30-PT07NAA300S501-LF64F58Y
datasheet

***flow*ANPC 2** | **650 V / 300 A**

Topology features

- Advanced Neutral Point Clamped topology
- Integrated snubber capacitor
- Split output for improved switching performance
- 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

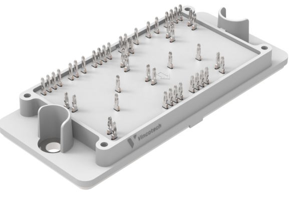
Target applications

- Power Supply
- UPS

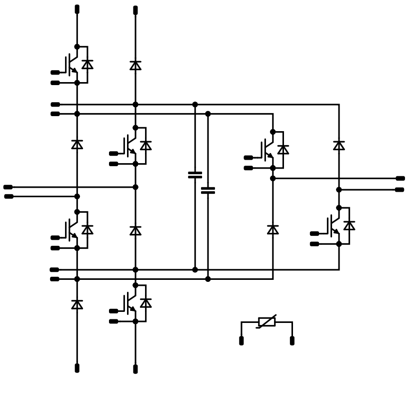
Types

- 30-PT07NAA300S501-LF64F58Y

flow 2 12 mm housing



Schematic



Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions		Value	Unit
AC Switch					
Collector-emitter voltage	V_{CES}			650	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$	T_s = 80 °C	214	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	296	W
Gate-emitter voltage	V_{GES}			±20	V
Maximum junction temperature	T_{jmax}			175	°C
AC Diode					
Peak repetitive reverse voltage	V_{RRM}			650	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s = 80 °C	183	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	223	W
Maximum junction temperature	T_{jmax}			175	°C
Neutral Point Switch					
Collector-emitter voltage	V_{CES}			650	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$	T_s = 80 °C	215	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}		675	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	231	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
DC-Link Diode					
Peak repetitive reverse voltage	V_{RRM}			650	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s = 80 °C	166	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}		450	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	214	W
Maximum junction temperature	T_{jmax}			175	°C
Neutral Point Switch Prot. Diode					
Peak repetitive reverse voltage	V_{RRM}			650	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s = 80 °C	25	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}		40	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	43	W
Maximum junction temperature	T_{jmax}			175	°C
DC-Link Switch					
Collector-emitter voltage	V_{CES}			650	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$	T_s = 80 °C	215	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}		675	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	231	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
Neutral Point Diode					
Peak repetitive reverse voltage	V_{RRM}			650	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s = 80 °C	166	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}		450	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	214	W
Maximum junction temperature	T_{jmax}			175	°C
DC-Link Switch Prot. Diode					
Peak repetitive reverse voltage	V_{RRM}			650	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s = 80 °C	25	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}		40	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	43	W
Maximum junction temperature	T_{jmax}			175	°C
Capacitor (DC)					
Maximum DC voltage	V_{MAX}			630	V
Operation Temperature	T_{op}			-55 ... 125	°C
AC Switch Prot. Diode					
Peak repetitive reverse voltage	V_{RRM}			650	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s = 80 °C	25	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}		40	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	43	W
Maximum junction temperature	T_{jmax}			175	°C

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions		Value	Unit
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

Vincotech

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
AC 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}							18000		pF
Output capacitance	C_{oes}	f = 1 Mhz	0	25		25		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} = 3,4 W/mK (PSX)						0,32		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$					25 125 150		46 49 48		ns
Rise time	t_r	R_{gon} = 2 Ω R_{goff} = 2 Ω				25 125 150		24 25 26		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		196 218 223		ns
Fall time	t_f		0/15	350	300	25 125 150		13,76 23,79 27,07		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=7,4 µC Q_{rFWD}=14,02 µC Q_{rFWD}=16,46 µC				25 125 150		3,6 4,09 4,11		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		3,03 5,4 5,74		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	
AC 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)						0,43		K/W
Dynamic										
Peak recovery current	I_{RRM}	d*i*/d*t*=10985 A/µs d*i*/d*t*=10127 A/µs d*i*/d*t*=9792 A/µs	0/15	350	300	25 125 150		159,65 209,87 225,99		A
Reverse recovery time	t_{rr}					25 125 150		108,11 142,58 159,45		ns
Recovered charge	Q_r					25 125 150		7,4 14,02 16,46		µC
Reverse recovered energy	E_{rec}					25 125 150		1,93 3,97 4,69		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		6854 2870 3068		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	
Neutral Point Switch										
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,003	25	4,2	5	5,8	V
Collector-emitter saturation voltage	V_{CEsat}		15		225	25 125 150		1,1 1,09 1,08	1,45[(1)]	V
Collector-emitter cut-off current	I_{CES}		0	650		25			120	µA
Gate-emitter leakage current	I_{GES}		20	0		25			300	nA
Internal gate resistance	r_g							None		Ω
Input capacitance	C_{ies}	f = 1 Mhz	0	25		25		34875		pF
Reverse transfer capacitance	C_{res}							90		pF
Gate charge	Q_g		15	520	225	25		1308		nC
Thermal										
Thermal resistance junction to sink [(2)]	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,41		K/W
DC-Link Diode										
Static										
Forward voltage	V_F				225	25 125 150		1,53 1,49 1,46	1,92[(1)]	V
Reverse leakage current	I_R	V_r = 650 V				25			11,4	µA
Thermal										
Thermal resistance junction to sink [(2)]	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,44		K/W

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	
Neutral Point Switch Prot. Diode										
Static										
Forward voltage	V_F				20	25 125 150	1,23	1,74 1,65 1,61	1,87(1)	V
Reverse leakage current	I_R	V_r = 650 V				25			0,24	µA
Thermal										
Thermal resistance junction to sink (2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						2,21		K/W
DC-Link Switch										
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$	V_{CE} = V_{GE}			0,003	25	4,2	5	5,8	V
Collector-emitter saturation voltage	V_{CEsat}		15		225	25 125 150		1,1 1,09 1,08	1,45(1)	V
Collector-emitter cut-off current	I_{CES}		0	650		25			120	µA
Gate-emitter leakage current	I_{GES}		20	0		25			300	nA
Internal gate resistance	r_g							None		Ω
Input capacitance	C_{ies}	f = 1 Mhz	0	25		25		34875		pF
Reverse transfer capacitance	C_{res}							90		pF
Gate charge	Q_g		15	520	225	25		1308		nC
Thermal										
Thermal resistance junction to sink (2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,41		K/W

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	
Neutral Point Diode										
Static										
Forward voltage	V_F				225	25 125 150		1,53 1,49 1,46	1,92(1)	V
Reverse leakage current	I_R	V_r = 650 V				25			11,4	µA
Thermal										
Thermal resistance junction to sink (2)	$R_{th(j\text{-}s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,44		K/W
DC-Link Switch Prot. Diode										
Static										
Forward voltage	V_F				20	25 125 150	1,23	1,74 1,65 1,61	1,87(1)	V
Reverse leakage current	I_R	V_r = 650 V				25			0,24	µA
Thermal										
Thermal resistance junction to sink (2)	$R_{th(j\text{-}s)}$	λ_{paste} = 3,4 W/mK (PSX)						2,21		K/W
Capacitor (DC)										
Static										
Capacitance	C	DC bias voltage = 0 V				25		10		nF
Tolerance							-5		5	%
Dissipation factor		f = 1 kHz				25		0,1		%

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
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	
AC Switch Prot. Diode										
Static										
Forward voltage	V_F				20	25 125 150	1,23	1,74 1,65 1,61	1,87(1)	V
Reverse leakage current	I_R	V_r = 650 V				25			0,24	µA
Thermal										
Thermal resistance junction to sink (2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						2,21		K/W

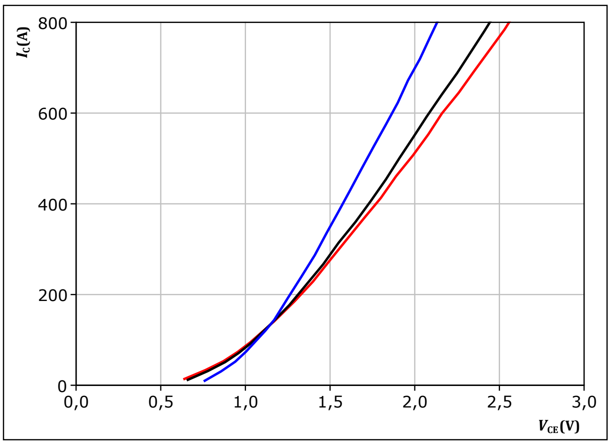
(1) Value at chip level
(2) Only valid with pre-applied Vincotech thermal interface material.

