Vincotech

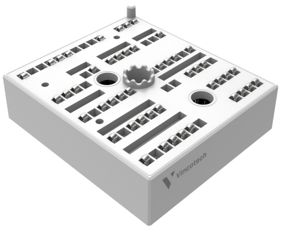
80-M212WPA015M7-K757F70
datasheet

MiniSKiiP® PACK 2 **1200 V / 15 A**

Features

- Twin sixpack configuration
- IGBT M7 with low VCEsat and improved EMC behavior
- Solderless spring contact mounting system

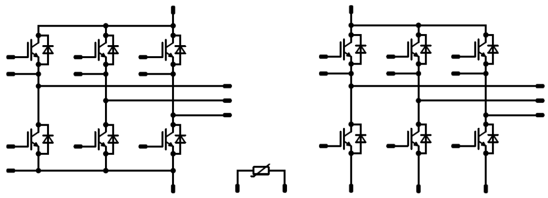
MiniSKiiP® 2 16 mm housing



Target applications

- Embedded Drives
- Industrial Drives

Schematic



Types

- 80-M212WPA015M7-K757F70

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions		Value	Unit
Inverter Switch 2					
Collector-emitter voltage	V_{CES}			1200	V
Collector current	I_C	$T_j = T_{jmax}$	T_s = 80 °C	21	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}		30	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	79	W
Gate-emitter voltage	V_{GES}			±20	V
Short circuit ratings	t_{SC}	V_{GE} = 0 V, V_{CC} = 800 V	T_j = 150 °C	9,5	µs
Maximum junction temperature	T_{jmax}			175	°C
Inverter Diode 2					
Peak repetitive reverse voltage	V_{RRM}			1200	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$	T_s = 80 °C	21	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, t_p = 10 ms	T_j = 25 °C	65	A
Surge current capability	I^2t			21	A^2s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	66	W
Maximum junction temperature	T_{jmax}			175	°C
Inverter Switch					
Collector-emitter voltage	V_{CES}			1200	V
Collector current	I_C	$T_j = T_{jmax}$	T_s = 80 °C	14	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}		20	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	67	W
Gate-emitter voltage	V_{GES}			±20	V
Short circuit ratings	t_{SC}	V_{GE} = 0 V, V_{CC} = 800 V	T_j = 150 °C	9,5	µs
Maximum junction temperature	T_{jmax}			175	°C

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions		Value	Unit
Inverter Diode					
Peak repetitive reverse voltage	V_{RRM}			1600	V
Forward average current	I_{FAV}	$T_j = T_{jmax}$	T_s = 80 °C	25	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, t_p = 10 ms	T_j = 150 °C	200	A
Surge current capability	I^2t	Single Half Sine Wave, t_p = 10 ms	T_j = 150 °C	200	A^2s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	58	W
Maximum junction temperature	T_{jmax}			150	°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	5500	V
Isolation voltage	V_{isol}	AC Voltage	t_p = 1 min	2500	V
Creepage distance		With std lid For more informations see handling instructions		6,3	mm
Clearance		With std lid For more informations see handling instructions		6,3	mm
Comparative Tracking Index	CTI			≥ 600	

*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
Inverter Switch 2										
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$			10	0,0015	25	5,4	6	6,6	V
Collector-emitter saturation voltage	V_{CEsat}		15		15	25 125 150		1,7 1,95 2,01	2,15	V
Collector-emitter cut-off current	I_{CES}		0	1200		25			60	µA
Gate-emitter leakage current	I_{GES}		0	0		25			500	nA
Internal gate resistance	r_g							None		Ω
Input capacitance	C_{ies}		0	10		25		2900		pF
Output capacitance	C_{oes}		0	10		25		120		pF
Reverse transfer capacitance	C_{res}		0	10		25		34		pF
Gate charge	Q_g	V_{CC} = 600 V	15		15	25		110		nC
Thermal										
Thermal resistance junction to sink*	$R_{th(j-s)}$	λ_{paste} = 2,5 W/mK (HPTP)						1,21		K/W

