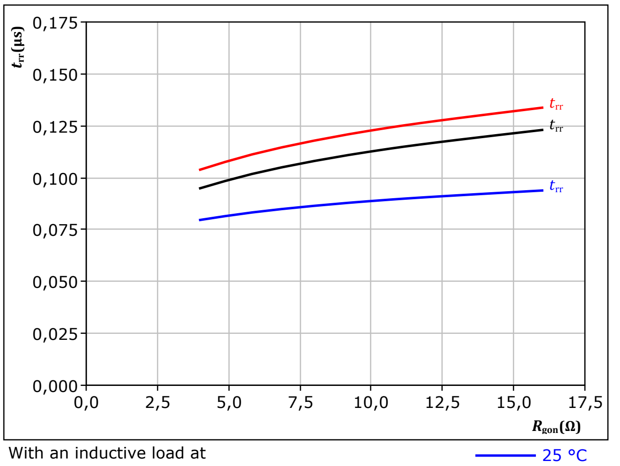
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	8	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 26. **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 =	475	A

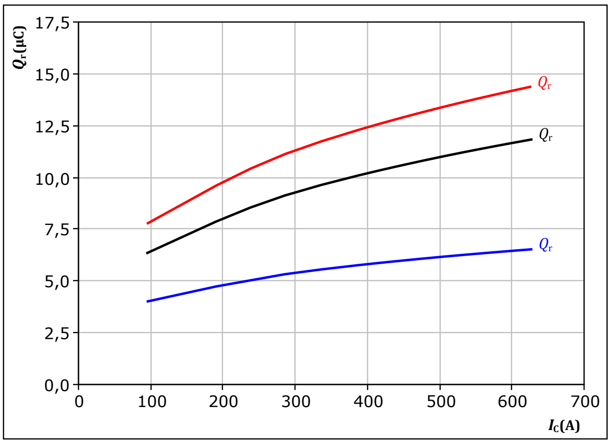
T_j: 25 °C, 125 °C, 150 °C

Buck Switching Characteristics

figure 27. **FWD**

Typical recovered charge as a function of collector current

Q_r = f(I_C)



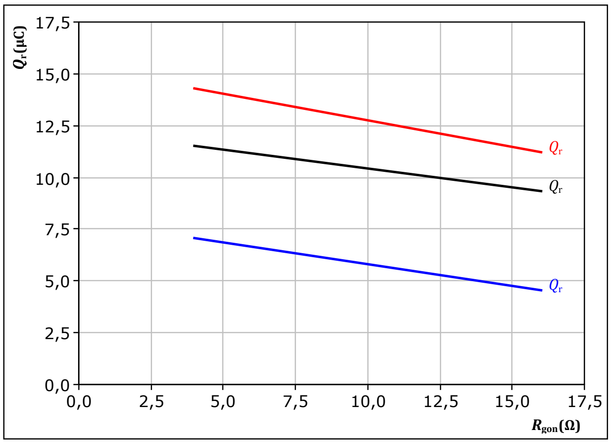
With an inductive load at

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

figure 28. **FWD**

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

Q_r = f(R_{gon})



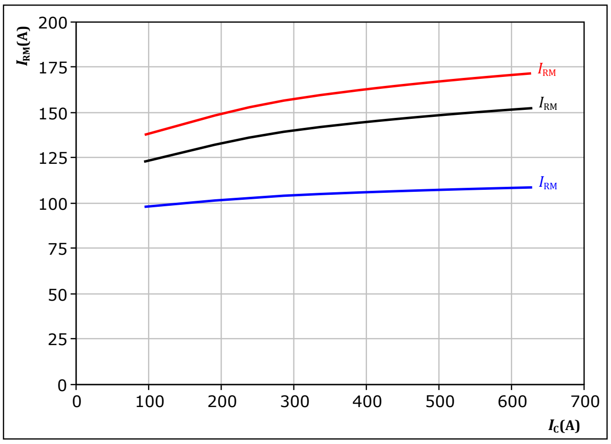
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	475	A		150 °C

figure 29. **FWD**

Typical peak reverse recovery current as a function of collector current

I_{RM} = f(I_C)



