Vincotech

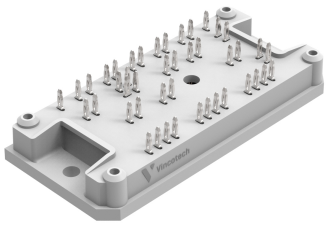
10-PY07N3A050SM-M896F04Y
datasheet

flow3xNPC 1 **1200 V / 50 A**

Features

- NPC with compact design
- Fast switching with IGBT H5+L5 and Stealth Diode
- Low inductive layout
- 3 phase design

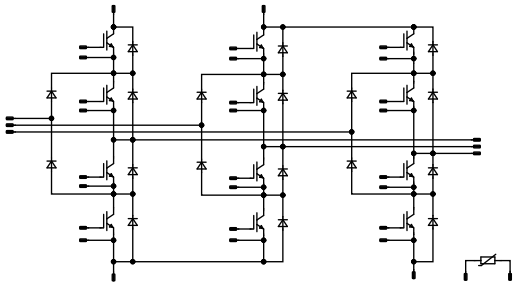
flow 1 12 mm housing



Target applications

- Power Supply
- Solar Inverters
- UPS

Schematic



Types

- 10-PY07N3A050SM-M896F04Y

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
Buck Switch				
Collector-emitter voltage	V_{CES}		650	V
Collector current	I_C	$T_j = T_{jmax}$ T_s = 80 °C	41	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	150	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ T_s = 80 °C	78	W
Gate-emitter voltage	V_{GES}		±20	V
Maximum junction temperature	T_{jmax}		175	°C
Buck Diode				
Peak repetitive reverse voltage	V_{RRM}		650	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$ T_s = 80 °C	29	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	180	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ T_s = 80 °C	52	W
Maximum junction temperature	T_{jmax}		175	°C
Boost Switch				
Collector-emitter voltage	V_{CES}		650	V
Collector current	I_C	$T_j = T_{jmax}$ T_s = 80 °C	84	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	225	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ T_s = 80 °C	95	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
Boost Diode				
Peak repetitive reverse voltage	V_{RRM}		650	V
Continuous (direct) forward current	I_F	T_j = T_{jmax} T_s = 80 °C	23	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	39	W
Maximum junction temperature	T_{jmax}		175	°C
Boost Sw. Inv. Diode				
Peak repetitive reverse voltage	V_{RRM}		650	V
Continuous (direct) forward current	I_F	T_j = T_{jmax} T_s = 80 °C	23	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	39	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
Isolation voltage	V_{isol}	AC Voltage t_p = 1 min	2500	V
Creepage distance			min. 12,7	mm
Clearance			8,6	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	$V_{GE(th)}$	V_{CE} = V_{GE}			0,0005	25	3,3	4	4,7	V
Collector-emitter saturation voltage	V_{CEsat}		15		50	25 125		1,83 2,01	2,22	V
Collector-emitter cut-off current	I_{CES}		0	650		25			40	µA
Gate-emitter leakage current	I_{GES}		20	0		25			120	nA
Internal gate resistance	r_g							None		Ω
Input capacitance	C_{ies}	f = 1 Mhz	0	25		25		3000		pF
Reverse transfer capacitance	C_{res}							11		pF
Gate charge	Q_g		15	520	50	25		120		nC
Thermal										
Thermal resistance junction to sink*	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						1,22		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 8 Ω R_{goff} = 8 Ω	-5/15	350	20	25 125 150		29 29 30		ns
Rise time	t_r					25 125 150		6 6 6		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		98 121 127		ns
Fall time	t_f					25 125 150		9,7 8,98 9,6		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=0,508 µC Q_{rFWD}=0,99 µC Q_{rFWD}=1,12 µC				25 125 150		0,142 0,25 0,287		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,086 0,142 0,159		mWs

*Only valid with pre-applied Vincotech thermal interface material.

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				30	25 125		2,47 2,03	2,6	V
Reverse leakage current	I_R	V_r = 650 V				25			10	µA
Thermal										
Thermal resistance junction to sink*	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						1,83		K/W
*Only valid with pre-applied Vincotech thermal interface material.										
Dynamic										
Peak recovery current	I_{RRM}	di/dt=4993 A/µs di/dt=4646 A/µs di/dt=4409 A/µs	-5/15	350	20	25 125 150		44,04 57,61 61,02		A
Reverse recovery time	t_{rr}					25 125 150		18,91 23,85 25,93		ns
Recovered charge	Q_r					25 125 150		0,508 0,99 1,12		µC
Reverse recovered energy	E_{rec}					25 125 150		0,104 0,193 0,211		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		5933 6559 6494		A/µs

Characteristic Values

Parameter	Symbol	Conditions					Values			Unit
			V_{GE} [V] V_{GS} [V]	V_{CE} [V] V_{DS} [V] V_F [V]	I_C [A] I_D [A] I_F [A]	T_j [°C]	Min	Typ	Max	
Boost Switch										
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$	V_{CE} = V_{GE}			0,001	25	4,2	5	5,8	V
Collector-emitter saturation voltage	V_{CEsat}		15		75	25 125 150		1,1 1,09 1,09	1,45	V
Collector-emitter cut-off current	I_{CES}		0	650		25			40	µA
Gate-emitter leakage current	I_{GES}		20	0		25			100	nA
Internal gate resistance	r_g							None		Ω
Input capacitance	C_{ies}	f = 1 Mhz	0	25		25		11625		pF
Reverse transfer capacitance	C_{res}							30		pF
Gate charge	Q_g		15	520	75	25		436		nC
Thermal										
Thermal resistance junction to sink*	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						1		K/W
*Only valid with pre-applied Vincotech thermal interface material.										
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 4 Ω R_{goff} = 4 Ω	-5/15	350	20	25 125 150		68 66 66		ns
Rise time	t_r					25 125 150		4 5 5		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		471 597 622		ns
Fall time	t_f					25 125 150		81,87 137,08 157,21		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=0,901 µC Q_{rFWD}=1,56 µC Q_{rFWD}=1,73 µC				25 125 150		0,052 0,096 0,111		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		1,14 1,82 1,96		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				20	25 125 150	1,23	1,74 1,66 1,61	1,87	V
Reverse leakage current	I_R	V_r = 650 V				25			0,24	µA
Thermal										
Thermal resistance junction to sink*	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						2,46		K/W
*Only valid with pre-applied Vincotech thermal interface material.										
Dynamic										
Peak recovery current	I_{RRM}	di/dt=4817 A/µs di/dt=5026 A/µs di/dt=5000 A/µs	-5/15	350	20	25 125 150		41,84 47,61 48,5		A
Reverse recovery time	t_{rr}					25 125 150		17,94 24,4 26,47		ns
Recovered charge	Q_r					25 125 150		0,901 1,56 1,73		µC
Reverse recovered energy	E_{rec}					25 125 150		0,256 0,455 0,503		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		6079 4632 4242		A/µs

Characteristic Values

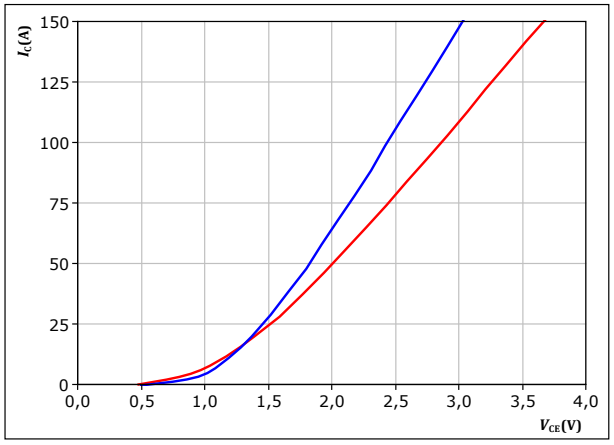
Parameter	Symbol	Conditions					Values			Unit
			V_{GE} [V] V_{GS} [V]	V_{CE} [V] V_{DS} [V] V_F [V]	I_C [A] I_D [A] I_F [A]	T_j [°C]	Min	Typ	Max	
Boost Sw. Inv. Diode										
Static										
Forward voltage	V_F				20	25 125 150	1,23	1,74 1,66 1,61	1,87	V
Reverse leakage current	I_R	V_r = 650 V				25			0,24	µA
Thermal										
Thermal resistance junction to sink*	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						2,46		K/W
*Only valid with pre-applied Vincotech thermal interface material.										
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							5		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	

