10-PY07NIA100S503-M515F58Y

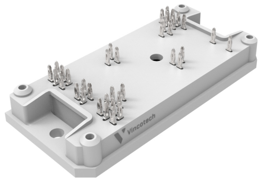
datasheet

*flow*NPC 1	650 V / 100 A

Features

- NPC inverter topology
- Optimized for 1200 Vdc applications
- High-speed IGBT
- Low inductive design
- Integrated NTC

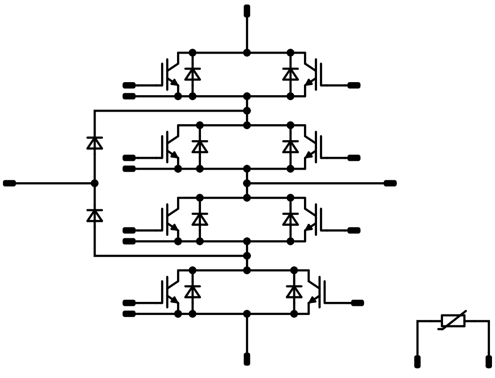
flow 1 12 mm housing



Target applications

- Solar Inverters
- UPS

Schematic



Types

- 10-PY07NIA100S503-M515F58Y

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 (DC current)	I_C	$T_j = T_{jmax}$	T_s = 80 °C	90	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}		300	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	133	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
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s = 80 °C	76	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}		200	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	106	W
Maximum junction temperature	T_{jmax}			175	°C
Boost Switch					
Collector-emitter voltage	V_{CES}			650	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$	T_s = 80 °C	129	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}		450	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	133	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
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s = 80 °C	85	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}		200	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	122	W
Maximum junction temperature	T_{jmax}			175	°C
Boost Sw. Inv. Diode					
Peak repetitive reverse voltage	V_{RRM}			650	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s = 80 °C	85	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}		200	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	122	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	6000	V
Isolation voltage	V_{isol}	AC Voltage	t_p = 1 min	2500	V
Creepage distance				min. 12,7	mm
Clearance				8,09	mm
Comparative Tracking Index	CTI			≥ 200	

*100 % tested in production

Characteristic Values

Parameter	Symbol	Conditions	V_{GE} [V] V_{GS} [V]	V_{CE} [V] V_{DS} [V] V_{F} [V]	I_{C} [A] I_{D} [A] I_{F} [A]	T_{j} [°C]	Min	Typ	Max	Unit
Buck Switch										
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,001	25	3,2	4	4,8	V
Collector-emitter saturation voltage	V_{CEsat}		15		100	25 125 150		1,39 1,48 1,51	1,75(1)	V
Collector-emitter cut-off current	I_{CES}		0	650		25			100	µA
Gate-emitter leakage current	I_{GES}		20	0		25			200	nA
Internal gate resistance	r_{g}							None		Ω
Input capacitance	C_{ies}	f = 1 Mhz	0	25		25		6200		pF
Output capacitance	C_{oes}							176		pF
Reverse transfer capacitance	C_{res}							24		pF
Gate charge	Q_{g}	V_{CC} = 520 V	15		100	25		240		nC
Thermal										
Thermal resistance junction to sink (2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,72		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 4 Ω R_{goff} = 4 Ω	±15	350	100	25 125 150		72 74 73		ns
Rise time	t_{r}					25 125 150		11 11 12		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		98 115 118		ns
Fall time	t_{f}					25 125 150		14,78 26,49 28,9		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=3,14 µC Q_{rFWD}=6,11 µC Q_{rFWD}=6,87 µC				25 125 150		0,661 0,951 1,03		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,903 1,4 1,53		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				100	25 125 150		1,6 1,58 1,57	1,92(1)	V
Reverse leakage current	I_R	V_r = 650 V				25			5,3	µA
Thermal										
Thermal resistance junction to sink (2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,9		K/W
Dynamic										
Peak recovery current	I_{RRM}	di/dt=10159 A/µs di/dt=8829 A/µs di/dt=8697 A/µs	±15	350	100	25 125 150		113,29 146,96 154,89		A
Reverse recovery time	t_{rr}					25 125 150		48,1 82,23 92,26		ns
Recovered charge	Q_r					25 125 150		3,14 6,11 6,87		µC
Reverse recovered energy	E_{rec}					25 125 150		0,837 1,63 1,81		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		4040 3052 3359		A/µs

Characteristic Values

Parameter	Symbol	Conditions	V_{GE} [V] / V_{GS} [V]	V_{CE} [V] / V_{DS} [V] / V_F [V]	I_C [A] / I_D [A] / I_F [A]	T_j [°C]	Values Min	Values Typ	Values Max	Unit
Boost Switch										
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$	V_{CE} = V_{GE}			0,002	25	4,2	5	5,8	V
Collector-emitter saturation voltage	V_{CEsat}		15		150	25 125 150		1,1 1,09 1,09	1,45(1)	V
Collector-emitter cut-off current	I_{CES}		0	650		25			80	µA
Gate-emitter leakage current	I_{GES}		20	0		25			200	nA
Internal gate resistance	r_g							None		Ω
Input capacitance	C_{ies}	f = 1 Mhz	0	25		25		23250		pF
Reverse transfer capacitance	C_{res}							60		pF
Gate charge	Q_g		15	520	150	25		872		nC
Thermal										
Thermal resistance junction to sink (2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,72		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 4 Ω R_{goff} = 4 Ω	±15	350	90	25 125 150		205,8 205,2 205		ns
Rise time	t_r					25 125 150		10,4 12,4 12,8		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		302,2 346 372		ns
Fall time	t_f					25 125 150		56,75 93,58 111,01		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=4,32 µC Q_{rFWD}=8,37 µC Q_{rFWD}=9,5 µC				25 125 150		0,58 0,586 0,605		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		4,57 6,97 7,51		mWs

Characteristic Values

Parameter	Symbol	Conditions	V_{GE} [V] V_{GS} [V]	V_{CE} [V] V_{DS} [V] V_F [V]	I_C [A] I_D [A] I_F [A]	T_j [°C]	Min	Typ	Max	Unit
Boost Diode										
Static										
Forward voltage	V_F				100	25 150	1,18	1,78 1,57	1,82(1)	V
Reverse leakage current	I_R	V_r = 650 V				25			1,2	µA
Thermal										
Thermal resistance junction to sink (2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,78		K/W
Dynamic										
Peak recovery current	I_{RRM}	d*i*/d*t*=10304 A/µs d*i*/d*t*=8191 A/µs d*i*/d*t*=8639 A/µs	±15	350	90	25 125 150		104,99 132,31 139,28		A
Reverse recovery time	t_{rr}					25 125 150		133,73 193,51 202,62		ns
Recovered charge	Q_r					25 125 150		4,32 8,37 9,5		µC
Reverse recovered energy	E_{rec}					25 125 150		1,08 2,36 2,7		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		7314 3676 3353		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				100	25 150	1,18	1,78 1,57	1,82(1)	V
Reverse leakage current	I_R	V_r = 650 V				25			1,2	µA
Thermal										
Thermal resistance junction to sink (2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,78		K/W
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	

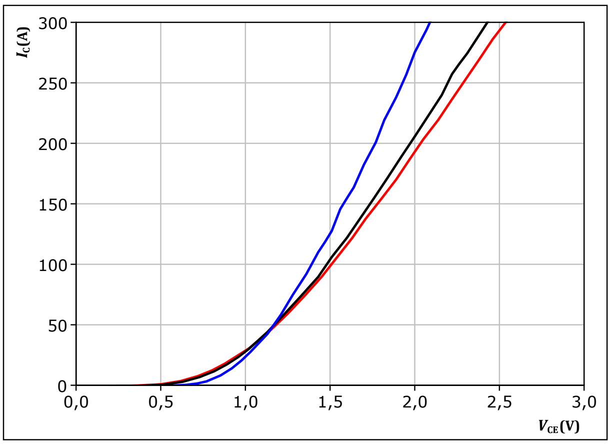
(1) Value at chip level
(2) Only valid with pre-applied Vincotech thermal interface material.