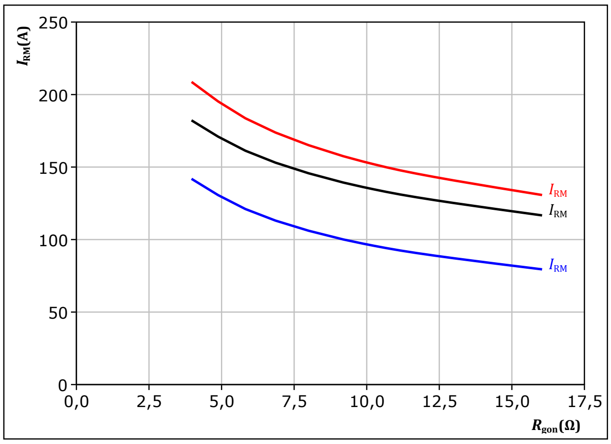
With an inductive load at

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

figure 30. **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

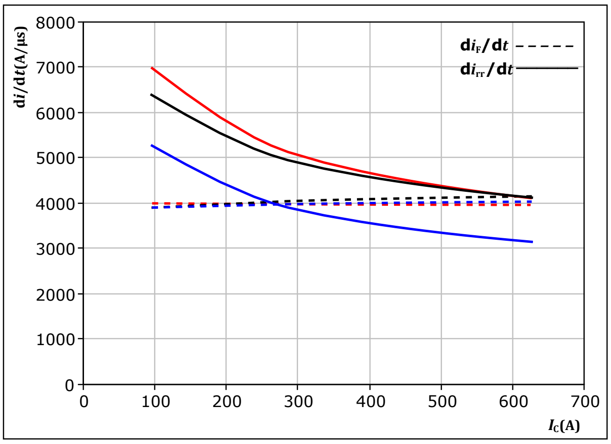
V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	475	A		150 °C

Buck Switching Characteristics

figure 31. **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)



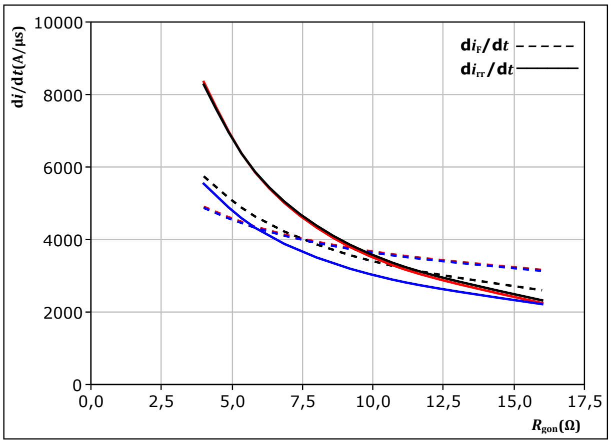
With an inductive load at

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

figure 32. **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})



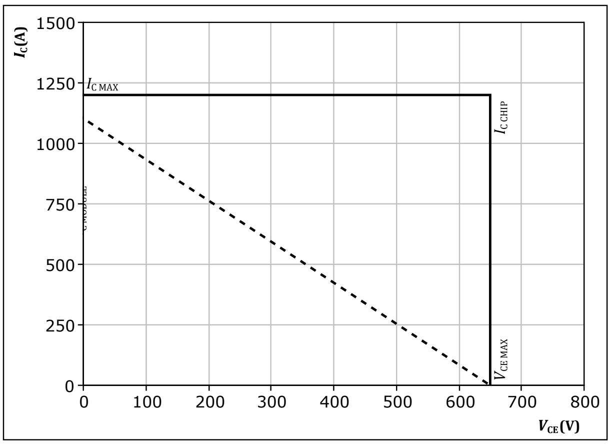
With an inductive load at

V_{CE} =	350	V	T_j: 25 °C
V_{GE} =	±15	V	125 °C
I_C =	475	A	150 °C

figure 33. **IGBT**

Reverse bias safe operating area

I_C = f(V_{CE})



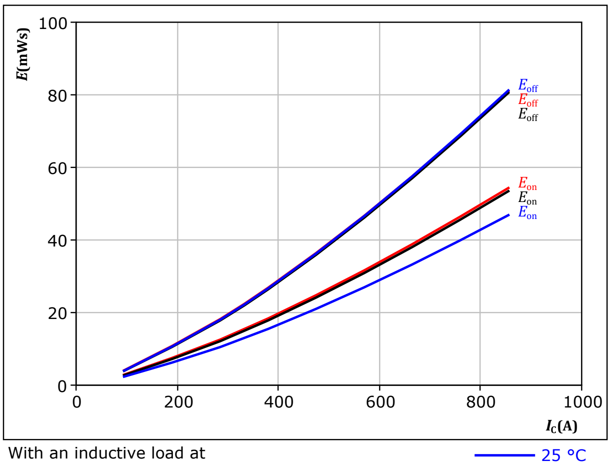
At	T_j =	150	°C
	R_{gon} =	8	Ω
	R_{goff} =	16	Ω

