Vincotech

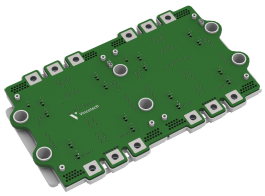
70-W424NIA1K2M702-LD07FP70
datasheet

VINcoNPC X8 **1500 V / 1200 A**

Features

- NPC topology up to 2400Vdc
- High efficiency
- Low inductive package

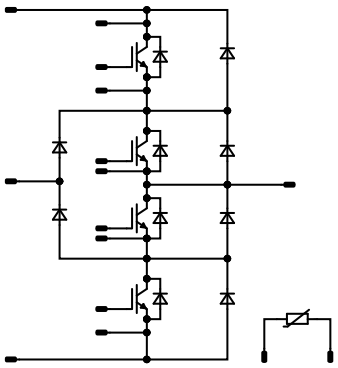
VINco X8 12 mm housing



Target applications

- Industrial Drives
- UPS

Schematic



Types

- 70-W424NIA1K2M702-LD07FP70

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions		Value	Unit
Buck Switch					
Collector-emitter voltage	V_{CES}			1200	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$	T_s = 80 °C	960	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}		2400	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	1667	W
Gate-emitter voltage	V_{GES}			±20	V
Short circuit ratings	t_{SC}	V_{GE} = 15 V, V_{CC} = 800 V	T_j = 150 °C	9,5	µs
Maximum junction temperature	T_{jmax}			175	°C
Buck Diode					
Peak repetitive reverse voltage	V_{RRM}			1200	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s = 80 °C	683	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}		2400	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	1038	W
Maximum junction temperature	T_{jmax}			175	°C
Buck Sw. Protection Diode					
Peak repetitive reverse voltage	V_{RRM}			1200	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s = 80 °C	68	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, t_p = 10 ms	T_j = 25 °C	260	A
Surge current capability	I^2t			336	A^2s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	181	W
Maximum junction temperature	T_{jmax}			175	°C

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
Boost Switch				
Collector-emitter voltage	V_{CES}		1200	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$ T_s = 80 °C	960	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	2400	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ T_s = 80 °C	1667	W
Gate-emitter voltage	V_{GES}		±20	V
Short circuit ratings	t_{SC}	V_{GE} = 15 V, V_{CC} = 800 V T_j = 150 °C	9,5	µs
Maximum junction temperature	T_{jmax}		175	°C
Boost Diode				
Peak repetitive reverse voltage	V_{RRM}		1200	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$ T_s = 80 °C	661	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	2400	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ T_s = 80 °C	990	W
Maximum junction temperature	T_{jmax}		175	°C
Boost Sw. Inv. Diode				
Peak repetitive reverse voltage	V_{RRM}		1200	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$ T_s = 80 °C	661	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	2400	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ T_s = 80 °C	990	W
Maximum junction temperature	T_{jmax}		175	°C

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions		Value	Unit
Boost Sw. Protection Diode					
Peak repetitive reverse voltage	V_{RRM}			1200	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s = 80 °C	68	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, t_p = 10 ms	T_j = 25 °C	260	A
Surge current capability	I^2t			336	A^2s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	181	W
Maximum junction temperature	T_{jmax}			175	°C
Module Properties					
Thermal Properties					
Storage temperature	T_{stg}			-40…+125	°C
Operation temperature under switching condition	T_{jop}			-40…+(T_{jmax} - 25)	°C
Isolation Properties					
Isolation voltage	V_{isol}	DC Test Voltage*	t_p = 2 s	4000	V
Creepage distance				>12,7	mm
Clearance				>12,7	mm
Comparative Tracking Index	CTI			≥ 200	

*100 % tested in production

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 Switch										
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$			10	0,12	25	5,4	6	6,6	V
Collector-emitter saturation voltage	V_{CEsat}		15		1200	25 125 150		1,53 1,78 1,86	1,85(1)	V
Collector-emitter cut-off current	I_{CES}		0	1200		25			800	µA
Gate-emitter leakage current	I_{GES}		20	0		25			4000	nA
Internal gate resistance	r_g							0,375		Ω
Input capacitance	C_{ies}		0	10		25		240000		pF
Output capacitance	C_{oes}							7040		pF
Reverse transfer capacitance	C_{res}							2560		pF
Gate charge	Q_g	V_{CC} = 600 V	15		1200	25		8000		nC
Thermal										
Thermal resistance junction to sink (2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,06		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 0,5 Ω R_{goff} = 0,5 Ω	-8/16	600	1000	25 125 150		320 315 317		ns
Rise time	t_r					25 125 150		76 77 77		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		349 365 378		ns
Fall time	t_f					25 125 150		74,72 96,05 105,29		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=99,96 µC Q_{rFWD}=163,06 µC Q_{rFWD}=182,49 µC				25 125 150		116,08 132,14 139,61		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		73,24 96,92 103,59		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				1200	25 125 150		1,8 1,9 1,89	2,1(1)	V
Reverse leakage current	I_R	V_r = 1200 V				25			320	µA
Thermal										
Thermal resistance junction to sink (2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,09		K/W
Dynamic										
Peak recovery current	I_{RRM}	di/dt=12125 A/µs di/dt=13125 A/µs di/dt=12093 A/µs	-8/16	600	1000	25 125 150		640,2 795,24 812,57		A
Reverse recovery time	t_{rr}					25 125 150		329,25 443,1 489,19		ns
Recovered charge	Q_r					25 125 150		99,96 163,06 182,49		µC
Reverse recovered energy	E_{rec}					25 125 150		31,11 56,5 64,27		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		2667 3440 3436		A/µs

Characteristic Values

Parameter	Symbol	Conditions					Values			Unit
			V_{GE} [V] V_{GS} [V]	V_{CE} [V] V_{DS} [V] V_F [V]	I_C [A] I_D [A] I_F [A]	T_j [°C]	Min	Typ	Max	
Buck Sw. Protection Diode										
Static										
Forward voltage	V_F				60	25 125 150		2,37 2,47	2,71(1) 2,77(1)	V
Reverse leakage current	I_R	V_r = 1200 V				25 150		 3600	240 7200	µA
Thermal										
Thermal resistance junction to sink (2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,52		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	
Boost Switch										
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$			10	0,12	25	5,4	6	6,6	V
Collector-emitter saturation voltage	V_{CEsat}		15		1200	25 125 150		1,53 1,78 1,86	1,85(1)	V
Collector-emitter cut-off current	I_{CES}		0	1200		25			800	µA
Gate-emitter leakage current	I_{GES}		20	0		25			4000	nA
Internal gate resistance	r_g							0,375		Ω
Input capacitance	C_{ies}		0	10		25		240000		pF
Output capacitance	C_{oes}							7040		pF
Reverse transfer capacitance	C_{res}							2560		pF
Gate charge	Q_g	V_{CC} = 600 V	15		1200	25		8000		nC
Thermal										
Thermal resistance junction to sink (2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,06		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 0,5 Ω R_{goff} = 0,5 Ω	-8/16	600	1000	25 125 150		308 316 314		ns
Rise time	t_r					25 125 150		76 69 75		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		351 378 390		ns
Fall time	t_f					25 125 150		76,26 93,93 104,83		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=98,92 µC Q_{rFWD}=179,27 µC Q_{rFWD}=193,41 µC				25 125 150		105,28 123,01 131,51		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		72,32 96,19 103		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				1200	25 125 150		1,8 1,9 1,89	2,1(1)	V
Reverse leakage current	I_R	V_r = 1200 V				25			320	µA
Thermal										
Thermal resistance junction to sink (2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,1		K/W
Dynamic										
Peak recovery current	I_{RRM}	di/dt=8132 A/µs di/dt=11625 A/µs di/dt=10500 A/µs	-8/16	600	1000	25 125 150		563,68 711,9 732,24		A
Reverse recovery time	t_{rr}					25 125 150		334,56 466 518,02		ns
Recovered charge	Q_r					25 125 150		98,92 179,27 193,41		µC
Reverse recovered energy	E_{rec}					25 125 150		31,65 64,47 69,26		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		3011 2978 2883		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 Sw. Inv. Diode										
Static										
Forward voltage	V_F				1200	25 125 150		1,8 1,9 1,89	2,1(1)	V
Reverse leakage current	I_R	V_r = 1200 V				25			320	µA
Thermal										
Thermal resistance junction to sink (2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,1		K/W
Boost Sw. Protection Diode										
Static										
Forward voltage	V_F				60	25 125 150		2,37 2,47	2,71(1) 2,77(1)	V
Reverse leakage current	I_R	V_r = 1200 V				25 150		 3600	240 7200	µA
Thermal										
Thermal resistance junction to sink (2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,52		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	
Thermistor										
Static										
Rated resistance	R					25		11		kΩ
Deviation of R_{100}	$\Delta_{R/R}$	R_{100} = 1484 Ω				100	-5		5	%
Power dissipation	P							10		mW
Power dissipation constant	d					25		3		mW/K
B-value	$B_{(25/50)}$	Tol. ±1 %						3962		K
B-value	$B_{(25/100)}$	Tol. ±1 %						4000		K
Vincotech Thermistor Reference									I	