Buck Switch Characteristics

figure 1. **IGBT**

Typical output characteristics

I_C = f(V_{CE})



t_p = 250 µs

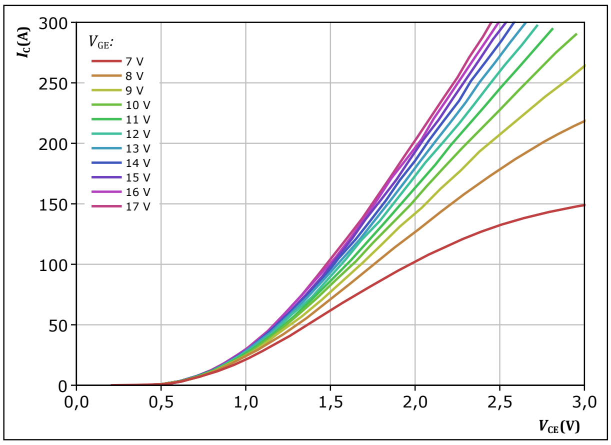
V_{GE} = 15 V

T_j: 25 °C, 125 °C, 150 °C

figure 2. **IGBT**

Typical output characteristics

I_C = f(V_{CE})



t_p = 250 µs

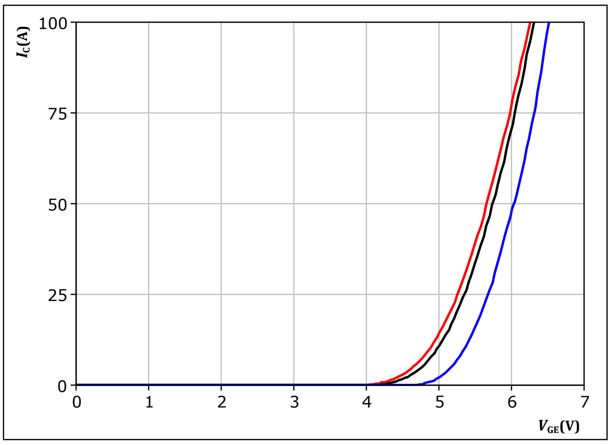
T_j = 150 °C

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

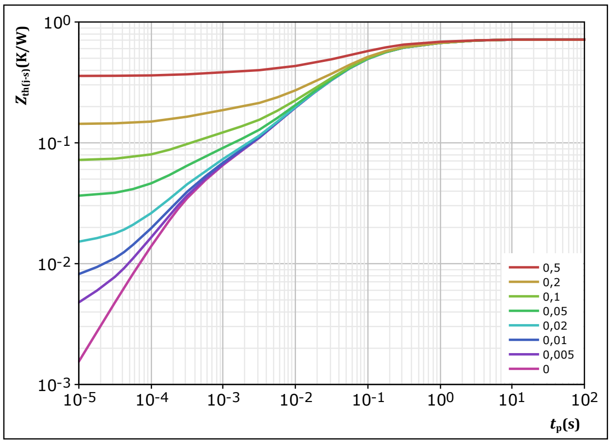
V_{CE} = 10 V

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

$R_{th(j-s)}$ = 0,715 K/W

IGBT thermal model values

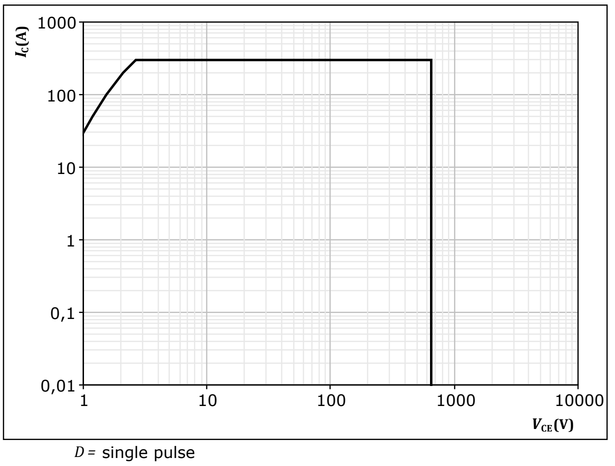
R (K/W)	τ (s)
7,52E-02	1,73E+00
1,31E-01	2,44E-01
3,01E-01	6,32E-02
1,21E-01	1,39E-02
4,30E-02	3,50E-03
4,35E-02	3,33E-04

Buck Switch Characteristics

figure 5.	IGBT

Safe operating area

$I_C = f(V_{CE})$



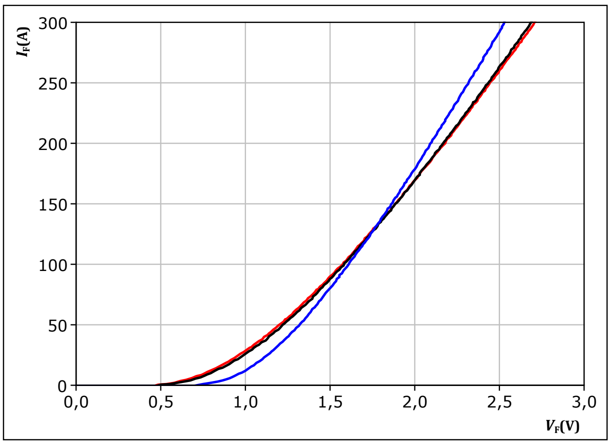
D =	single pulse	
T_s =	80	°C
V_{GE} =	15	V
T_j =	T_{jmax}	

Buck Diode Characteristics

figure 6. **FWD**

Typical forward characteristics

I_F = f(V_F)



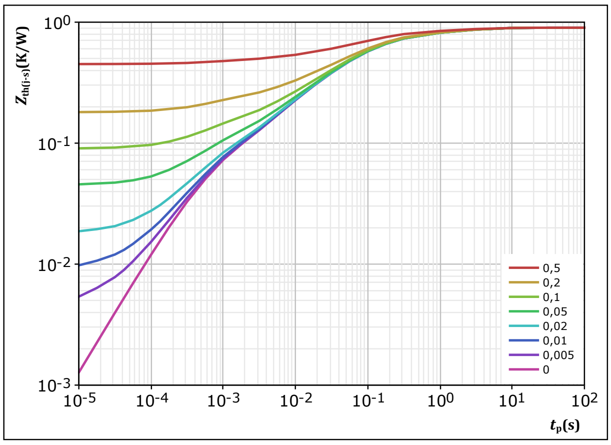
t_p = 250 µs

T_j: 25 °C, 125 °C, 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

$R_{th(j-s)}$ = 0,9 K/W

FWD thermal model values

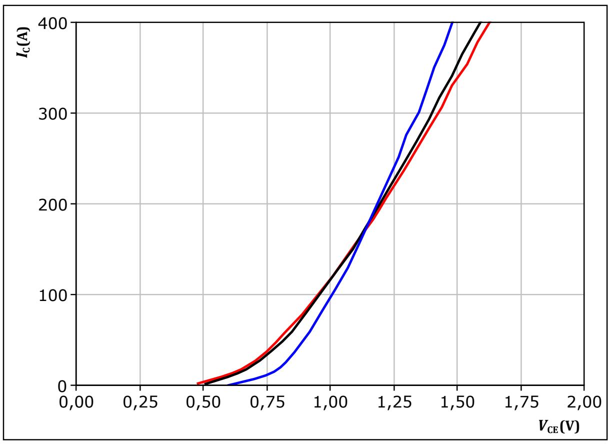
R (K/W)	τ (s)
7,42E-02	3,64E+00
1,41E-01	5,85E-01
3,41E-01	1,04E-01
1,94E-01	2,64E-02
9,09E-02	6,04E-03
5,85E-02	5,72E-04

