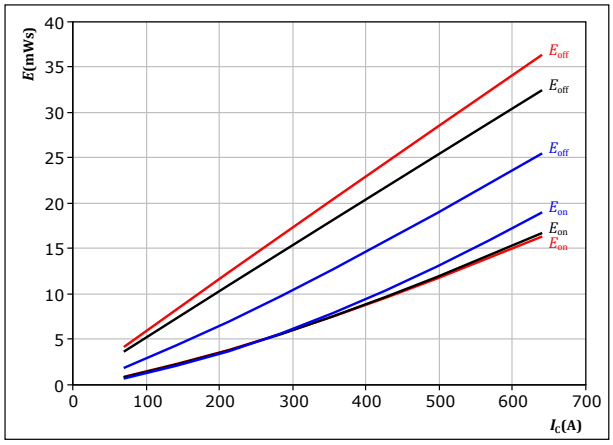
DC-Link Switching Characteristics

figure 38. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



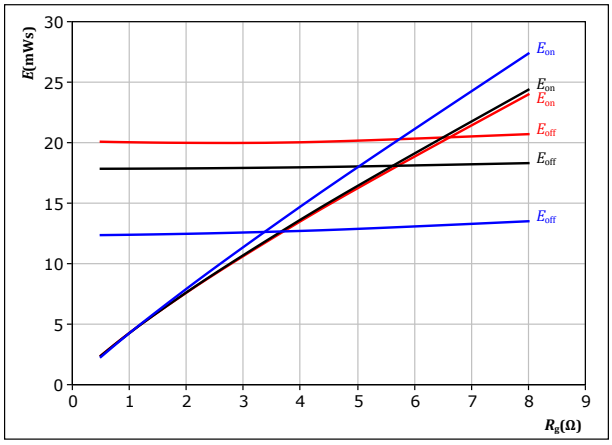
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	2	Ω		150 °C
R_{goff} =	2	Ω		

figure 39. **IGBT**

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

$E = f(R_g)$



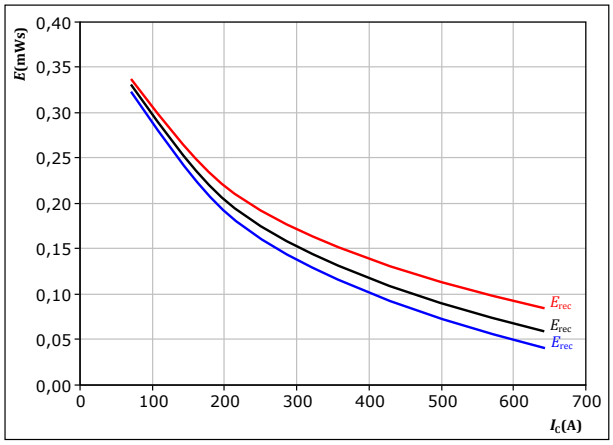
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	355	A		150 °C

figure 40. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



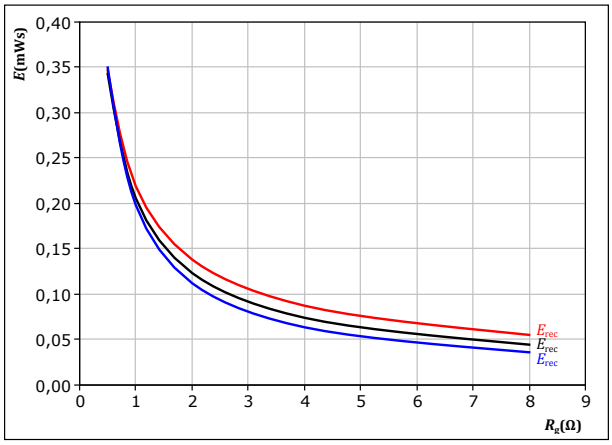
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	2	Ω		150 °C

