Vincotech

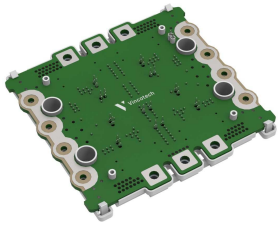
70-W212NMA800M7-LC00F70
datasheet

VINcoMNPC X4 **1200 V / 800 A**

Features

- Low inductive package
- IGBT M7 technology with low V_{CEsat} and improved EMC behavior
- High efficiency

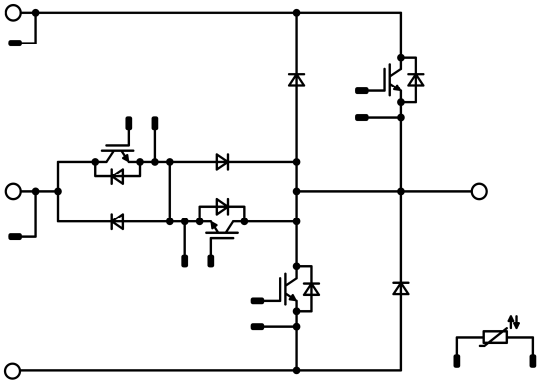
VINco X4 housing



Target applications

- Solar Inverters
- UPS

Schematic



Types

- 70-W212NMA800M7-LC00F70

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Condition	Value	Unit
Buck Switch				
Collector-emitter voltage	V_{CES}		1200	V
Collector current	I_C	T_j = T_{jmax} T_s = 80 °C	560	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	1600	A
Total power dissipation	P_{tot}	T_j = T_{jmax} T_s = 80 °C	932	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	Condition		Value	Unit
Buck Diode					
Peak repetitive reverse voltage	V_{RRM}			650	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$	T_s = 80 °C	419	A
Repetitive peak forward current	I_{FRM}			1600	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	552	W
Maximum junction temperature	T_{jmax}			175	°C
Buck Sw. Protection Diode					
Peak repetitive reverse voltage	V_{RRM}			1200	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$	T_s = 80 °C	30	A
Surge (non-repetitive) forward current	I_{FSM}	50 Hz Single Half Sine Wave t_p = 10 ms	T_j = 150 °C	130	A
Surge current capability	I^2t			84	A^2s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	126	W
Maximum junction temperature	T_{jmax}			175	°C
Boost Switch					
Collector-emitter voltage	V_{CES}	Relative moisture level	≤ 50% > 50%	650 500	V
Collector current	I_C	$T_j = T_{jmax}$	T_s = 80 °C	587	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}		1600	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	736	W
Gate-emitter voltage	V_{GES}			±20	V
Maximum junction temperature	T_{jmax}			175	°C
Boost Diode					
Peak repetitive reverse voltage	V_{RRM}			1200	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$	T_s = 80 °C	409	A
Repetitive peak forward current	I_{FRM}			1600	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	593	W
Maximum junction temperature	T_{jmax}			175	°C

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Condition		Value	Unit
Boost Sw. Protection Diode					
Peak repetitive reverse voltage	V_{RRM}			650	V
Continuous (direct) forward current	I_F	T_j = T_{jmax}	T_s = 80 °C	49	A
Repetitive peak forward current	I_{FRM}			80	A
Total power dissipation	P_{tot}	T_j = T_{jmax}	T_s = 80 °C	84	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
Maximum allowed PCB temperature	T_{PCB}			125	°C
Isolation Properties					
Isolation voltage	V_{isol}	DC Test Voltage*	t_p = 2 s	4000	V
		AC Voltage	t_p = 1 min	2500	V
Creepage distance				min. 12,7	mm
Clearance				min. 12,7	mm
Comparative Tracking Index	CTI			> 200	

*100 % tested in production

Characteristic Values

Parameter	Symbol	Conditions					Value			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 Switch										
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$			10	0,08	25	5,4	6	6,6	V
Collector-emitter saturation voltage	V_{CEsat}		15		800	25 125 150		1,68 1,88 1,93	1,85	V
Collector-emitter cut-off current	I_{CES}		0	1200		25			400	µA
Gate-emitter leakage current	I_{GES}		20	0		25			2000	nA
Internal gate resistance	r_g							0,5		Ω
Input capacitance	C_{ies}		0	10		25		148000		pF
Output capacitance	C_{oes}							4400		
Reverse transfer capacitance	C_{res}							1680		
Gate charge	Q_g		15	600	800	25		4800		nC
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,102		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 0,75 Ω R_{goff} = 0,75 Ω	-8 / 16	350	800	25 125 150		374 377 375		ns
Rise time	t_r					25 125 150		102 108 108		
Turn-off delay time	$t_{d(off)}$					25 125 150		271 293 296		
Fall time	t_f					25 125 150		67 80 81		
Turn-on energy (per pulse)	E_{on}	Q_{rFWD} = 75,4 µC Q_{rFWD} = 127,6 µC Q_{rFWD} = 156,7 µC				25 125 150		34,10 45,92 47,53		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		33,39 42,92 42,87		

Characteristic Values

Parameter	Symbol	Conditions					Value			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				800	25 125 150		1,70 1,74 1,74	1,85	V
Reverse leakage current	I_R			650		25			200	µA
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,172		K/W
Dynamic										
Peak recovery current	I_{RRM}	di/dt = 6065 A/µs di/dt = 6272 A/µs di/dt = 6205 A/µs	-8 / 16	350	800	25 125 150		342 370 392		A
Reverse recovery time	t_{rr}					25 125 150		661 1001 1152		ns
Recovered charge	Q_r					25 125 150		75,38 127,61 156,69		µC
Reverse recovered energy	E_{rec}					25 125 150		18,83 31,67 39,93		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		3722 2710 2551		A/µs
Buck Sw. Protection Diode										
Static										
Forward voltage	V_F				30	25 125		2,37 2,47	2,71	V
Reverse leakage current	I_R			1200		25 150			120 3600	µA
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,755		K/W

Characteristic Values

Parameter	Symbol	Conditions					Value			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	$V_{GE(th)}$			10	0,08	25	5,4	6	6,6	V
Collector-emitter saturation voltage	V_{CEsat}		15		800	25 125 150		1,34 1,39 1,41	1,6	V
Collector-emitter cut-off current	I_{CES}		0	650		25			200	µA
Gate-emitter leakage current	I_{GES}		20	0		25			2000	nA
Internal gate resistance	r_g							0,75		Ω
Input capacitance	C_{ies}		0	10		25		96000		pF
Output capacitance	C_{oes}							4000		
Reverse transfer capacitance	C_{res}							1880		
Gate charge	Q_g		15	300	800	25		3320		nC
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,129		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 0,75 Ω R_{goff} = 0,75 Ω	-8 / 16	350	800	25 125 150		268 275 275		ns
Rise time	t_r					25 125 150		92 94 96		
Turn-off delay time	$t_{d(off)}$					25 125 150		224 258 268		
Fall time	t_f					25 125 150		70 90 96		
Turn-on energy (per pulse)	E_{on}	Q_{rFWD} = 55,4 µC Q_{rFWD} = 82,1 µC Q_{rFWD} = 87,7 µC				25 125 150		28,96 37,61 39,92		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		30,32 39,45 43,61		

Characteristic Values

Parameter	Symbol	Conditions					Value			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				800	25 125 150		1,71 1,87 1,88	2,1	V
Reverse leakage current	I_R			1200		25			160	µA
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,160		K/W
Dynamic										
Peak recovery current	I_{RRM}	di/dt = 7722 A/µs di/dt = 7739 A/µs di/dt = 7571 A/µs	-8 / 16	350	800	25 125 150		424 464 476		A
Reverse recovery time	t_{rr}					25 125 150		335 472 457		ns
Recovered charge	Q_r					25 125 150		55,43 82,14 87,68		µC
Reverse recovered energy	E_{rec}					25 125 150		12,21 18,21 19,29		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		4416 3530 3572		A/µs
Boost Sw. Protection Diode										
Static										
Forward voltage	V_F				40	25 125 150		1,74 1,66 1,61	1,87	V
Reverse leakage current	I_R			650		25			0,48	µA
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						1,135		K/W

Characteristic Values

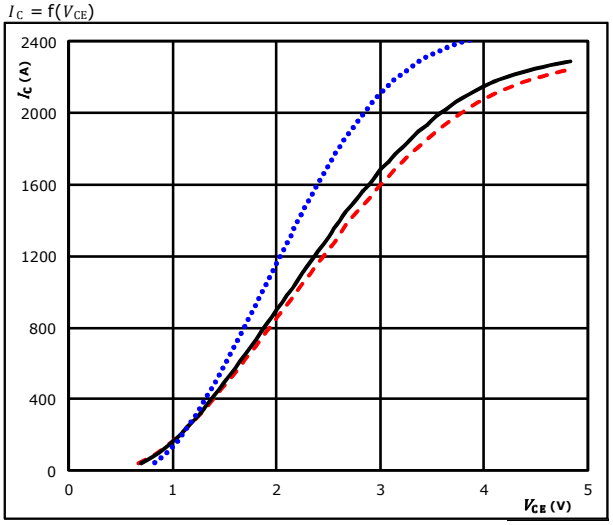
Parameter	Symbol	Conditions					Value			Unit
			V_{GE} [V] V_{GS} [V]	V_{CE} [V] V_{DS} [V] V_F [V]	I_C [A] I_D [A] I_F [A]	T_j [°C]	Min	Typ	Max	
Thermistor										
Rated resistance	R					25		22		kΩ
Deviation of R_{100}	$\Delta_{R/R}$	R_{100} = 1484 Ω				100	-5		5	%
Power dissipation	P					25		5		mW
Power dissipation constant						25		1,5		mW/K
B-value	$B_{(25/50)}$	Tol. ±1 %				25		3962		K
B-value	$B_{(25/100)}$	Tol. ±1 %				25		4000		K
Vincotech NTC Reference									I	