Buck Switch Characteristics

figure 1. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$

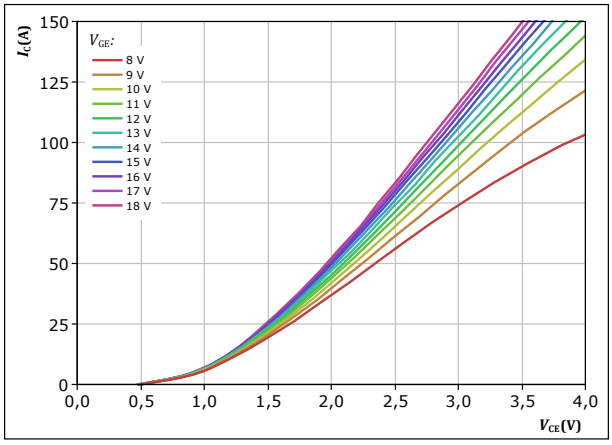


t_p =	250	µs	T_j:	25 °C
V_{GE} =	15	V		125 °C

figure 2. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$



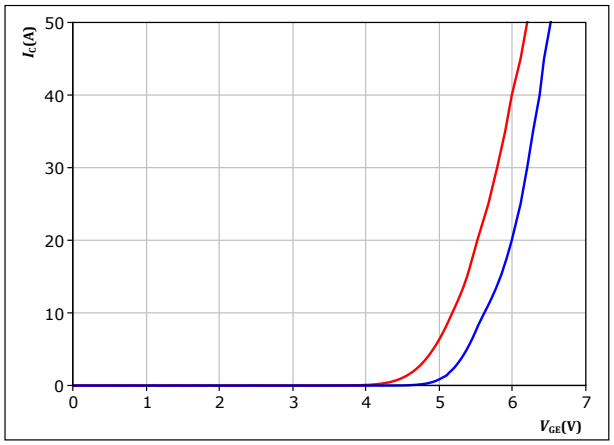
t_p =	250	µs
T_j =	125	°C

V_{GE} from 8 V to 18 V in steps of 1 V

figure 3. **IGBT**

Typical transfer characteristics

$I_C = f(V_{GE})$

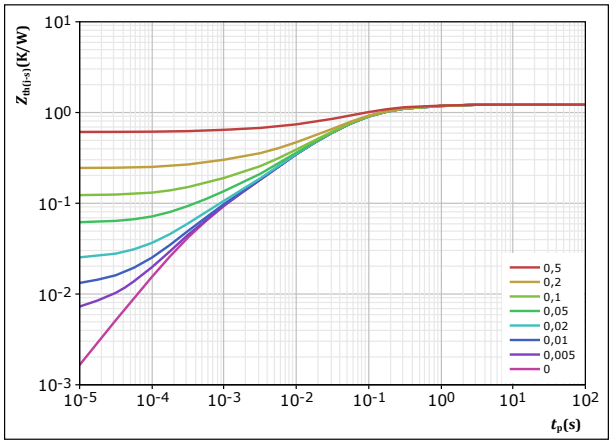


t_p =	250	µs	T_j:	25 °C
V_{CE} =	10	V		125 °C

figure 4. **IGBT**

Transient thermal impedance as a function of pulse width

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



D =	t_p / T	
$R_{th(j-s)}$ =	1,222	K/W

IGBT thermal model values

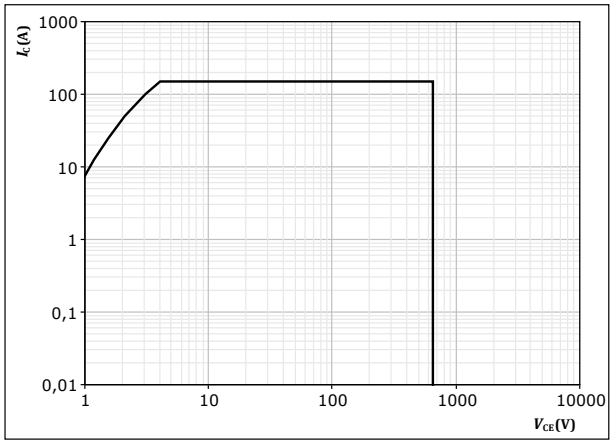
R (K/W)	τ (s)
1,28E-01	8,75E-01
4,40E-01	1,12E-01
3,96E-01	3,56E-02
1,75E-01	7,55E-03
3,44E-02	1,97E-03
4,80E-02	4,33E-04

Buck Switch Characteristics

figure 5. **IGBT**

Safe operating area

$I_C = f(V_{CE})$



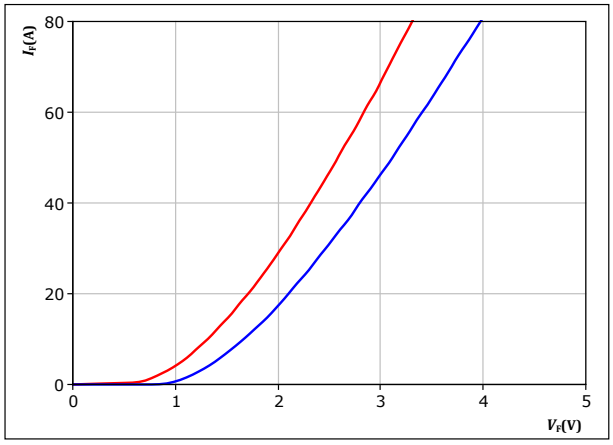
D =	single pulse	
T_s =	80	°C
V_{GE} =	15	V
T_j =	T_{jmax}	

Buck Diode Characteristics

figure 6. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



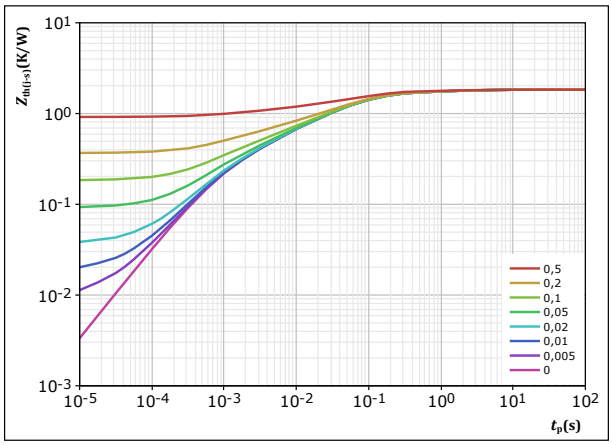
t_p = 250 µs

T_j: 25 °C, 125 °C

figure 7. **FWD**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 1,833 K/W

IGBT thermal model values

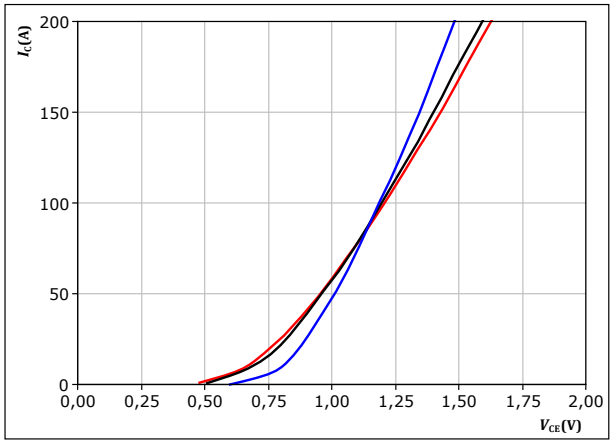
R (K/W)	τ (s)
6,05E-02	3,63E+00
1,50E-01	6,48E-01
8,27E-01	7,70E-02
4,06E-01	1,51E-02
2,16E-01	3,45E-03
1,73E-01	7,36E-04