figure 41. **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

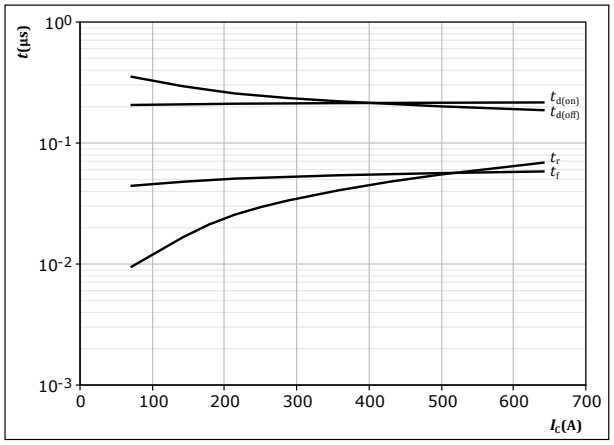
V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	355	A		150 °C

DC-Link Switching Characteristics

figure 42. **IGBT**

Typical switching times as a function of collector current

t = f(I_C)



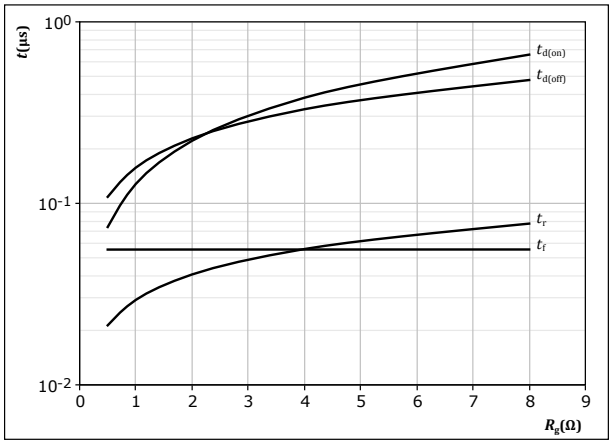
With an inductive load at

T_j =	150	°C
V_{CE} =	600	V
V_{GE} =	±15	V
R_{gon} =	2	Ω
R_{goff} =	2	Ω

figure 43. **IGBT**

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

t = f(R_g)



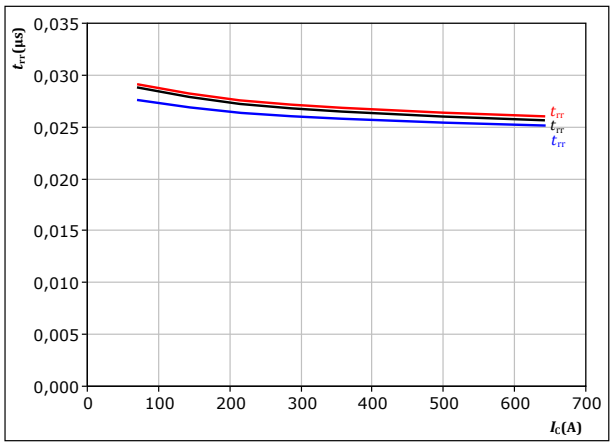
With an inductive load at

T_j =	150	°C
V_{CE} =	600	V
V_{GE} =	±15	V
I_C =	355	A

figure 44. **FWD**

Typical reverse recovery time as a function of collector current

t_{rr} = f(I_C)



With an inductive load at

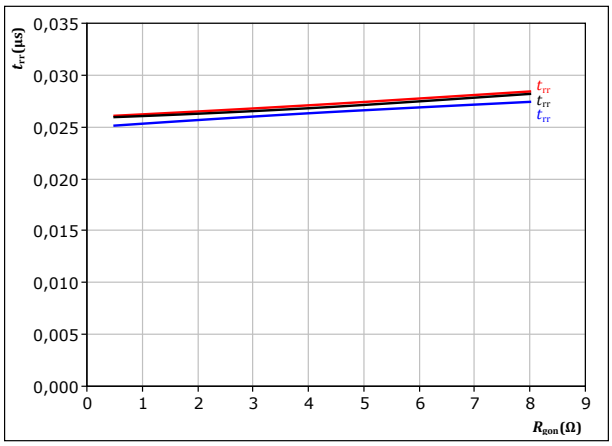
V_{CE} =	600	V
V_{GE} =	±15	V
R_{gon} =	2	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 45. **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} =	600	V
V_{GE} =	±15	V
I_C =	355	A