Buck Switch Characteristics

figure 1. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$

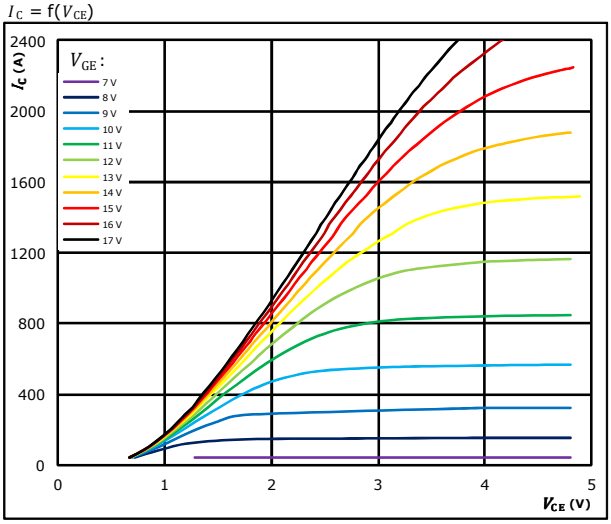


t_p =	250	µs		25 °C	
V_{GE} =	15	V	T_j:	125 °C	
				150 °C	

figure 2. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$

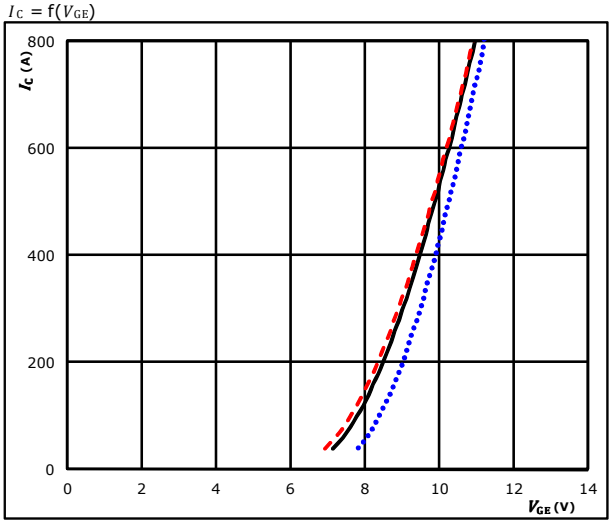


t_p =	250	µs
T_j =	125	°C
V_{GE} from	7 V to 17 V in steps of 1 V	

figure 3. **IGBT**

Typical transfer characteristics

$I_C = f(V_{GE})$

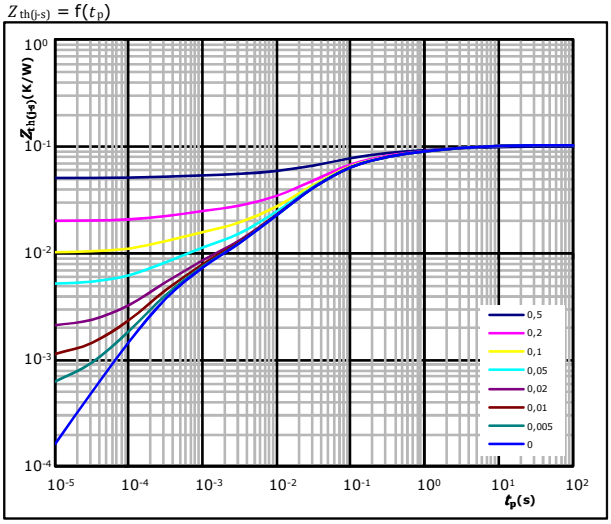


t_p =	100	µs		25 °C	
V_{CE} =	10	V	T_j:	125 °C	
				150 °C	

figure 4. **IGBT**

Transient thermal impedance as function of pulse duration

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



D =	t_p / T	
$R_{th(j-s)}$ =	0,102	K/W

IGBT thermal model values

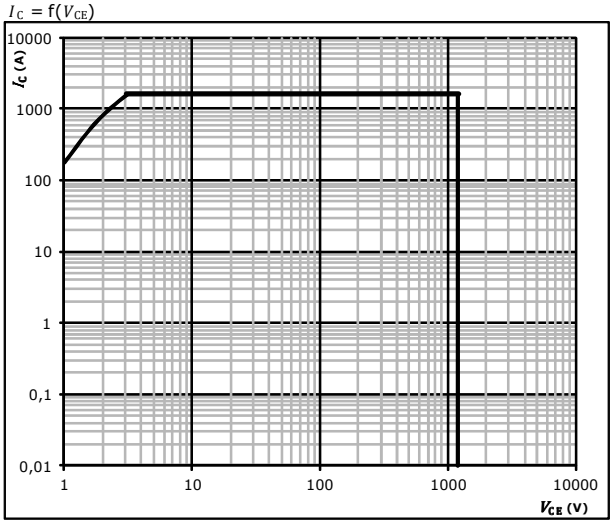
R (K/W)	τ (s)
8,39E-03	1,59E+00
1,48E-02	2,88E-01
2,16E-02	5,29E-02
3,68E-02	1,37E-02
1,19E-02	4,14E-03
3,65E-03	8,40E-04
4,90E-03	1,04E-04

Buck Switch Characteristics

figure 5. **IGBT**

Safe operating area

$I_C = f(V_{CE})$



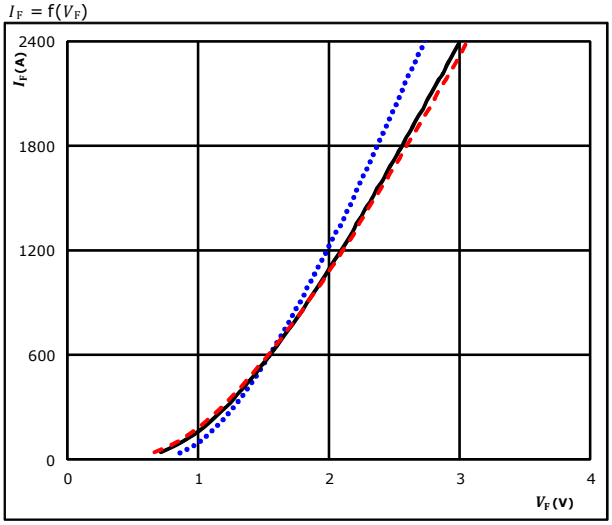
D =	single pulse	
T_s =	80	ºC
V_{GE} =	±15	V
T_j =	T_{jmax}	

Buck Diode Characteristics

figure 1. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



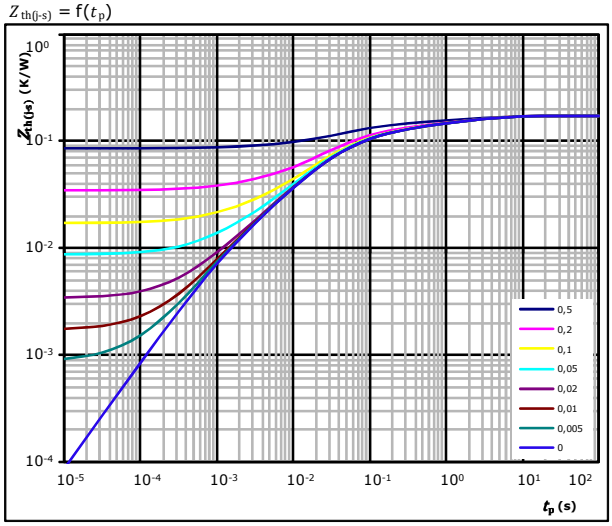
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 2. **FWD**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 0,172 K/W

FWD thermal model values

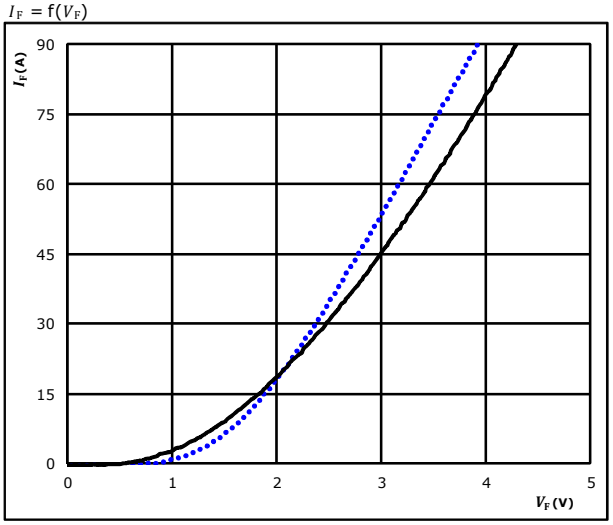
R (K/W)	τ (s)
2,25E-02	2,85E+00
2,51E-02	5,91E-01
3,85E-02	1,10E-01
6,62E-02	2,27E-02
1,48E-02	5,31E-03
5,22E-03	8,47E-04