AC Switch Characteristics

figure 1. **IGBT**

Typical output characteristics

I_C = f(V_{CE})

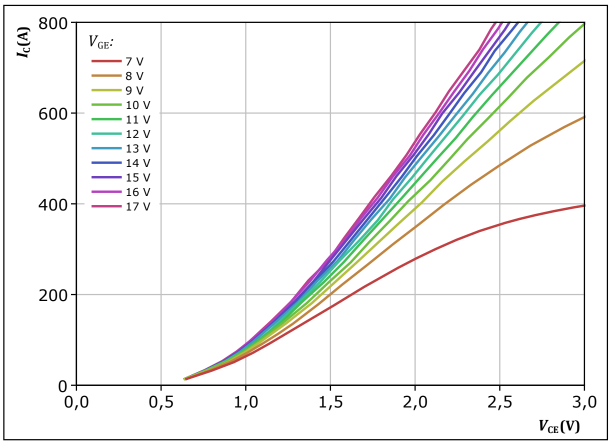


t_p =	250	µs		25 °C
V_{GE} =	15	V	T_j:	125 °C
				150 °C

figure 2. **IGBT**

Typical output characteristics

I_C = f(V_{CE})



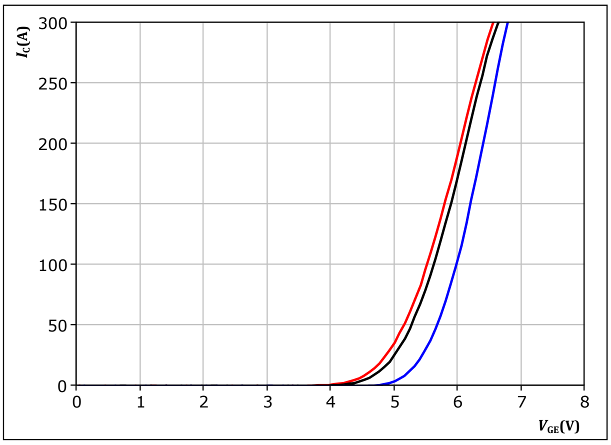
t_p =	250	µs
T_j =	150	°C

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

figure 3. **IGBT**

Typical transfer characteristics

I_C = f(V_{GE})

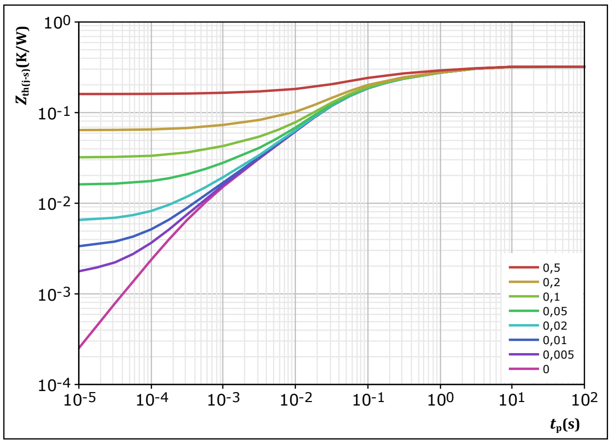


t_p =	250	µs		25 °C
V_{CE} =	10	V	T_j:	125 °C
				150 °C

figure 4. **IGBT**

Transient thermal impedance as a function of pulse width

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



D =	t_p / T	
$R_{th(j-s)}$ =	0,321	K/W

IGBT thermal model values

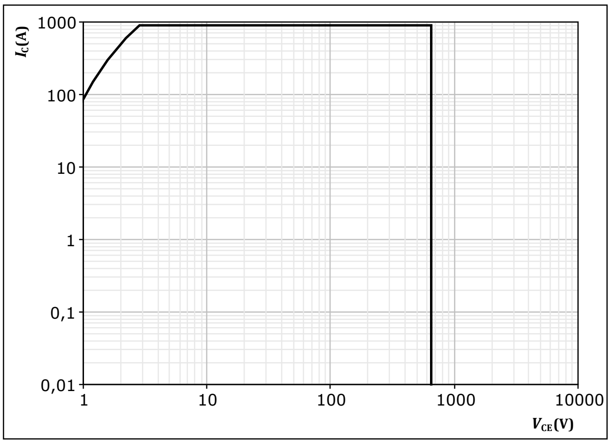
R (K/W)	τ (s)
6,32E-02	2,19E+00
6,12E-02	3,83E-01
9,23E-02	8,00E-02
8,40E-02	2,29E-02
1,35E-02	2,47E-03
6,54E-03	4,38E-04

AC Switch Characteristics

figure 5.	IGBT

Safe operating area

$I_C = f(V_{CE})$



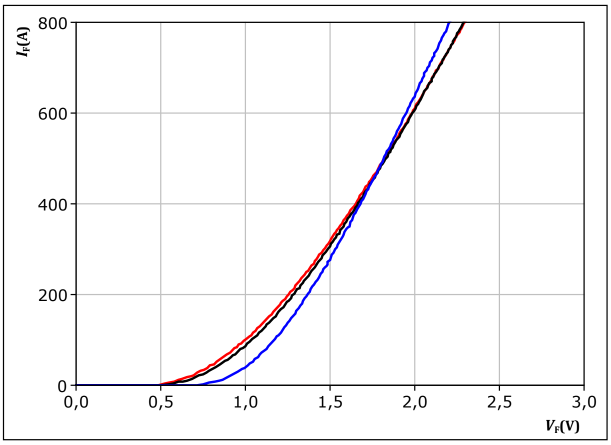
D =	single pulse	
T_s =	80	°C
V_{GE} =	15	V
T_j =	T_{jmax}	

AC Diode Characteristics

figure 6. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



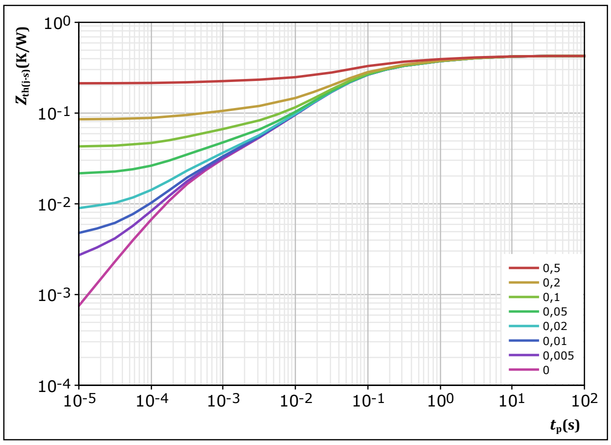
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 7. **FWD**

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$

$R_{th(j-s)}$ = 0,426 K/W

FWD thermal model values

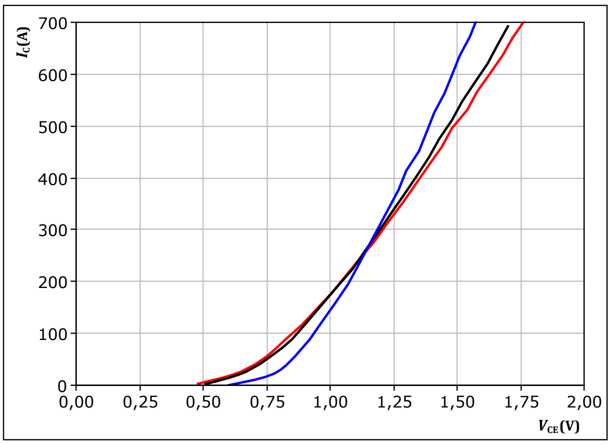
R (K/W)	τ (s)
3,16E-02	5,87E+00
6,09E-02	1,16E+00
1,04E-01	1,83E-01
1,65E-01	4,07E-02
3,48E-02	8,38E-03
1,39E-02	1,32E-03
1,60E-02	2,81E-04