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

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
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 16 Ω R_{goff} = 16 Ω	±15	600	15	25 125 150		99,84 98,88 98,56		ns
Rise time	t_r	R_{gon} = 16 Ω R_{goff} = 16 Ω	±15	600	15	25 125 150		18,24 19,84 19,52		ns
Turn-off delay time	$t_{d(off)}$	R_{gon} = 16 Ω R_{goff} = 16 Ω	±15	600	15	25 125 150		160,32 187,2 196,48		ns
Fall time	t_f	R_{gon} = 16 Ω R_{goff} = 16 Ω	±15	600	15	25 125 150		132,29 173,22 179,81		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=0,931 µC Q_{rFWD}=1,95 µC Q_{rFWD}=2,33 µC	±15	600	15	25 125 150		0,722 1,04 1,14		mWs
Turn-off energy (per pulse)	E_{off}		±15	600	15	25 125 150		1,18 1,73 1,81		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	
Inverter Diode 2										
Static										
Forward voltage	V_F				15	25 150		2,6 2,65	2,71 2,77	V
Reverse leakage current	I_R	V_r = 1200 V				25 150		 900	60 1800	µA
Thermal										
Thermal resistance junction to sink*	$R_{th(j-s)}$	λ_{paste} = 2,5 W/mK (HPTP)						1,44		K/W

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

Parameter	Symbol	Conditions	V_{GE} [V]	V_{CE} [V]	I_F [A]	T_j [°C]	Min	Typ	Max	Unit
Dynamic										
Peak recovery current	I_{RRM}	d*i*/d*t*=766 A/µs d*i*/d*t*=707 A/µs d*i*/d*t*=713 A/µs	±15	600	15	25 125 150		13,36 15,91 17,02		A
Reverse recovery time	t_{rr}					25 125 150		171,98 380,09 402,2		ns
Recovered charge	Q_r					25 125 150		0,931 1,95 2,33		µC
Reverse recovered energy	E_{rec}					25 125 150		0,342 0,803 0,965		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		472,56 300,4 261,5		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
Inverter Switch										
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$			10	0,001	25	5,4	6	6,6	V
Collector-emitter saturation voltage	V_{CEsat}		15		10	25 125 150		1,66 1,9 1,96	2,15	V
Collector-emitter cut-off current	I_{CES}		0	1200		25			35	µA
Gate-emitter leakage current	I_{GES}		0	0		25			500	nA
Internal gate resistance	r_g							None		Ω
Input capacitance	C_{ies}		0	10		25		2000		pF
Output capacitance	C_{oes}							86		pF
Reverse transfer capacitance	C_{res}							23		pF
Gate charge	Q_g	V_{CC} = 600 V	15		10	25		80		nC
Thermal										
Thermal resistance junction to sink*	$R_{th(j-s)}$	λ_{paste} = 2,5 W/mK (HPTP)						1,41		K/W

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

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
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 16 Ω R_{goff} = 16 Ω	±15	600	10	25 125		74,24 73,6		ns
Rise time	t_r					25 125		11,52 13,44		ns
Turn-off delay time	$t_{d(off)}$					25 125		157,12 183,04		ns
Fall time	t_f					25 125		126,85 138,39		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=25,13 µC Q_{rFWD}=28,84 µC				25 125		11,73 14,32		mWs
Turn-off energy (per pulse)	E_{off}					25 125		0,699 0,911		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	
Inverter Diode										
Static										
Forward voltage	V_F				18	25 125 150		1,12 1,03 1,02	1,5	V
Reverse leakage current	I_R	V_r = 1600 V				25 150			100 1000	µA
Thermal										
Thermal resistance junction to sink*	$R_{th(j-s)}$	λ_{paste} = 2,5 W/mK (HPTP)						1,2		K/W