Buck Sw. Protection Diode Characteristics

figure 1. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



t_p = 250 µs

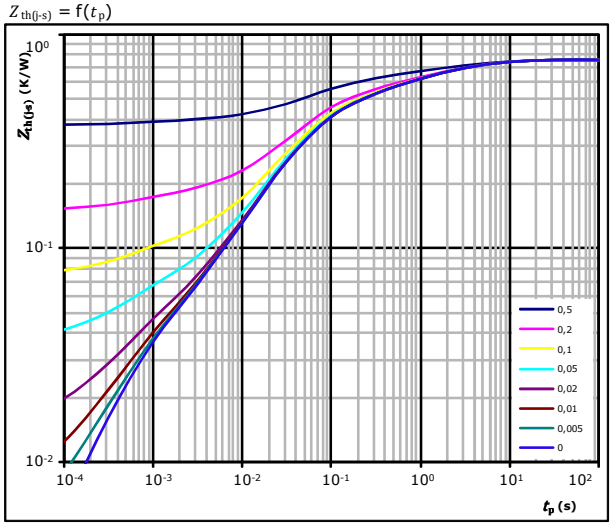
T_j: 25 °C

125 °C

figure 2. **FWD**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 0,755 K/W

FWD thermal model values

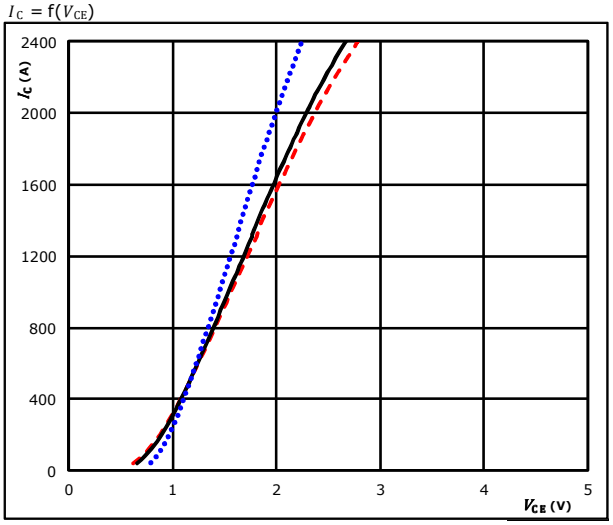
R (K/W)	τ (s)
9,01E-02	1,79E+01
1,41E-01	3,84E+00
1,39E-01	7,39E-01
2,74E-01	1,58E-01
7,19E-02	4,92E-02
1,59E-02	6,95E-03
2,29E-02	1,65E-03

Boost Switch Characteristics

figure 1. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$

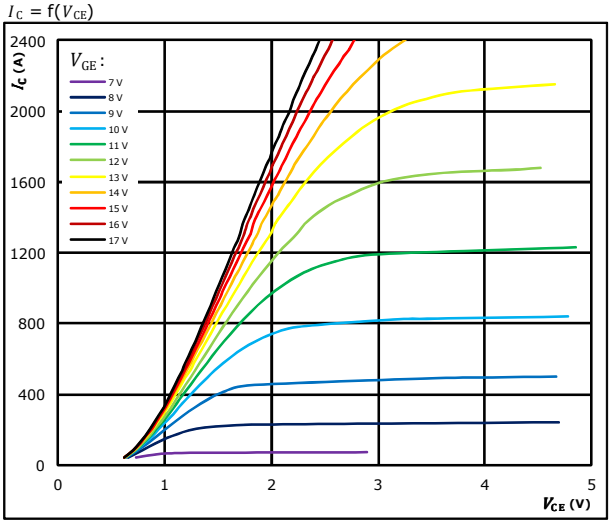


t_p =	250	µs		25 °C	
V_{GE} =	15	V	T_j:	125 °C	
				150 °C	

figure 2. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$

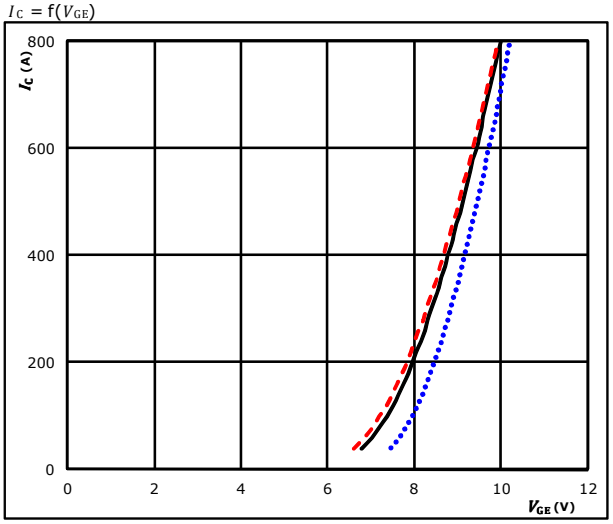


t_p =	250	µs
T_j =	125	°C
V_{GE} from	7 V to 17 V in steps of 1 V	

figure 3. **IGBT**

Typical transfer characteristics

$I_C = f(V_{GE})$

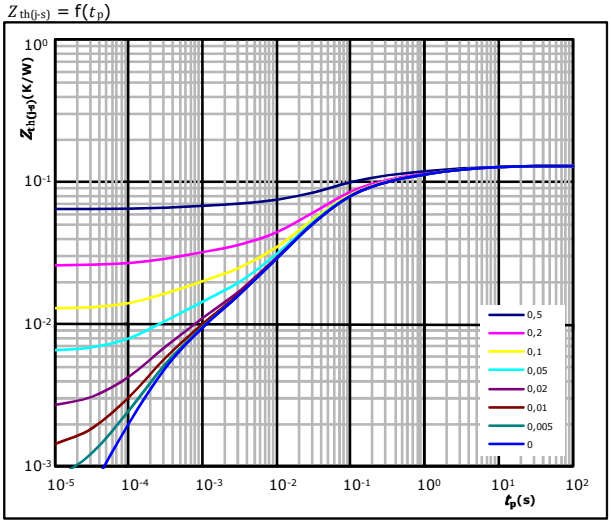


t_p =	100	µs		25 °C	
V_{CE} =	10	V	T_j:	125 °C	
				150 °C	

figure 4. **IGBT**

Transient thermal impedance as function of pulse duration

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



D =	t_p / T	
$R_{th(j-s)}$ =	0,129	K/W

IGBT thermal model values

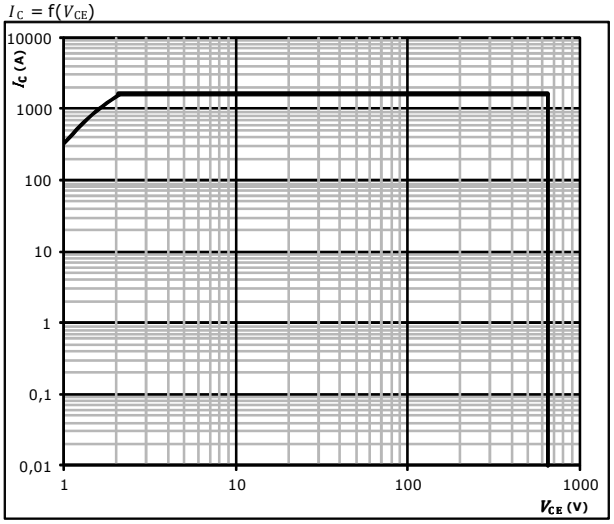
R (K/W)	τ (s)
9,57E-03	1,78E+00
1,84E-02	3,50E-01
3,14E-02	5,54E-02
5,00E-02	1,23E-02
1,05E-02	2,54E-03
4,22E-03	3,98E-04
4,83E-03	8,51E-05

Boost Switch Characteristics

figure 5. **IGBT**

Safe operating area

$I_C = f(V_{CE})$



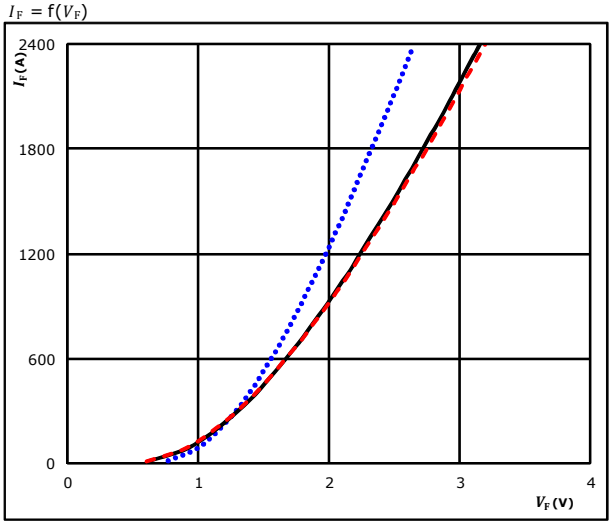
D =	single pulse	
T_s =	80	ºC
V_{GE} =	±15	V
T_j =	T_{jmax}	

Boost Diode Characteristics

figure 1. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



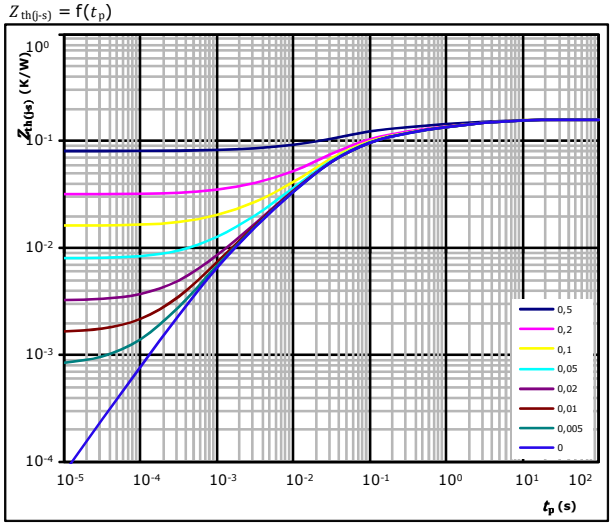
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 2. **FWD**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 0,160 K/W