Boost Switch Characteristics

figure 8. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$

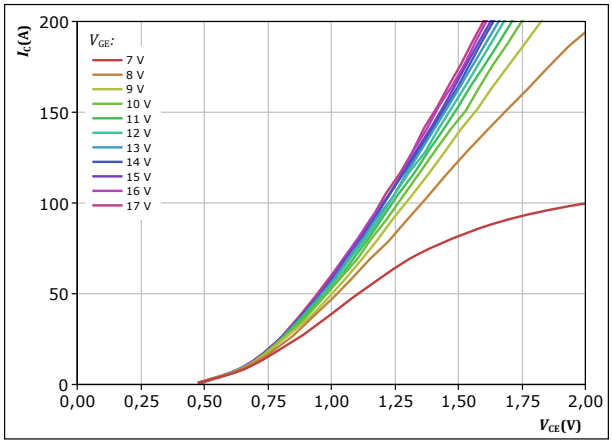


t_p =	250	µs		
V_{GE} =	15	V	T_j:	25 °C
				125 °C
				150 °C

figure 9. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$



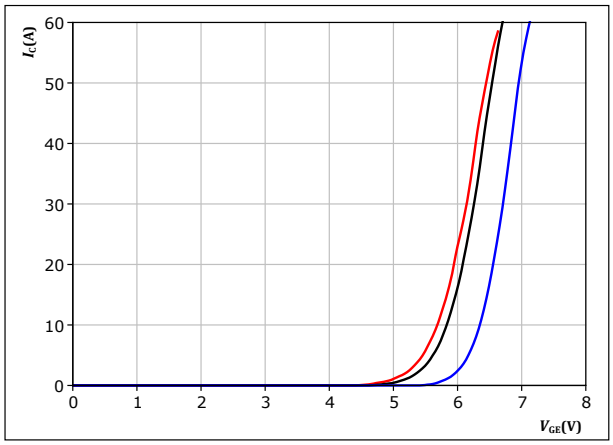
t_p =	250	µs
T_j =	150	°C

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

figure 10. **IGBT**

Typical transfer characteristics

$I_C = f(V_{GE})$

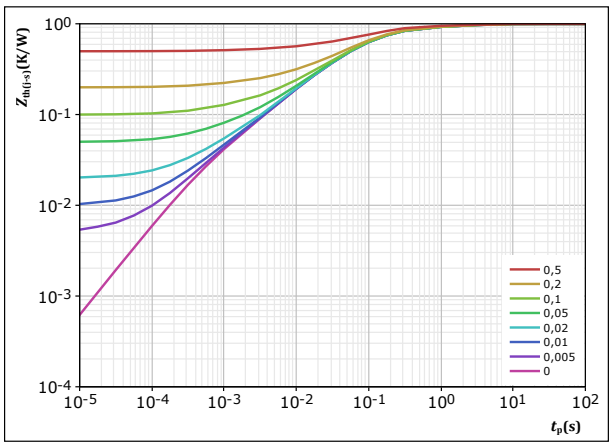


t_p =	250	µs		
V_{CE} =	10	V	T_j:	25 °C
				125 °C
				150 °C

figure 11. **IGBT**

Transient thermal impedance as a function of pulse width

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



D =	t_p / T	
$R_{th(j-s)}$ =	0,996	K/W

IGBT thermal model values

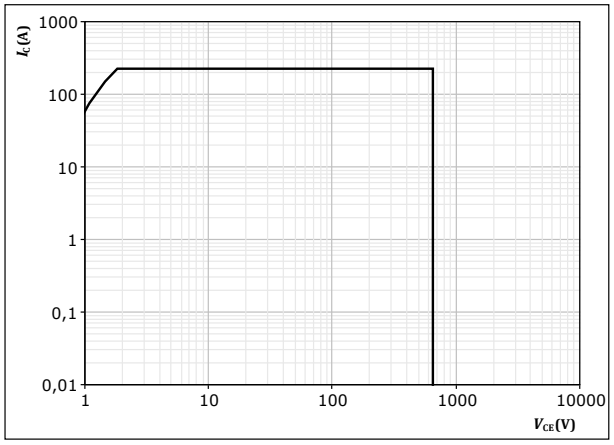
R (K/W)	τ (s)
8,80E-02	2,68E+00
1,67E-01	3,70E-01
5,38E-01	8,09E-02
1,47E-01	1,56E-02
3,80E-02	3,42E-03
1,88E-02	5,45E-04

Boost Switch Characteristics

figure 12. **IGBT**

Safe operating area

$I_C = f(V_{CE})$



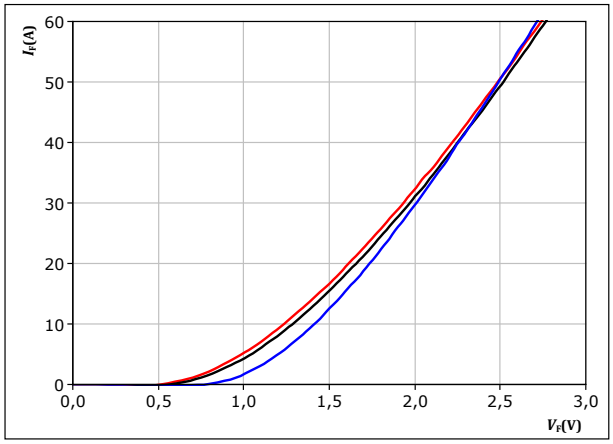
D =	single pulse	
T_s =	80	°C
V_{GE} =	15	V
T_j =	T_{jmax}	

Boost Diode Characteristics

figure 13. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



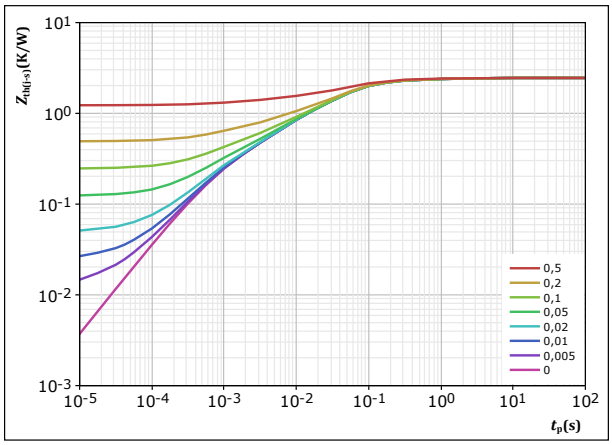
t_p = 250 µs

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

$R_{th(j-s)}$ = 2,457 K/W

IGBT thermal model values

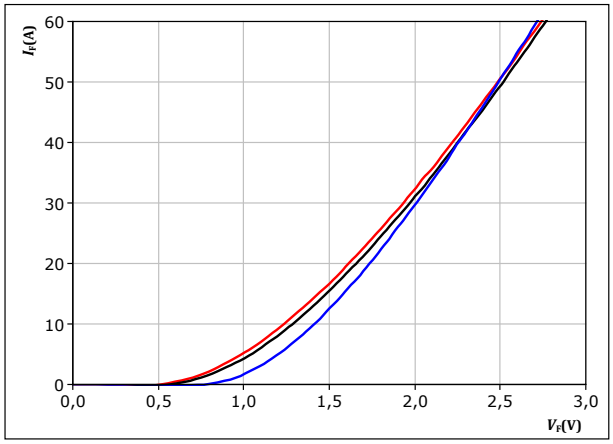
R (K/W)	τ (s)
1,00E-01	2,27E+00
3,37E-01	2,00E-01
1,37E+00	4,58E-02
4,51E-01	6,21E-03
2,01E-01	7,45E-04

Boost Sw. Inv. Diode Characteristics

figure 15. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



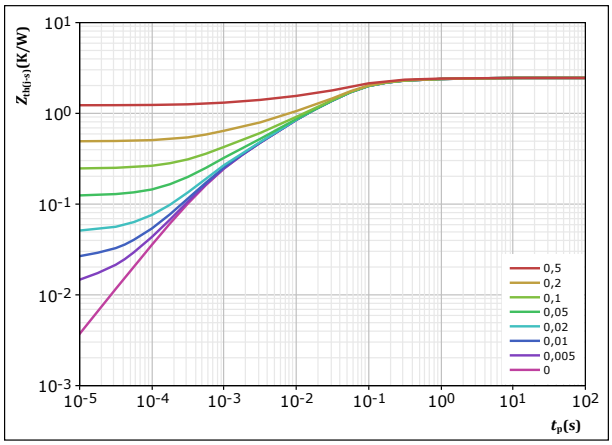
t_p = 250 µs

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

$R_{th(j-s)}$ = 2,457 K/W

IGBT thermal model values

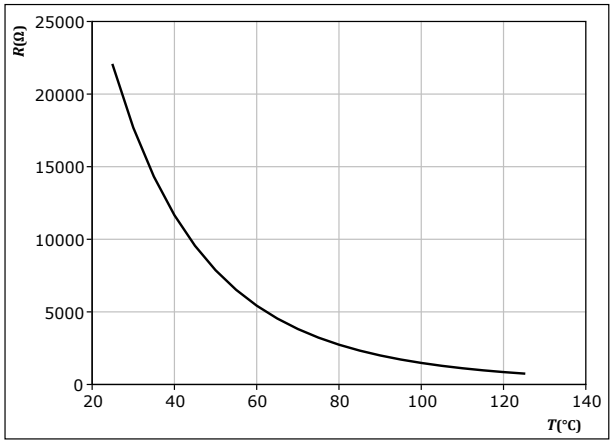
R (K/W)	τ (s)
1,00E-01	2,27E+00
3,37E-01	2,00E-01
1,37E+00	4,58E-02
4,51E-01	6,21E-03
2,01E-01	7,45E-04