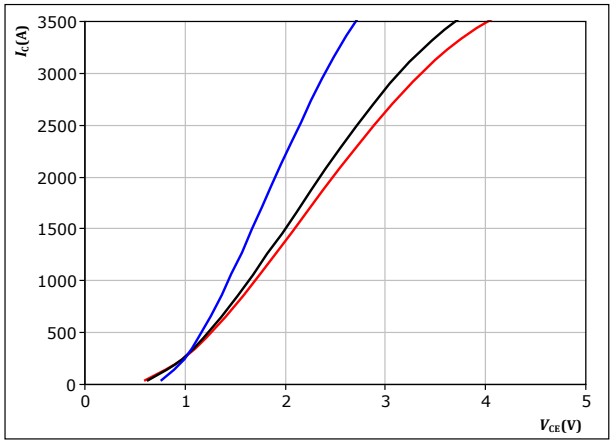
(1) Value at chip level
(2) Only valid with pre-applied Vincotech thermal interface material.

Buck Switch Characteristics

figure 1. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$

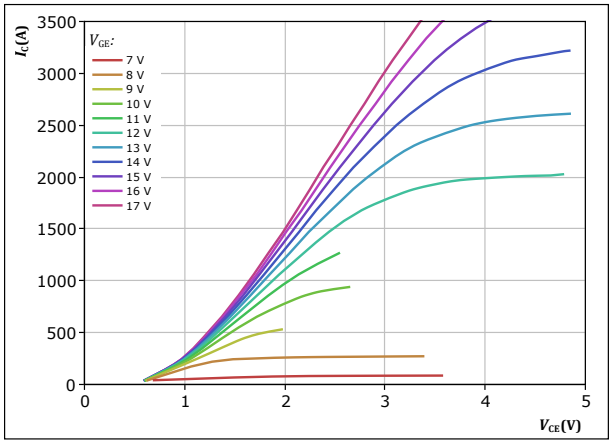


t_p =	250	µs		
V_{GE} =	15	V	T_j:	25 °C
				125 °C
				150 °C

figure 2. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$



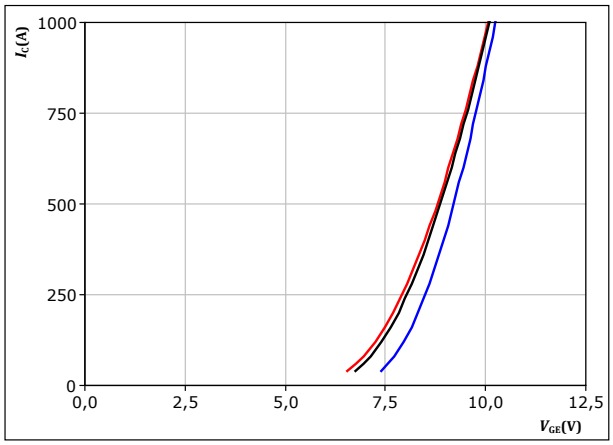
t_p =	250	µs
T_j =	150	°C

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

figure 3. **IGBT**

Typical transfer characteristics

$I_C = f(V_{GE})$

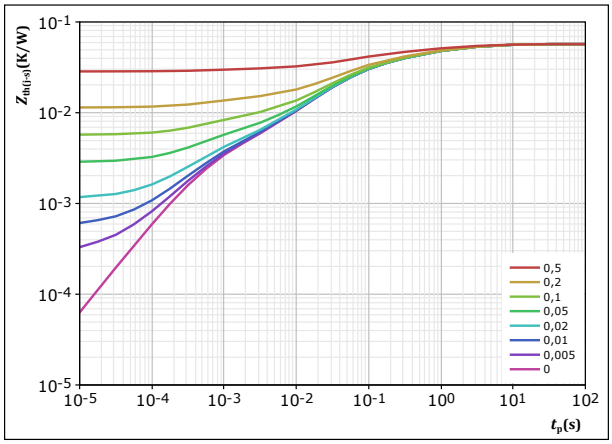


t_p =	250	µs		
V_{CE} =	10	V	T_j:	25 °C
				125 °C
				150 °C

figure 4. **IGBT**

Transient thermal impedance as a function of pulse width

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



D =	t_p / T	
$R_{th(j-s)}$ =	0,057	K/W

IGBT thermal model values

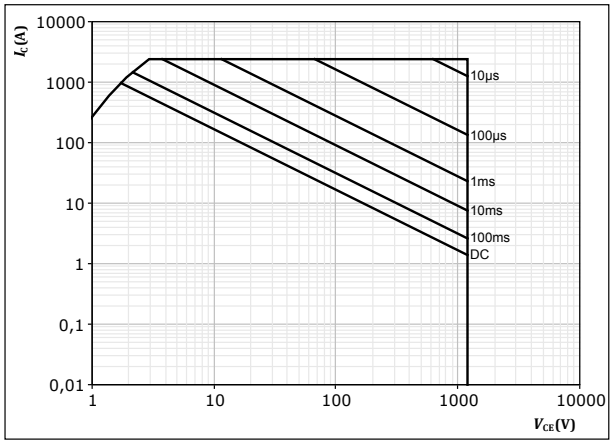
R (K/W)	τ (s)
5,19E-03	5,72E+00
9,87E-03	1,19E+00
1,27E-02	3,03E-01
1,64E-02	6,32E-02
8,59E-03	2,04E-02
1,84E-03	2,67E-03
2,47E-03	5,00E-04

Buck Switch Characteristics

figure 5. **IGBT**

Safe operating area

$I_C = f(V_{CE})$



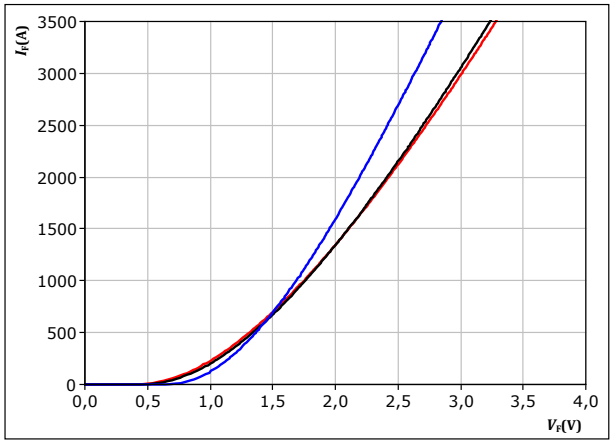
D =	single pulse	
T_s =	80	°C
V_{GE} =	15	V
T_j =	T_{jmax}	