Boost Switch Characteristics

figure 8. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$

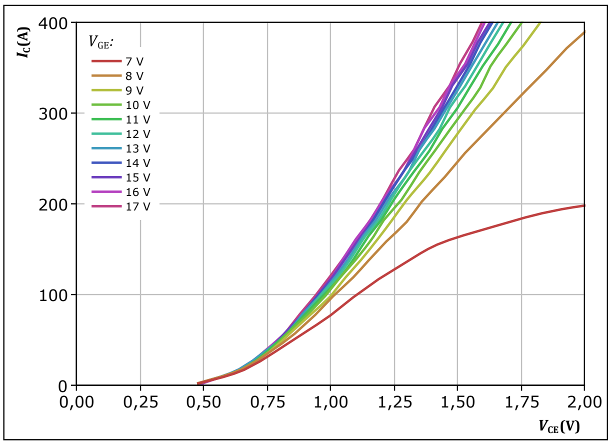


t_p =	250	µs		25 °C
V_{GE} =	15	V	T_j:	125 °C
				150 °C

figure 9. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$



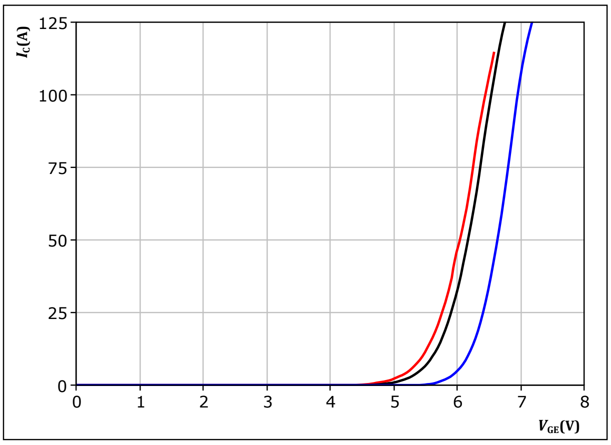
t_p =	250	µs
T_j =	150	°C

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

figure 10. **IGBT**

Typical transfer characteristics

$I_C = f(V_{GE})$

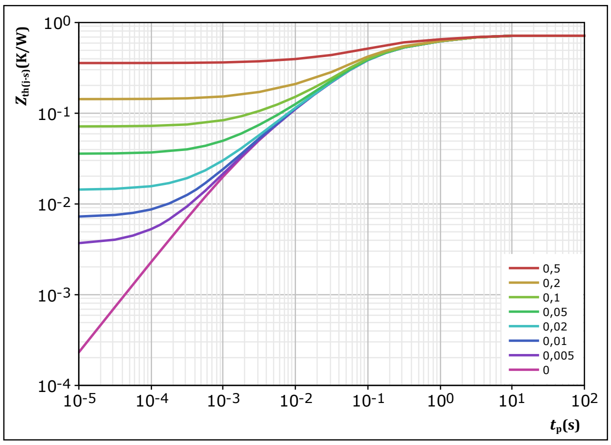


t_p =	250	µs		25 °C
V_{CE} =	10	V	T_j:	125 °C
				150 °C

figure 11. **IGBT**

Transient thermal impedance as a function of pulse width

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



D =	t_p / T	
$R_{th(j-s)}$ =	0,715	K/W

IGBT thermal model values

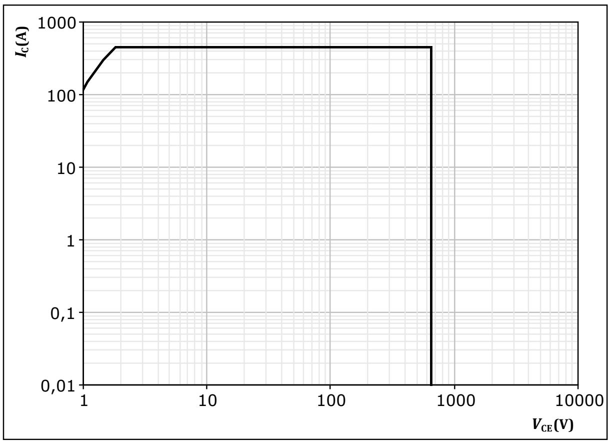
R (K/W)	τ (s)
1,29E-01	2,09E+00
1,33E-01	4,46E-01
3,21E-01	8,45E-02
6,42E-02	2,97E-02
5,12E-02	7,88E-03
1,68E-02	1,62E-03

Boost Switch Characteristics

figure 12.	IGBT

Safe operating area

I_C = f(V_{CE})



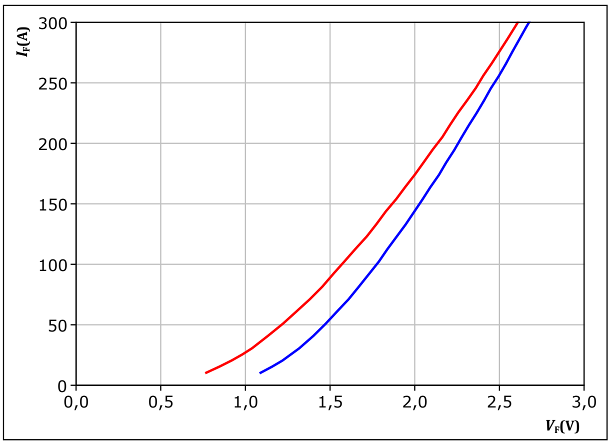
D =	single pulse	
T_s =	80	°C
V_{GE} =	15	V
T_j =	T_{jmax}	

Boost Diode Characteristics

figure 13. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



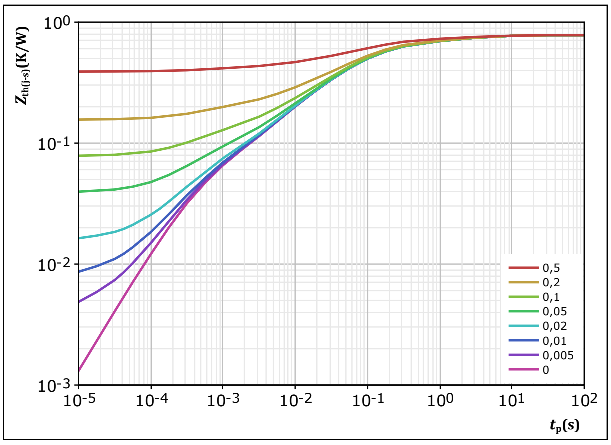
t_p = 250 µs

T_j: 25 °C, 150 °C

figure 14. **FWD**

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$

$R_{th(j-s)}$ = 0,78 K/W

FWD thermal model values

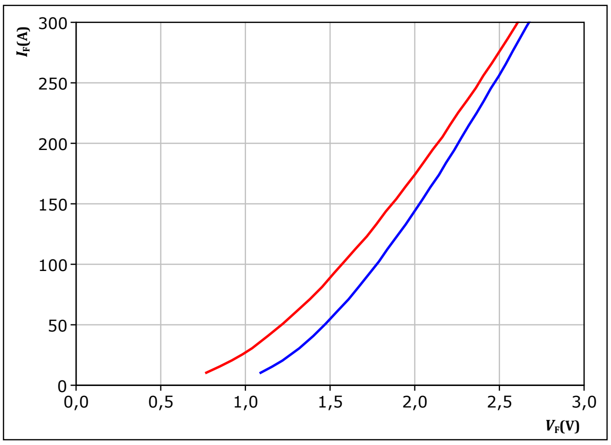
R (K/W)	τ (s)
5,76E-02	5,42E+00
8,79E-02	1,09E+00
2,14E-01	1,59E-01
2,31E-01	4,95E-02
1,16E-01	1,05E-02
3,20E-02	2,39E-03
4,19E-02	4,10E-04

Boost Sw. Inv. Diode Characteristics

figure 15. FWD

Typical forward characteristics

$I_F = f(V_F)$



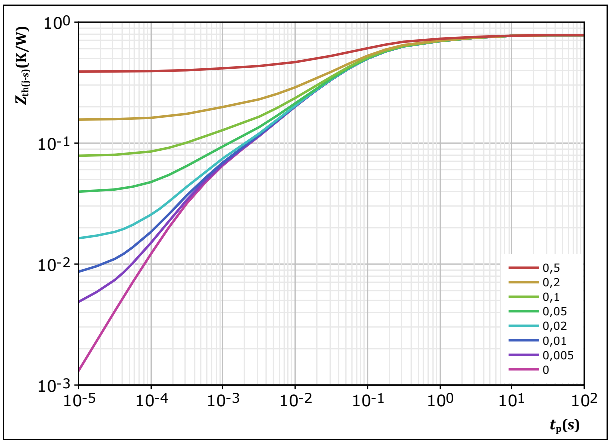
t_p = 250 μs

T_j: 25 °C, 150 °C

figure 16. FWD

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$

$R_{th(j-s)}$ = 0,78 K/W

FWD thermal model values

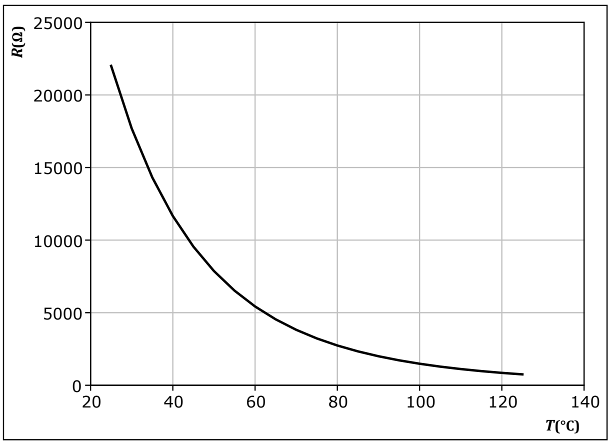
R (K/W)	τ (s)
5,76E-02	5,42E+00
8,79E-02	1,09E+00
2,14E-01	1,59E-01
2,31E-01	4,95E-02
1,16E-01	1,05E-02
3,20E-02	2,39E-03
4,19E-02	4,10E-04