Neutral Point Switch Characteristics

figure 8. **IGBT**

Typical output characteristics

I_C = f(V_{CE})

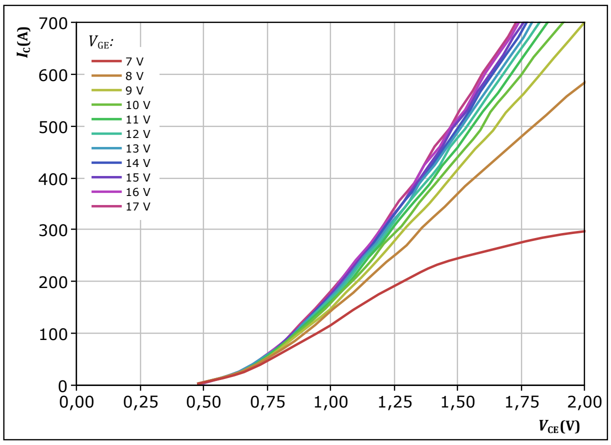


t_p =	250	μs	
V_{GE} =	15	V	T_j: 25 °C / 125 °C / 150 °C

figure 9. **IGBT**

Typical output characteristics

I_C = f(V_{CE})



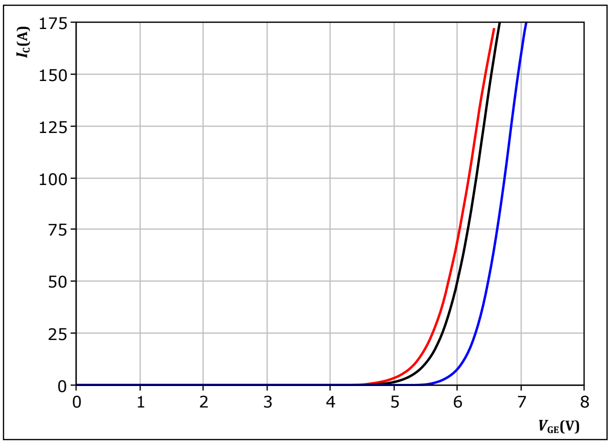
t_p =	250	μs
T_j =	150	°C

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

figure 10. **IGBT**

Typical transfer characteristics

I_C = f(V_{GE})

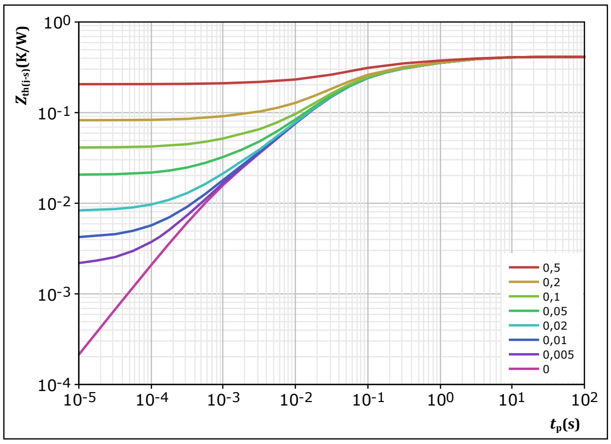


t_p =	250	μs	
V_{CE} =	10	V	T_j: 25 °C / 125 °C / 150 °C

figure 11. **IGBT**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 0,412 K/W

IGBT thermal model values

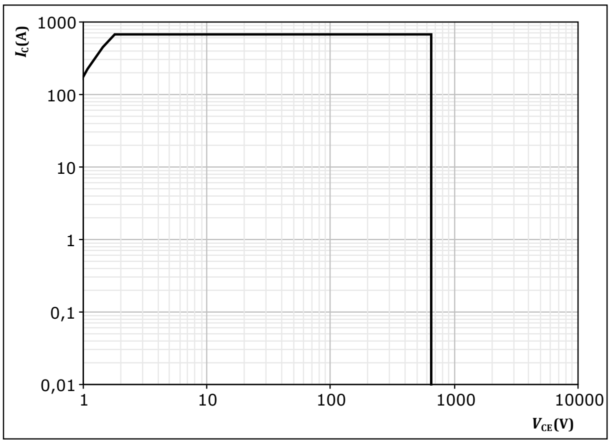
R (K/W)	τ (s)
4,53E-02	4,06E+00
6,68E-02	9,20E-01
1,07E-01	1,59E-01
1,53E-01	3,65E-02
2,93E-02	7,79E-03
1,11E-02	8,69E-04

Neutral Point Switch Characteristics

figure 12.	IGBT

Safe operating area

I_C = f(V_{CE})



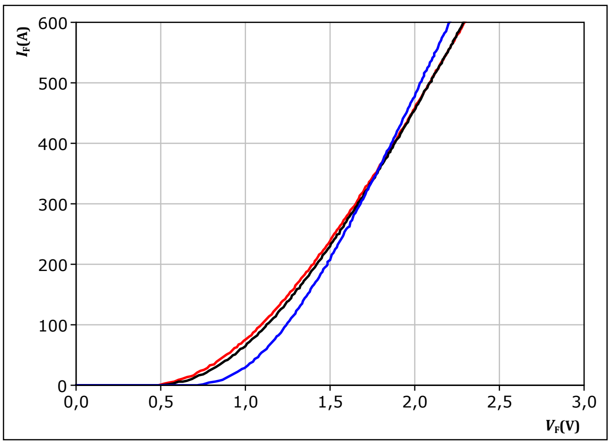
D =	single pulse	
T_s =	80	°C
V_{GE} =	15	V
T_j =	T_{jmax}	

DC-Link Diode Characteristics

figure 13. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



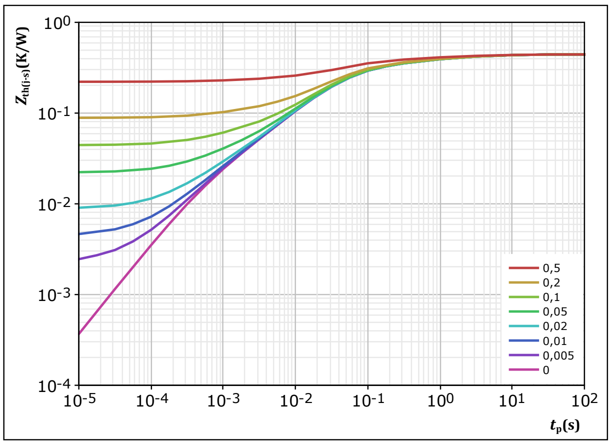
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 14. **FWD**

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$

$R_{th(j-s)}$ = 0,443 K/W

FWD thermal model values

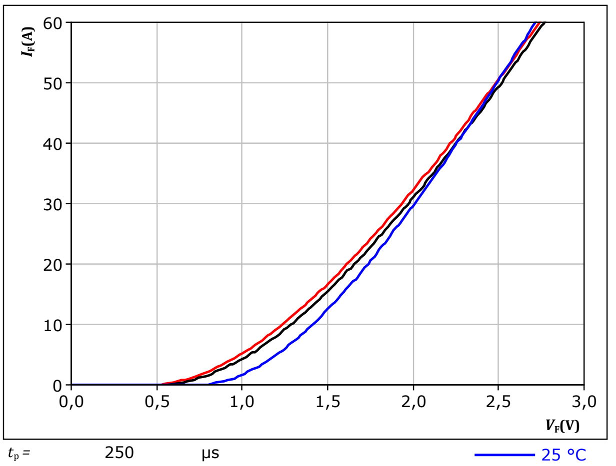
R (K/W)	τ (s)
2,77E-02	7,35E+00
5,61E-02	1,27E+00
8,82E-02	2,03E-01
1,88E-01	4,07E-02
5,56E-02	1,11E-02
1,65E-02	2,47E-03
1,04E-02	5,17E-04

Neutral Point Switch Prot. Diode Characteristics

figure 15. **FWD**

Typical forward characteristics

I_F = f(V_F)