Thermistor Characteristics

figure 17. **Thermistor**

Typical NTC characteristic as function of temperature

$R_T = f(T)$

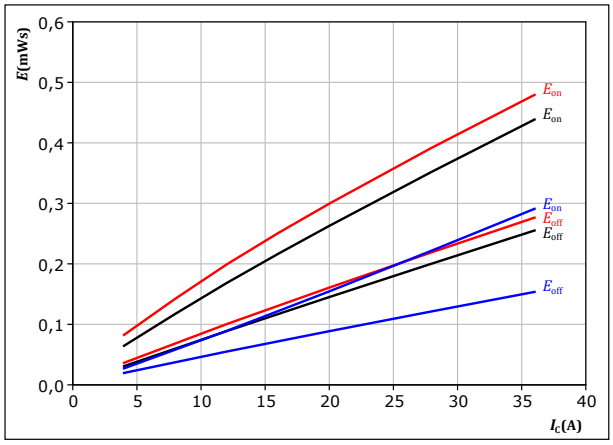


Buck Switching Characteristics

figure 18. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



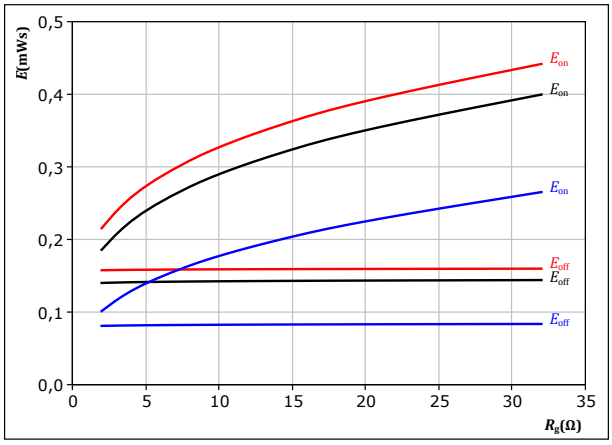
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	-5/15	V		125 °C
R_{gon} =	8	Ω		150 °C
R_{goff} =	8	Ω		

figure 19. **IGBT**

Typical switching energy losses as a function of gate resistor

$E = f(R_g)$



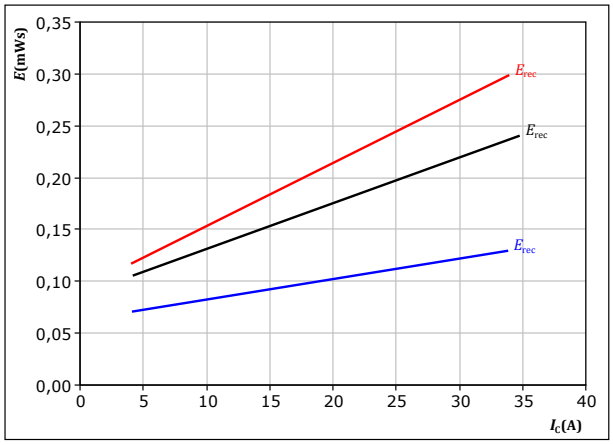
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	-5/15	V		125 °C
I_C =	20	A		150 °C

figure 20. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



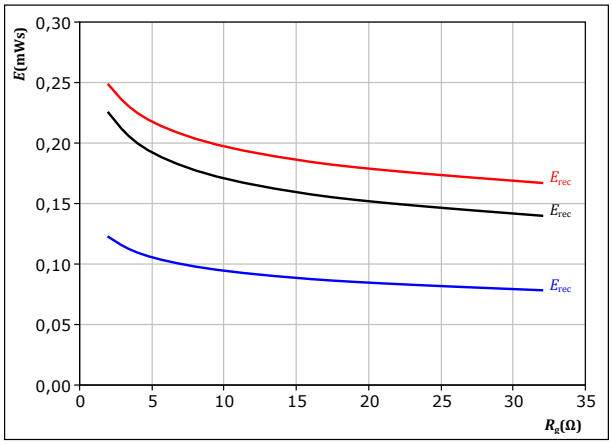
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	-5/15	V		125 °C
R_{gon} =	8	Ω		150 °C

figure 21. **FWD**

Typical reverse recovered energy loss as a function of gate resistor

$E_{rec} = f(R_g)$



With an inductive load at

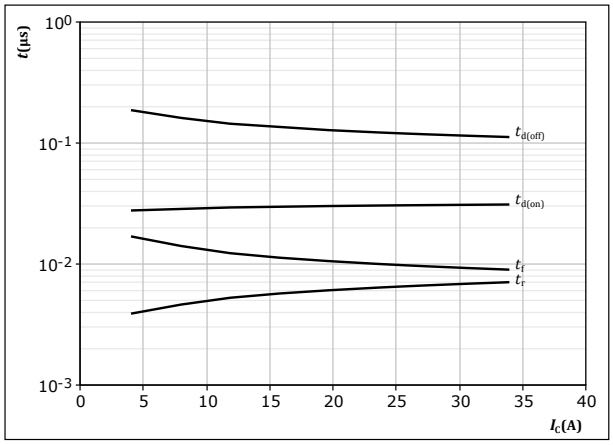
V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	-5/15	V		125 °C
I_C =	20	A		150 °C

Buck Switching Characteristics

figure 22. **IGBT**

Typical switching times as a function of collector current

t = f(I_C)



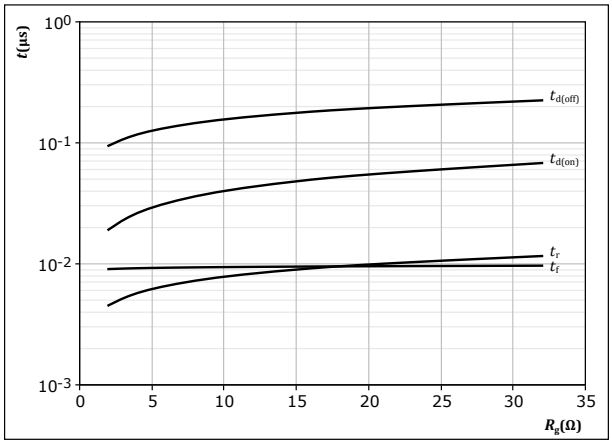
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	-5/15	V
R_{gon} =	8	Ω
R_{goff} =	8	Ω

figure 23. **IGBT**

Typical switching times as a function of gate resistor

t = f(R_g)



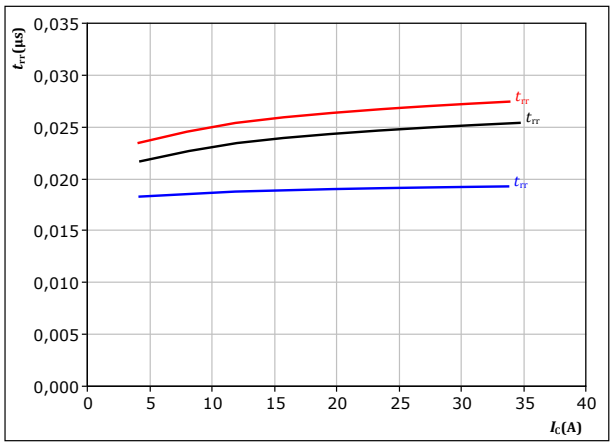
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	-5/15	V
I_C =	20	A

figure 24. **FWD**

Typical reverse recovery time as a function of collector current

t_{rr} = f(I_C)



With an inductive load at

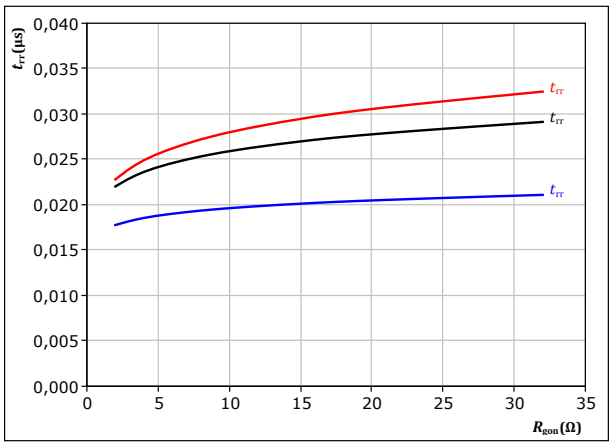
V_{CE} =	350	V
V_{GE} =	-5/15	V
R_{gon} =	8	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 25. **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} =	-5/15	V
I_C =	20	A