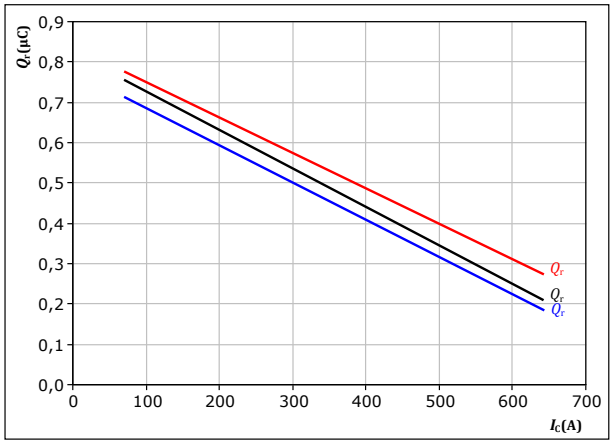
T_j: 25 °C, 125 °C, 150 °C

DC-Link Switching Characteristics

figure 46. **FWD**

Typical recovered charge as a function of collector current

$Q_r = f(I_C)$



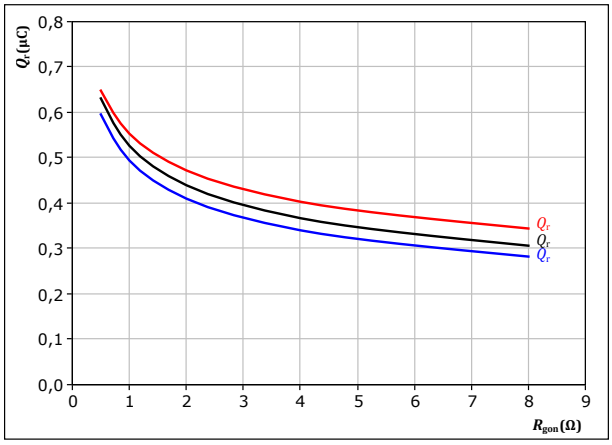
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	2	Ω		150 °C

figure 47. **FWD**

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

$Q_r = f(R_{gon})$



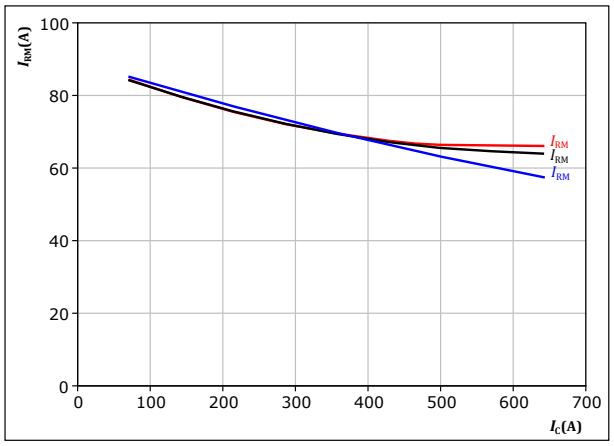
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	355	A		150 °C

figure 48. **FWD**

Typical peak reverse recovery current as a function of collector current

$I_{RM} = f(I_C)$



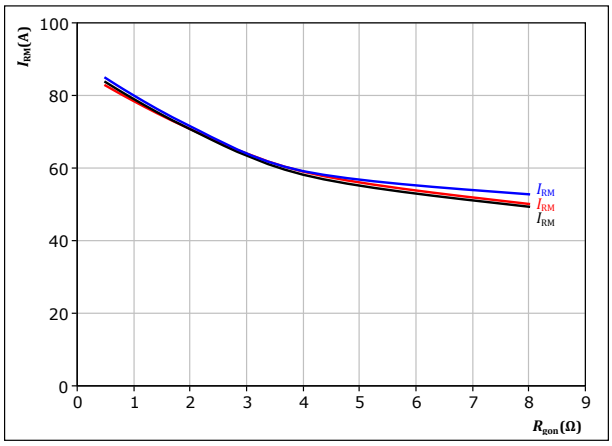
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	2	Ω		150 °C