Thermistor Characteristics

figure 17.	**Thermistor**

Typical NTC characteristic as function of temperature

R_T = f(T)

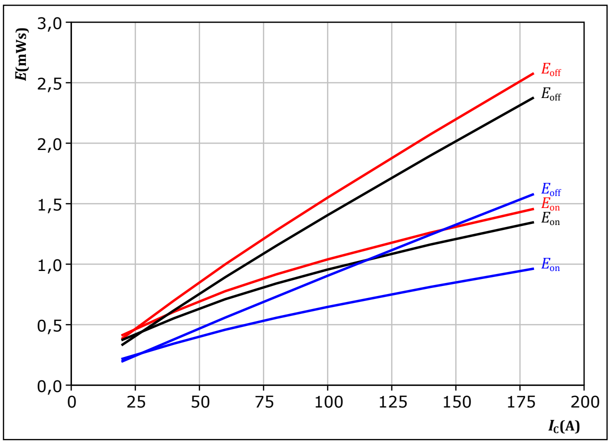


Buck Switching Characteristics

figure 18. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



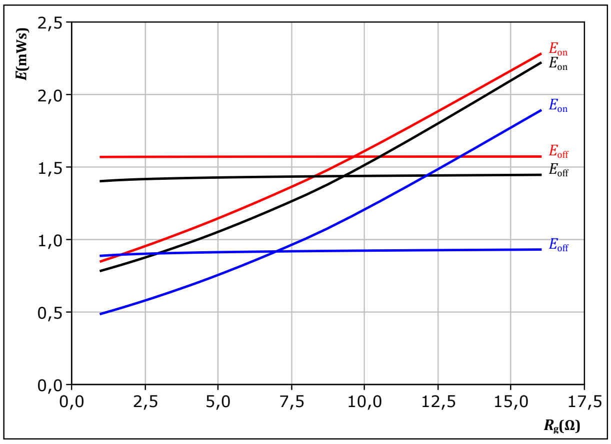
With an inductive load at

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

figure 19. **IGBT**

Typical switching energy losses as a function of gate resistor

$E = f(R_g)$



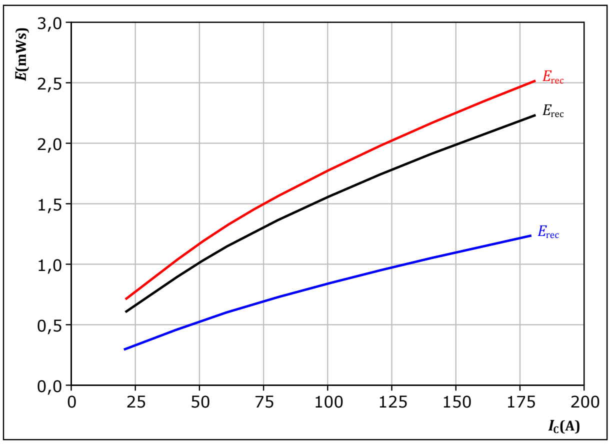
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	100	A		150 °C

figure 20. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



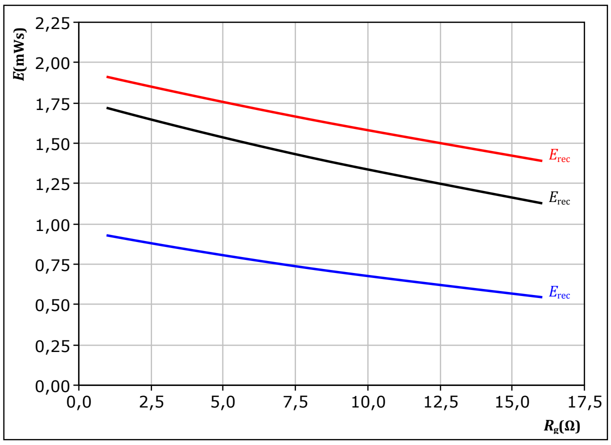
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	4	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

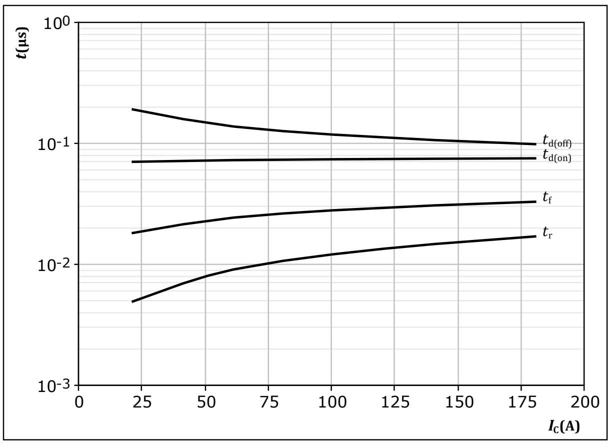
V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	100	A		150 °C

Buck Switching Characteristics

figure 22. **IGBT**

Typical switching times as a function of collector current

t = f(I_C)



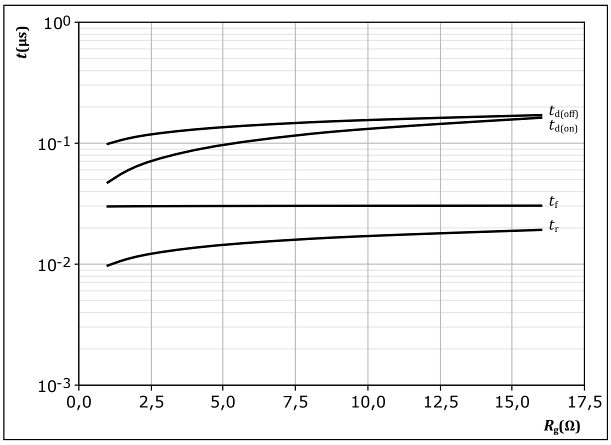
With an inductive load at

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

figure 23. **IGBT**

Typical switching times as a function of gate resistor

t = f(R_g)



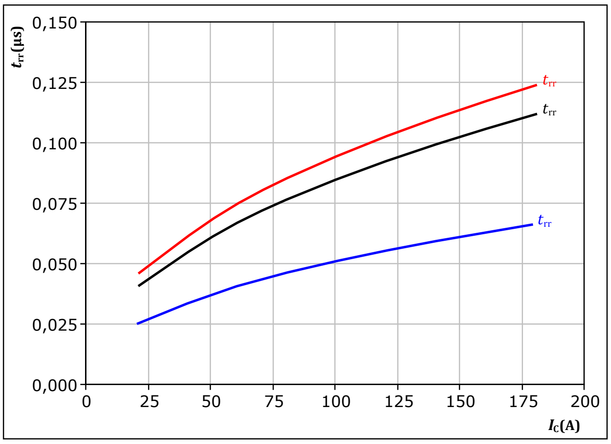
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	±15	V
I_C =	100	A

figure 24. **FWD**

Typical reverse recovery time as a function of collector current

t_{rr} = f(I_C)



With an inductive load at

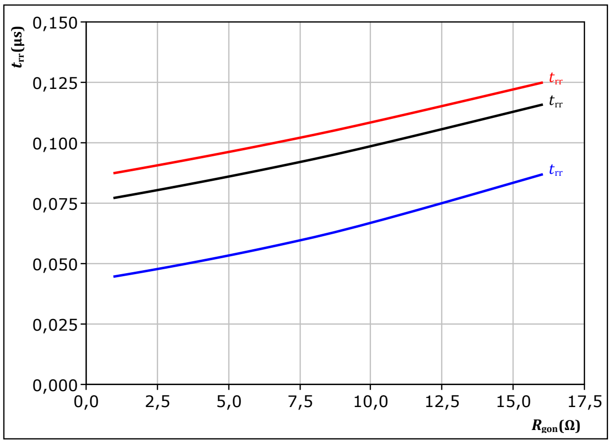
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	4	Ω