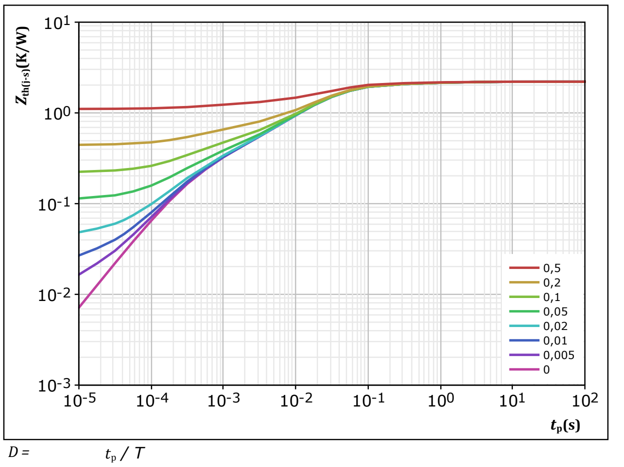
t_p = 250 µs

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

$R_{th(j-s)}$ = 2,209 K/W

FWD thermal model values

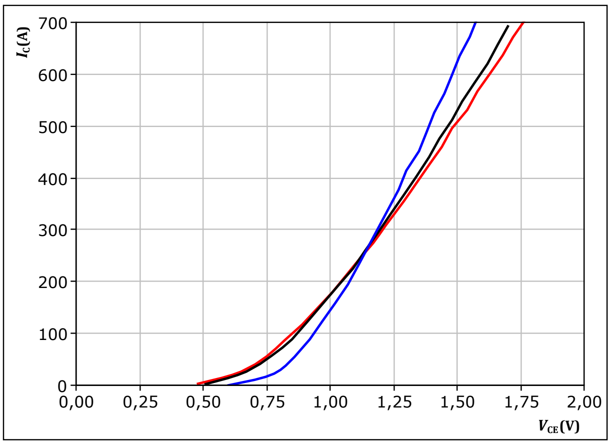
R (K/W)	τ (s)
8,86E-02	2,28E+00
2,06E-01	2,30E-01
1,06E+00	3,33E-02
4,76E-01	1,15E-02
1,85E-01	2,22E-03
1,98E-01	3,49E-04

DC-Link Switch Characteristics

figure 17. **IGBT**

Typical output characteristics

I_C = f(V_{CE})

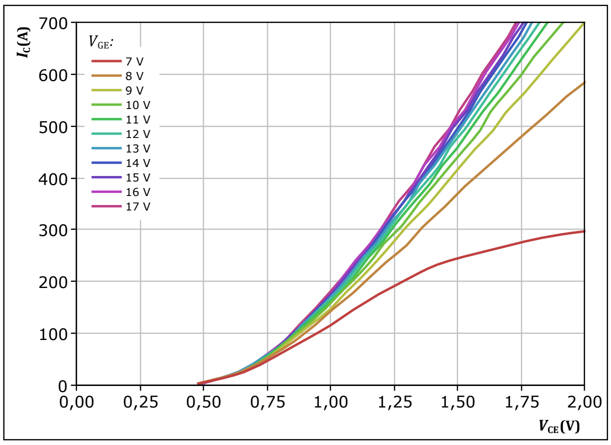


t_p =	250	µs		25 °C
V_{GE} =	15	V	T_j:	125 °C
				150 °C

figure 18. **IGBT**

Typical output characteristics

I_C = f(V_{CE})



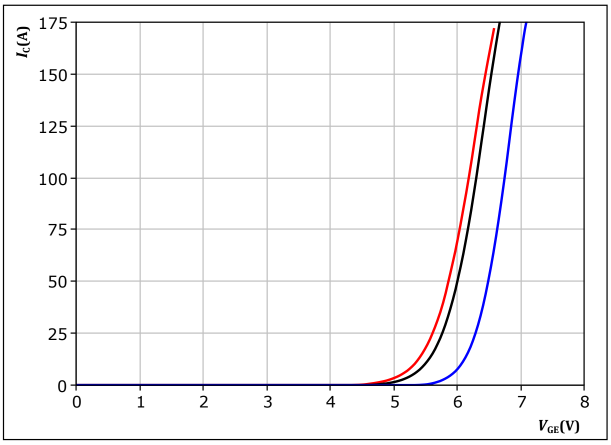
t_p =	250	µs
T_j =	150	°C

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

figure 19. **IGBT**

Typical transfer characteristics

I_C = f(V_{GE})

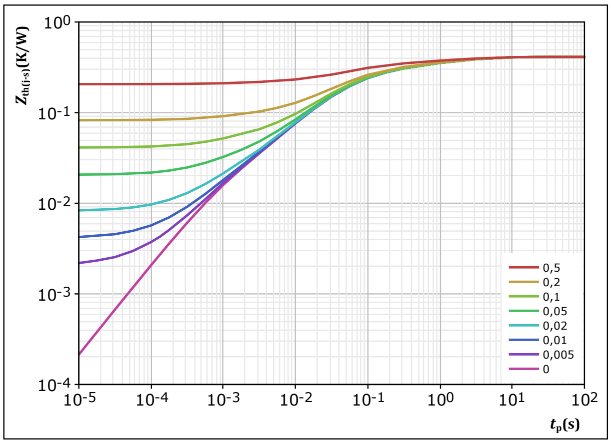


t_p =	250	µs		25 °C
V_{CE} =	10	V	T_j:	125 °C
				150 °C

figure 20. **IGBT**

Transient thermal impedance as a function of pulse width

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



D =	t_p / T	
$R_{th(j-s)}$ =	0,412	K/W

IGBT thermal model values

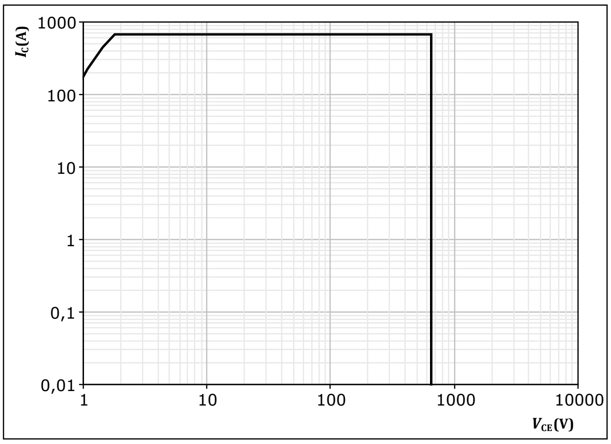
R (K/W)	τ (s)
4,53E-02	4,06E+00
6,68E-02	9,20E-01
1,07E-01	1,59E-01
1,53E-01	3,65E-02
2,93E-02	7,79E-03
1,11E-02	8,69E-04

DC-Link Switch Characteristics

figure 21.	IGBT

Safe operating area

I_C = f(V_{CE})



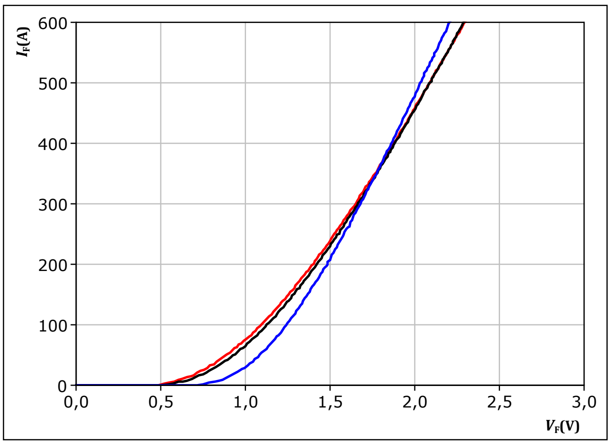
D =	single pulse	
T_s =	80	°C
V_{GE} =	15	V
T_j =	T_{jmax}	

Neutral Point Diode Characteristics

figure 22. **FWD**

Typical forward characteristics

I_F = f(V_F)



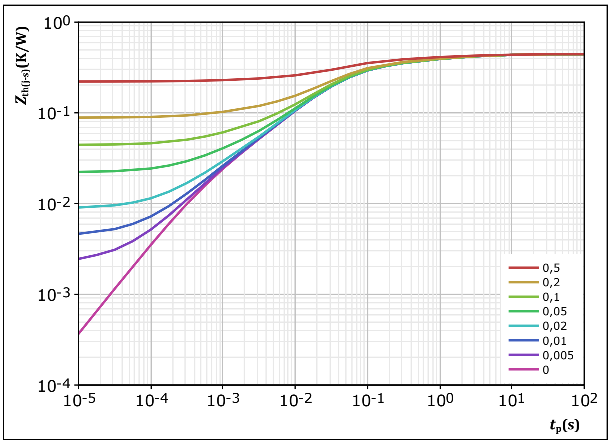
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 23. **FWD**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 0,443 K/W