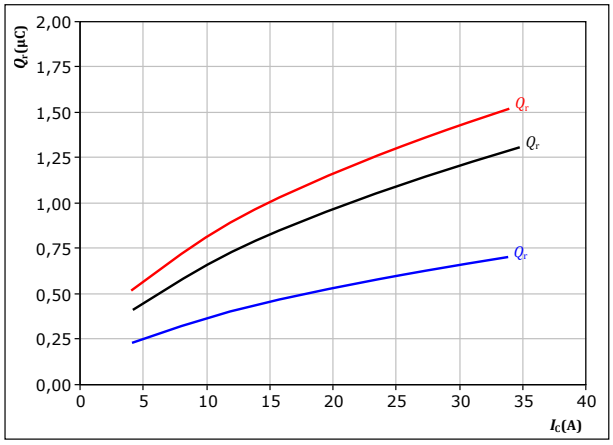
T_j: 25 °C, 125 °C, 150 °C

Buck Switching Characteristics

figure 26. **FWD**

Typical recovered charge as a function of collector current

$Q_r = f(I_C)$



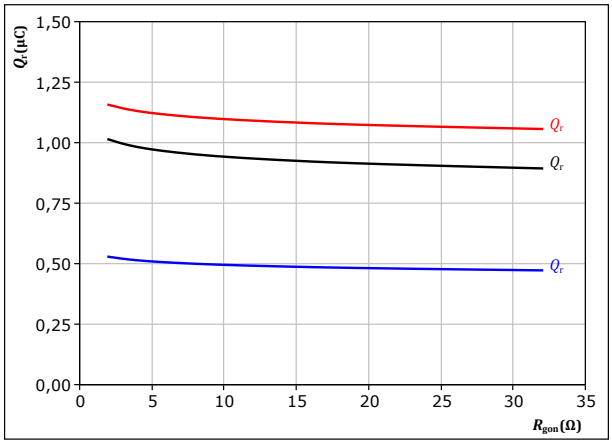
With an inductive load at

V_{CE} =	350	V	T_j: 25 °C
V_{GE} =	-5/15	V	125 °C
R_{gon} =	8	Ω	150 °C

figure 27. **FWD**

Typical recovered charge as a function of turn on gate resistor

$Q_r = f(R_{gon})$



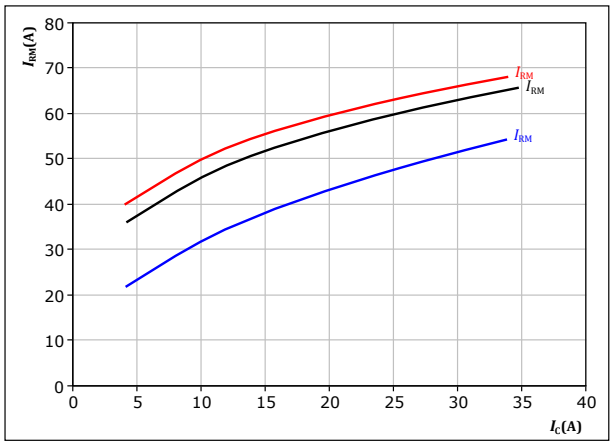
With an inductive load at

V_{CE} =	350	V	T_j: 25 °C
V_{GE} =	-5/15	V	125 °C
I_C =	20	A	150 °C

figure 28. **FWD**

Typical peak reverse recovery current as a function of collector current

$I_{RM} = f(I_C)$



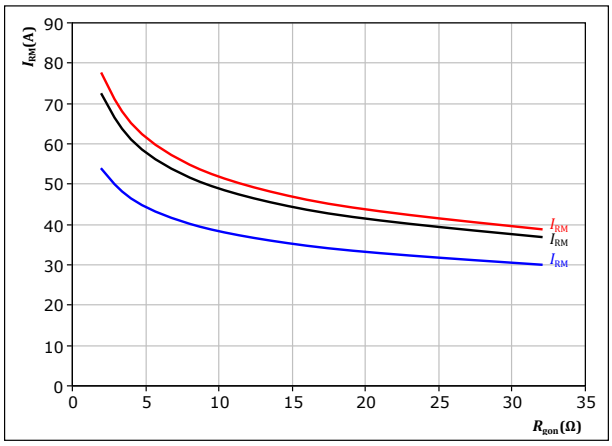
With an inductive load at

V_{CE} =	350	V	T_j: 25 °C
V_{GE} =	-5/15	V	125 °C
R_{gon} =	8	Ω	150 °C

figure 29. **FWD**

Typical peak reverse recovery current as a function of turn on gate resistor

$I_{RM} = f(R_{gon})$



With an inductive load at

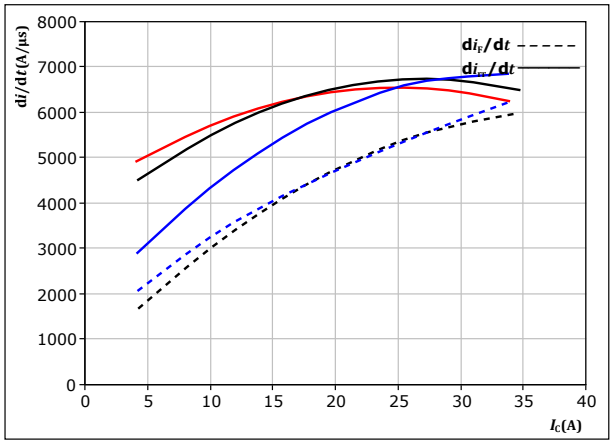
V_{CE} =	350	V	T_j: 25 °C
V_{GE} =	-5/15	V	125 °C
I_C =	20	A	150 °C

Buck Switching Characteristics

figure 30. **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)



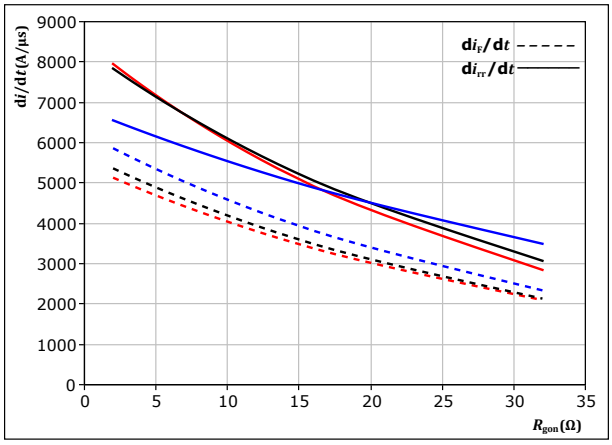
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	-5/15	V		125 °C
R_{gon} =	8	Ω		150 °C

figure 31. **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})



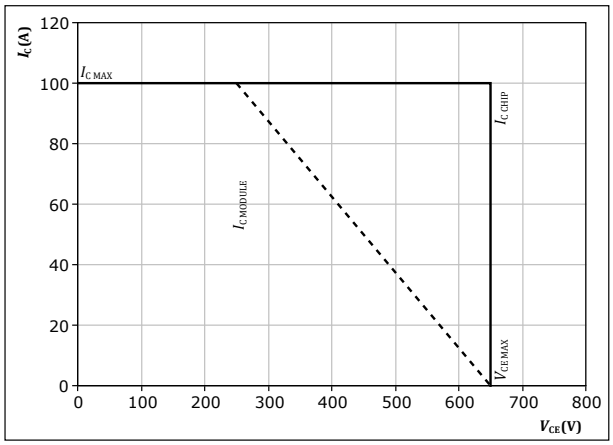
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	-5/15	V		125 °C
I_C =	20	A		150 °C

figure 32. **IGBT**

Reverse bias safe operating area

I_C = f(V_{CE})



At

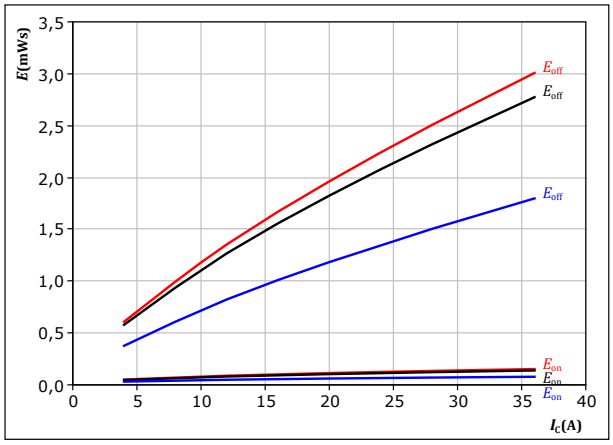
T_j =	150	°C	
R_{gon} =	8	Ω	
R_{goff} =	8	Ω	