Boost Switching Characteristics

figure 34. **IGBT**

Typical switching energy losses as a function of collector current

E = f(I_C)



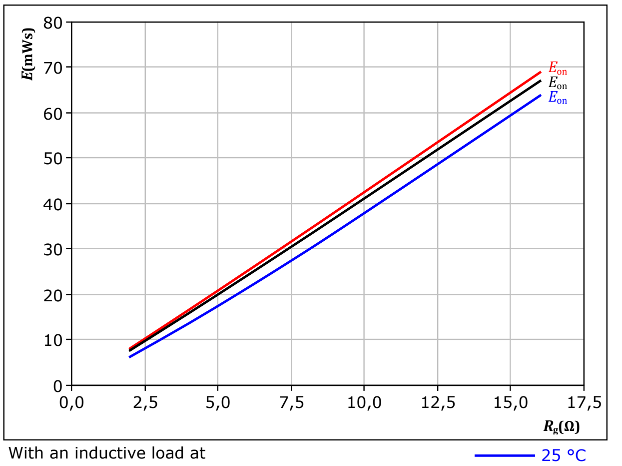
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	5,82	Ω		150 °C
R_{goff} =	12,8	Ω		

figure 35. **IGBT**

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

E = f(R_g)



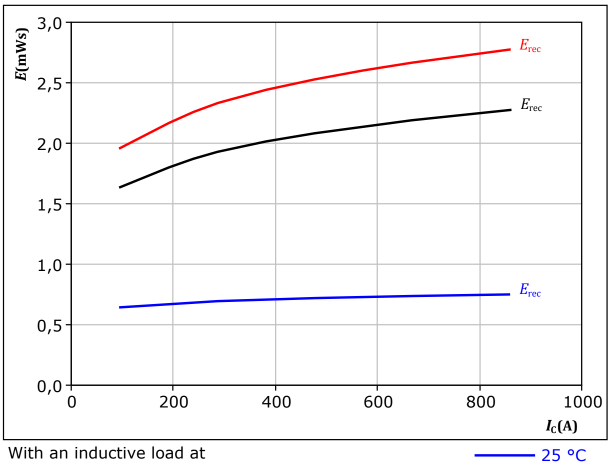
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	475	A		150 °C

figure 36. **FWD**

Typical reverse recovered energy loss as a function of collector current

E_{rec} = f(I_C)



With an inductive load at

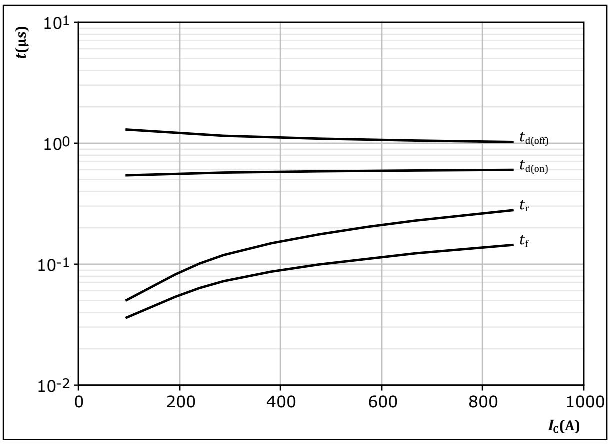
V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	5,82	Ω		150 °C

Boost Switching Characteristics

figure 38. **IGBT**

Typical switching times as a function of collector current

t = f(I_C)