figure 49. **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

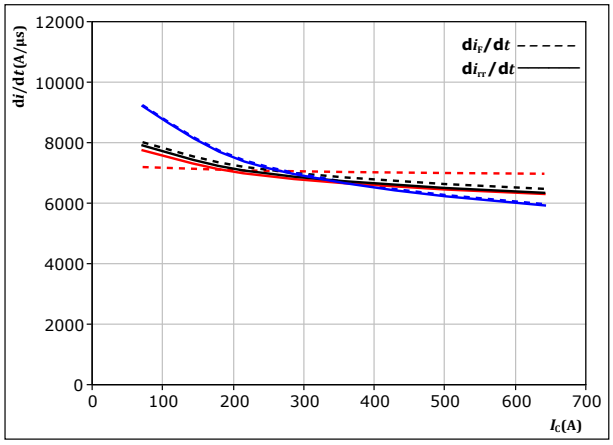
V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	355	A		150 °C

DC-Link Switching Characteristics

figure 50. **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)



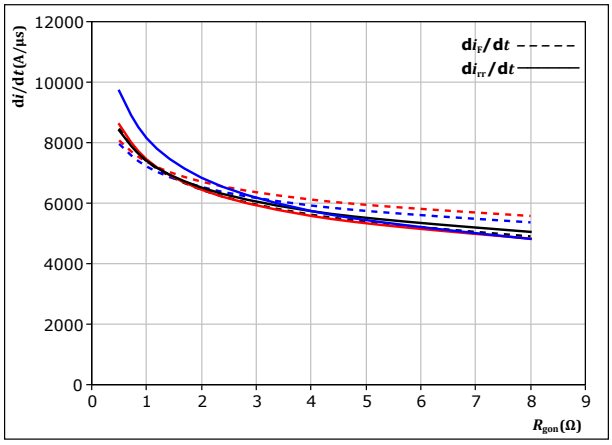
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	2	Ω		150 °C

figure 51. **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})



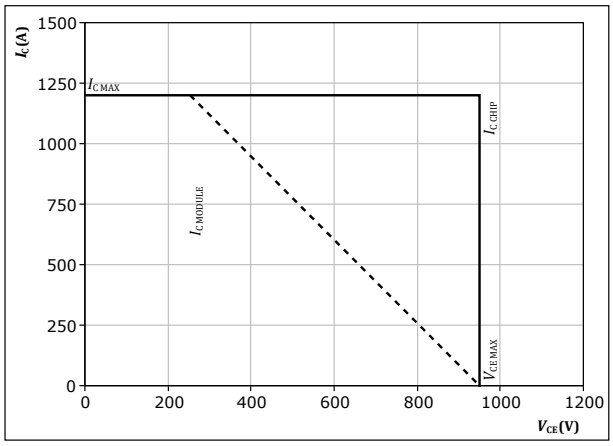
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	355	A		150 °C