Boost Switching Characteristics

figure 33. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



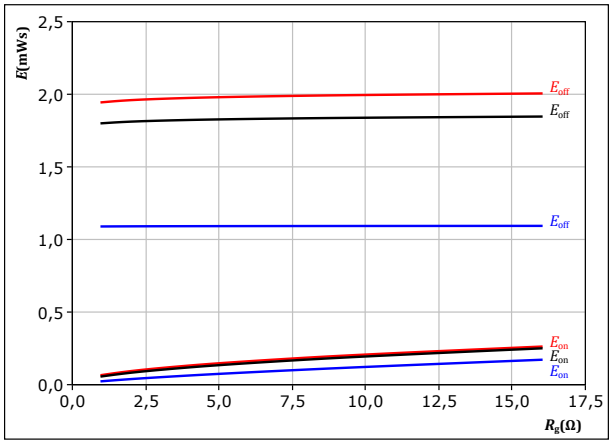
With an inductive load at

V_{CE} =	350	V	T_j: 25 °C
V_{GE} =	-5/15	V	125 °C
R_{gon} =	4	Ω	150 °C
R_{goff} =	4	Ω	

figure 34. **IGBT**

Typical switching energy losses as a function of gate resistor

$E = f(R_g)$



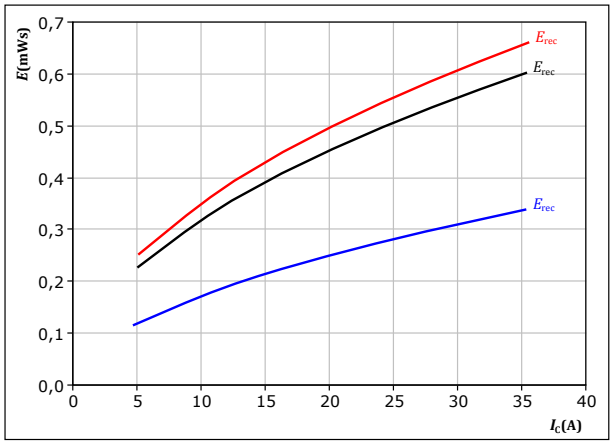
With an inductive load at

V_{CE} =	350	V	T_j: 25 °C
V_{GE} =	-5/15	V	125 °C
I_C =	20	A	150 °C

figure 35. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



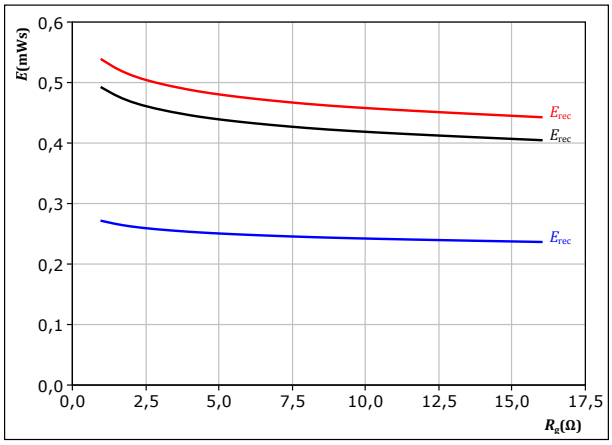
With an inductive load at

V_{CE} =	350	V	T_j: 25 °C
V_{GE} =	-5/15	V	125 °C
R_{gon} =	4	Ω	150 °C

figure 36. **FWD**

Typical reverse recovered energy loss as a function of gate resistor

$E_{rec} = f(R_g)$



With an inductive load at

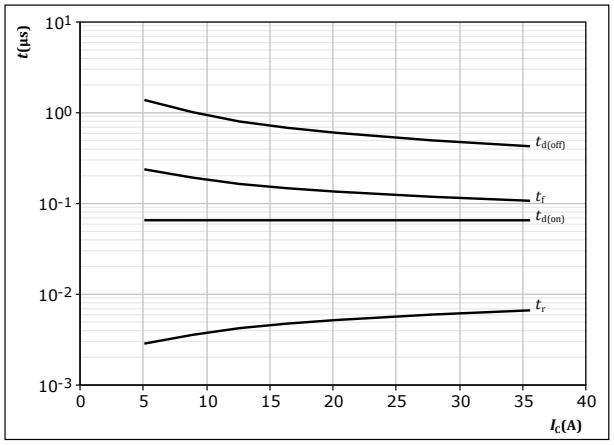
V_{CE} =	350	V	T_j: 25 °C
V_{GE} =	-5/15	V	125 °C
I_C =	20	A	150 °C

Boost Switching Characteristics

figure 37. **IGBT**

Typical switching times as a function of collector current

$t = f(I_C)$



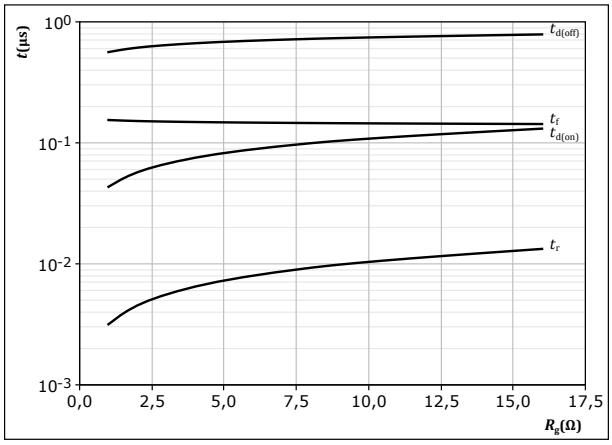
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	-5/15	V
R_{gon} =	4	Ω
R_{goff} =	4	Ω

figure 38. **IGBT**

Typical switching times as a function of gate resistor

$t = f(R_g)$



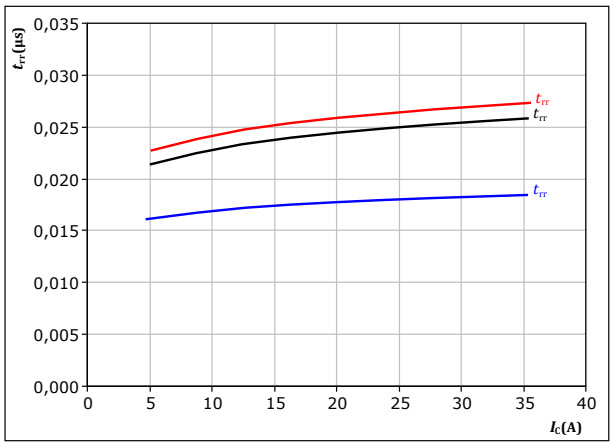
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	-5/15	V
I_C =	20	A

figure 39. **FWD**

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_C)$



With an inductive load at

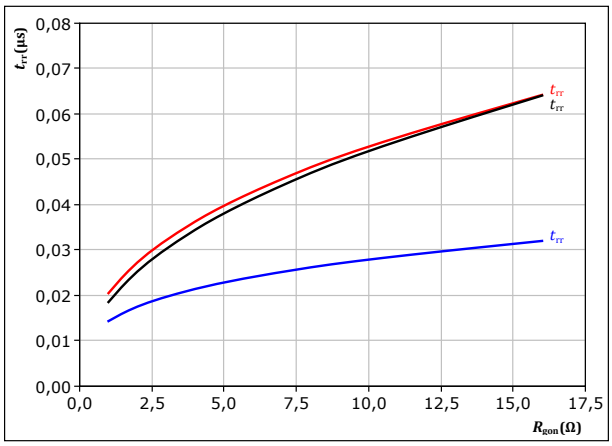
V_{CE} =	350	V
V_{GE} =	-5/15	V
R_{gon} =	4	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 40. **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} =	-5/15	V
I_C =	20	A