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

Thermistor

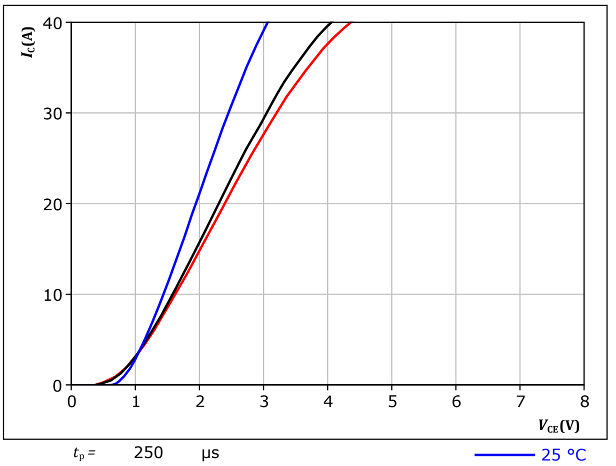
Parameter	Symbol	Conditions				T_j [°C]	Min	Typ	Max	Unit
Static										
Rated resistance	R					25		5		kΩ
Deviation of R_{100}	$\Delta_{R/R}$	R_{100} = 499 Ω				100	3,2		3,3	%
Power dissipation	P							5		mW
Power dissipation constant	d					25		1,3		mW/K
B-value	$B_{(25/50)}$	Tol. ±1 %						3380		K