Buck Diode Characteristics

figure 6. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



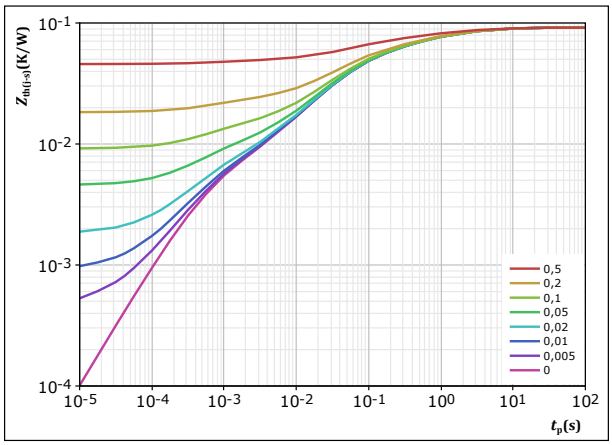
t_p = 250 µs

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

$R_{th(j-s)}$ = 0,092 K/W

FWD thermal model values

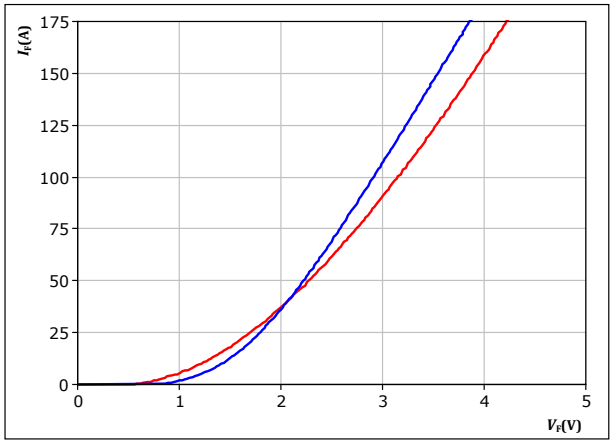
R (K/W)	τ (s)
8,32E-03	5,72E+00
1,58E-02	1,19E+00
2,03E-02	3,03E-01
2,63E-02	6,32E-02
1,38E-02	2,04E-02
2,95E-03	2,67E-03
3,96E-03	5,00E-04

Buck Sw. Protection Diode Characteristics

figure 8. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



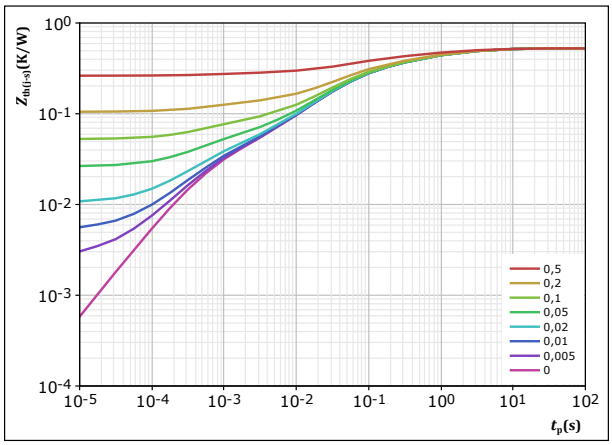
t_p = 250 µs

T_j: 25 °C, 125 °C

figure 9. **FWD**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 0,525 K/W

FWD thermal model values

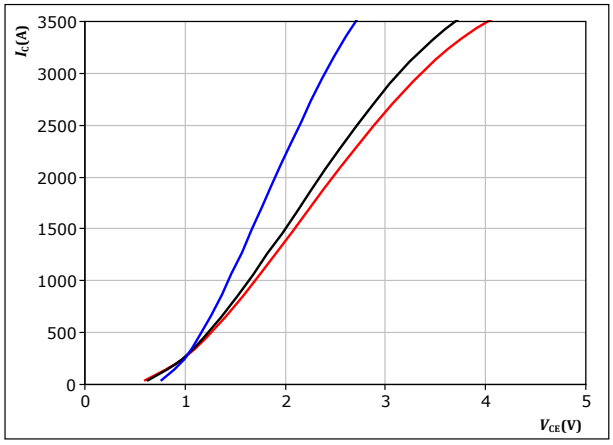
R (K/W)	τ (s)
4,78E-02	5,72E+00
9,08E-02	1,19E+00
1,17E-01	3,03E-01
1,51E-01	6,32E-02
7,91E-02	2,04E-02
1,69E-02	2,67E-03
2,28E-02	5,00E-04

Boost Switch Characteristics

figure 10. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$

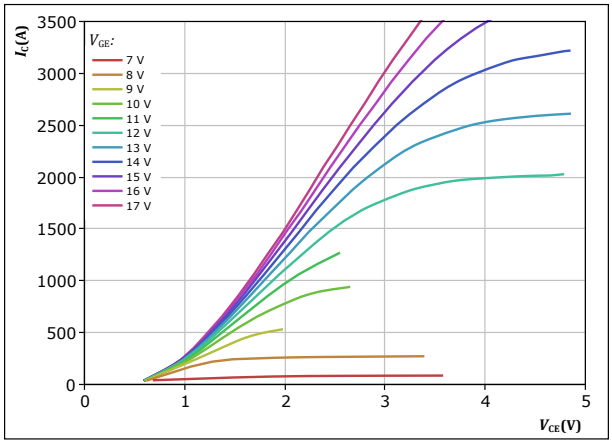


t_p =	250	µs		
V_{GE} =	15	V	T_j:	25 °C
				125 °C
				150 °C

figure 11. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$



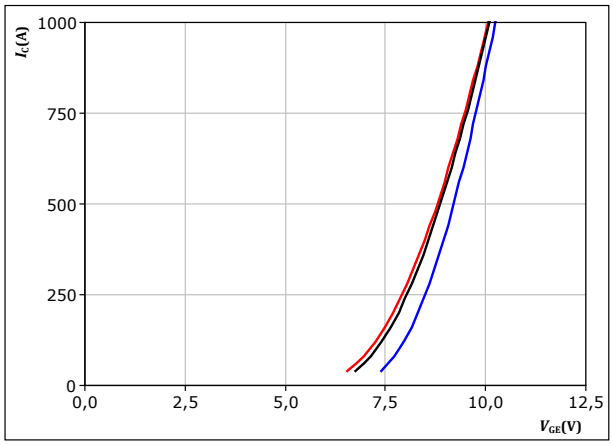
t_p =	250	µs
T_j =	150	°C

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

figure 12. **IGBT**

Typical transfer characteristics

$I_C = f(V_{GE})$

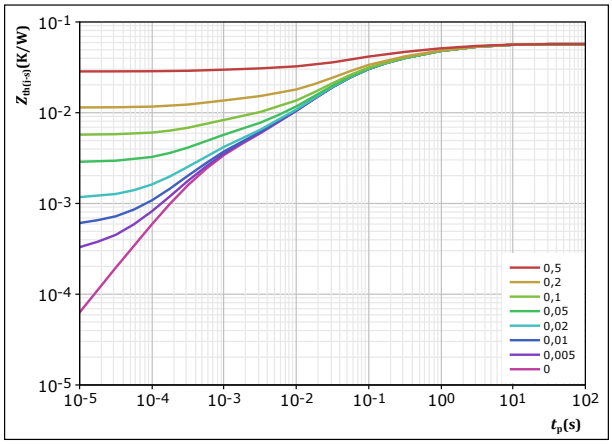


t_p =	250	µs		
V_{CE} =	10	V	T_j:	25 °C
				125 °C
				150 °C

figure 13. **IGBT**

Transient thermal impedance as a function of pulse width

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



D =	t_p / T	
$R_{th(j-s)}$ =	0,057	K/W

IGBT thermal model values

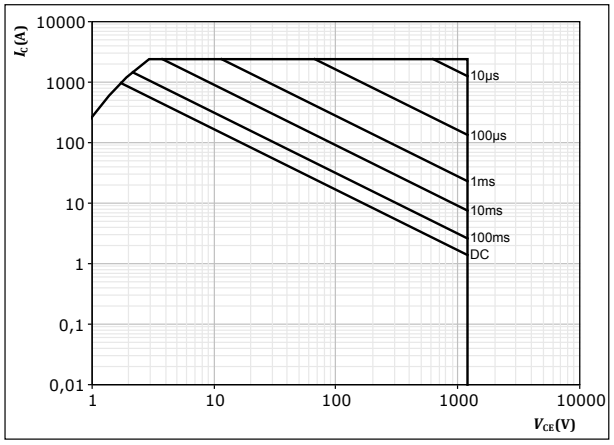
R (K/W)	τ (s)
5,19E-03	5,72E+00
9,87E-03	1,19E+00
1,27E-02	3,03E-01
1,64E-02	6,32E-02
8,59E-03	2,04E-02
1,84E-03	2,67E-03
2,47E-03	5,00E-04