figure 52. **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 53. **IGBT**

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

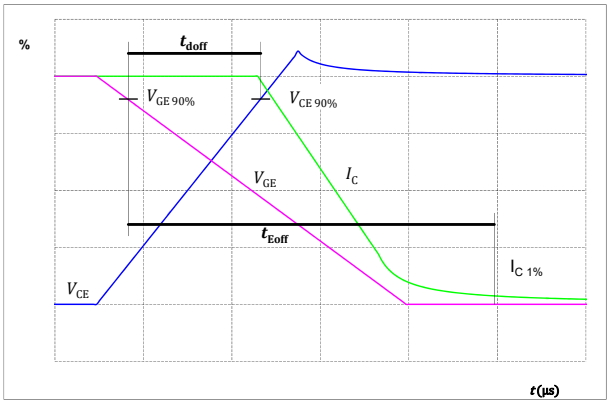


figure 54. **IGBT**

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

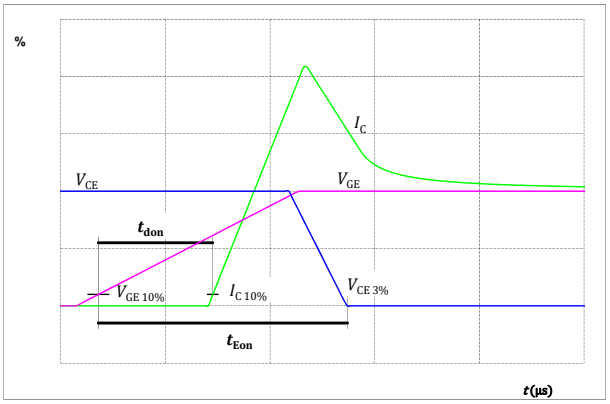


figure 55. **IGBT**

Turn-off Switching Waveforms & definition of t_f

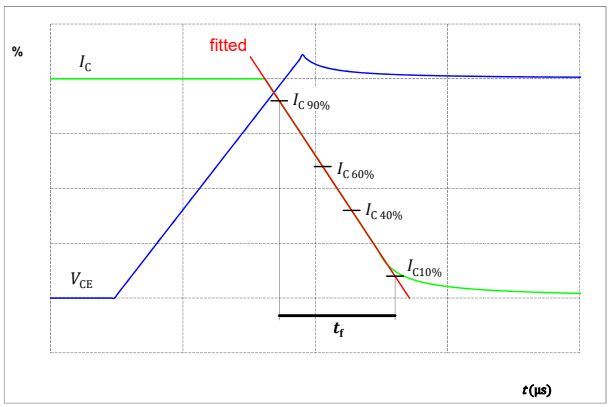
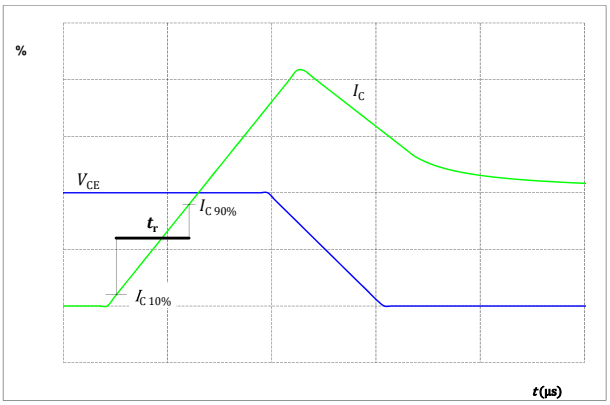


figure 56. **IGBT**

Turn-on Switching Waveforms & definition of t_r



Switching Definitions

figure 57. **FWD**

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

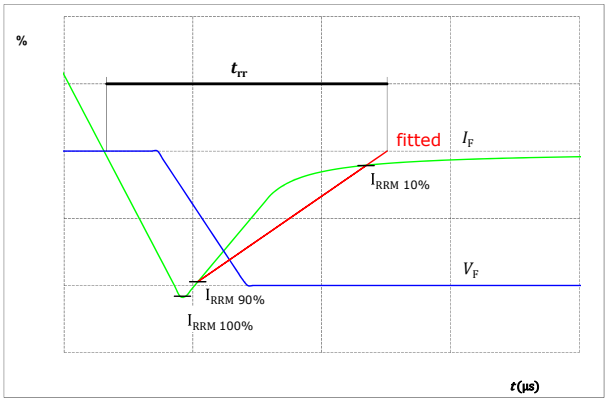
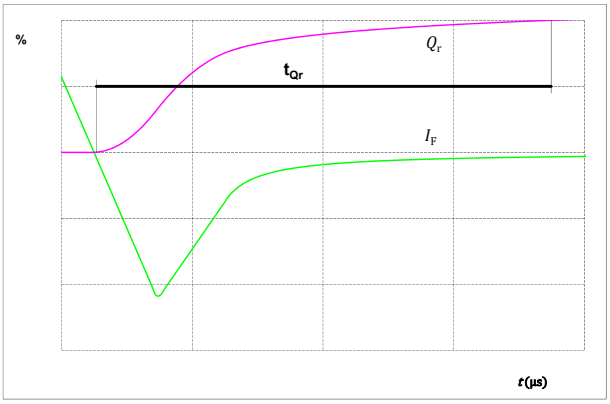