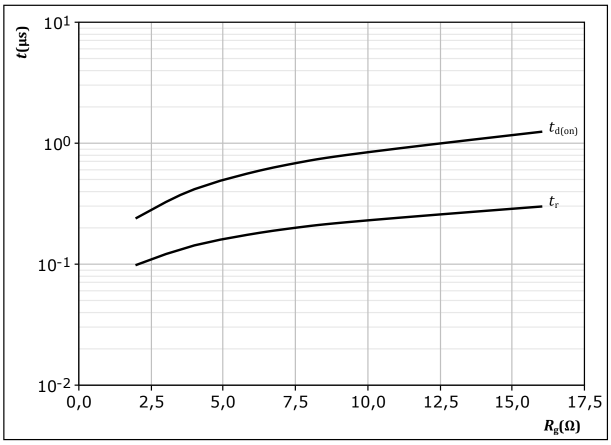
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	5,82	Ω
R_{goff} =	12,8	Ω

figure 39. **IGBT**

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

t = f(R_g)



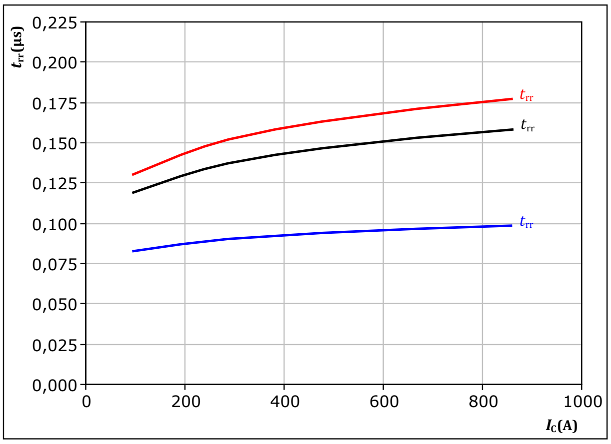
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	±15	V
I_C =	475	A

figure 40. **FWD**

Typical reverse recovery time as a function of collector current

t_{rr} = f(I_C)



With an inductive load at

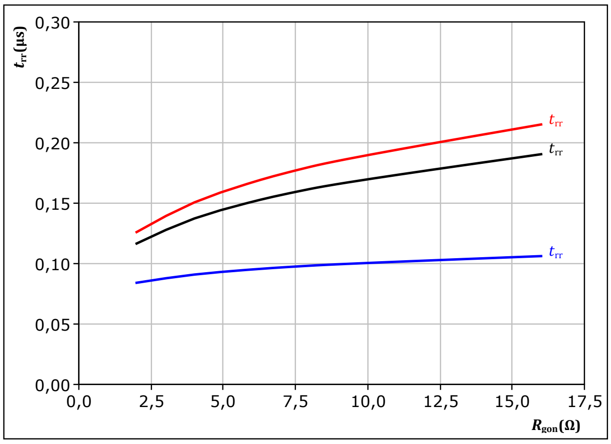
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	5,82	Ω

T_j: 25 °C / 125 °C / 150 °C

figure 41. **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 =	475	A

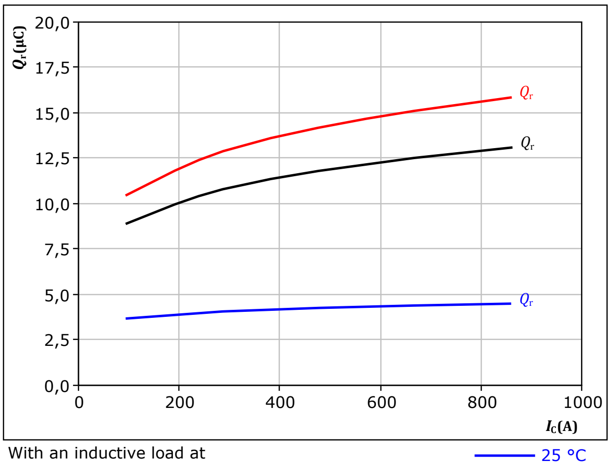
T_j: 25 °C / 125 °C / 150 °C

Boost Switching Characteristics

figure 42. **FWD**

Typical recovered charge as a function of collector current

Q_r = f(I_C)



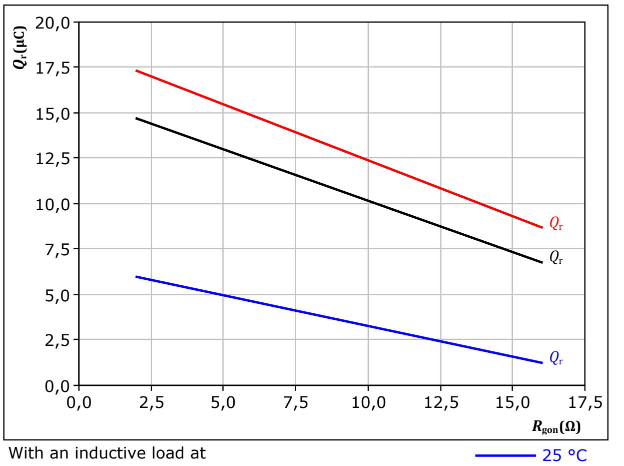
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	5,82	Ω		150 °C

figure 43. **FWD**

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

Q_r = f(R_{gon})