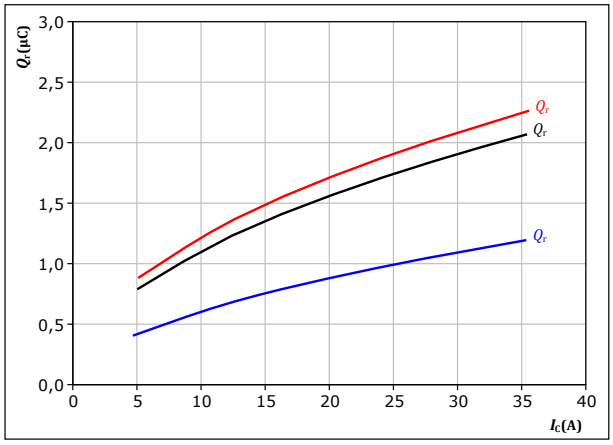
T_j: 25 °C, 125 °C, 150 °C

Boost Switching Characteristics

figure 41. **FWD**

Typical recovered charge as a function of collector current

$Q_r = f(I_C)$



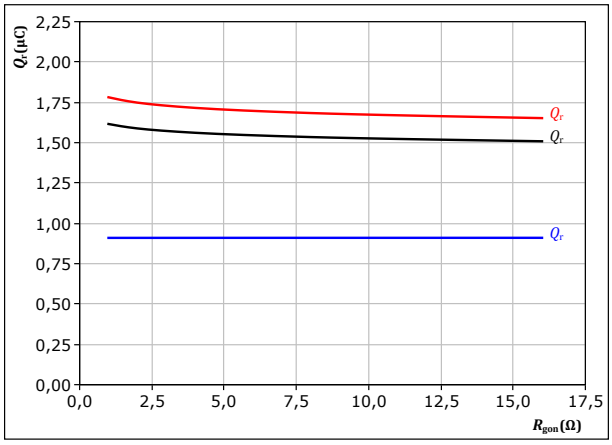
With an inductive load at

V_{CE} =	350	V	T_j: 25 °C
V_{GE} =	-5/15	V	125 °C
R_{gon} =	4	Ω	150 °C

figure 42. **FWD**

Typical recovered charge as a function of turn on gate resistor

$Q_r = f(R_{gon})$



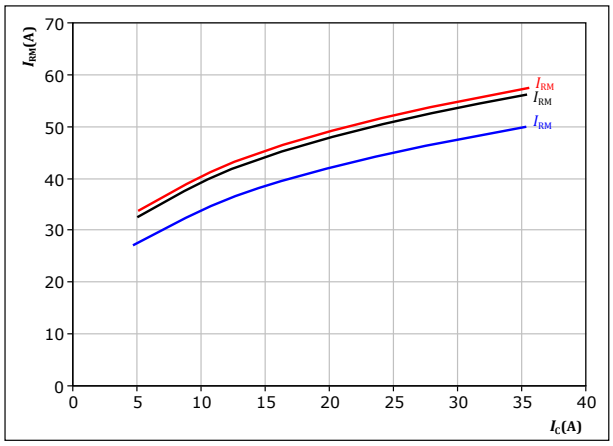
With an inductive load at

V_{CE} =	350	V	T_j: 25 °C
V_{GE} =	-5/15	V	125 °C
I_C =	20	A	150 °C

figure 43. **FWD**

Typical peak reverse recovery current as a function of collector current

$I_{RM} = f(I_C)$



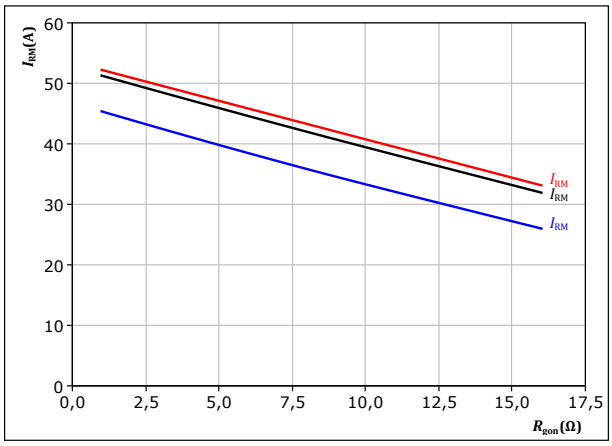
With an inductive load at

V_{CE} =	350	V	T_j: 25 °C
V_{GE} =	-5/15	V	125 °C
R_{gon} =	4	Ω	150 °C

figure 44. **FWD**

Typical peak reverse recovery current as a function of turn on gate resistor

$I_{RM} = f(R_{gon})$



With an inductive load at

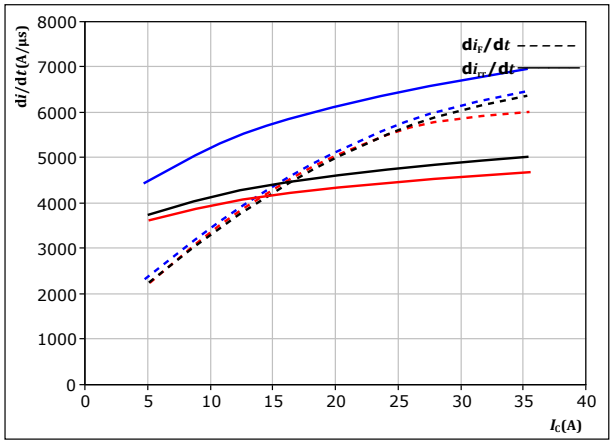
V_{CE} =	350	V	T_j: 25 °C
V_{GE} =	-5/15	V	125 °C
I_C =	20	A	150 °C

Boost Switching Characteristics

figure 45. **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)



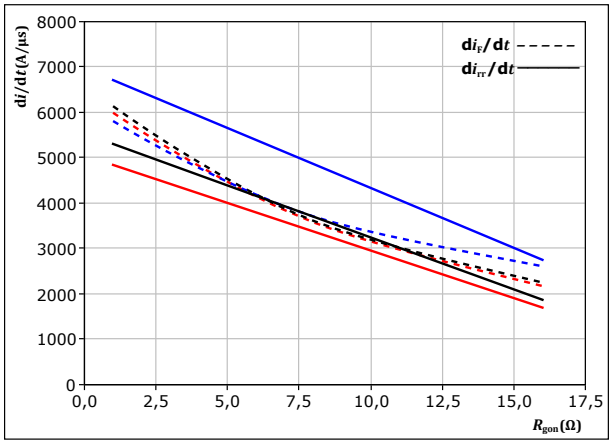
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	-5/15	V		125 °C
R_{gon} =	4	Ω		150 °C

figure 46. **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})



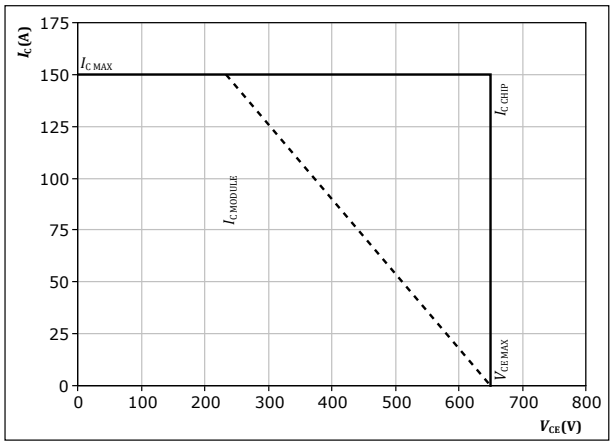
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	-5/15	V		125 °C
I_C =	20	A		150 °C

figure 47. **IGBT**

Reverse bias safe operating area

I_C = f(V_{CE})