FWD thermal model values

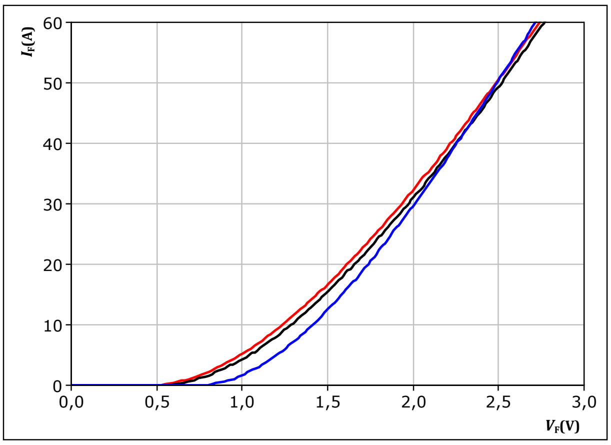
R (K/W)	τ (s)
2,77E-02	7,35E+00
5,61E-02	1,27E+00
8,82E-02	2,03E-01
1,88E-01	4,07E-02
5,56E-02	1,11E-02
1,65E-02	2,47E-03
1,04E-02	5,17E-04

DC-Link Switch Prot. Diode Characteristics

figure 24. **FWD**

Typical forward characteristics

I_F = f(V_F)



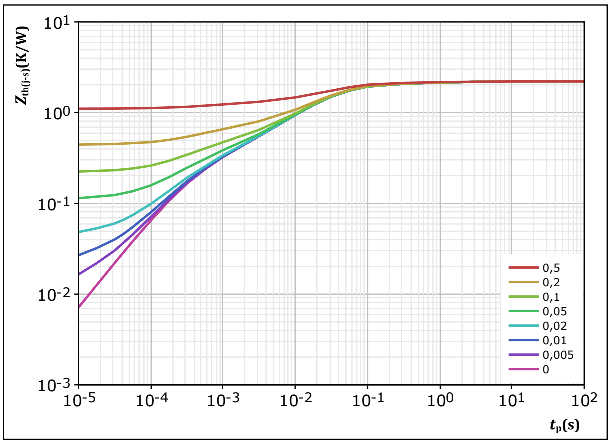
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 25. **FWD**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 2,209 K/W

FWD thermal model values

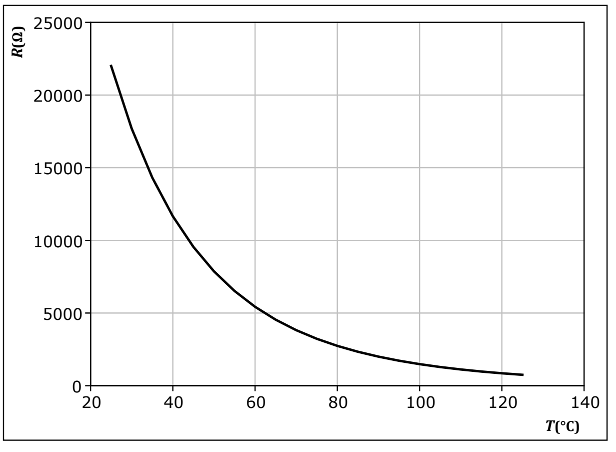
R (K/W)	τ (s)
8,86E-02	2,28E+00
2,06E-01	2,30E-01
1,06E+00	3,33E-02
4,76E-01	1,15E-02
1,85E-01	2,22E-03
1,98E-01	3,49E-04

Thermistor Characteristics

figure 26. **Thermistor**

Typical NTC characteristic as function of temperature

R_T = f(T)

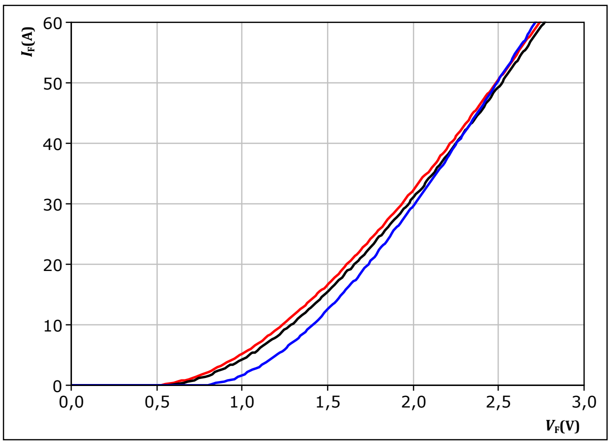


AC Switch Prot. Diode Characteristics

figure 27. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



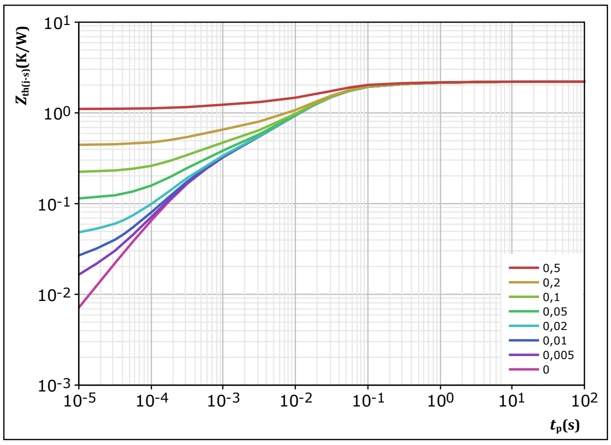
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 28. **FWD**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 2,209 K/W

FWD thermal model values

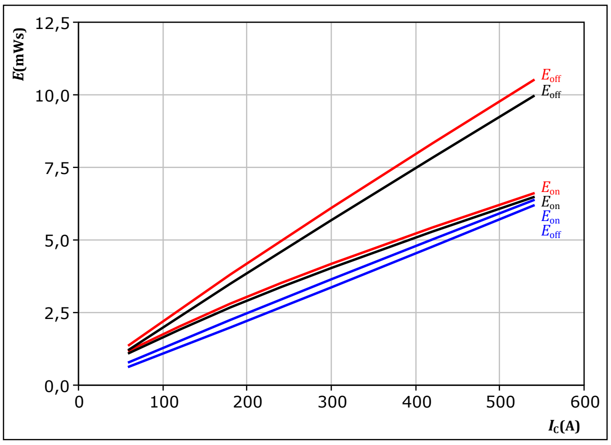
R (K/W)	τ (s)
8,86E-02	2,28E+00
2,06E-01	2,30E-01
1,06E+00	3,33E-02
4,76E-01	1,15E-02
1,85E-01	2,22E-03
1,98E-01	3,49E-04