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} =	±15	V
I_C =	100	A

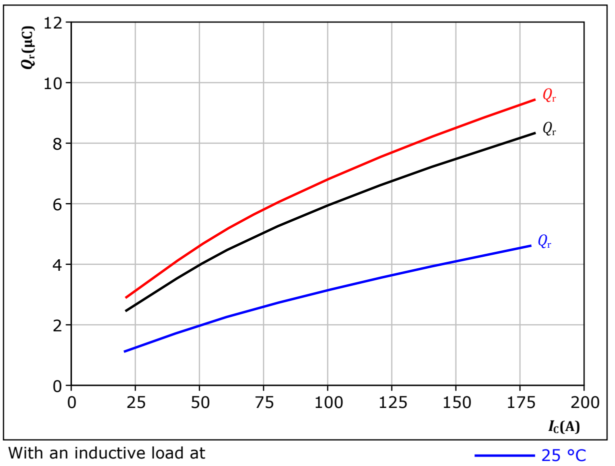
T_j: 25 °C, 125 °C, 150 °C

Buck Switching Characteristics

figure 26. **FWD**

Typical recovered charge as a function of collector current

$Q_r = f(I_C)$



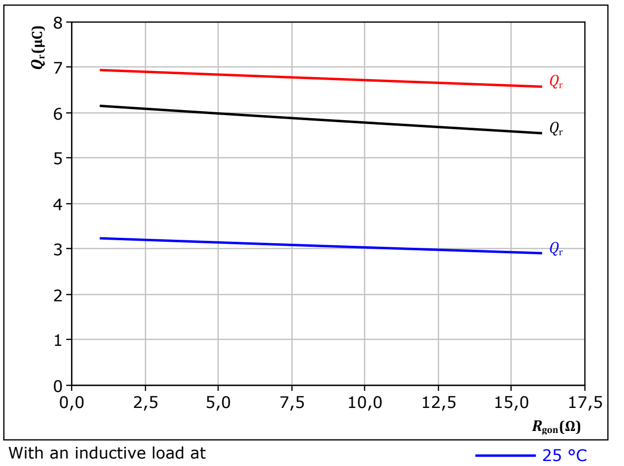
With an inductive load at

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

figure 27. **FWD**

Typical recovered charge as a function of turn on gate resistor

$Q_r = f(R_{gon})$



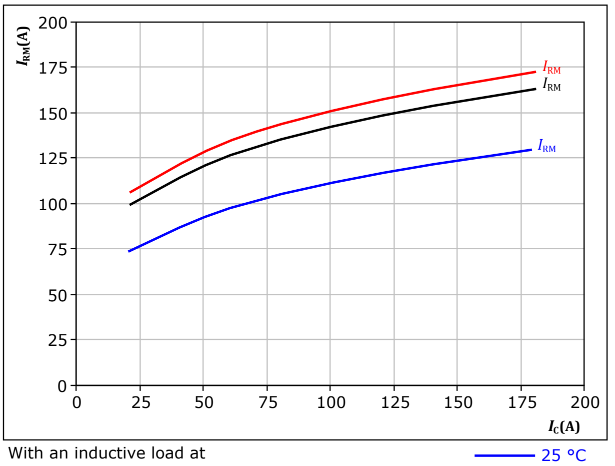
With an inductive load at

V_{CE} =	350	V	T_j: 25 °C / 125 °C / 150 °C
V_{GE} =	±15	V	
I_C =	100	A	

figure 28. **FWD**

Typical peak reverse recovery current as a function of collector current

$I_{RM} = f(I_C)$



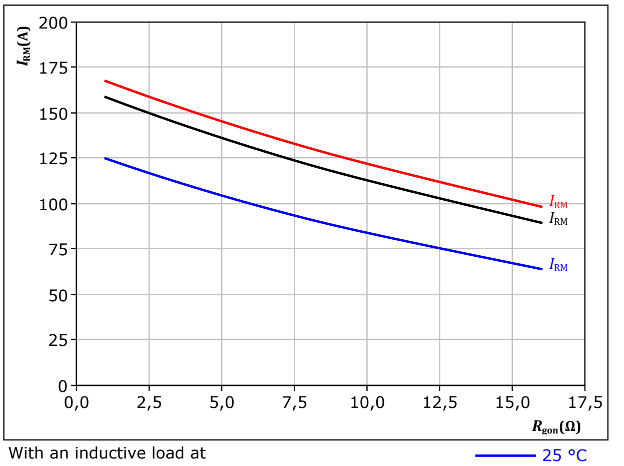
With an inductive load at

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

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

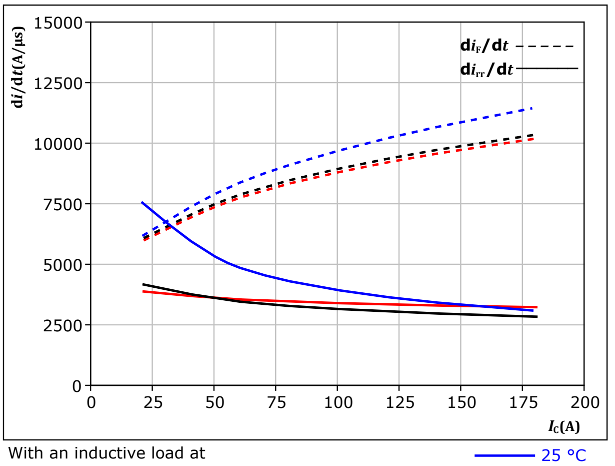
V_{CE} =	350	V	T_j: 25 °C / 125 °C / 150 °C
V_{GE} =	±15	V	
I_C =	100	A	

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)



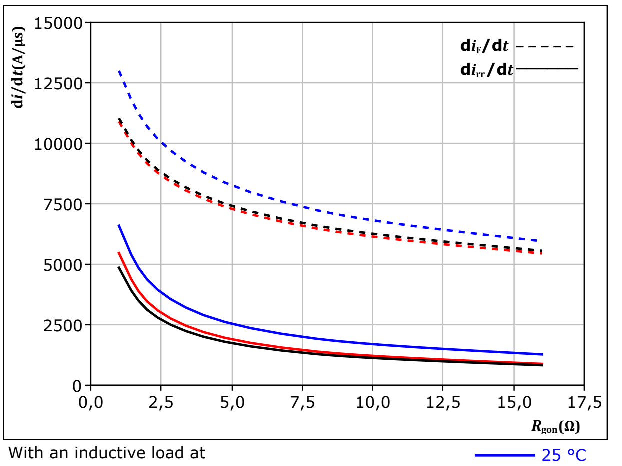
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	4	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})



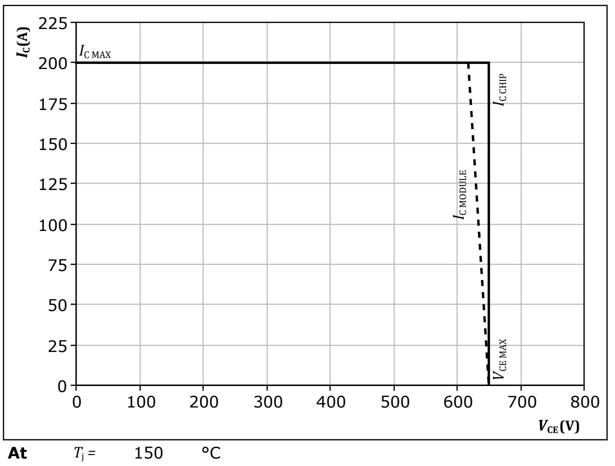
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	100	A		150 °C

figure 32. **IGBT**

Reverse bias safe operating area

I_C = f(V_{CE})



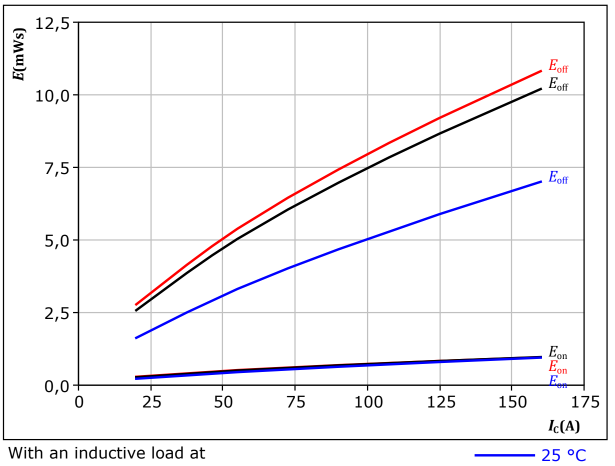
At	T_j =	150	°C
	R_{gon} =	4	Ω
	R_{goff} =	4	Ω