Inverter Switch 2 Characteristics

figure 1. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$



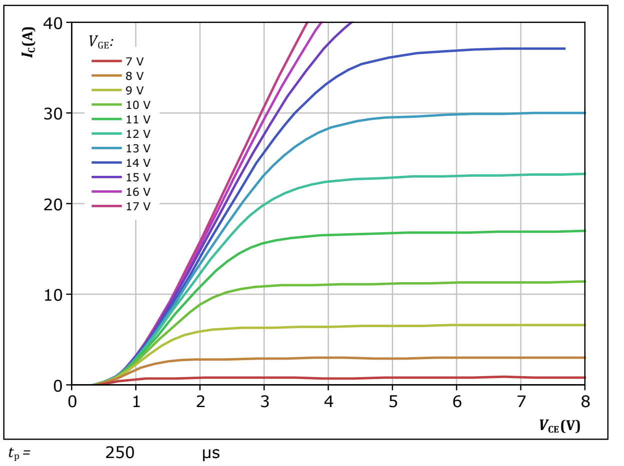
t_p =	250	μs
V_{GE} =	15	V

T_j: 25 °C, 125 °C, 150 °C

figure 2. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$



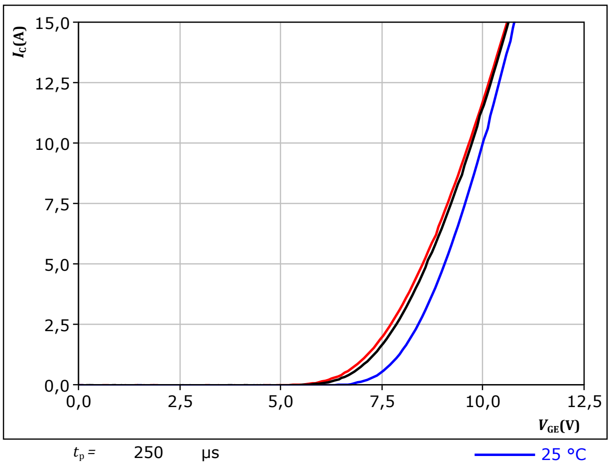
t_p =	250	μs
T_j =	150	°C

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

figure 3. **IGBT**

Typical transfer characteristics

$I_C = f(V_{GE})$



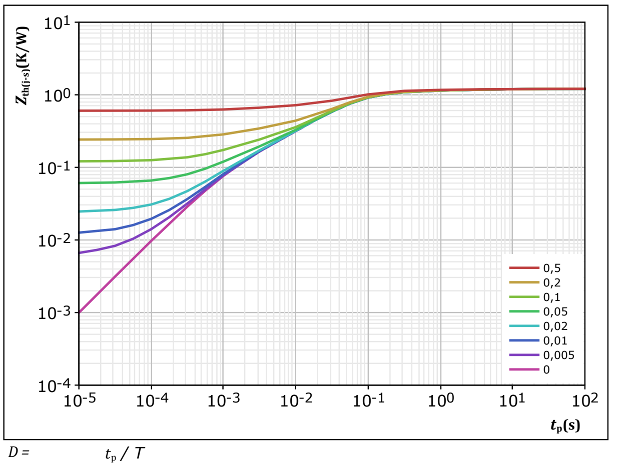
t_p =	250	μs
V_{CE} =	10	V

T_j: 25 °C, 125 °C, 150 °C

figure 4. **IGBT**

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$

$R_{th(j-s)}$ = 1,208 K/W

IGBT thermal model values

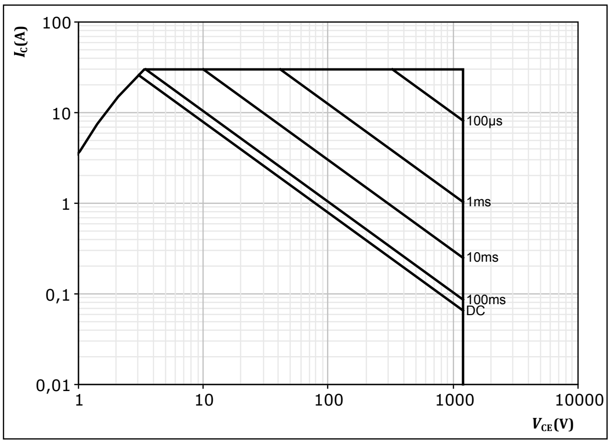
R (K/W)	τ (s)
4,50E-02	8,76E+00
8,43E-02	7,46E-01
2,24E-01	1,33E-01
6,47E-01	4,45E-02
1,21E-01	8,66E-03
8,10E-02	1,33E-03
5,58E-03	6,42E-04

Inverter Switch 2 Characteristics

figure 5.	IGBT

Safe operating area

$I_C = f(V_{CE})$



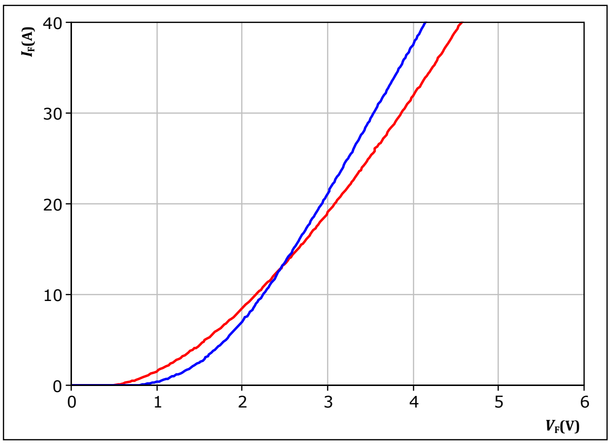
D =	single pulse	
T_s =	80	°C
V_{GE} =	15	V
T_j =	T_{jmax}	

Inverter Diode 2 Characteristics

figure 6. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



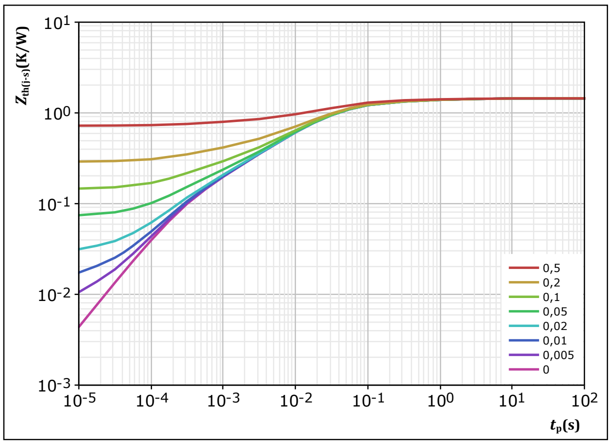
t_p = 250 μs

T_j: 25 °C, 150 °C

figure 7. **FWD**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j\text{-}s)}$ = 1,445 K/W