figure 58. **FWD**

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



Ordering Code	
Version	**Ordering Code**
Without thermal paste	B0-SP10NAD600S704-PE19F18T
With thermal paste (5,2 W/mK, PTM6000HV)	B0-SP10NAD600S704-PE19F18T-/7/

Marking

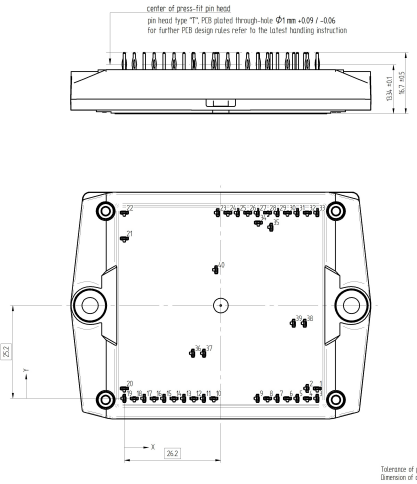
	Name	Date code	UL & VIN	Lot	Serial
Text	NN-NNNNNNNNNNNNNN-TTTTTTVV	WWYY	UL VIN	LLLLL	SSSS

	Type&Ver	Lot number	Serial	Date code		
Datamatrix	TTTTTTVV	LLLLL	SSSS	WWYY		

High Side Module B0-SP10NAD600S704-PE19F18T

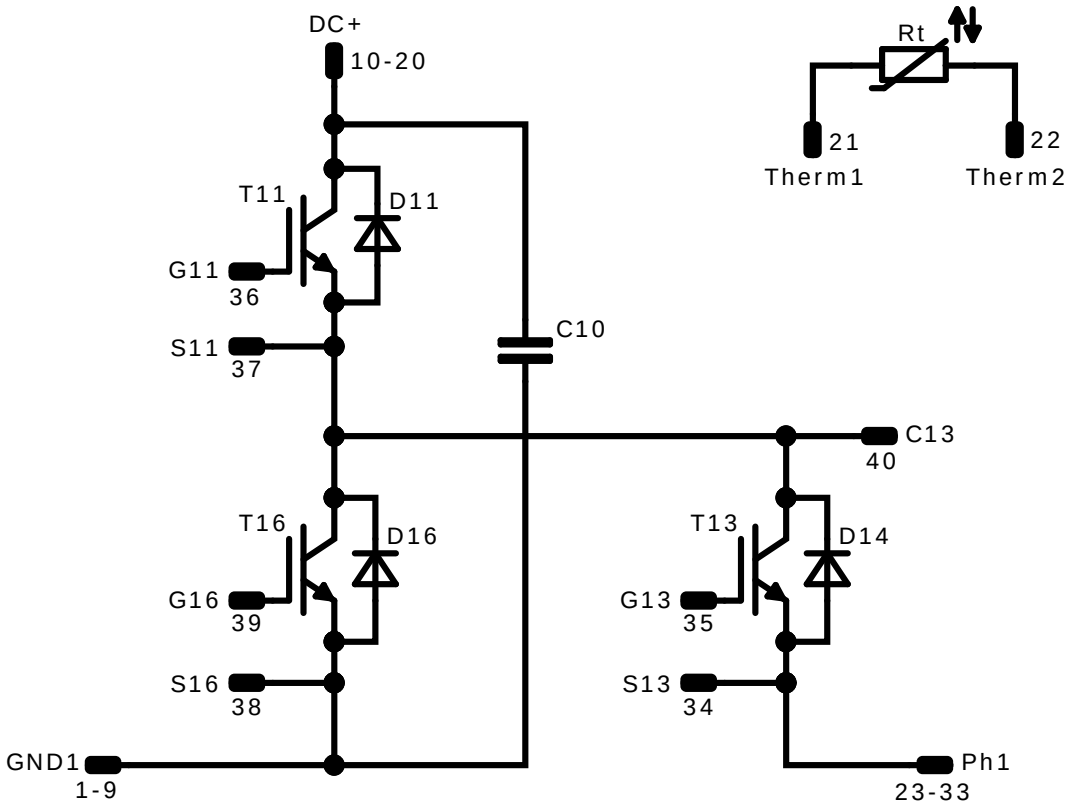
Outline

Pin table [mm]			
Pin	X	Y	Function
1	52,4	2,7	GND1
2	49,7	2,7	GND1
3	52,4	0	GND1
4	49,7	0	GND1
5	47	0	GND1
6	44,3	0	GND1
7	41,6	0	GND1
8	38,9	0	GND1
9	36,2	0	GND1
10	24,3	0	DC+
11	21,6	0	DC+
12	18,9	0	DC+
13	16,2	0	DC+
14	13,5	0	DC+
15	10,8	0	DC+
16	8,1	0	DC+
17	5,4	0	DC+
18	2,7	0	DC+
19	0	0	DC+
20	0	2,7	DC+
21	0	43,4	Therm1