Boost Switching Characteristics

figure 33. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



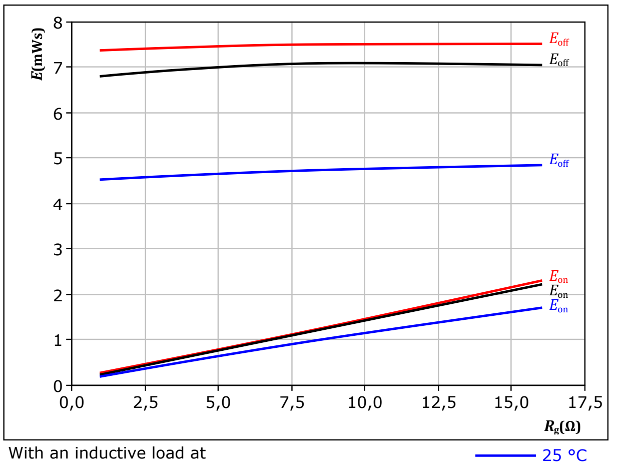
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±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

$E = f(R_g)$



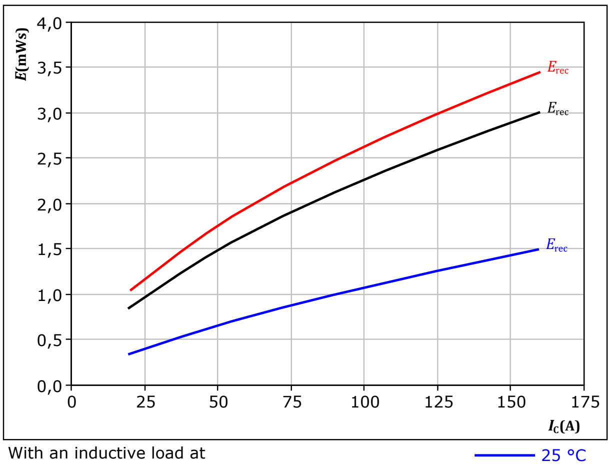
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	90	A		150 °C

figure 35. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



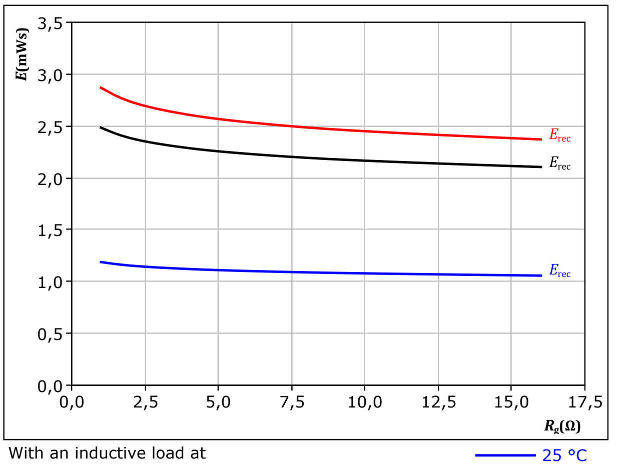
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±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

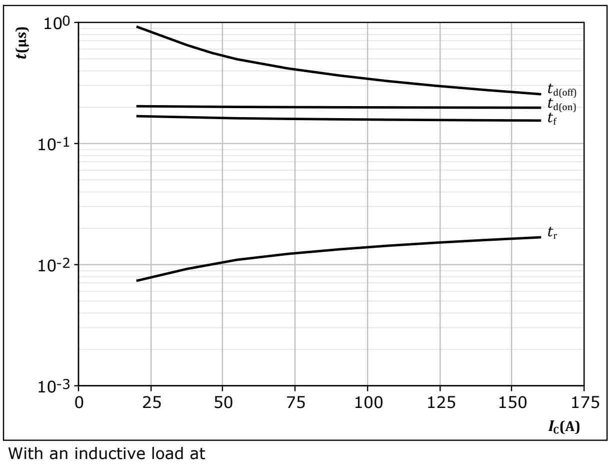
V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	90	A		150 °C

Boost Switching Characteristics

figure 37. IGBT

Typical switching times as a function of collector current

t = f(I_C)



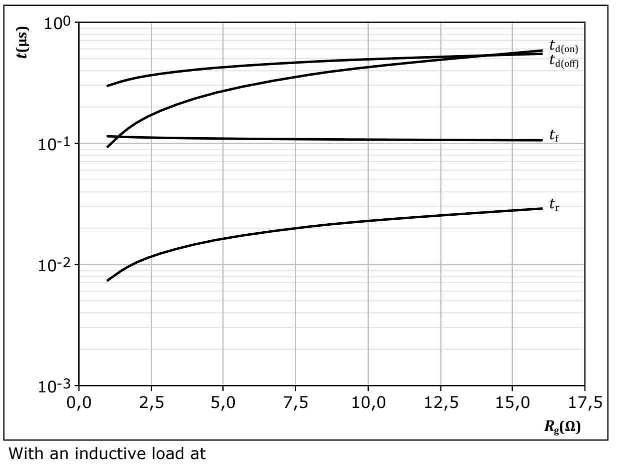
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	±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)



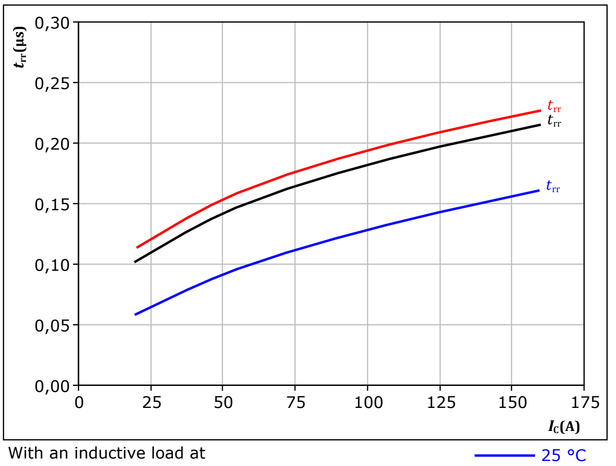
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	±15	V
I_C =	90	A

figure 39. FWD

Typical reverse recovery time as a function of collector current

t_{rr} = f(I_C)



With an inductive load at

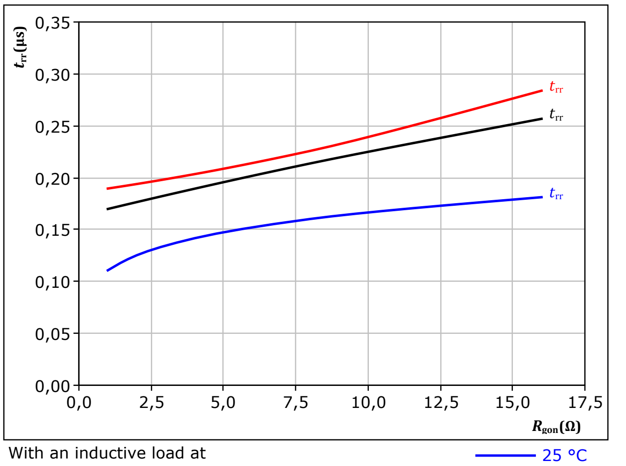
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	4	Ω

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} =	±15	V
I_C =	90	A

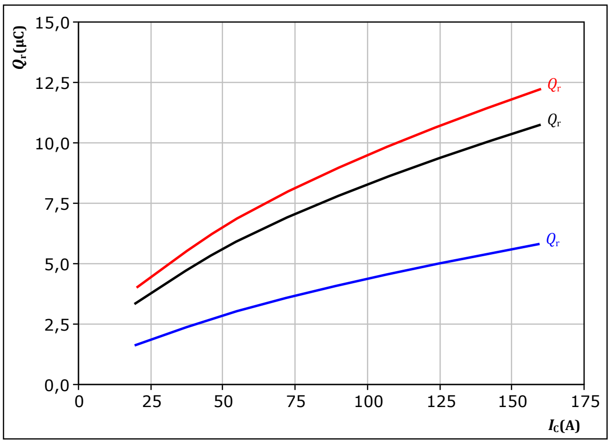
T_j: 25 °C, 125 °C, 150 °C

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

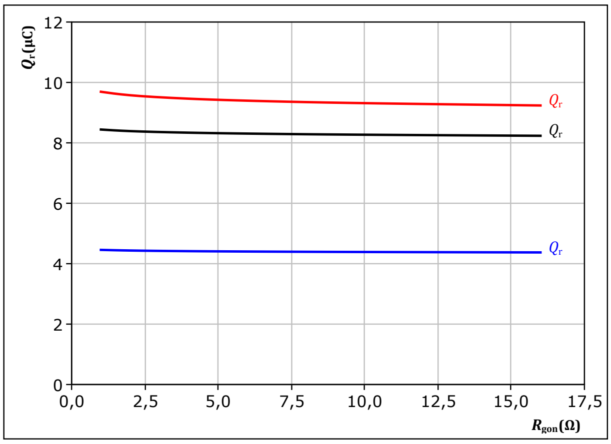
V_{CE} = 350 V
V_{GE} = ±15 V
R_{gon} = 4 Ω