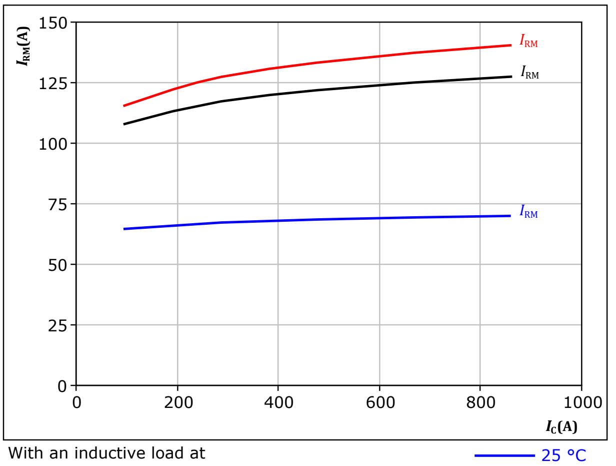
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	475	A		150 °C

figure 44. **FWD**

Typical peak reverse recovery current as a function of collector current

I_{RM} = f(I_C)



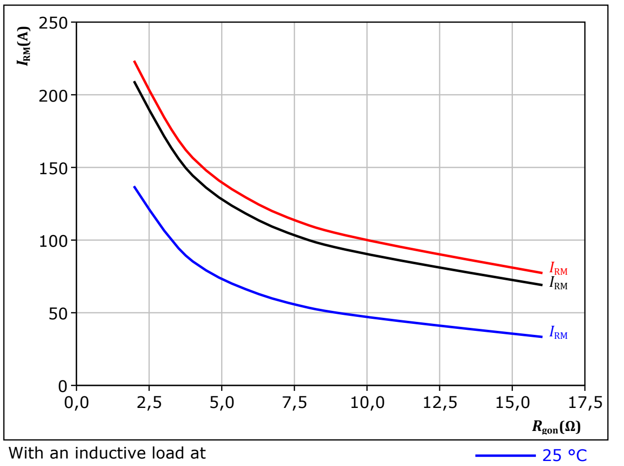
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	5,82	Ω		150 °C

figure 45. **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

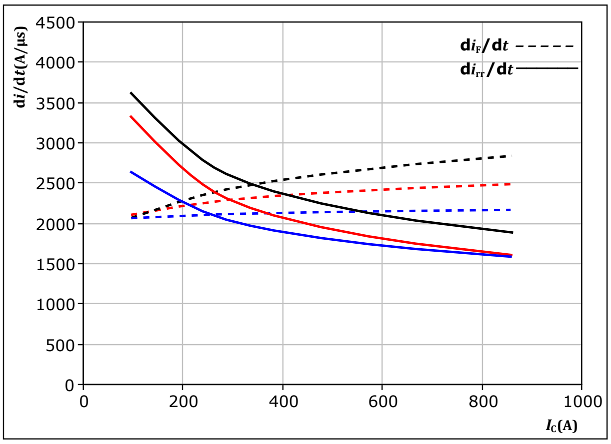
V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	475	A		150 °C

Boost Switching Characteristics

figure 46. **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)



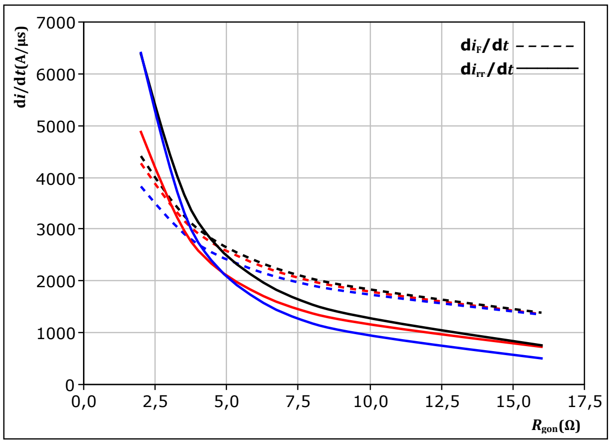
With an inductive load at

V_{CE} =	350	V	T_j: 25 °C
V_{GE} =	±15	V	125 °C
R_{gon} =	5,82	Ω	150 °C

figure 47. **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})