FWD thermal model values

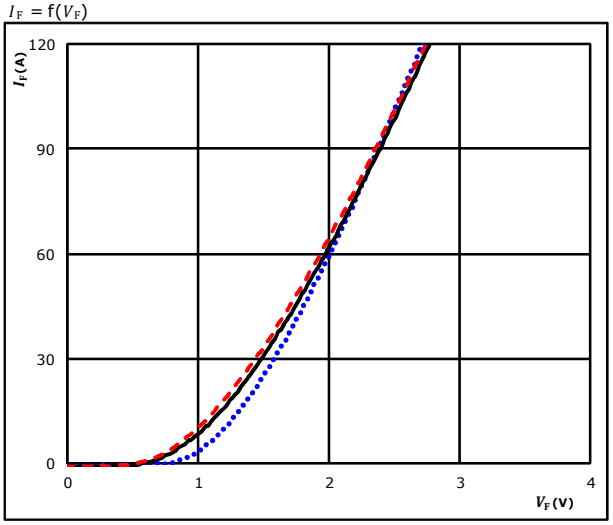
R (K/W)	τ (s)
2,09E-02	2,65E+00
2,33E-02	5,50E-01
3,58E-02	1,02E-01
6,15E-02	2,11E-02
1,38E-02	4,94E-03
4,86E-03	7,87E-04

Boost Sw. Protection Diode Characteristics

figure 1. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



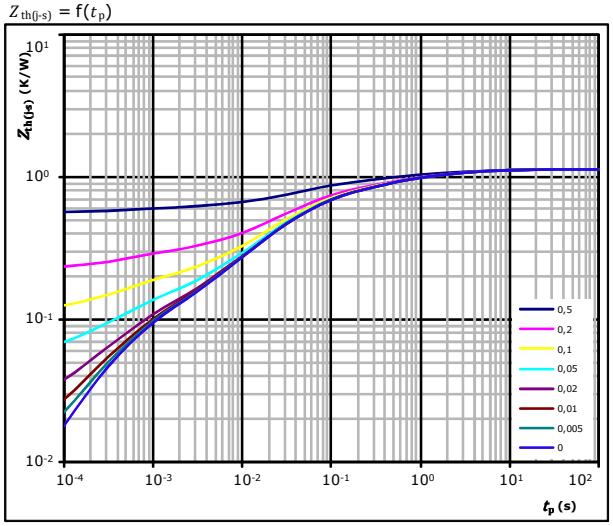
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 2. **FWD**

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$

$R_{th(j-s)}$ = 1,135 K/W

FWD thermal model values

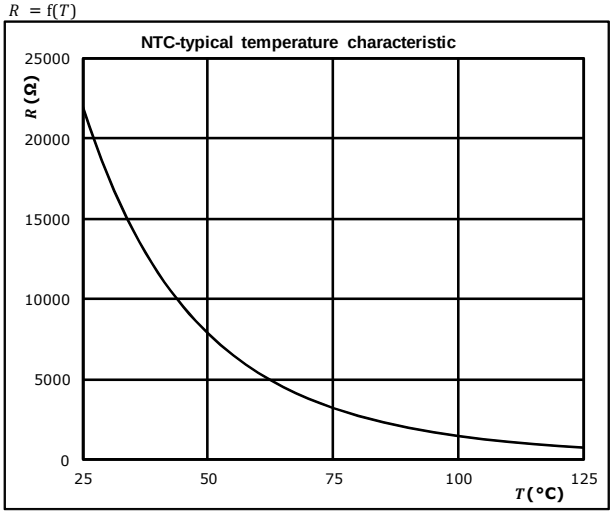
R (K/W)	τ (s)
7,97E-02	1,69E+01
1,66E-01	3,48E+00
2,55E-01	7,36E-01
3,92E-01	1,28E-01
1,42E-01	3,52E-02
3,49E-02	5,63E-03
6,52E-02	1,24E-03

Thermistor Characteristics

figure 1. **Thermistor**

Typical NTC characteristic as a function of temperature

$R = f(T)$

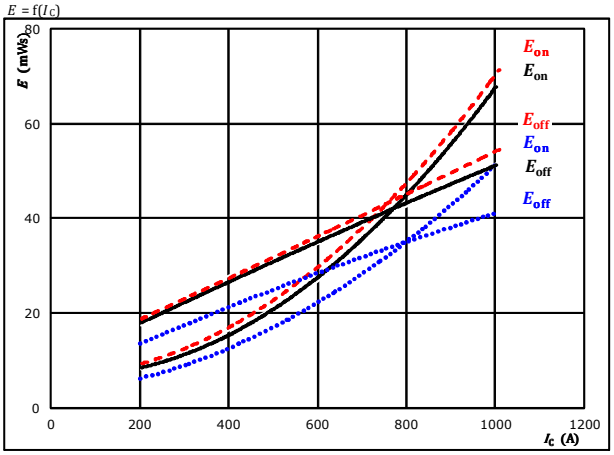


Buck Switching Characteristics

figure 1. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



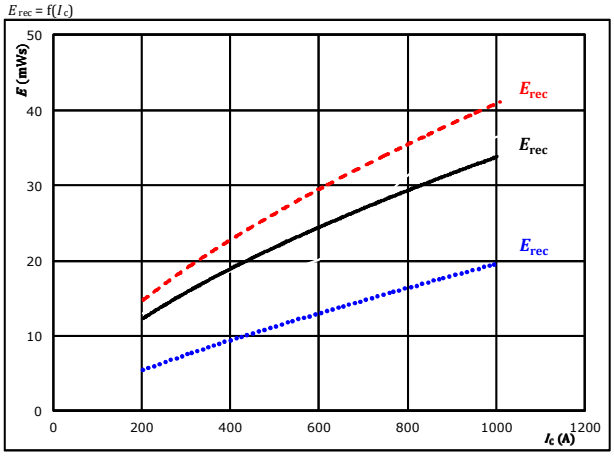
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	-8 / 16	V		125 °C
R_{gon} =	0,75	Ω		150 °C
R_{goff} =	0,75	Ω		

figure 2. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



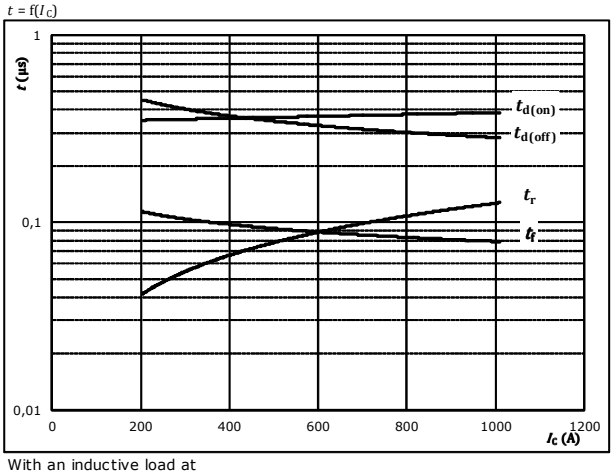
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	-8 / 16	V		125 °C
R_{gon} =	0,75	Ω		150 °C

figure 3. **IGBT**

Typical switching times as a function of collector current

$t = f(I_C)$



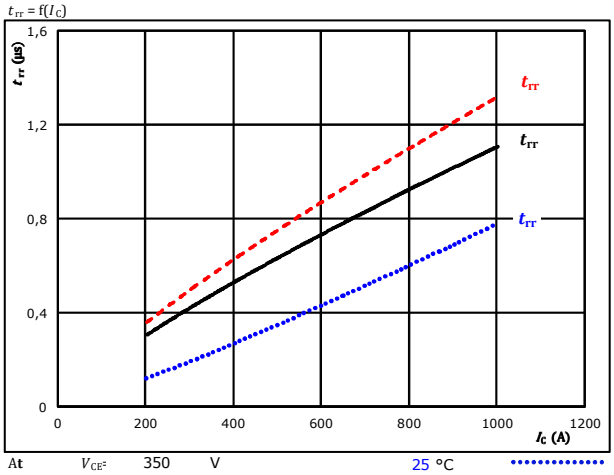
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	-8 / 16	V
R_{gon} =	0,75	Ω
R_{goff} =	0,75	Ω

figure 4. **FWD**

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_C)$



At

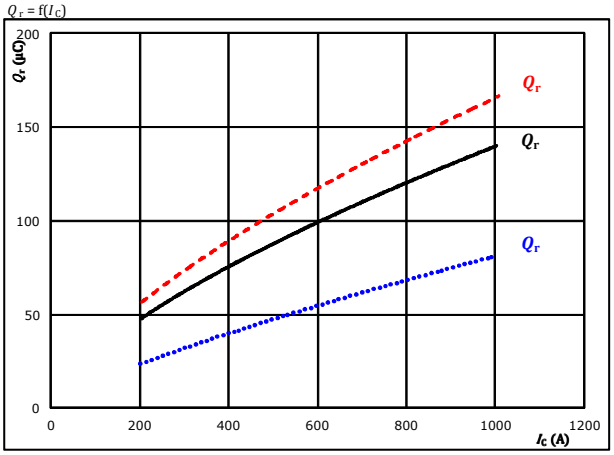
V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	-8 / 16	V		125 °C
R_{gon} =	0,75	Ω		150 °C