IGBT thermal model values

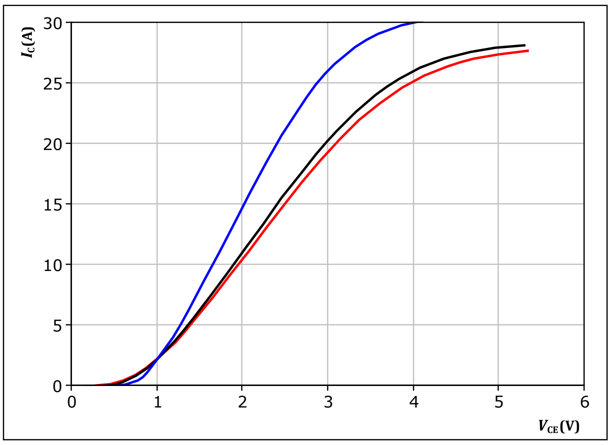
R (K/W)	τ (s)
6,32E-02	2,71E+00
1,25E-01	3,62E-01
4,72E-01	5,21E-02
4,73E-01	1,60E-02
2,06E-01	3,00E-03
1,06E-01	3,17E-04

Inverter Switch Characteristics

figure 8. **IGBT**

Typical output characteristics

I_C = f(V_{CE})

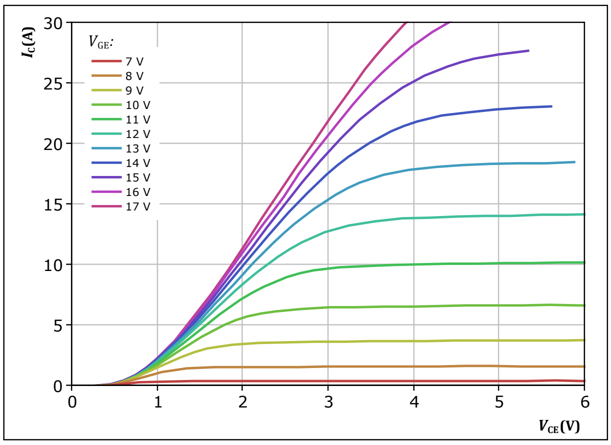


t_p =	250	µs		25 °C
V_{GE} =	15	V	T_j:	125 °C
				150 °C

figure 9. **IGBT**

Typical output characteristics

I_C = f(V_{CE})



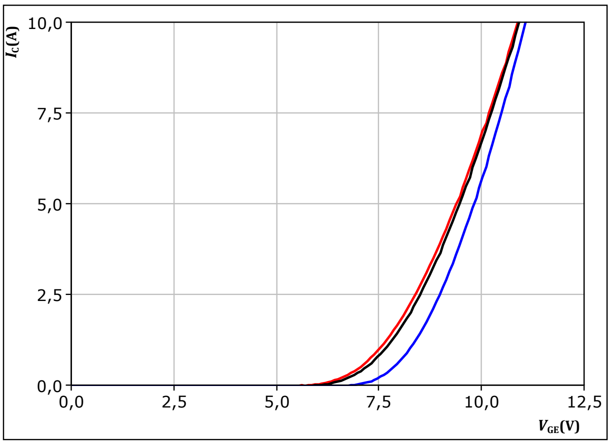
t_p =	250	µs
T_j =	150	°C

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

figure 10. **IGBT**

Typical transfer characteristics

I_C = f(V_{GE})