At

T_j =	150	°C	
R_{gon} =	4	Ω	
R_{goff} =	4	Ω	

Switching Definitions

figure 48. **IGBT**

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

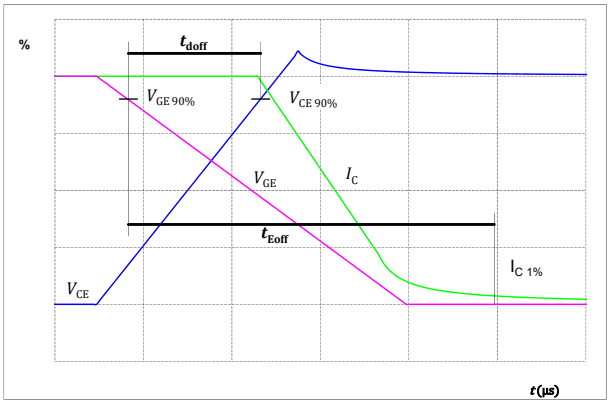


figure 49. **IGBT**

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

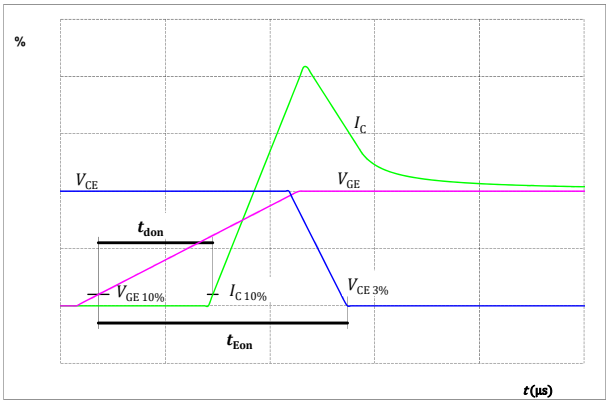


figure 50. **IGBT**

Turn-off Switching Waveforms & definition of t_f

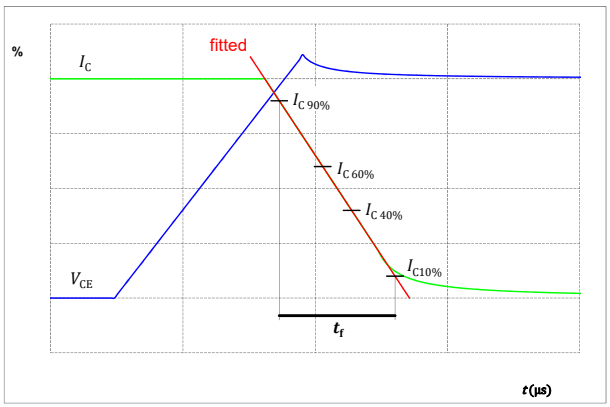
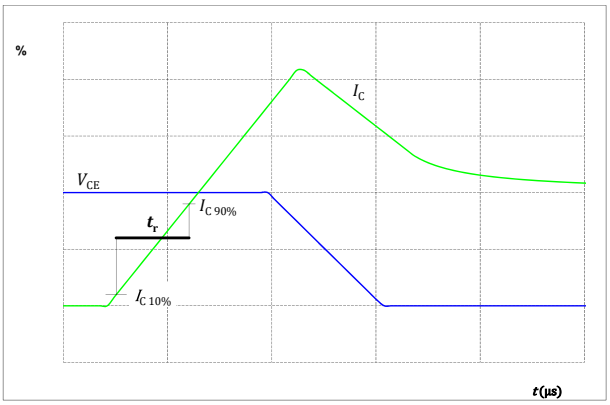


figure 51. **IGBT**

Turn-on Switching Waveforms & definition of t_r



Switching Definitions

figure 52. **FWD**

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

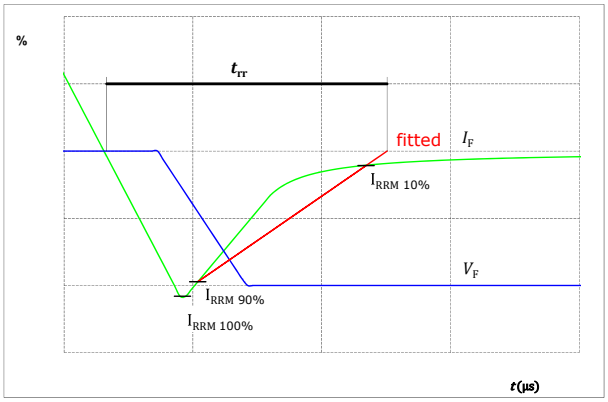
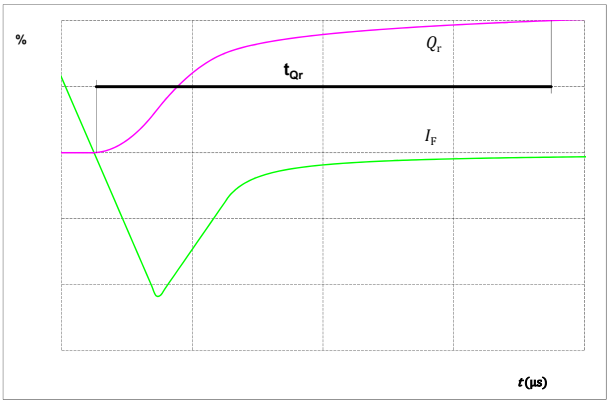


figure 53. **FWD**

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



Ordering Code

Version	Ordering Code
Without thermal paste	10-PY07N3A050SM-M896F04Y
With thermal paste	10-PY07N3A050SM-M896F04Y-/3/

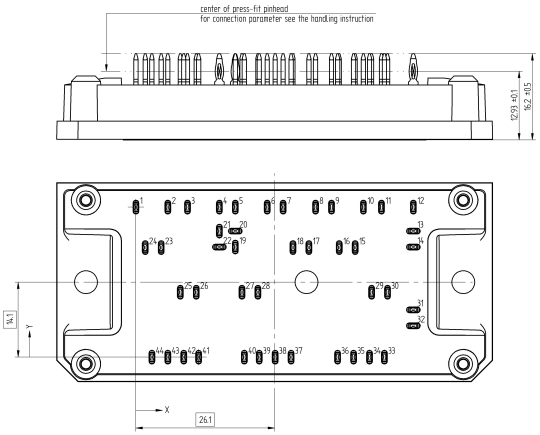
Marking

	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

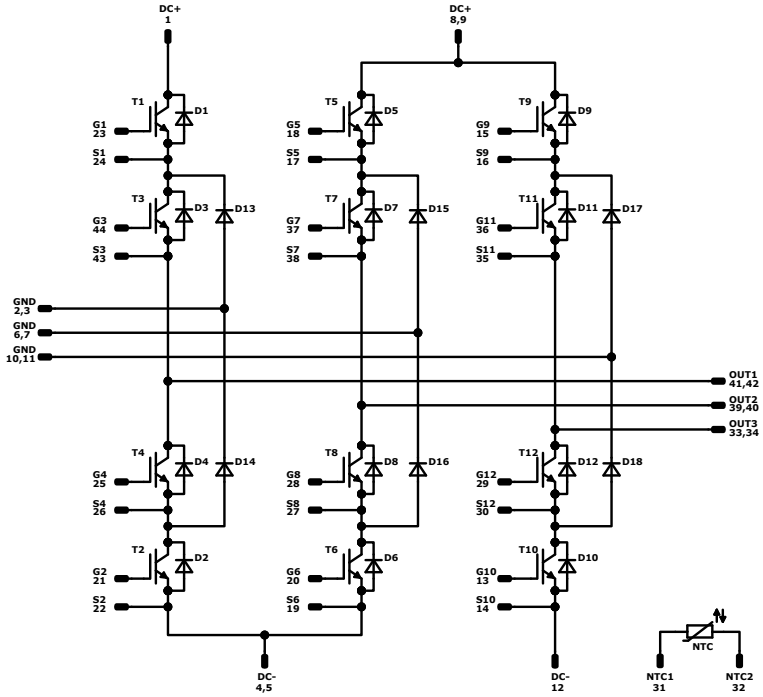
Pin table [mm]

Pin	X	Y	Function
1	0	28,2	+DC
2	6	28,2	GND
3	9,7	28,2	GND
4	15,7	28,2	-DC
5	18,7	28,2	-DC
6	24,7	28,2	GND
7	27,7	28,2	GND
8	33,8	28,2	+DC
9	36,8	28,2	+DC
10	42,8	28,2	GND
11	46,2	28,2	GND
12	52,2	28,2	-DC
13	52,2	23,7	G10
14	52,2	20,7	S10
15	41,25	20,6	G9
16	38,25	20,6	S9
17	32,55	20,6	S5
18	29,55	20,6	G5
19	18,7	20,7	S6
20	18,7	23,7	G6
21	15,7	23,7	G2
22	15,7	20,7	S2
23	4,75	20,6	G1
24	1,75	20,6	S1
25	8,35	12,2	G4
26	11,35	12,2	S4
27	19,95	12,2	S8
28	22,95	12,2	G8
29	44,35	12,2	G12
30	47,35	12,2	S12
31	52,2	8,9	NTC1
32	52,2	5,9	NTC2
33	46,75	0	OUT3
34	43,95	0	OUT3
35	40,95	0	S11
36	37,95	0	G11
37	29,2	0	G7
38	26,2	0	S7
39	23,2	0	OUT2
40	20,4	0	OUT2
41	11,8	0	OUT1
42	9	0	OUT1
43	6	0	S3
44	3	0	G3



Tolerance of pinpositions: ±0.5mm at the end of pins
Dimension of coordinate axis is only offset without tolerance

Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T1, T5, T9, T2, T6, T10	IGBT	650 V	50 A	Buck Switch	
D13, D15, D17, D14, D16, D18	FWD	650 V	30 A	Buck Diode	
T3, T7, T11, T4, T8, T12	IGBT	650 V	75 A	Boost Switch	
D2, D6, D10, D1, D5, D9	FWD	650 V	20 A	Boost Diode	
D4, D3, D8, D7, D12, D11	FWD	650 V	20 A	Boost Sw. Inv. Diode	
NTC	NTC			Thermistor	

Packaging instruction				
Standard packaging quantity (SPQ) 100	>SPQ	Standard	<SPQ	Sample

Handling instruction
Handling instructions for *flow* 1 packages see vincotech.com website.

Package data
Package data for *flow* 1 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.

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10-PY07N3A050SM-M896F04Y-D1-14	21 May. 2020		