Boost Switch Characteristics

figure 14. **IGBT**

Safe operating area

$I_C = f(V_{CE})$



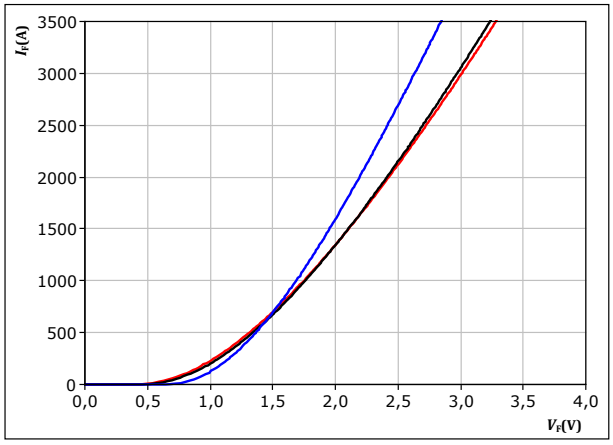
D = single pulse
T_s = 80 °C
V_{GE} = 15 V
T_j = T_{jmax}

Boost Diode Characteristics

figure 15. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



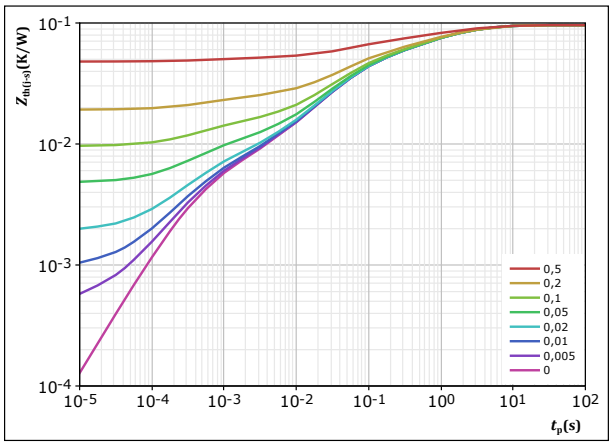
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 16. **FWD**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 0,096 K/W

FWD thermal model values

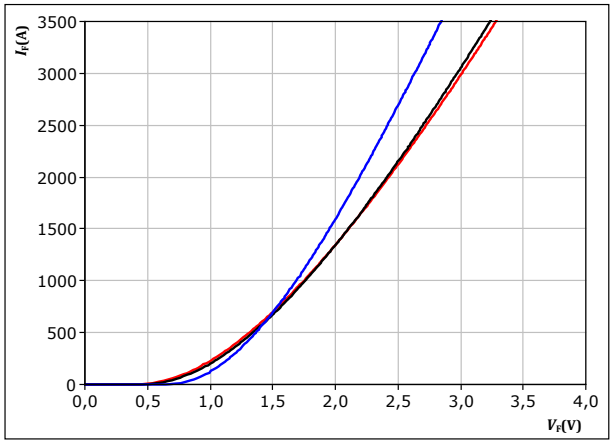
R (K/W)	τ (s)
1,42E-02	4,37E+00
2,44E-02	1,03E+00
2,03E-02	2,32E-01
2,67E-02	4,58E-02
4,42E-03	1,04E-02
3,31E-03	1,02E-03
2,72E-03	3,18E-04

Boost Sw. Inv. Diode Characteristics

figure 17. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



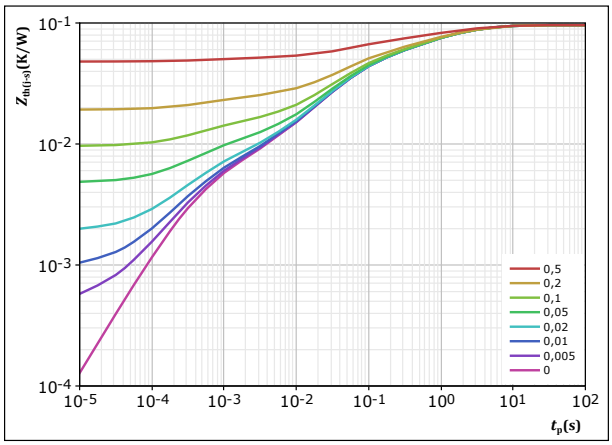
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 18. **FWD**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 0,096 K/W

FWD thermal model values

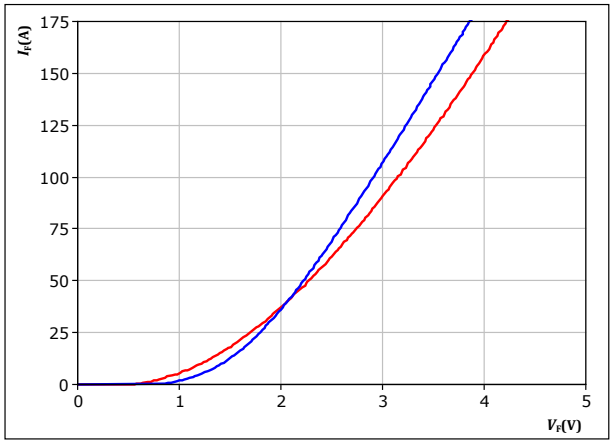
R (K/W)	τ (s)
1,42E-02	4,37E+00
2,44E-02	1,03E+00
2,03E-02	2,32E-01
2,67E-02	4,58E-02
4,42E-03	1,04E-02
3,31E-03	1,02E-03
2,72E-03	3,18E-04

Boost Sw. Protection Diode Characteristics

figure 19. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



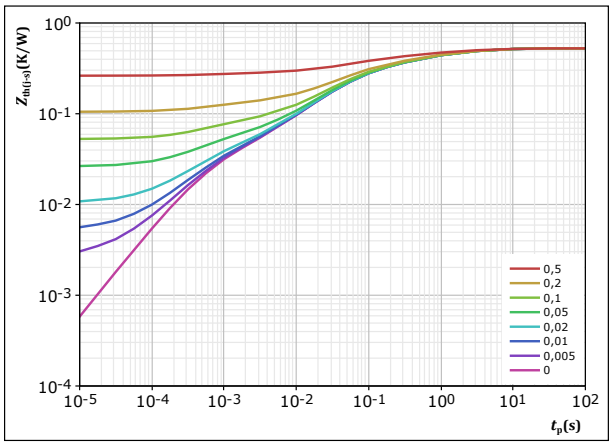
t_p = 250 µs

T_j: 25 °C, 125 °C

figure 20. **FWD**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 0,525 K/W

FWD thermal model values

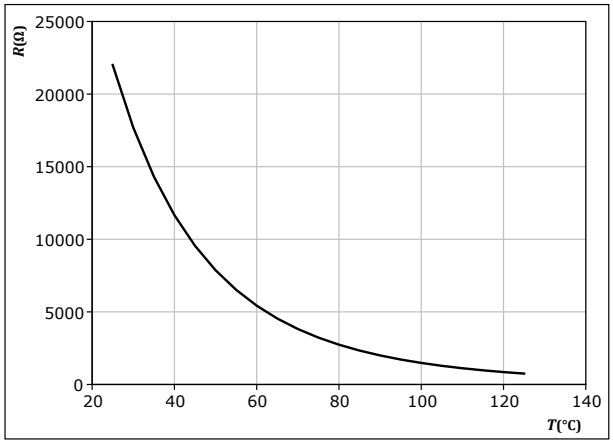
R (K/W)	τ (s)
4,78E-02	5,72E+00
9,08E-02	1,19E+00
1,17E-01	3,03E-01
1,51E-01	6,32E-02
7,91E-02	2,04E-02
1,69E-02	2,67E-03
2,28E-02	5,00E-04