AC Switching Characteristics

figure 29. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



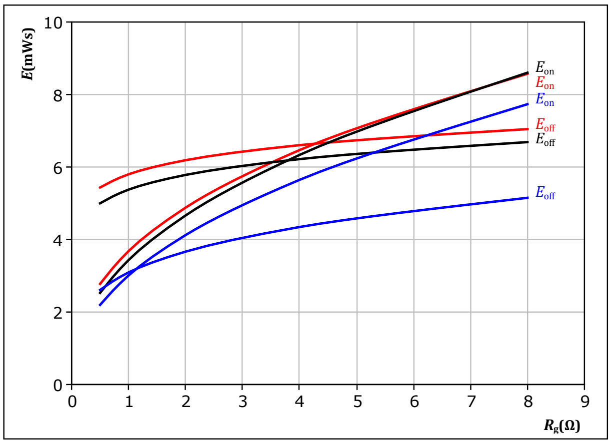
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	0/15	V		125 °C
R_{gon} =	2	Ω		150 °C
R_{goff} =	2	Ω		

figure 30. **IGBT**

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

$E = f(R_g)$



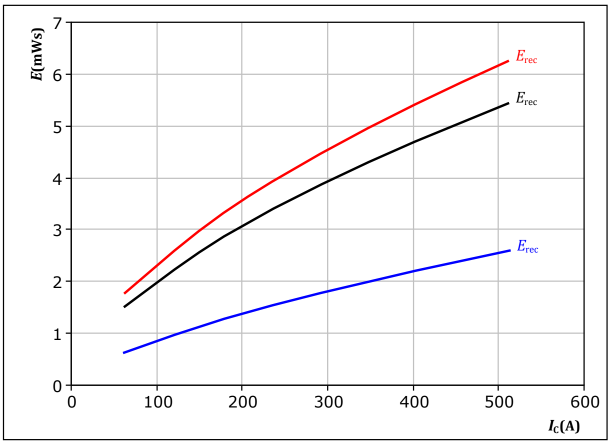
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	0/15	V		125 °C
I_C =	300	A		150 °C

figure 31. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



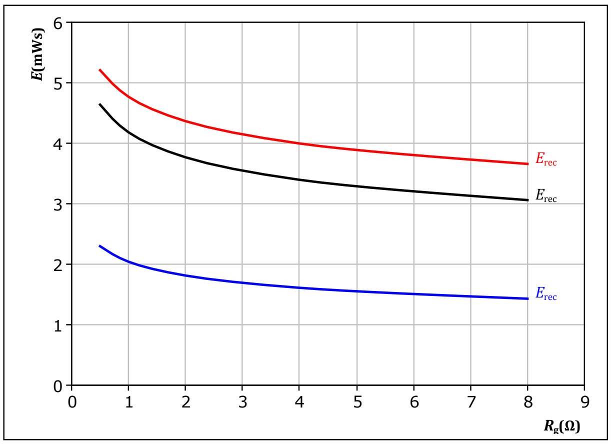
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	0/15	V		125 °C
R_{gon} =	2	Ω		150 °C

figure 32. **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

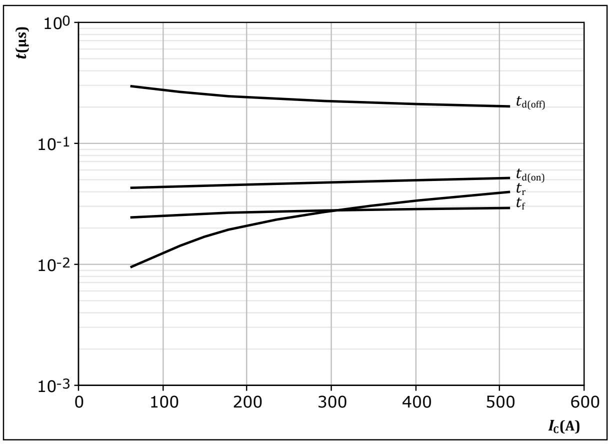
V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	0/15	V		125 °C
I_C =	300	A		150 °C

AC Switching Characteristics

figure 33. **IGBT**

Typical switching times as a function of collector current

t = f(I_C)



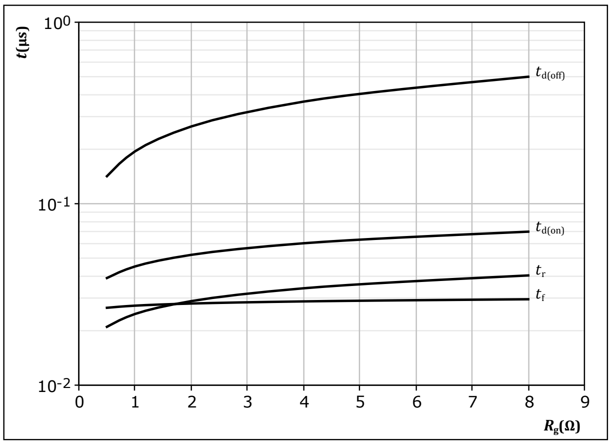
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	0/15	V
R_{gon} =	2	Ω
R_{goff} =	2	Ω

figure 34. **IGBT**

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

t = f(R_g)



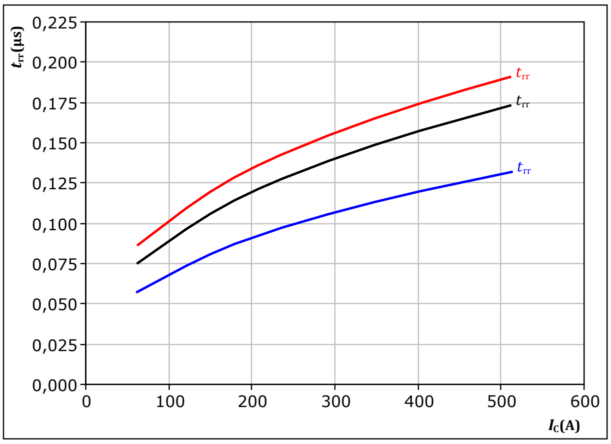
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	0/15	V
I_C =	300	A

figure 35. **FWD**

Typical reverse recovery time as a function of collector current

t_{rr} = f(I_C)



With an inductive load at

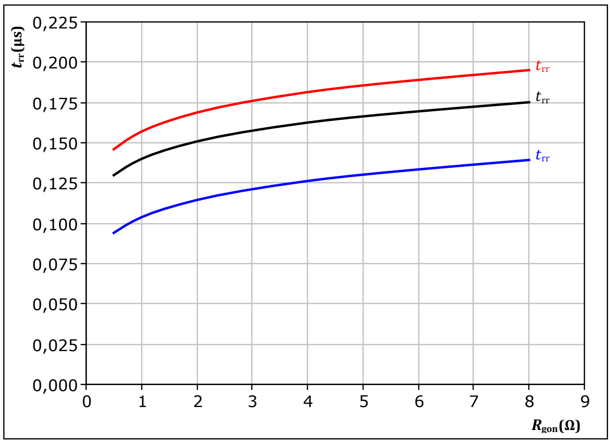
V_{CE} =	350	V
V_{GE} =	0/15	V
R_{gon} =	2	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 36. **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} =	0/15	V
I_C =	300	A

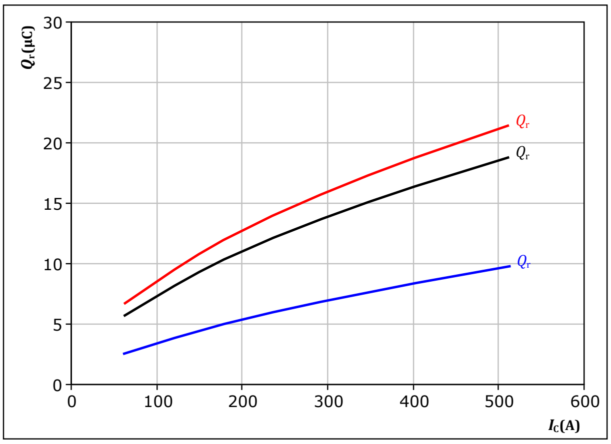
T_j: 25 °C, 125 °C, 150 °C

AC Switching Characteristics

figure 37. **FWD**

Typical recovered charge as a function of collector current

Q_r = f(I_C)



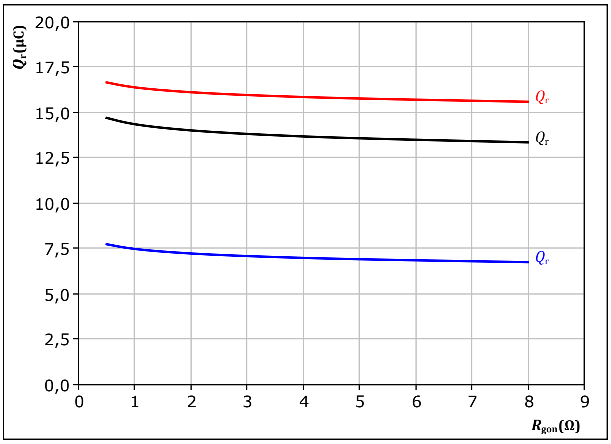
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	0/15	V		125 °C
R_{gon} =	2	Ω		150 °C

figure 38. **FWD**

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

Q_r = f(R_{gon})