Buck Switching Characteristics

figure 5. **FWD**

Typical recovered charge as a function of collector current

$Q_r = f(I_C)$

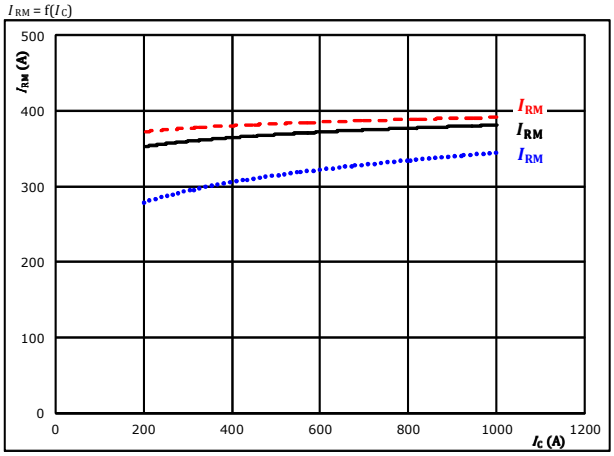


At					
V_{CE} =	350	V		25 °C	
V_{GE} =	-8 / 16	V	T_j:	125 °C	
R_{gon} =	0,75	Ω		150 °C	

figure 6. **FWD**

Typical peak reverse recovery current current as a function of collector current

$I_{RM} = f(I_C)$

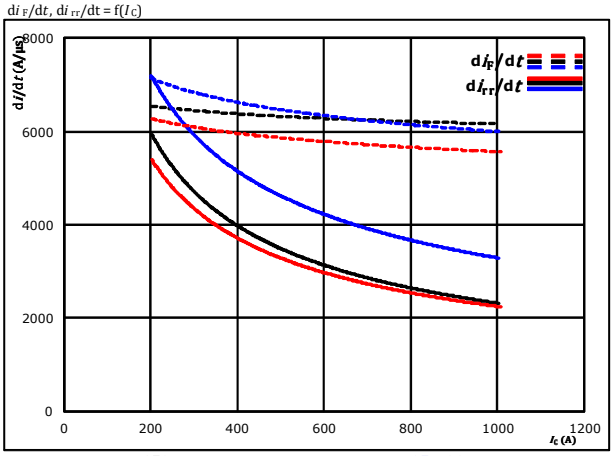


At					
V_{CE}:	350	V		25 °C	
V_{GE} =	-8 / 16	V	T_j:	125 °C	
R_{gon} =	0,75	Ω		150 °C	

figure 7. **FWD**

Typical rate of fall of forward and reverse recovery current as a function of collector current

$di_F/dt, di_{rr}/dt = f(I_C)$

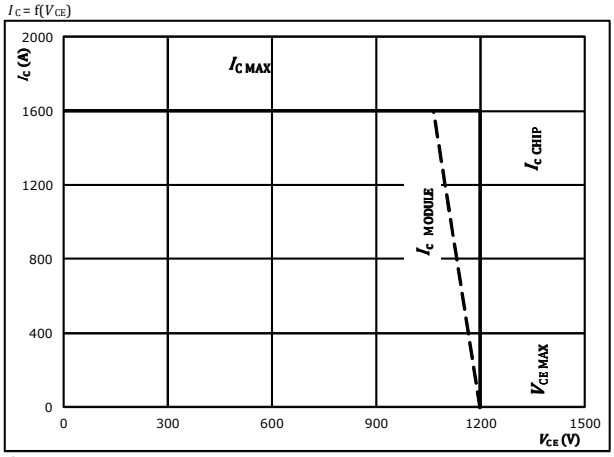


At					
V_{CE}:	350	V		25 °C	
V_{GE} =	-8 / 16	V	T_j:	125 °C	
R_{gon} =	0,75	Ω		150 °C	

figure 8. **IGBT**

Reverse bias safe operating area

$I_C = f(V_{CE})$



At		
T_j =	125	°C
R_{gon} =	0,75	Ω
R_{goff} =	0,75	Ω

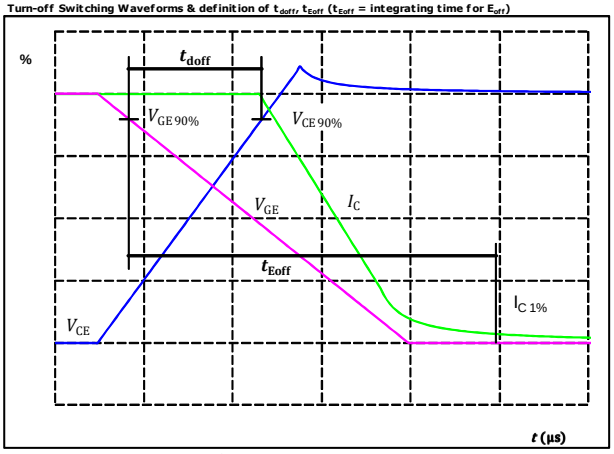
Buck Switching Definitions

General conditions

T_j	=	**125 °C**
R_{gon}	=	**0,75 Ω**
R_{goff}	=	**0,75 Ω**

figure 1. **IGBT**

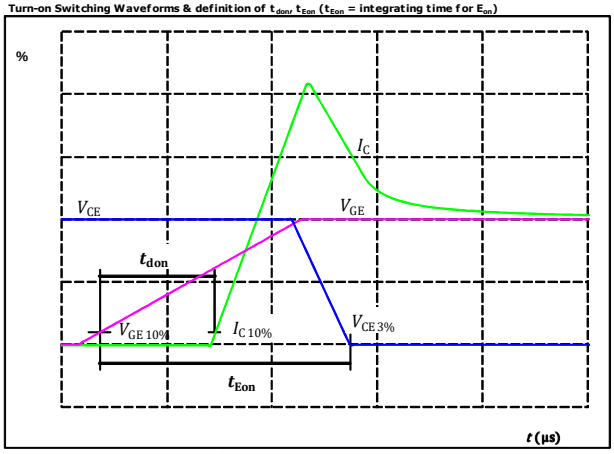
Turn-off Switching Waveforms & definition of t_{doff}, t_{Eoff} (t_{Eoff} = integrating time for E_{off})



$V_{GE}(0\%)$ =	-8	V
$V_{GE}(100\%)$ =	16	V
$V_C(100\%)$ =	350	V
$I_C(100\%)$ =	800	A
t_{doff} =	293	ns

figure 2. **IGBT**

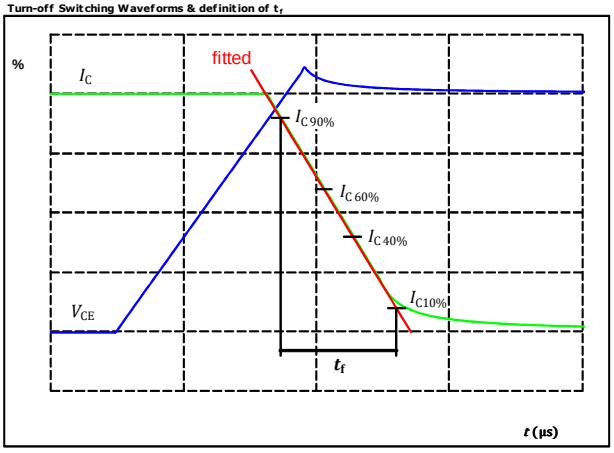
Turn-on Switching Waveforms & definition of t_{don}, t_{Eon} (t_{Eon} = integrating time for E_{on})



$V_{GE}(0\%)$ =	-8	V
$V_{GE}(100\%)$ =	16	V
$V_C(100\%)$ =	350	V
$I_C(100\%)$ =	800	A
t_{don} =	377	ns

figure 3. **IGBT**

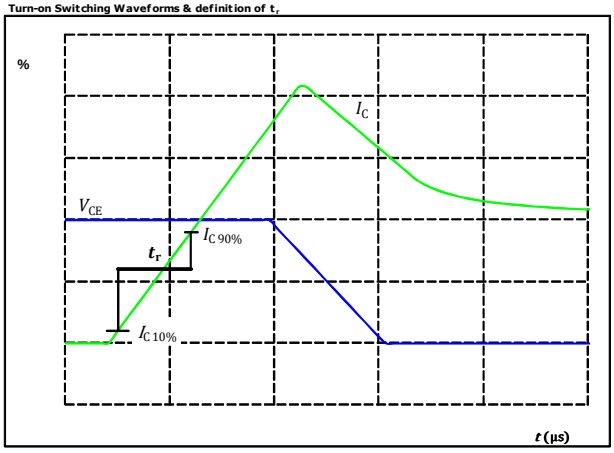
Turn-off Switching Waveforms & definition of t_f