Thermistor Characteristics

figure 21. **Thermistor**

Typical NTC characteristic as function of temperature

$R_T = f(T)$

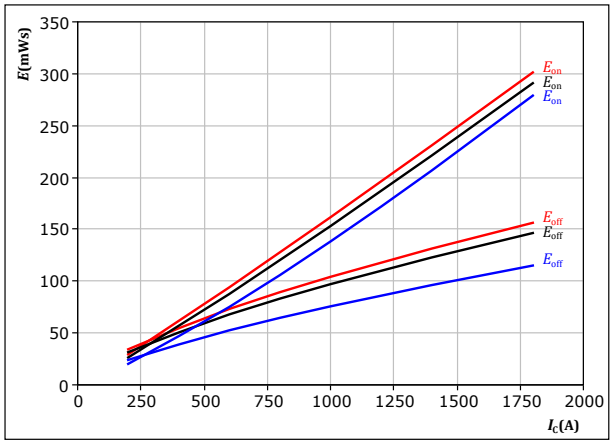


Buck Switching Characteristics

figure 22. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



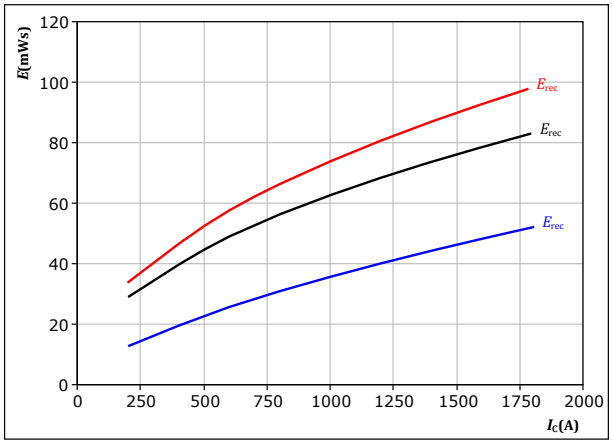
With an inductive load at

			T_j:	
V_{CE} =	600	V		25 °C
V_{GE} =	-8/16	V		125 °C
R_{gon} =	0,5	Ω		150 °C
R_{goff} =	0,5	Ω		

figure 23. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



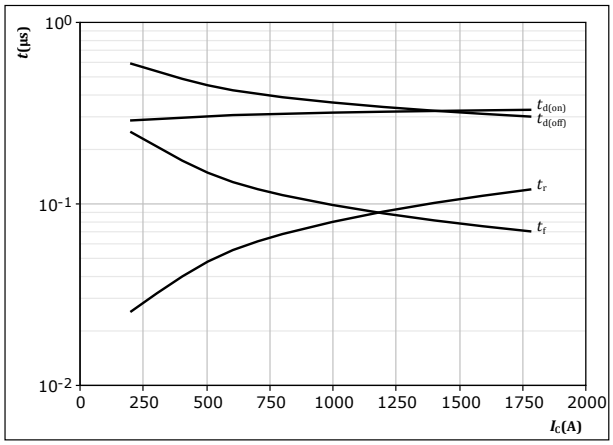
With an inductive load at

			T_j:	
V_{CE} =	600	V		25 °C
V_{GE} =	-8/16	V		125 °C
R_{gon} =	0,5	Ω		150 °C

figure 24. **IGBT**

Typical switching times as a function of collector current

$t = f(I_C)$



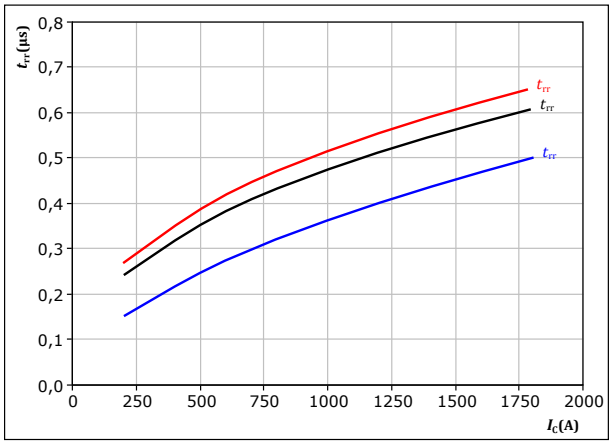
With an inductive load at

T_j =	150	°C
V_{CE} =	600	V
V_{GE} =	-8/16	V
R_{gon} =	0,5	Ω
R_{goff} =	0,5	Ω

figure 25. **FWD**

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_C)$



With an inductive load at

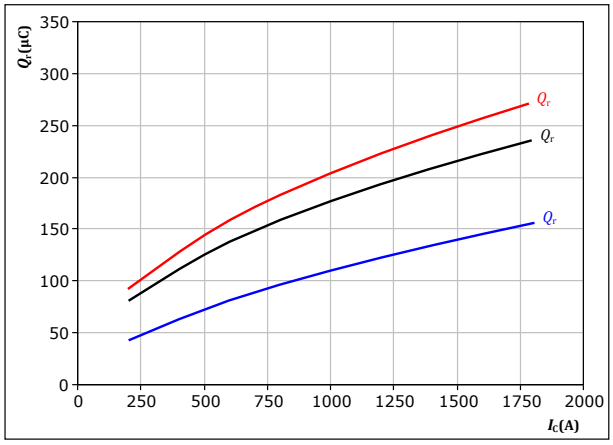
			T_j:	
V_{CE} =	600	V		25 °C
V_{GE} =	-8/16	V		125 °C
R_{gon} =	0,5	Ω		150 °C

Buck Switching Characteristics

figure 26. **FWD**

Typical recovered charge as a function of collector current

$Q_r = f(I_C)$



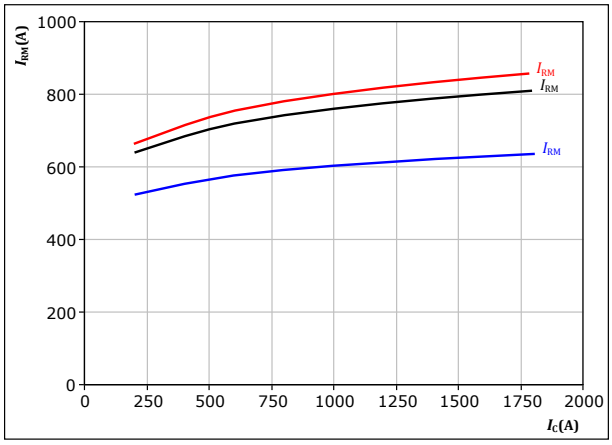
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	-8/16	V		125 °C
R_{gon} =	0,5	Ω		150 °C

figure 27. **FWD**

Typical peak reverse recovery current as a function of collector current

$I_{RM} = f(I_C)$



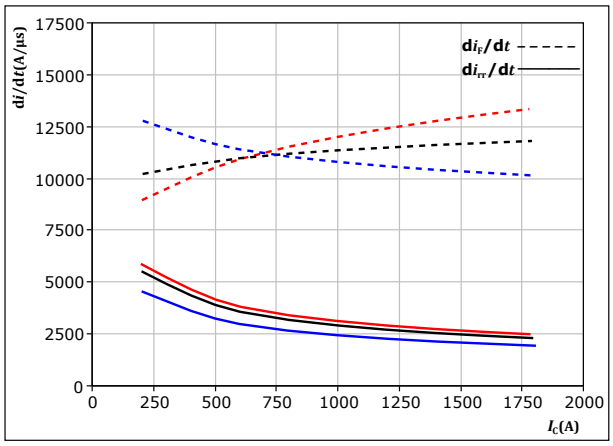
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	-8/16	V		125 °C
R_{gon} =	0,5	Ω		150 °C