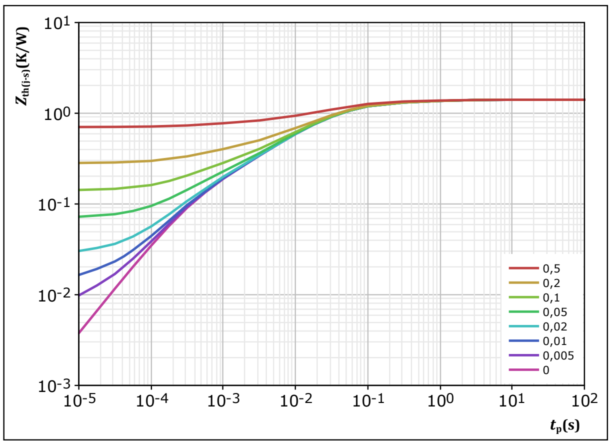


t_p =	250	µs		25 °C
V_{CE} =	10	V	T_j:	125 °C
				150 °C

figure 11. **IGBT**

Transient thermal impedance as a function of pulse width

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



D =	t_p / T	
$R_{th(j-s)}$ =	1,409	K/W

IGBT thermal model values

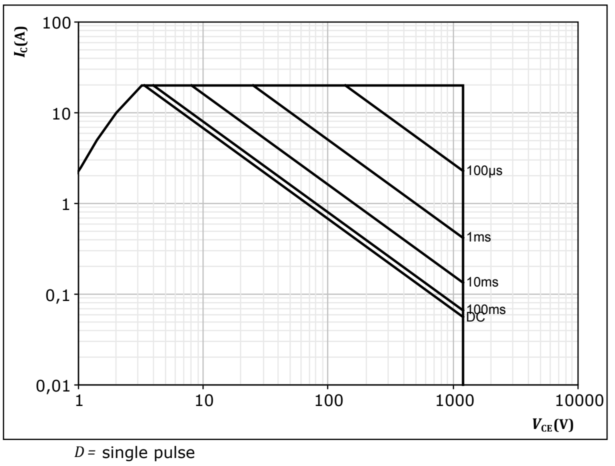
R (K/W)	τ (s)
7,86E-02	1,46E+00
1,33E-01	2,21E-01
5,83E-01	4,32E-02
3,51E-01	1,14E-02
1,57E-01	2,77E-03
1,06E-01	3,80E-04

Inverter Switch Characteristics

figure 12.	**IGBT**

Safe operating area

I_C = f(V_{CE})



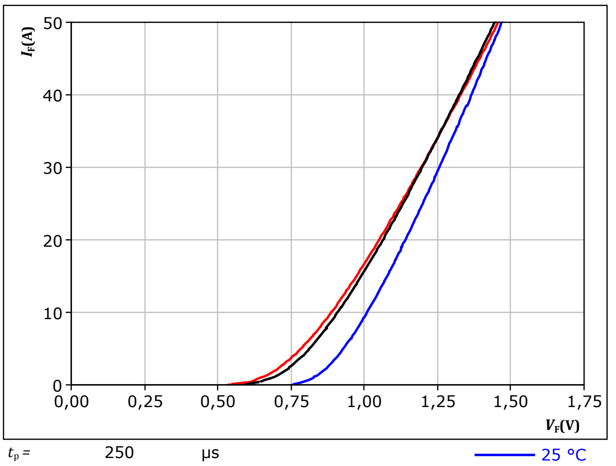
D =	single pulse	
T_s =	80	°C
V_{GE} =	15	V
T_j =	T_{jmax}	