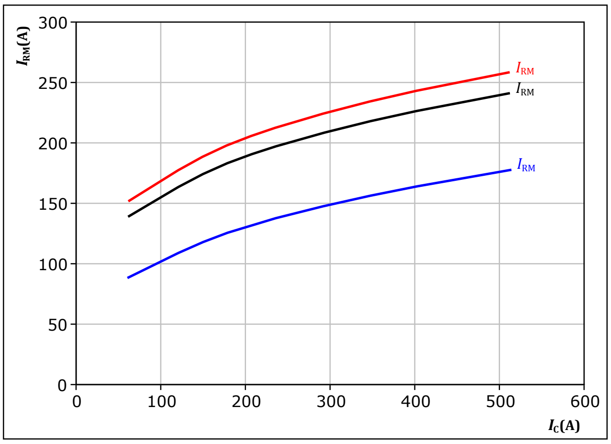
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	0/15	V		125 °C
I_C =	300	A		150 °C

figure 39. **FWD**

Typical peak reverse recovery current as a function of collector current

I_{RM} = f(I_C)



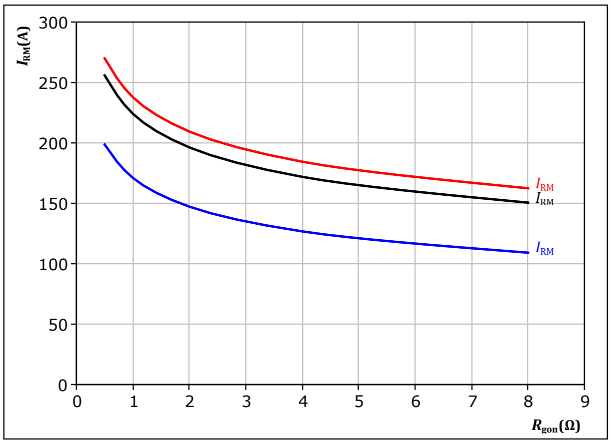
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	0/15	V		125 °C
R_{gon} =	2	Ω		150 °C

figure 40. **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

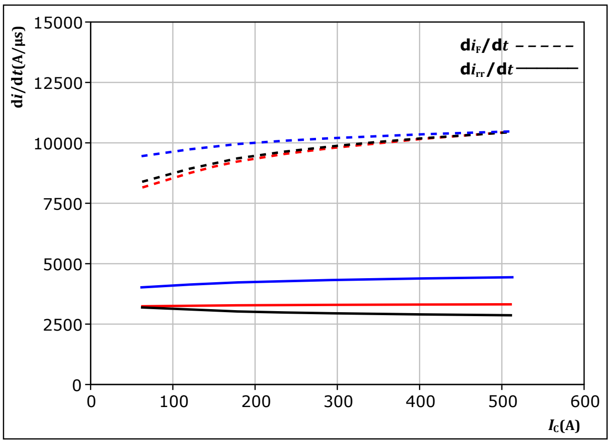
V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	0/15	V		125 °C
I_C =	300	A		150 °C

AC Switching Characteristics

figure 41. **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)



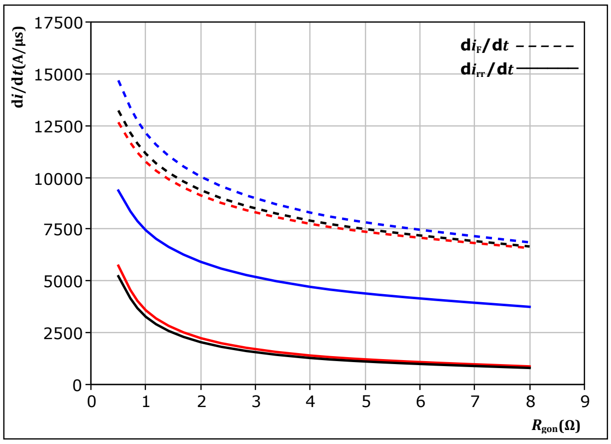
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	0/15	V		125 °C
R_{gon} =	2	Ω		150 °C

figure 42. **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})



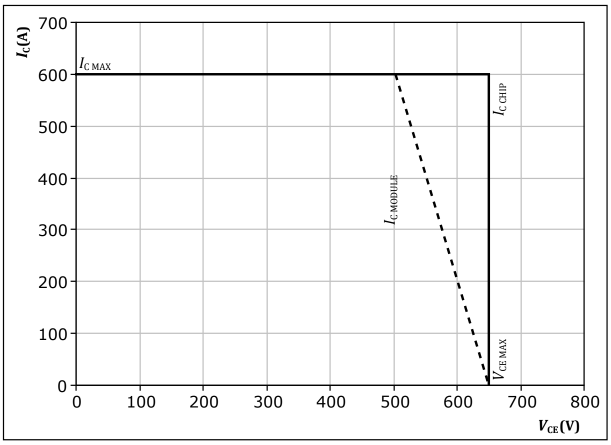
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	0/15	V		125 °C
I_C =	300	A		150 °C

figure 43. **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 44. **IGBT**

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

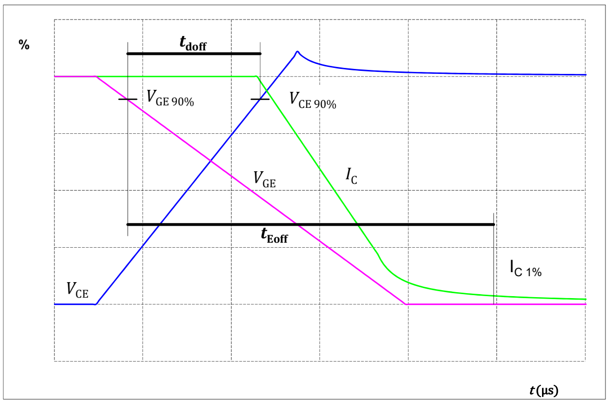


figure 45. **IGBT**

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

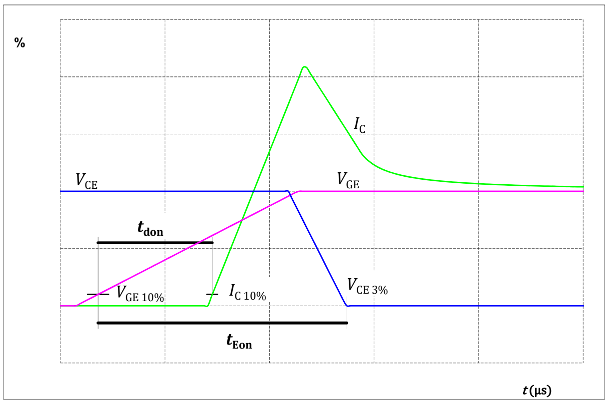


figure 46. **IGBT**

Turn-off Switching Waveforms & definition of t_f

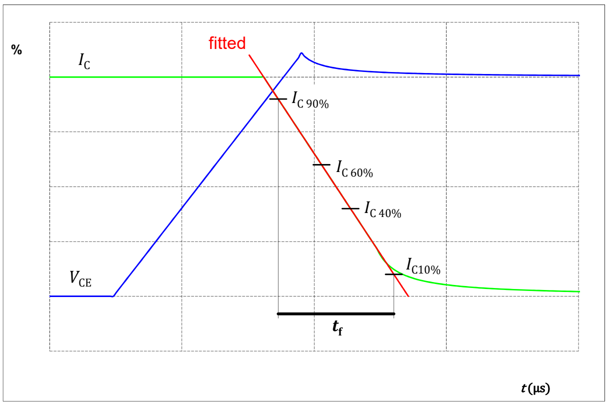
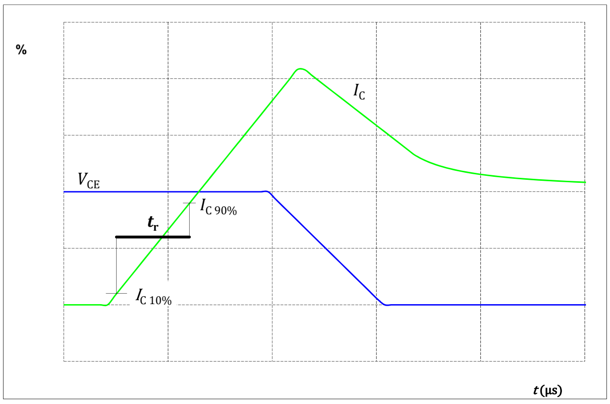