figure 28. **FWD**

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

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



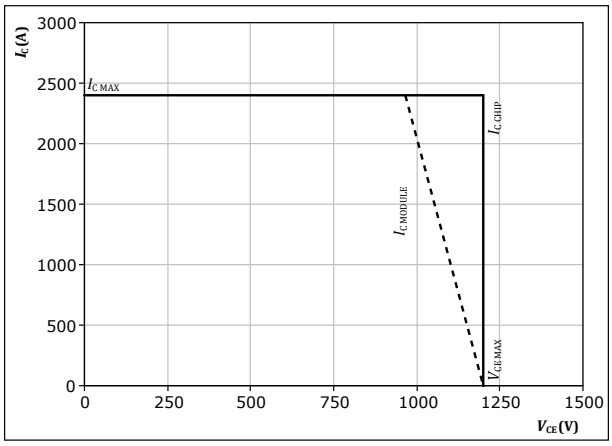
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	-8/16	V		125 °C
R_{gon} =	0,5	Ω		150 °C

figure 29. **IGBT**

Reverse bias safe operating area

$I_C = f(V_{CE})$



At

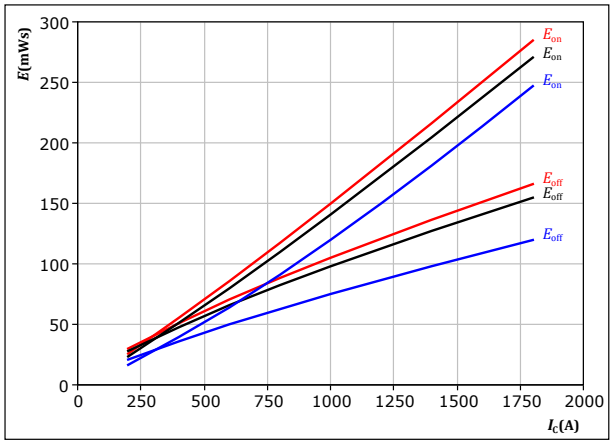
T_j =	150	°C
R_{gon} =	0,5	Ω
R_{goff} =	0,5	Ω

Boost Switching Characteristics

figure 30. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



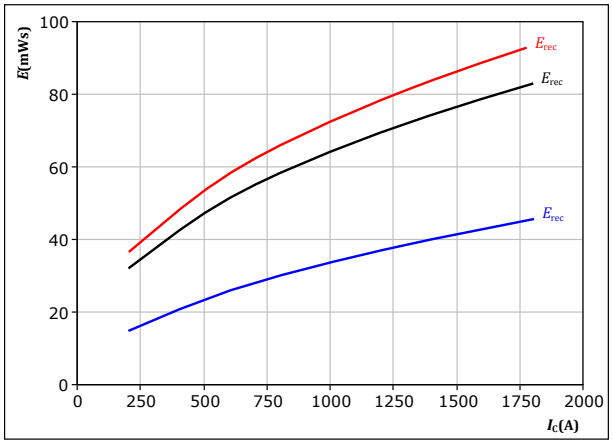
With an inductive load at

			T_j:	
V_{CE} =	600	V		25 °C
V_{GE} =	-8/16	V		125 °C
R_{gon} =	0,5	Ω		150 °C
R_{goff} =	0,5	Ω		

figure 31. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



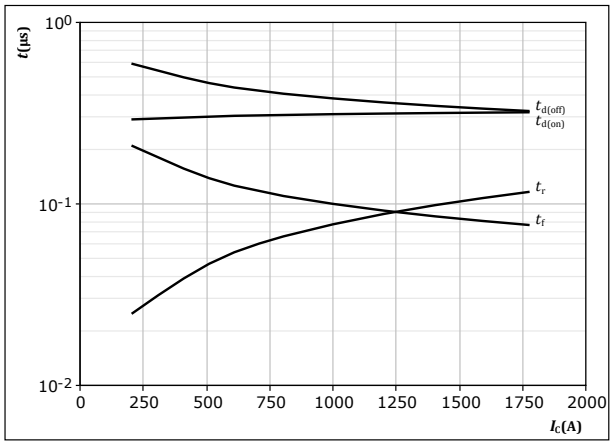
With an inductive load at

			T_j:	
V_{CE} =	600	V		25 °C
V_{GE} =	-8/16	V		125 °C
R_{gon} =	0,5	Ω		150 °C

figure 32. **IGBT**

Typical switching times as a function of collector current

$t = f(I_C)$



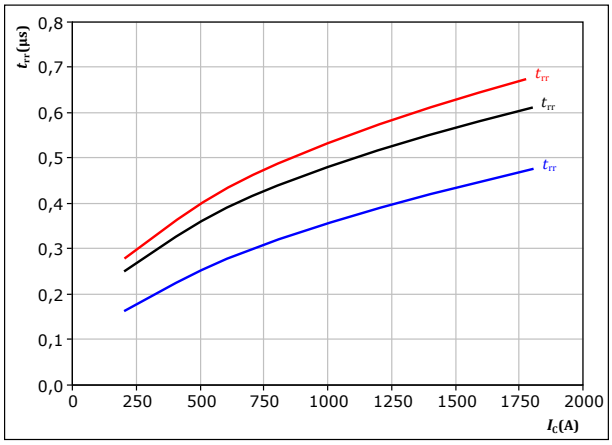
With an inductive load at

T_j =	150	°C
V_{CE} =	600	V
V_{GE} =	-8/16	V
R_{gon} =	0,5	Ω
R_{goff} =	0,5	Ω

figure 33. **FWD**

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_C)$



With an inductive load at

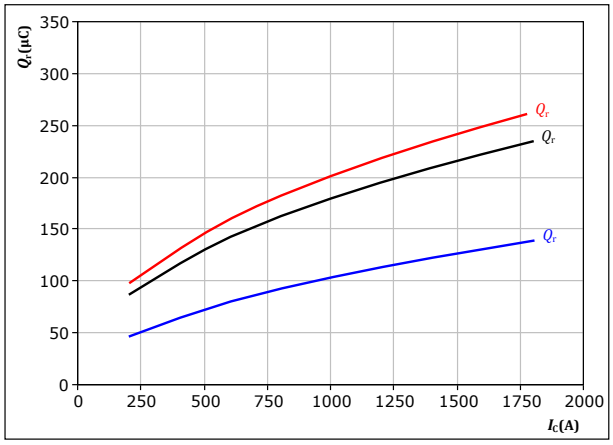
			T_j:	
V_{CE} =	600	V		25 °C
V_{GE} =	-8/16	V		125 °C
R_{gon} =	0,5	Ω		150 °C