Inverter Diode Characteristics

figure 13. **Rectifier**

Typical forward characteristics

$I_F = f(V_F)$



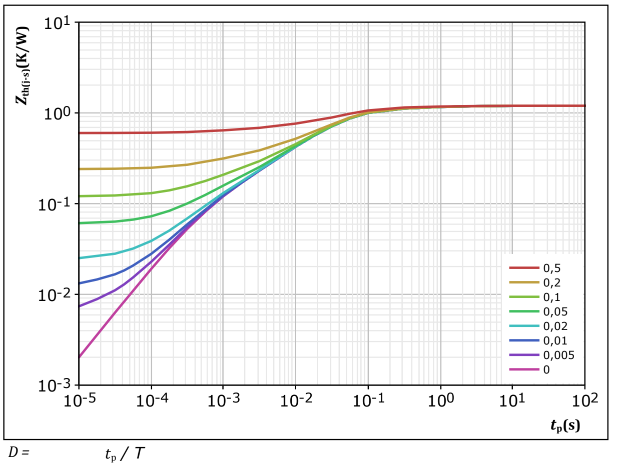
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 14. **Rectifier**

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$

$R_{th(j-s)}$ = 1,199 K/W

IGBT thermal model values

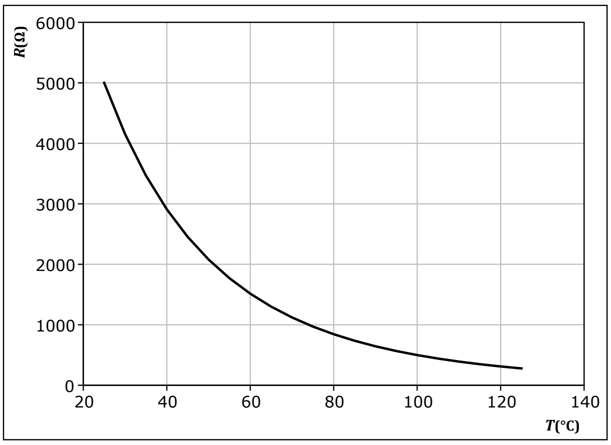
R (K/W)	τ (s)
4,23E-02	2,73E+00
1,04E-01	3,60E-01
5,86E-01	4,98E-02
2,59E-01	1,70E-02
1,36E-01	3,63E-03
7,19E-02	5,18E-04

Thermistor Characteristics

figure 15.	Thermistor

Typical NTC characteristic as function of temperature

R_T = f(T)

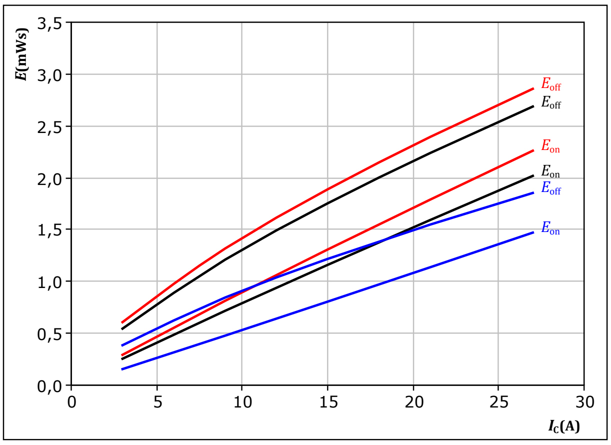


Inverter Switching Characteristics 2

figure 16. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



With an inductive load at

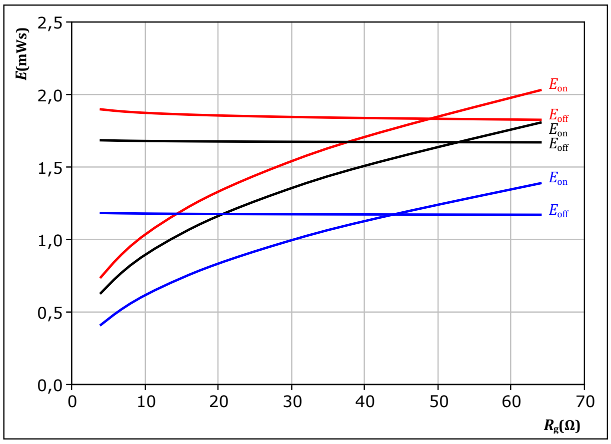
V_{CE} = 600 V
V_{GE} = ±15 V
R_{gon} = 16 Ω
R_{goff} = 16 Ω