$V_C(100\%)$ =	350	V
$I_C(100\%)$ =	800	A
t_f =	80	ns

figure 4. **IGBT**

Turn-on Switching Waveforms & definition of t_r

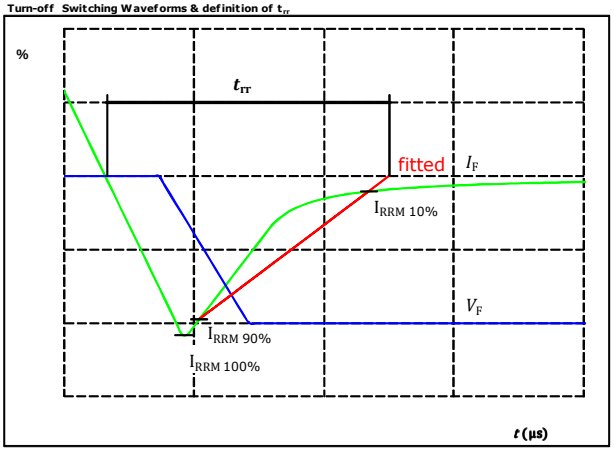


$V_C(100\%)$ =	350	V
$I_C(100\%)$ =	800	A
t_r =	108	ns

Buck Switching Characteristics

figure 5. **FWD**

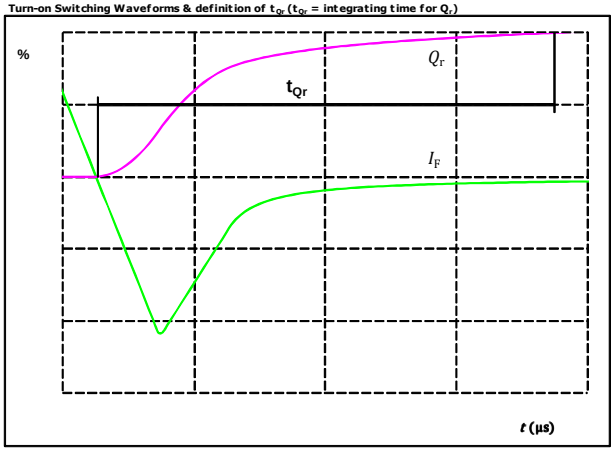
Turn-off Switching Waveforms & definition of t_{rr}



$V_F(100\%)$ =	350	V
$I_F(100\%)$ =	800	A
$I_{RRM}(100\%)$ =	370	A
t_{rr} =	1001	ns

figure 6. **FWD**

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



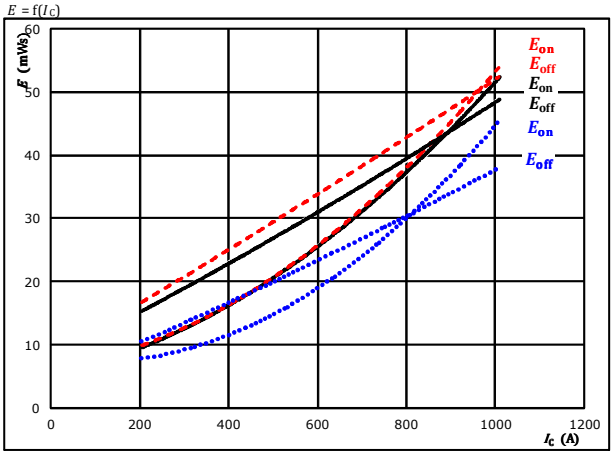
$I_F(100\%)$ =	800	A
$Q_r(100\%)$ =	127,61	µC

Boost Switching Characteristics

figure 1. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



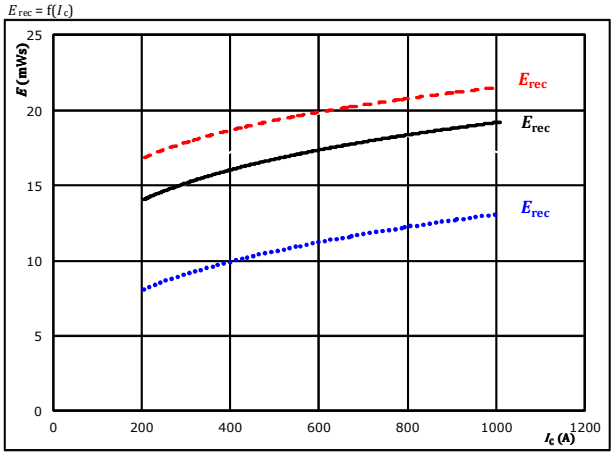
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	-8 / 16	V		125 °C
R_{gon} =	0,75	Ω		150 °C
R_{goff} =	0,75	Ω		

figure 2. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



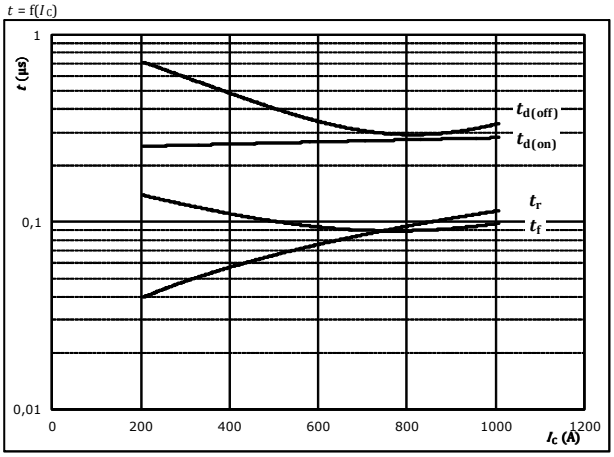
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	-8 / 16	V		125 °C
R_{gon} =	0,75	Ω		150 °C

figure 3. **IGBT**

Typical switching times as a function of collector current

$t = f(I_C)$



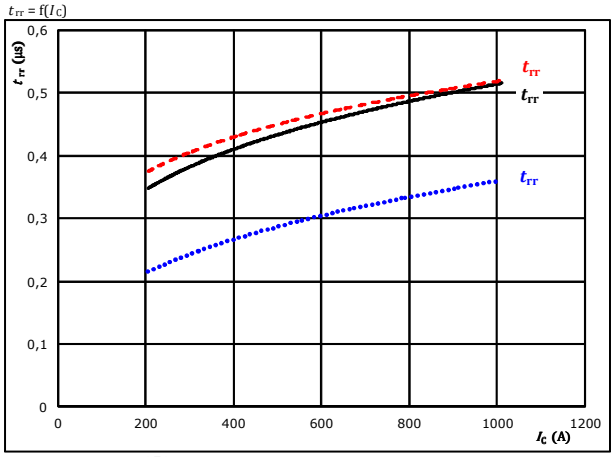
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	-8 / 16	V
R_{gon} =	0,75	Ω
R_{goff} =	0,75	Ω

figure 4. **FWD**

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_C)$



At

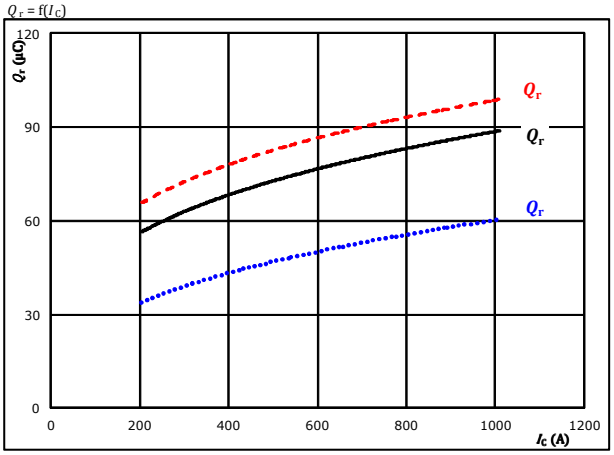
V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	-8 / 16	V		125 °C
R_{gon} =	0,75	Ω		150 °C

Boost Switching Characteristics

figure 5. FWD

Typical recovered charge as a function of collector current

$Q_r = f(I_C)$

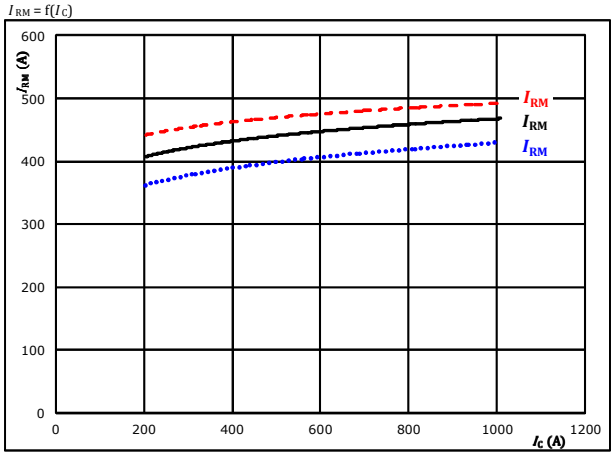


At						
	V_{CE} =	350	V		25 °C	
	V_{GE} =	-8 / 16	V	T_j:	125 °C	
	R_{gon} =	0,75	Ω		150 °C	

figure 6. FWD

Typical peak reverse recovery current current as a function of collector current

$I_{RM} = f(I_C)$

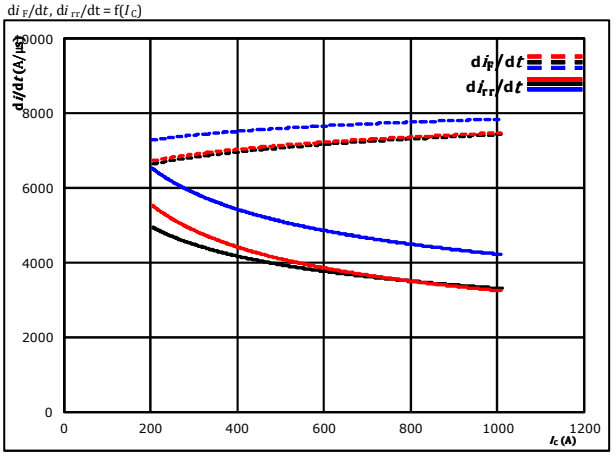


At						
	V_{CE}:	350	V		25 °C	
	V_{GE} =	-8 / 16	V	T_j:	125 °C	
	R_{gon} =	0,75	Ω		150 °C	

figure 7. FWD

Typical rate of fall of forward and reverse recovery current as a function of collector current