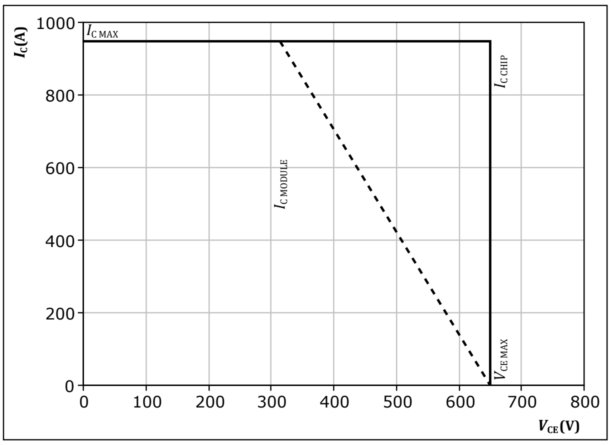
With an inductive load at

V_{CE} =	350	V	T_j: 25 °C
V_{GE} =	±15	V	125 °C
I_C =	475	A	150 °C

figure 48. **IGBT**

Reverse bias safe operating area

I_C = f(V_{CE})



At	T_j =	150	°C
	R_{gon} =	5,82	Ω
	R_{goff} =	12,8	Ω

Switching Definitions

figure 49.	IGBT

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

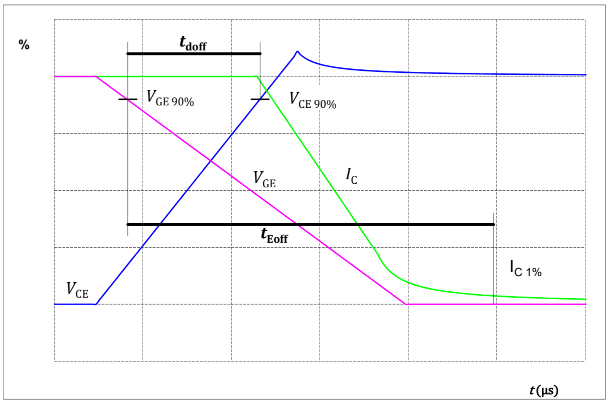


figure 50.	IGBT

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

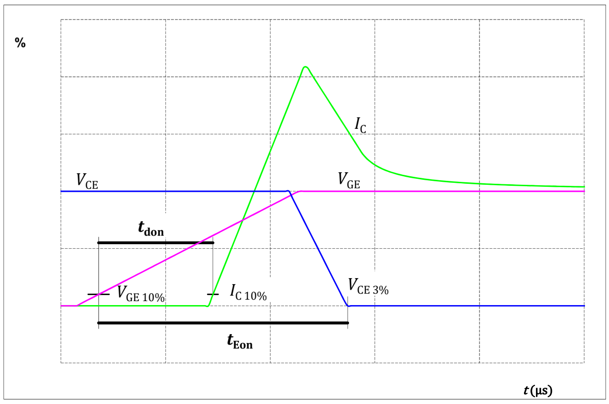


figure 51.	IGBT

Turn-off Switching Waveforms & definition of t_f

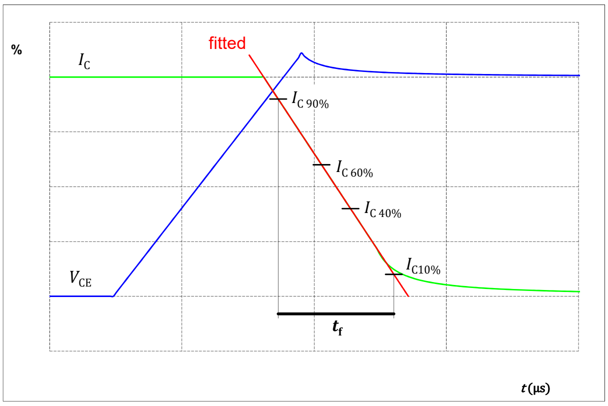
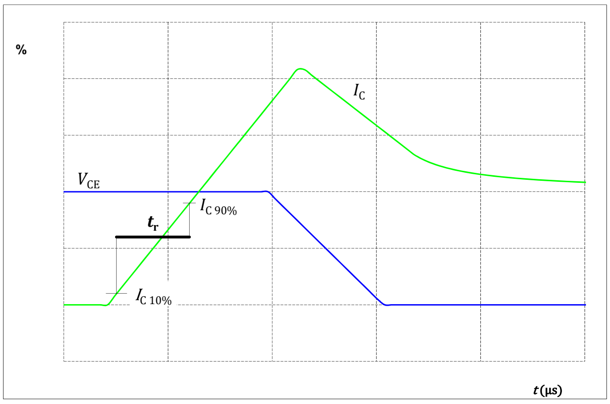