T_j: 25 °C / 125 °C / 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

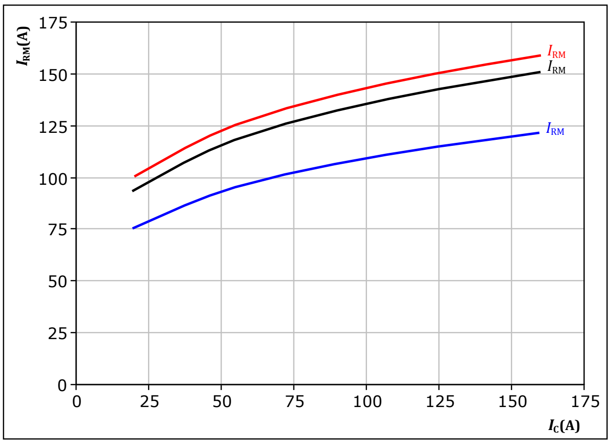
V_{CE} = 350 V
V_{GE} = ±15 V
I_C = 90 A

T_j: 25 °C / 125 °C / 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

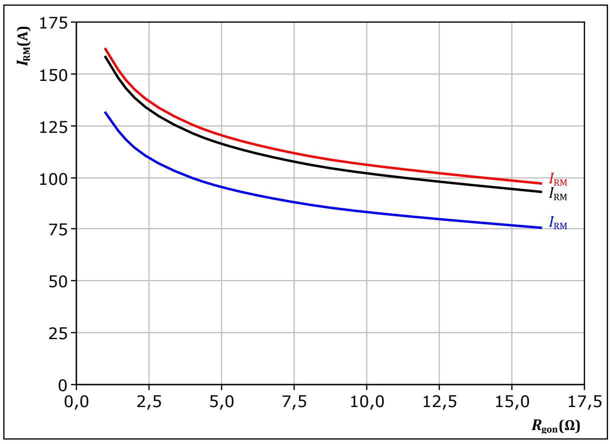
V_{CE} = 350 V
V_{GE} = ±15 V
R_{gon} = 4 Ω

T_j: 25 °C / 125 °C / 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
V_{GE} = ±15 V
I_C = 90 A

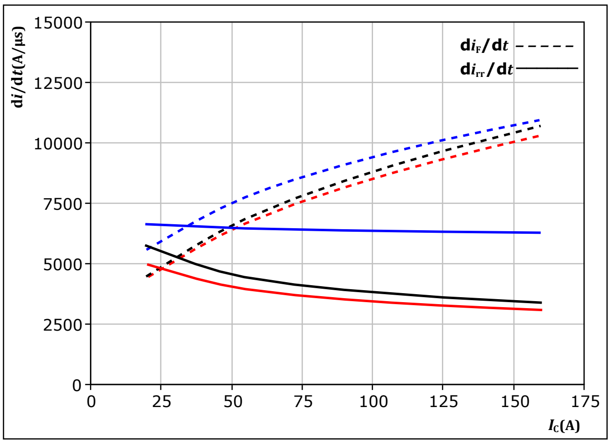
T_j: 25 °C / 125 °C / 150 °C

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)



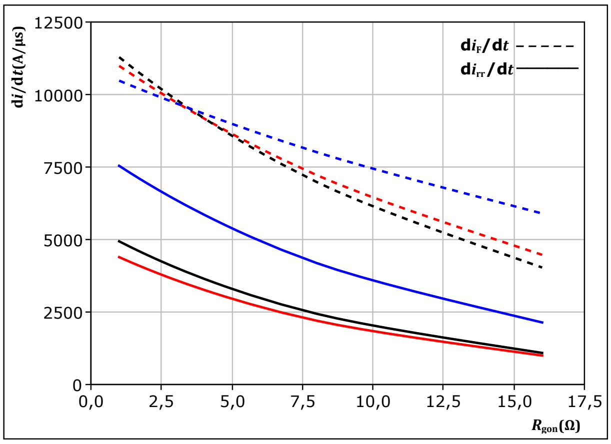
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±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})



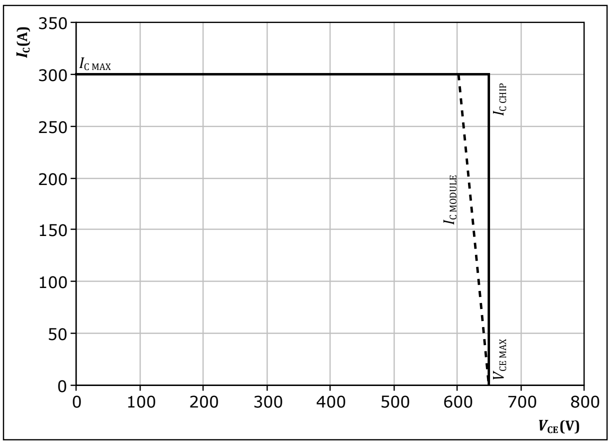
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	90	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})

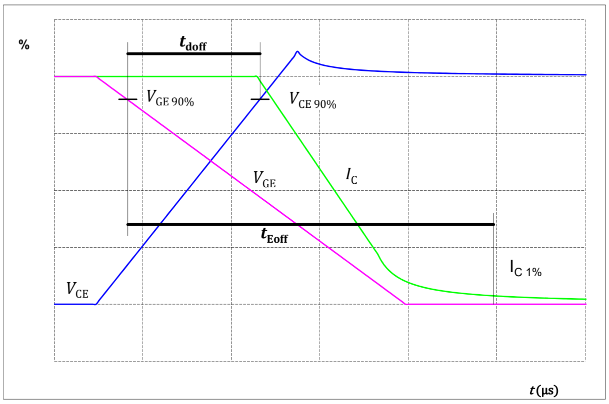


figure 49. **IGBT**

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

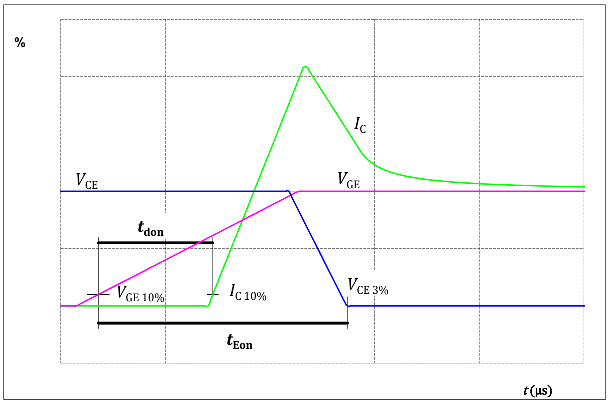


figure 50. **IGBT**

Turn-off Switching Waveforms & definition of t_f

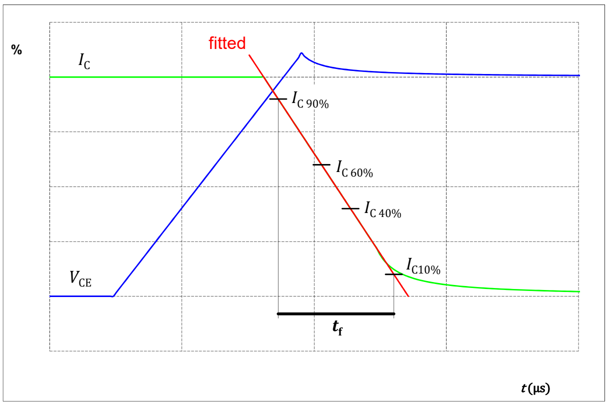
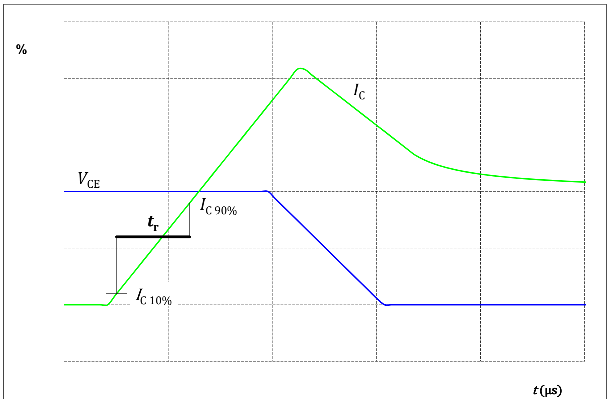