$di_F/dt, di_{rr}/dt = f(I_C)$

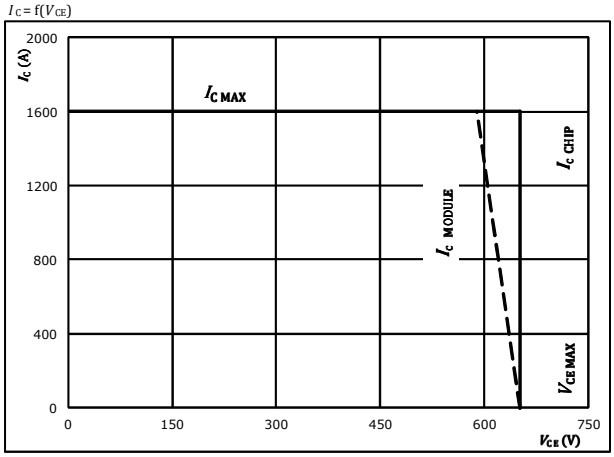


At						
	V_{CE}:	350	V		25 °C	
	V_{GE} =	-8 / 16	V	T_j:	125 °C	
	R_{gon} =	0,75	Ω		150 °C	

figure 8. IGBT

Reverse bias safe operating area

$I_C = f(V_{CE})$



At			
T_j =	125	°C	
R_{gon} =	0,75	Ω	
R_{goff} =	0,75	Ω	

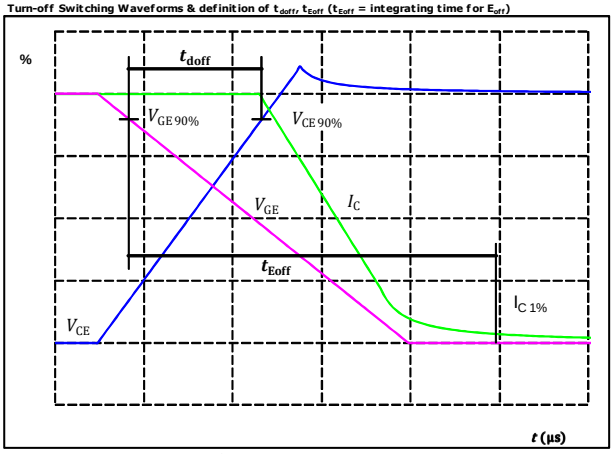
Boost Switching Definitions

General conditions

T_j	=	**125 °C**
R_{gon}	=	**0,75 Ω**
R_{goff}	=	**0,75 Ω**

figure 1. **IGBT**

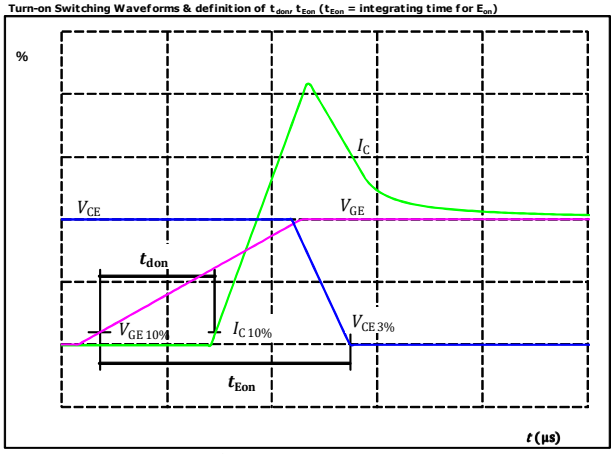
Turn-off Switching Waveforms & definition of t_{doff}, t_{Eoff} (t_{Eoff} = integrating time for E_{off})



$V_{GE}(0\%)$ =	-8	V
$V_{GE}(100\%)$ =	16	V
$V_C(100\%)$ =	350	V
$I_C(100\%)$ =	800	A
t_{doff} =	258	ns

figure 2. **IGBT**

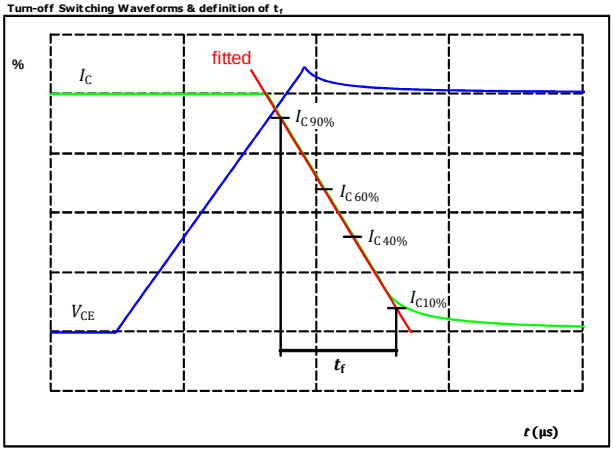
Turn-on Switching Waveforms & definition of t_{don}, t_{Eon} (t_{Eon} = integrating time for E_{on})



$V_{GE}(0\%)$ =	-8	V
$V_{GE}(100\%)$ =	16	V
$V_C(100\%)$ =	350	V
$I_C(100\%)$ =	800	A
t_{don} =	275	ns

figure 3. **IGBT**

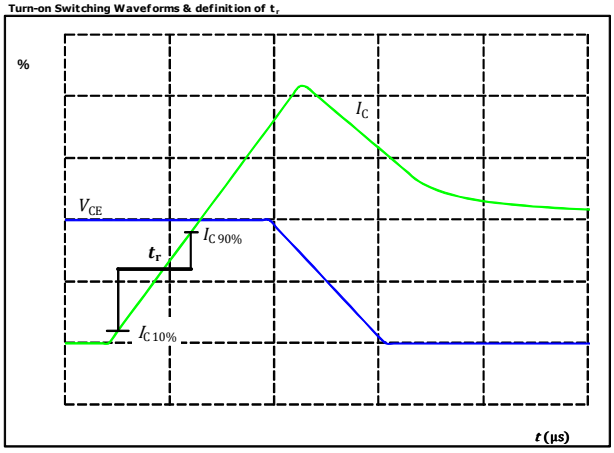
Turn-off Switching Waveforms & definition of t_f



$V_C(100\%)$ =	350	V
$I_C(100\%)$ =	800	A
t_f =	90	ns

figure 4. **IGBT**

Turn-on Switching Waveforms & definition of t_r

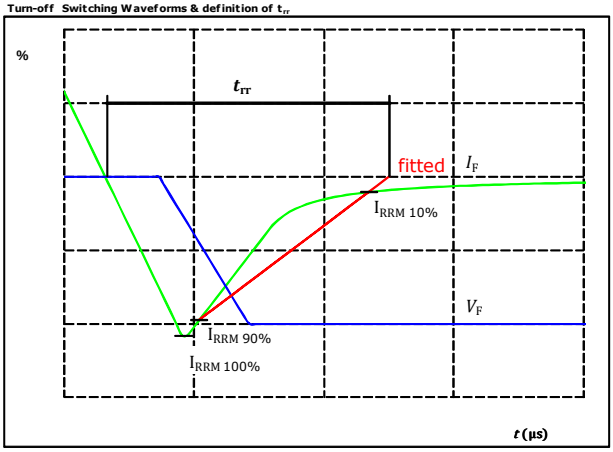


$V_C(100\%)$ =	350	V
$I_C(100\%)$ =	800	A
t_r =	94	ns

Boost Switching Characteristics

figure 5. **FWD**

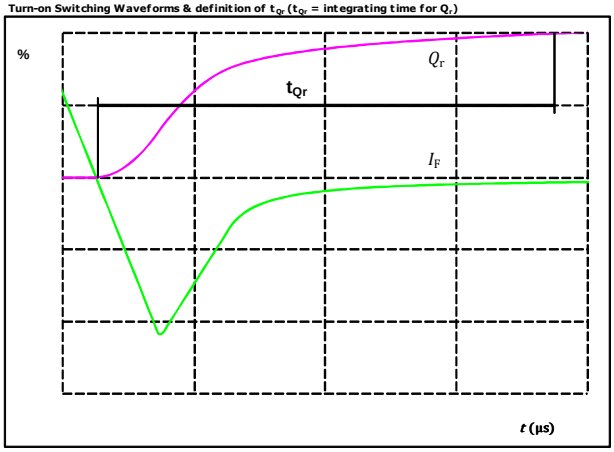
Turn-off Switching Waveforms & definition of t_{rr}



$V_F(100\%)$ =	350	V
$I_F(100\%)$ =	800	A
$I_{RRM}(100\%)$ =	464	A
t_{rr} =	472	ns

figure 6. **FWD**

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



$I_F(100\%)$ =	800	A
$Q_r(100\%)$ =	82,14	µC

Vincotech

Ordering Code & Marking

Version	Ordering Code
without thermal paste	70-W212NMA800M7-LC00F70
with thermal paste	70-W212NMA800M7-LC00F70-/3/