Boost Switching Characteristics

figure 34. **FWD**

Typical recovered charge as a function of collector current

$Q_r = f(I_C)$



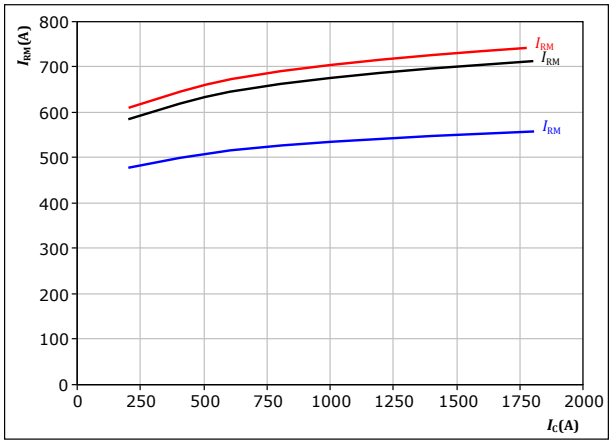
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	-8/16	V		125 °C
R_{gon} =	0,5	Ω		150 °C

figure 35. **FWD**

Typical peak reverse recovery current as a function of collector current

$I_{RM} = f(I_C)$



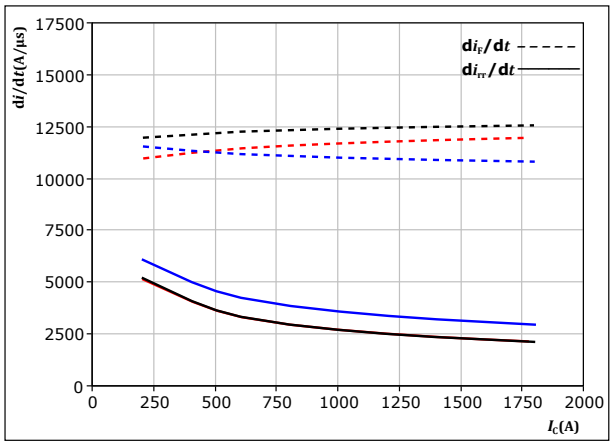
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	-8/16	V		125 °C
R_{gon} =	0,5	Ω		150 °C

figure 36. **FWD**

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

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



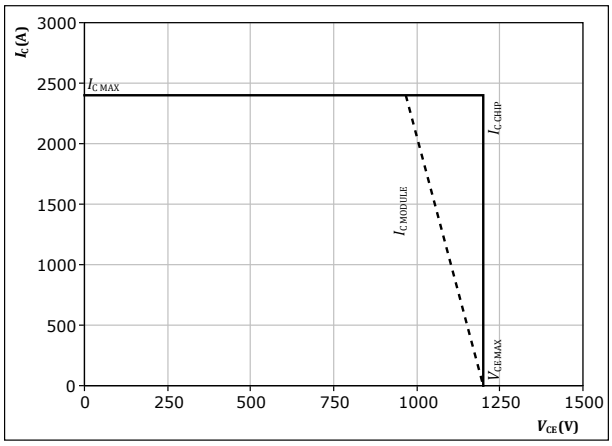
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	-8/16	V		125 °C
R_{gon} =	0,5	Ω		150 °C

figure 37. **IGBT**

Reverse bias safe operating area

$I_C = f(V_{CE})$



At

T_j =	150	°C
R_{gon} =	0,5	Ω
R_{goff} =	0,5	Ω

Switching Definitions

figure 38. **IGBT**

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

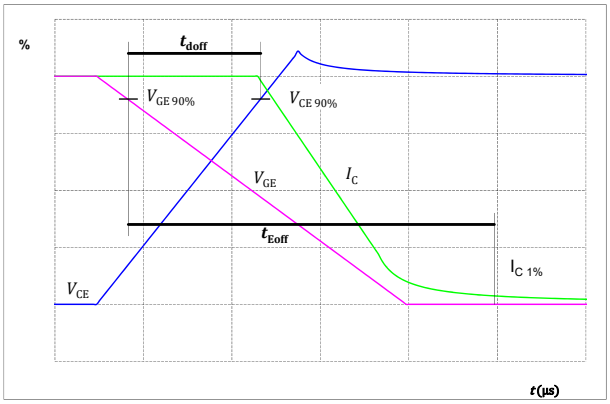


figure 39. **IGBT**

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

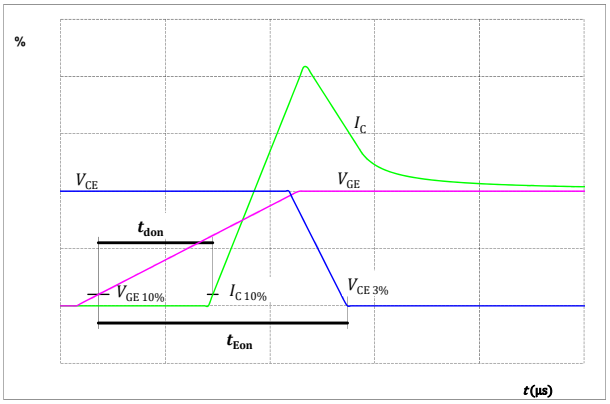


figure 40. **IGBT**

Turn-off Switching Waveforms & definition of t_f

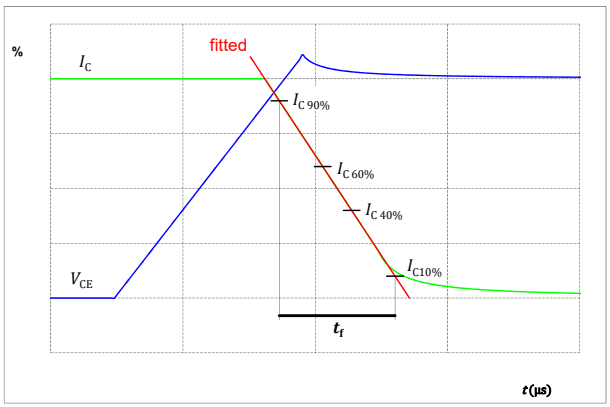
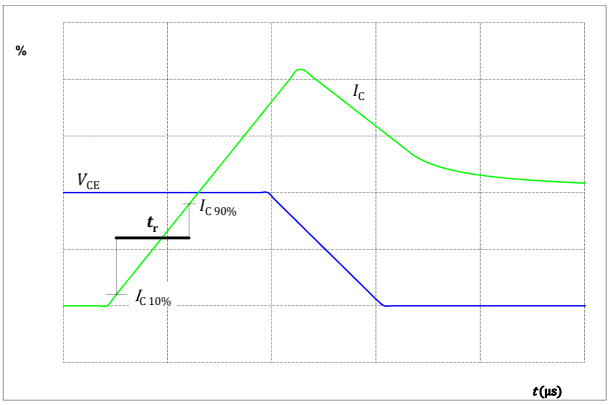


figure 41. **IGBT**

Turn-on Switching Waveforms & definition of t_r



Switching Definitions

figure 42. **FWD**

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

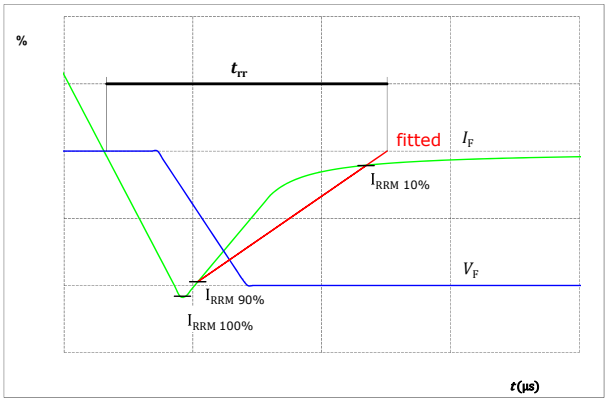
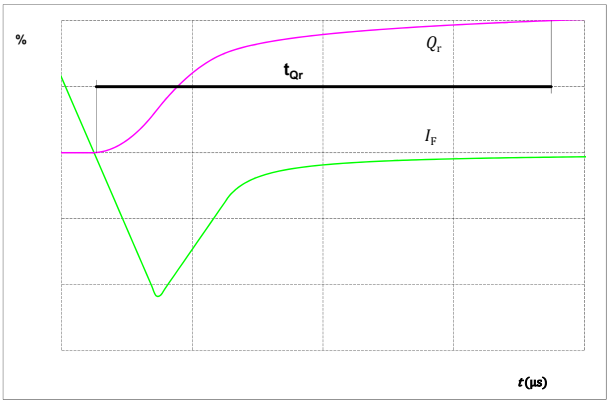


figure 43. **FWD**

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



Ordering Code

Version	Ordering Code
Without thermal paste	70-W424NIA1K2M702-LD07FP70
With thermal paste (3,4 W/mK, PSX-P7)	70-W424NIA1K2M702-LD07FP70-/3/