figure 52.	IGBT

Turn-on Switching Waveforms & definition of t_r



Switching Definitions

figure 53. **FWD**

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

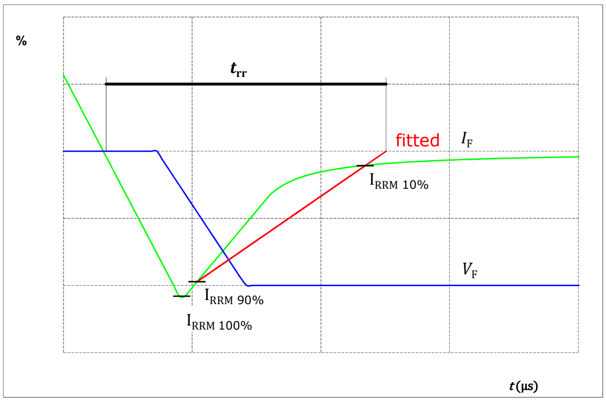
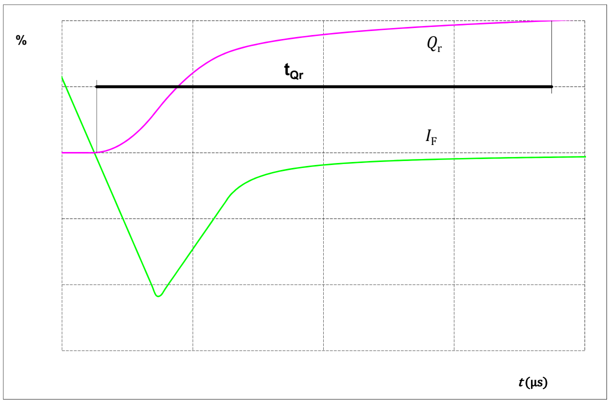


figure 54. **FWD**

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



Ordering Code

Version	Ordering Code
Without thermal paste	30-PT07NIA600S501-PD60F58Y
With thermal paste (3,4 W/mK, PSX-P7)	30-PT07NIA600S501-PD60F58Y-/3/