22	0	50,4	Therm2
23	25,4	50,4	Ph1
24	28,1	50,4	Ph1
25	30,8	50,4	Ph1
26	33,5	50,4	Ph1
27	36,2	50,4	Ph1
28	38,9	50,4	Ph1
29	41,6	50,4	Ph1
30	44,3	50,4	Ph1
31	47	50,4	Ph1
32	49,7	50,4	Ph1
33	52,4	50,4	Ph1
34	36,4	47,7	S13
35	39,9	46,45	G13
36	18,65	12,25	G11
37	21,65	12,25	S11
38	49	20,4	S16
39	46	20,4	G16
40	24,95	34,9	C13



High Side Module B0-SP10NAD600S704-PE19F18T

Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T13	IGBT	950 V	400 A	AC Switch	
D14	FWD	950 V	300 A	AC Diode	
T16	IGBT	950 V	400 A	Neutral Point Switch	
D11	FWD	950 V	300 A	DC-Link Diode	
T11	IGBT	950 V	600 A	DC-Link Switch	
D16	FWD	1200 V	160 A	Neutral Point Diode	
C10	Capacitor	1000 V		Capacitor (DC)	
Rt	Thermistor			Thermistor	

Ordering Code	
Version	**Ordering Code**
Without thermal paste	B0-SP10NAE600S704-PE29F18T
With thermal paste (5,2 W/mK, PTM6000HV)	B0-SP10NAE600S704-PE29F18T-/7/