figure 47. **IGBT**

Turn-on Switching Waveforms & definition of t_r



Switching Definitions

figure 48. **FWD**

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

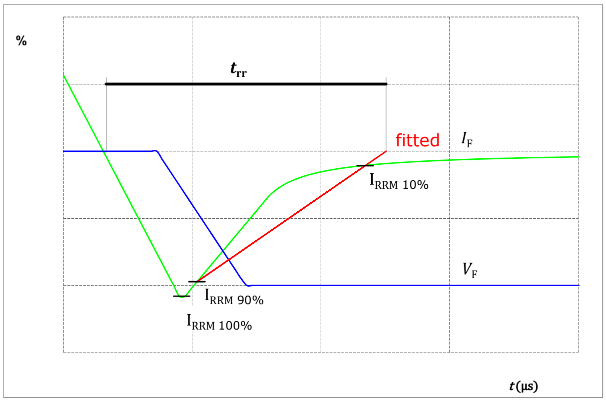
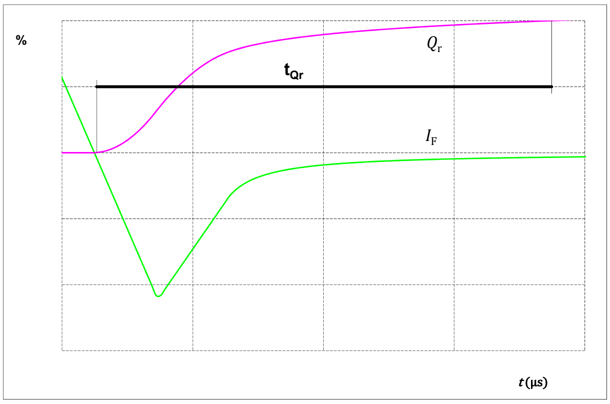


figure 49. **FWD**

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



30-PT07NAA300S501-LF64F58Y
datasheet

Vincotech

Ordering Code

Version	Ordering Code
Without thermal paste	30-PT07NAA300S501-LF64F58Y
With thermal paste (3,4 W/mK, PSX-P7)	30-PT07NAA300S501-LF64F58Y-/3/

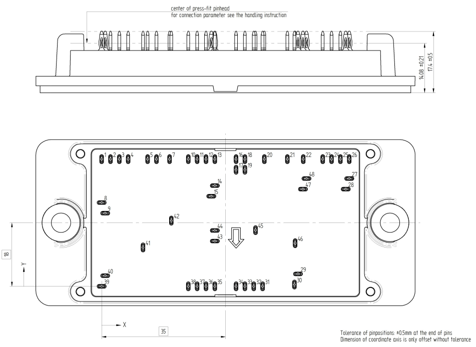
Marking

	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		

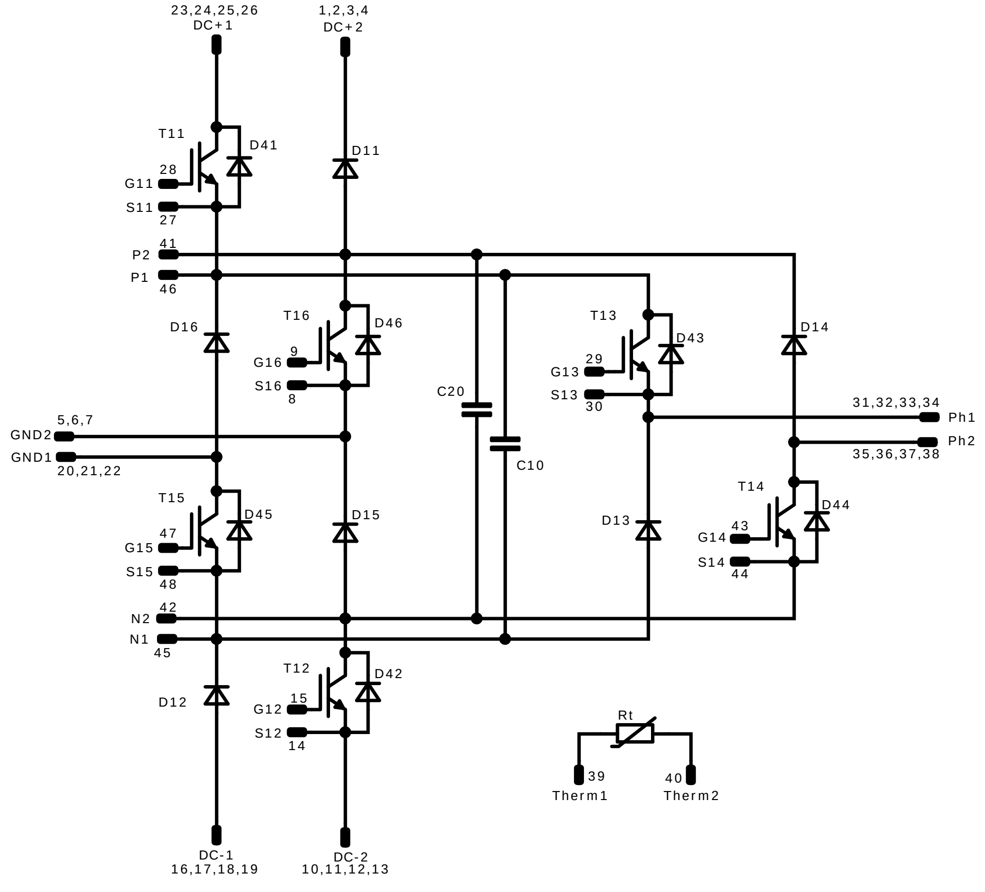
Outline

Pin table [mm]

Pin	X	Y	Function	Pin	X	Y	Function
1	0	36	DC+2	25	67,5	36	DC+1
2	2,5	36	DC+2	26	70	36	DC+1
3	5	36	DC+2	27	70	30,5	S11
4	7,5	36	DC+2	28	69	27,5	G11
5	13	36	GND2	29	55,5	3,5	G13
6	15,5	36	GND2	30	54,5	0,5	S13
7	19,2	36	GND2	31	45,5	0	Ph1
8	0	23,7	S16	32	43	0	Ph1
9	1	20,7	G16	33	40,5	0	Ph1
10	24,5	36	DC-2	34	38	0	Ph1
11	27	36	DC-2	35	32	0	Ph2
12	29,5	36	DC-2	36	29,5	0	Ph2
13	32	36	DC-2	37	27	0	Ph2
14	32	28,5	S12	38	24,5	0	Ph2
15	31	25,5	G12	39	0	0	Therm1
16	38	36	DC-1	40	1	3	Therm2
17	38	33	DC-1	41	11,7	11	P2
18	40,5	36	DC-1	42	19,7	18,6	N2
19	40,5	33	DC-1	43	32	12,8	G14
20	46	36	GND1	44	32	15,8	S14
21	52,5	36	GND1	45	43,5	15,9	N1
22	57	36	GND1	46	54,7	12,2	P1
23	62,5	36	DC+1	47	56,9	27,5	G15
24	65	36	DC+1	48	57,9	30,5	S15



Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
D43, D44	FWD	650 V	20 A	AC Switch Prot. Diode	
T13, T14	IGBT	650 V	300 A	AC Switch	
D13, D14	FWD	650 V	300 A	AC Diode	
T15, T16	IGBT	650 V	225 A	Neutral Point Switch	
D11, D12	FWD	650 V	225 A	DC-Link Diode	
D45, D46	FWD	650 V	20 A	Neutral Point Switch Prot. Diode	
T11, T12	IGBT	650 V	225 A	DC-Link Switch	
D15, D16	FWD	650 V	225 A	Neutral Point Diode	
D41, D42	FWD	650 V	20 A	DC-Link Switch Prot. Diode	
C10, C20	Capacitor	630 V		Capacitor (DC)	
Rt	NTC			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-PT07NAA300S501-LF64F58Y-D3-14	28 Apr. 2022	New Datasheet format, module is unchanged	