figure 51. **IGBT**

Turn-on Switching Waveforms & definition of t_r



Switching Definitions

figure 52. **FWD**

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

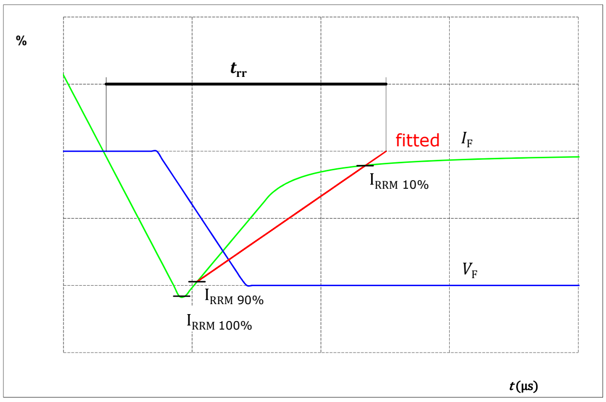
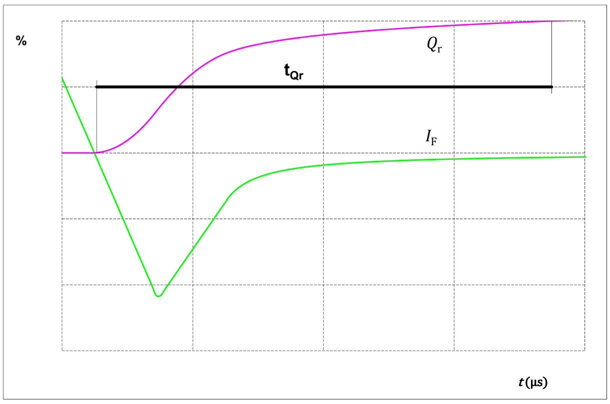


figure 53. **FWD**

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



Ordering Code

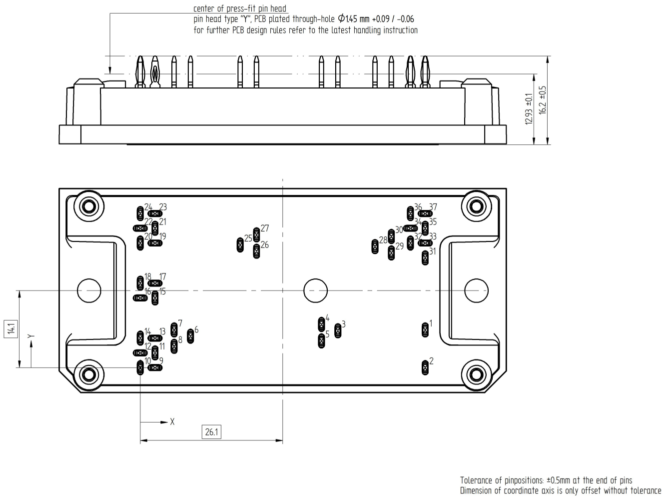
Version	Ordering Code
Without thermal paste	10-PY07NIA100S503-M515F58Y
With thermal paste	10-PY07NIA100S503-M515F58Y-/3/

Marking

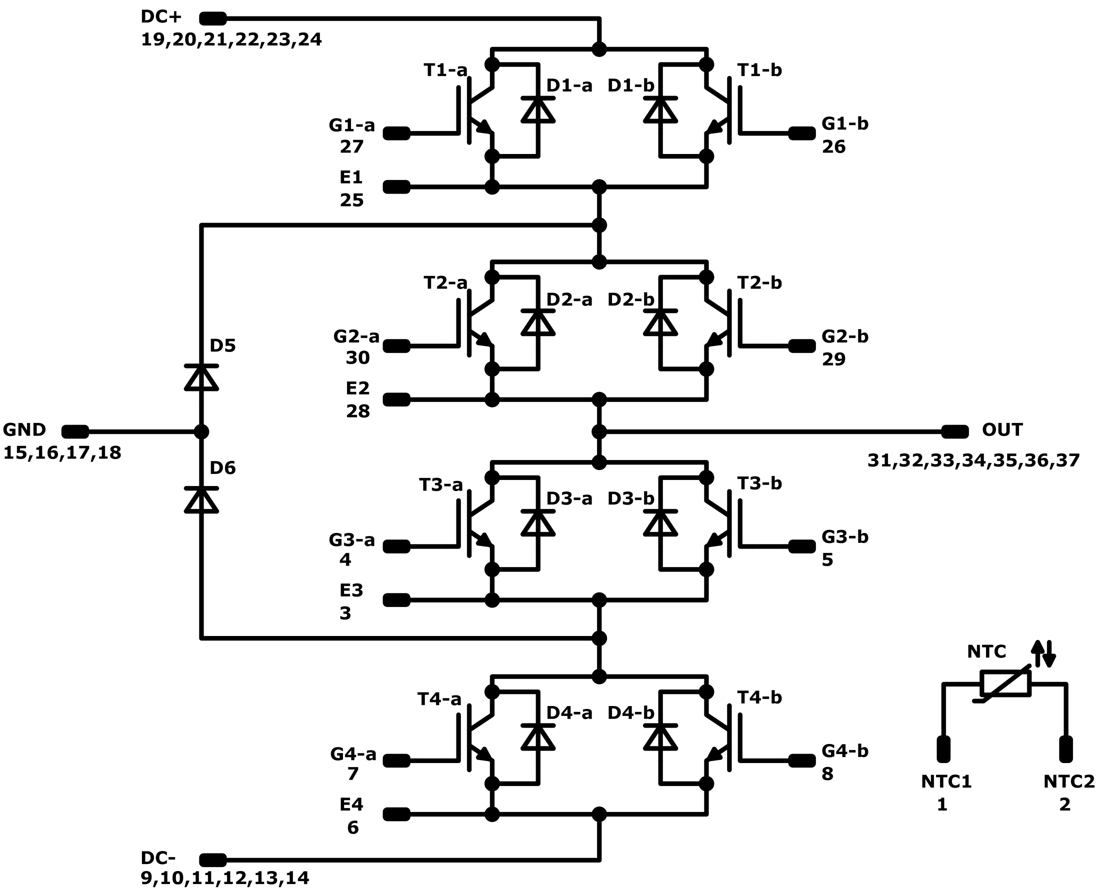
		Name		Date code	UL & VIN	Lot	Serial
	Text	NN-NNNNNNNNNNNNNN-TTTTTTTVV		WWYY	UL VIN	LLLLL	SSSS
	Datamatrix	Type&Ver	Lot number	Serial	Date code		
		TTTTTTTVV	LLLLL	SSSS	WWYY		

Outline

Pin table [mm]			
Pin	X	Y	Function
1	52,2	6,9	NTC1
2	52,2	0	NTC2
3	36,2	6,75	E3
4	33,2	7,9	G3-a
5	33,2	4,9	G3-b
6	9,2	5,75	E4
7	6,2	6,9	G4-a
8	6,2	3,9	G4-b
9	2,7	0	DC-
10	0	0	DC-
11	2,7	2,7	DC-
12	0	2,7	DC-
13	2,7	5,4	DC-
14	0	5,4	DC-
15	2,7	12,75	GND
16	0	12,75	GND
17	2,7	15,45	GND
18	0	15,45	GND
19	2,7	22,8	DC+
20	0	22,8	DC+
21	2,7	25,5	DC+
22	0	25,5	DC+
23	2,7	28,2	DC+
24	0	28,2	DC+
25	18,3	22,45	E1
26	21,3	21,3	G1-b
27	21,3	24,3	G1-a
28	43	22,15	E2
29	46	21	G2-b
30	46	24	G2-a
31	52,2	20,1	OUT
32	49,5	22,8	OUT
33	52,2	22,8	OUT
34	49,5	25,5	OUT
35	52,2	25,5	OUT
36	49,5	28,2	OUT
37	52,2	28,2	OUT



Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T1, T4	IGBT	650 V	100 A	Buck Switch	
D5, D6	FWD	650 V	100 A	Buck Diode	
T2, T3	IGBT	650 V	150 A	Boost Switch	
D4, D1	FWD	650 V	100 A	Boost Diode	
D3, D2	FWD	650 V	100 A	Boost Sw. Inv. Diode	
NTC	Thermistor			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.

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
10-PY07NIA100S503-M515F58Y-D1-14	2 Nov. 2020		