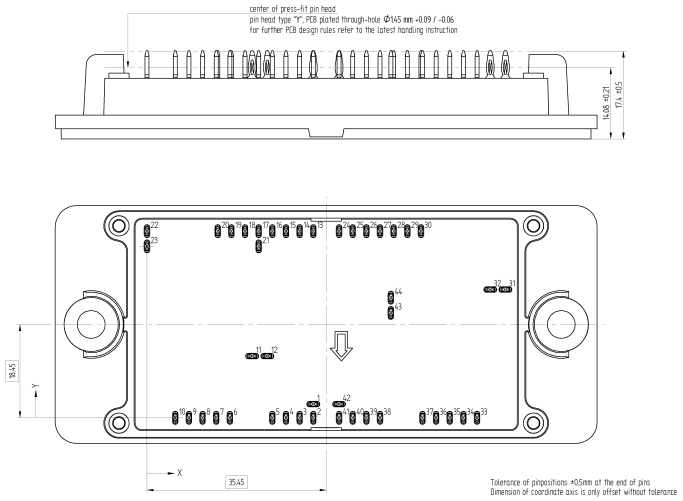
Marking

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		

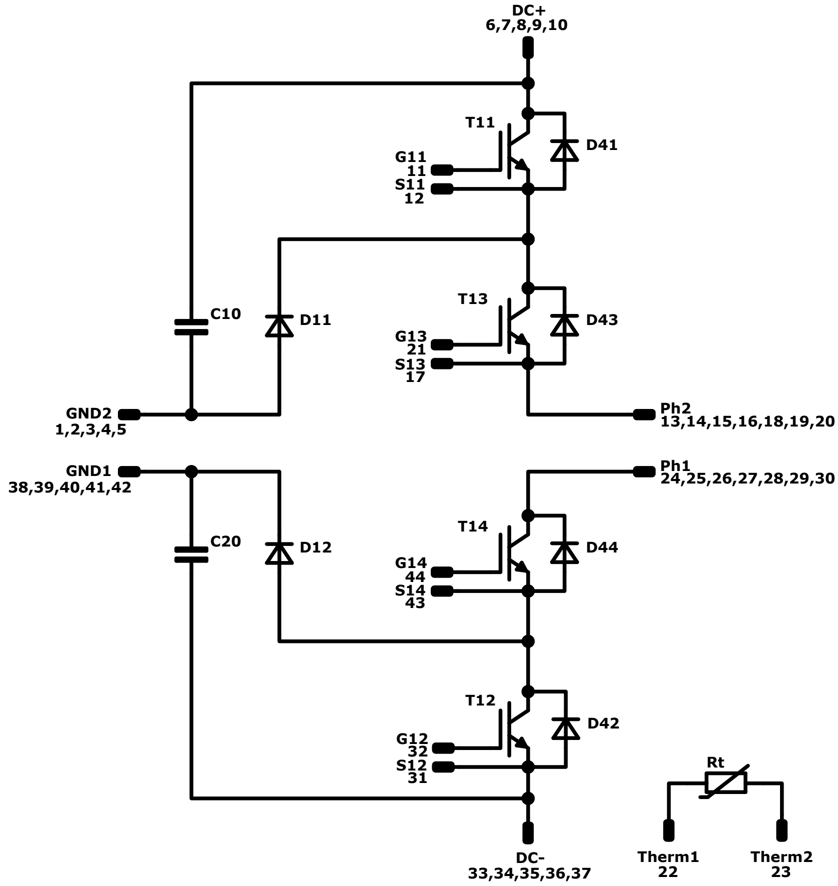
Outline

Pin	X	Y	Function
1	32,9	2,7	GND2
2	32,9	0	GND2
3	30,2	0	GND2
4	27,5	0	GND2
5	24,8	0	GND2
6	16,4	0	DC+
7	13,7	0	DC+
8	11	0	DC+
9	8,3	0	DC+
10	5,6	0	DC+
11	20,8	12,2	G11
12	23,8	12,2	S11
13	32,9	36,9	Ph2
14	30,2	36,9	Ph2
15	27,5	36,9	Ph2
16	24,8	36,9	Ph2
17	22,1	36,9	S13
18	19,4	36,9	Ph2
19	16,7	36,9	Ph2
20	14	36,9	Ph2
21	22,1	33,9	G13
22	0	36,9	Therm1
23	0	33,9	Therm2
24	38	36,9	Ph1
25	40,7	36,9	Ph1
26	43,4	36,9	Ph1
27	46,1	36,9	Ph1
28	48,8	36,9	Ph1
29	51,5	36,9	Ph1
30	54,2	36,9	Ph1
31	70,9	25,35	S12
32	67,9	25,35	G12
33	65,3	0	DC-
34	62,6	0	DC-
35	59,9	0	DC-
36	57,2	0	DC-
37	54,5	0	DC-
38	46,1	0	GND1
39	43,4	0	GND1
40	40,7	0	GND1
41	38	0	GND1
42	38	2,7	GND1
43	48,25	20,75	S14
44	48,25	23,75	G14

Pin table [mm]



Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T11, T12	IGBT	650 V	600 A	Buck Switch	
D11, D12	FWD	650 V	375 A	Buck Diode	
T13, T14	IGBT	650 V	474 A	Boost Switch	
D42, D41	FWD	650 V	300 A	Boost Diode	
D43, D44	FWD	650 V	300 A	Boost Sw. Inv. Diode	
C10, C20	Capacitor	630 V		Capacitor (DC)	
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.

Document No.:	Date:	Modification:	Pages
30-PT07NIA600S501-PD60F58Y-D1-14	1 Jul. 2022		
30-PT07NIA600S501-PD60F58Y-D2-14	12 Aug. 2022	Boost Switch Rth corrected. Module unchanged.	