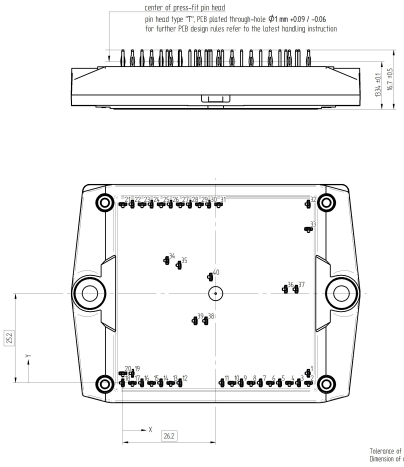
Marking

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

Low Side Module B0-SP10NAE600S704-PE29F18T

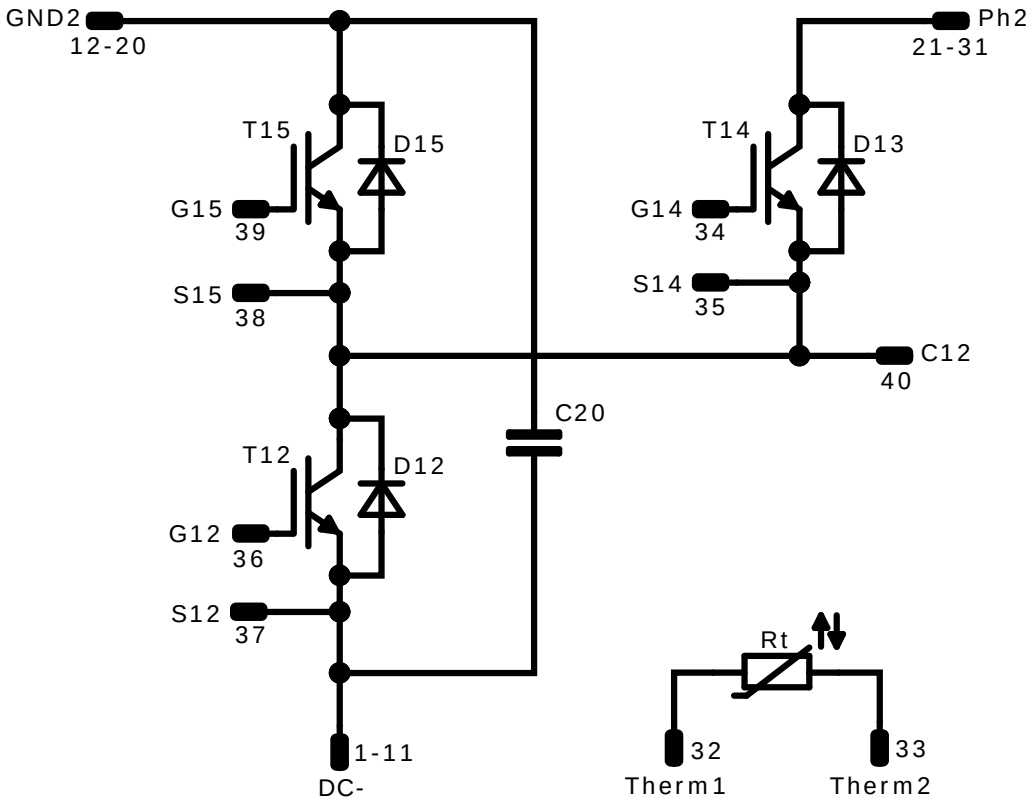
Outline

Pin table [mm]			
Pin	X	Y	Function
1	52,4	2,7	DC-
2	52,4	0	DC-
3	49,7	0	DC-
4	47	0	DC-
5	44,3	0	DC-
6	41,6	0	DC-
7	38,9	0	DC-
8	36,2	0	DC-
9	33,5	0	DC-
10	30,8	0	DC-
11	28,1	0	DC-
12	16,2	0	GND2
13	13,5	0	GND2
14	10,8	0	GND2
15	8,1	0	GND2
16	5,4	0	GND2
17	2,7	0	GND2
18	0	0	GND2
19	2,7	2,7	GND2
20	0	2,7	GND2
21	0	50,4	Ph2
22	2,7	50,4	Ph2
23	5,4	50,4	Ph2
24	8,1	50,4	Ph2
25	10,8	50,4	Ph2
26	13,5	50,4	Ph2
27	16,2	50,4	Ph2
28	18,9	50,4	Ph2
29	21,6	50,4	Ph2
30	24,3	50,4	Ph2
31	27	50,4	Ph2
32	52,4	50,4	Therm1
33	52,4	43,4	Therm2
34	12,5	34,5	G14
35	16	33,2	S14
36	46	26,4	G12
37	49	26,4	S12
38	23,5	17,5	S15
39	20,5	17,5	G15
40	24,85	29,85	C12



Low Side Module B0-SP10NAE600S704-PE29F18T

Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T14	IGBT	950 V	400 A	AC Switch	
D13	FWD	950 V	300 A	AC Diode	
T15	IGBT	950 V	400 A	Neutral Point Switch	
D12	FWD	950 V	300 A	DC-Link Diode	
T12	IGBT	950 V	600 A	DC-Link Switch	
D15	FWD	1200 V	160 A	Neutral Point Diode	
C20	Capacitor	1000 V		Capacitor (DC)	
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-SP10NAx600S704-PEx9F18T-D1-14	1 Aug. 2022		