Marking

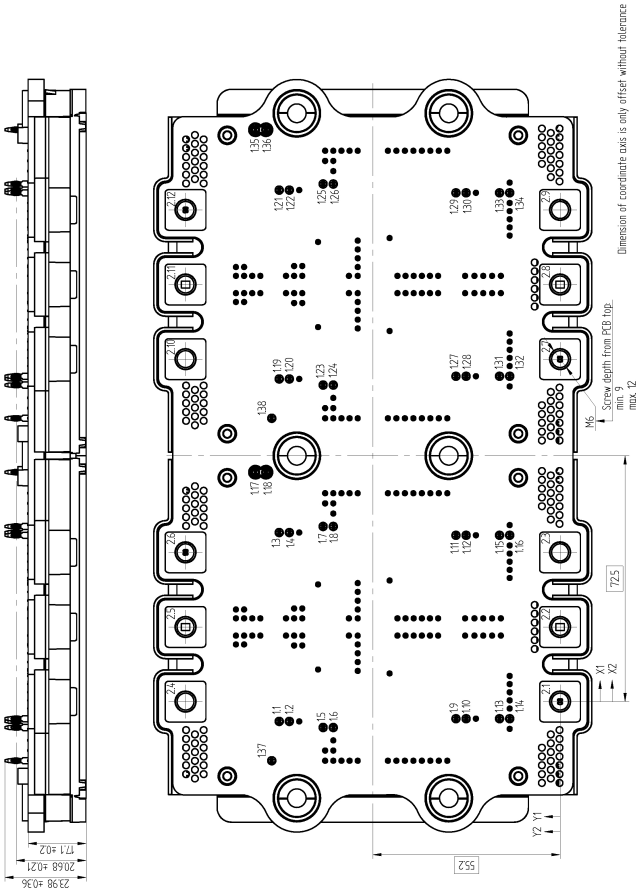
	Name	Date code	UL & VIN	Lot	Serial
Text	NN-NNNNNNNNNNNNN-TTTTTTVV	WWYY	UL VIN	LLLLL	SSSS

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

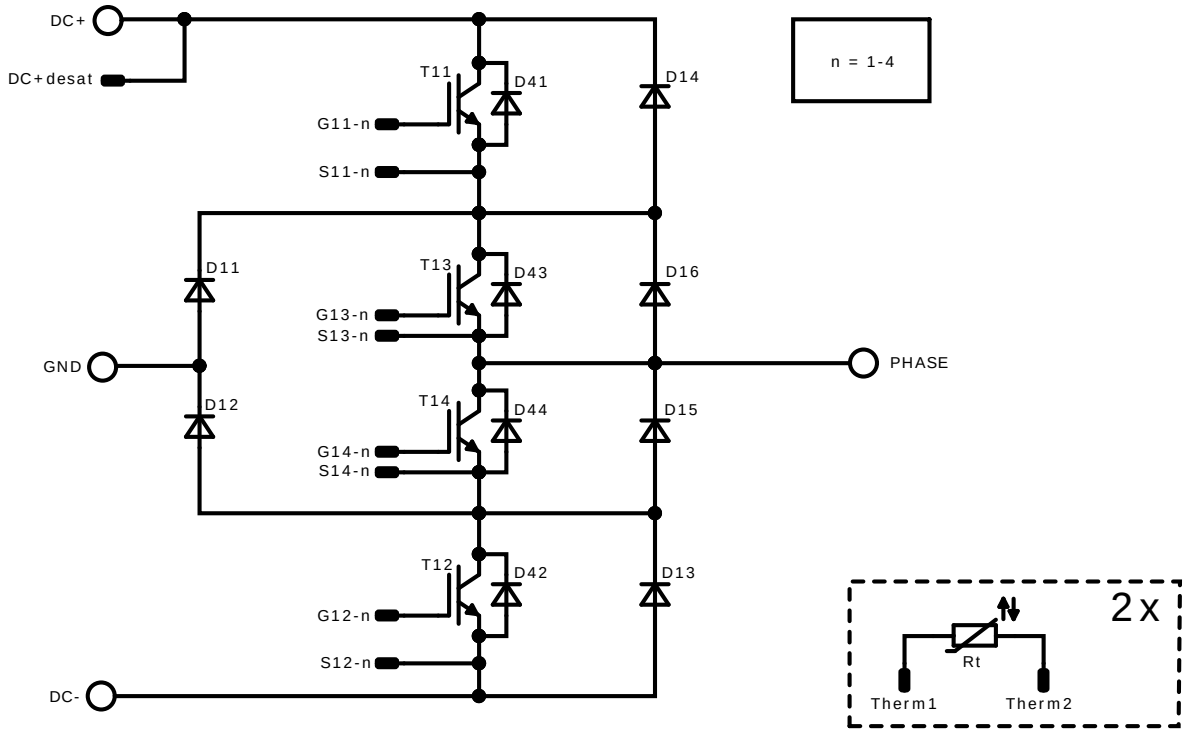
Outline

Pin table [mm]

Pin	X	Y	Function	28	95,95	27,7	S14-3
1	-5,85	82,8	G11-1	29	150,05	30,7	G14-4
2	-5,85	79,8	S11-1	30	150,05	27,7	S14-4
3	49,85	82,8	G11-2	31	95,95	17,85	G12-3
4	49,85	79,8	S11-2	32	95,95	14,85	S12-3
5	-7,65	69,85	G13-1	33	150,05	17,85	G12-4
6	-7,65	66,85	S13-1	34	150,05	14,85	S12-4
7	51,65	69,85	G13-2	35	168,65	89,8	Therm1-2
8	51,65	66,85	S13-2	36	168,65	86,7	Therm2-2
9	-5,05	30,7	G14-1	37	-17,45	85	DC+desat
10	-5,05	27,7	S14-1	38	83,55	85	DC+desat
11	49,05	30,7	G14-2	39	not assembled		
12	49,05	27,7	S14-2	40	not assembled		
13	-5,05	17,85	G12-1	41	X2	Y2	Function
14	-5,05	14,85	S12-1	42	0	0	Phase
15	49,05	17,85	G12-2	43	22	0	Phase
16	49,05	14,85	S12-2	44	44	0	Phase
17	67,65	89,8	Therm1-1	45	0	110,4	DC+
18	67,65	86,7	Therm2-1	46	22	110,4	GND
19	95,15	82,8	G11-3	47	44	110,4	DC-
20	95,15	79,8	S11-3	48	101	0	Phase
21	150,85	82,8	G11-4	49	123	0	Phase
22	150,85	79,8	S11-4	50	145	0	Phase
23	93,35	69,85	G13-3	51	101	110,4	DC+
24	93,35	66,85	S13-3	52	123	110,4	GND
25	152,65	69,85	G13-4	53	145	110,4	DC-
26	152,65	66,85	S13-4				
27	95,95	30,7	G14-3				



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	1200 A	Buck Switch	
D11, D12	FWD	1200 V	1200 A	Buck Diode	
D41, D42	FWD	1200 V	60 A	Buck Sw. Protection Diode	
T13, T14	IGBT	1200 V	1200 A	Boost Switch	
D13, D14	FWD	1200 V	1200 A	Boost Diode	
D15, D16	FWD	1200 V	1200 A	Boost Sw. Inv. Diode	
D43, D44	FWD	1200 V	60 A	Boost Sw. Protection Diode	
Rt	NTC			Thermistor	

Packaging instruction				
Standard packaging quantity (SPQ) 4	>SPQ	Standard	<SPQ	Sample

Handling instruction
Handling instructions for VINco X8 packages see vincotech.com website.

Package data
Package data for VINco X8 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
70-W424NIA1K2M702-LD07FP70-D4-14	30 Sep. 2021	Change of Buck Switch and Diode static characteristics Change of Boost Switch and Diode static characteristics Change of Boost Sw. Inv. Diode static characteristics	