Name
YK/Date code
Lot
Serial
Vincotech UL

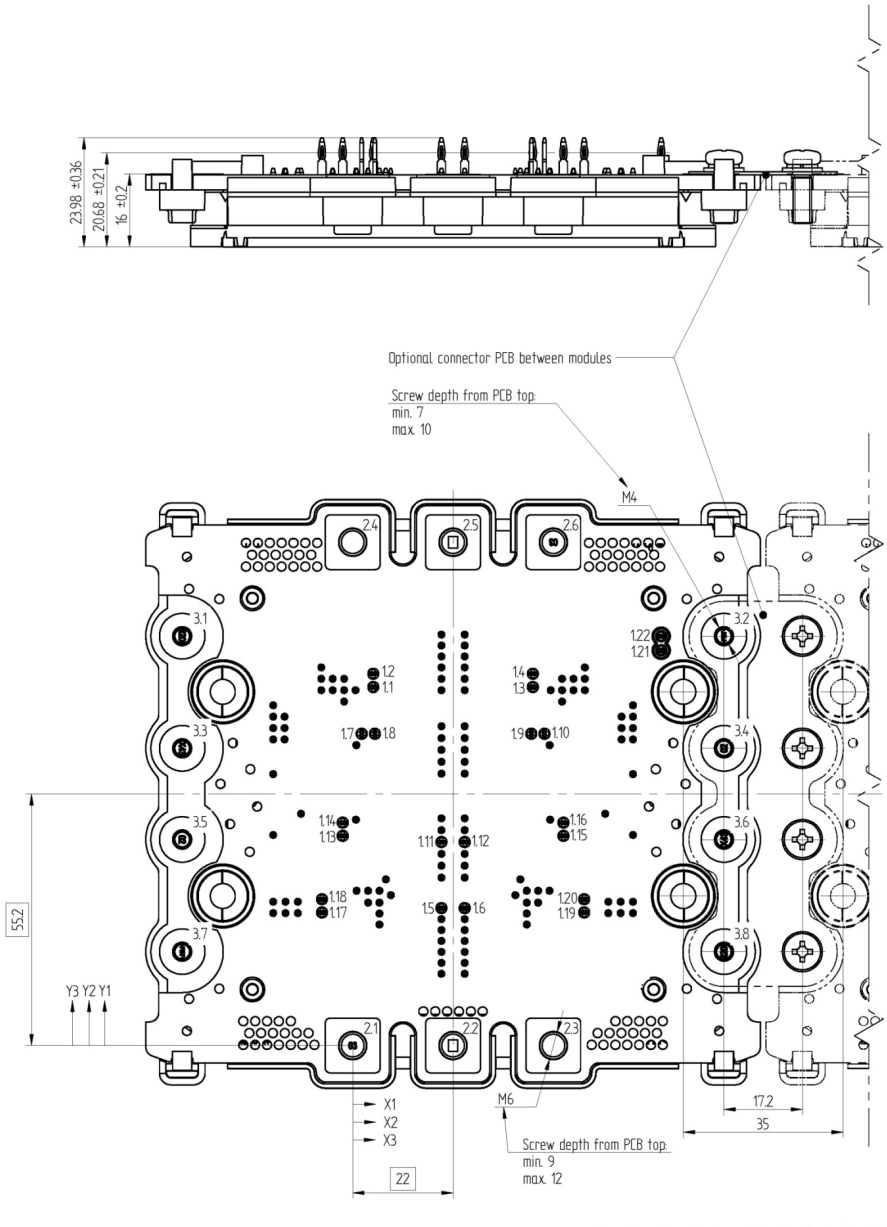
		Name		Date code	UL & VIN	Lot	Serial
Text		NN-NNNNNNNNNNNNN-TTTTTTVV		WWYY	UL VIN	LLLLL	SSSS
Datamatrix	Type&Ver	Lot number	Serial	Date code			
	TTTTTTVV	LLLLL	SSSS	WWYY			

Outline

Driver pins			
Pin	X1	Y1	Function
1.1	4,5	78,65	G11-1
1.2	4,5	81,55	S11-1
1.3	39,5	78,65	G11-2
1.4	39,5	81,55	S11-2
1.5	19,45	30,15	DC+desat
1.6	24,55	30,15	DC+desat
1.7	1,95	68,4	S14-1
1.8	4,85	68,4	G14-1
1.9	39,15	68,4	G14-2
1.10	42,05	68,4	S14-2
1.11	19,45	44,65	GND_desat
1.12	24,55	44,65	GND_desat
1.13	-2,2	46	G13-1
1.14	-2,2	48,9	S13-1
1.15	46,2	46	G13-2
1.16	46,2	48,9	S13-2
1.17	-6,75	29,2	S12-1
1.18	-6,75	32,1	G12-1
1.19	50,75	29,2	S12-2
1.20	50,75	32,1	G12-2
1.21	67,65	86,7	Therm2
1.22	67,65	89,8	Therm1

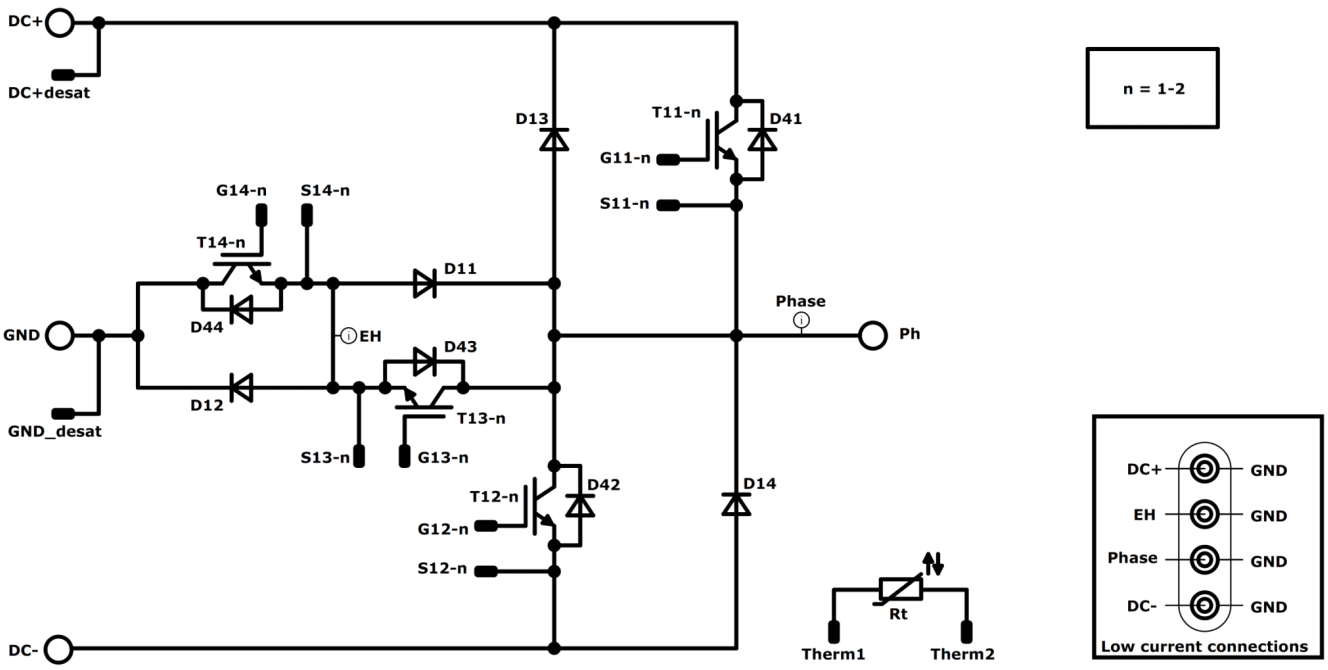
Power interconnections			
M6 screw	X2	Y2	Function
2.1	0	0	Phase
2.2	22	0	Phase
2.3	44	0	Phase
2.4	0	110,4	DC+
2.5	22	110,4	GND
2.6	44	110,4	DC-

Low current connections			
M4 screw	X3	Y3	Function
3.1	-37,4	89,8	DC+
3.2	81,4	89,8	DC+
3.3	-37,4	65,2	EH
3.4	81,4	65,2	EH
3.5	-37,4	45,2	Phase
3.6	81,4	45,2	Phase
3.7	-37,4	20,6	DC-
3.8	81,4	20,6	DC-



Vincotech

Pinout



NOTE: Driver pins for parallel devices are not connected inside the module!

Identification

ID	Component	Voltage	Current	Function	Comment
T11, T12	IGBT	1200 V	800 A	Buck Switch	
D11, D12	FWD	650 V	800 A	Buck Diode	
D41, D42	FWD	1200 V	30 A	Buck Sw. Protection Diode	
T13, T14	IGBT	650 V	800 A	Boost Switch	
D13, D14	FWD	1200 V	800 A	Boost Diode	
D43, D44	FWD	650 V	40 A	Boost Sw. Protection Diode	
Rt	NTC			Thermistor	

Packaging instruction					
Standard packaging quantity (SPQ)	8	>SPQ	Standard	<SPQ	Sample

Handling instruction
Handling instructions for VINco X4 packages see vincotech.com website.

Package data
Package data for VINco X4 packages see 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
70-W212NMA800M7-LC00F70-D2-14	09 Apr. 2019	Boost switch V_{ces} conditions added I_c/I_F corrected SPQ updated	1,2,3,27