T_j: 25 °C / 125 °C / 150 °C

figure 17. **IGBT**

Typical switching energy losses as a function of gate resistor

$E = f(R_g)$



With an inductive load at

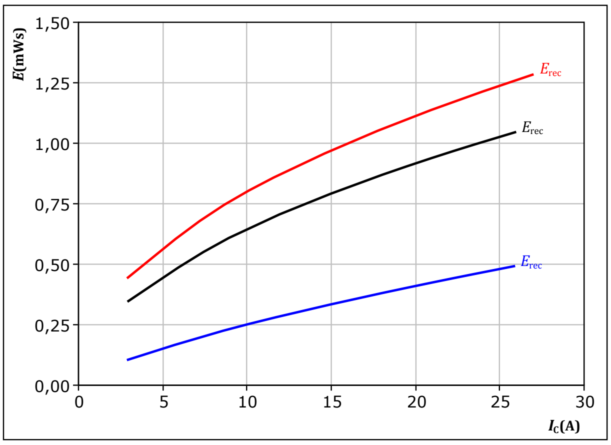
V_{CE} = 600 V
V_{GE} = ±15 V
I_C = 15 A

T_j: 25 °C / 125 °C / 150 °C

figure 18. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



With an inductive load at

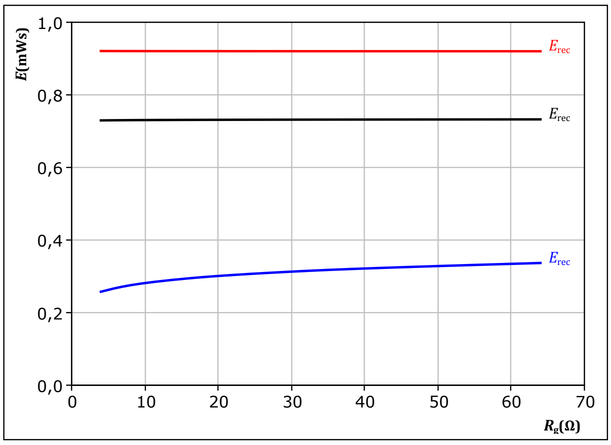
V_{CE} = 600 V
V_{GE} = ±15 V
R_{gon} = 16 Ω

T_j: 25 °C / 125 °C / 150 °C

figure 19. **FWD**

Typical reverse recovered energy loss as a function of gate resistor

$E_{rec} = f(R_g)$



With an inductive load at

V_{CE} = 600 V
V_{GE} = ±15 V
I_C = 15 A

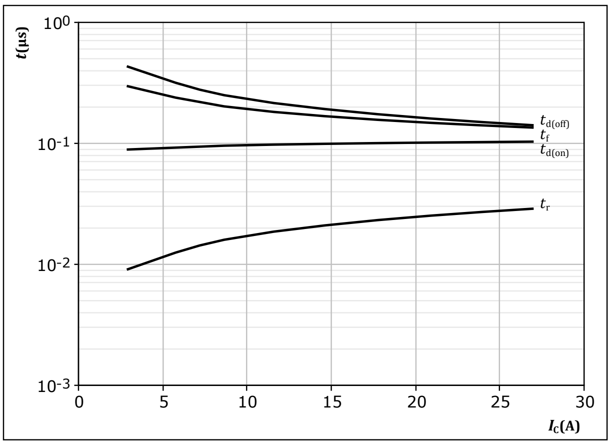
T_j: 25 °C / 125 °C / 150 °C

Inverter Switching Characteristics 2

figure 20. **IGBT**

Typical switching times as a function of collector current

t = f(I_C)



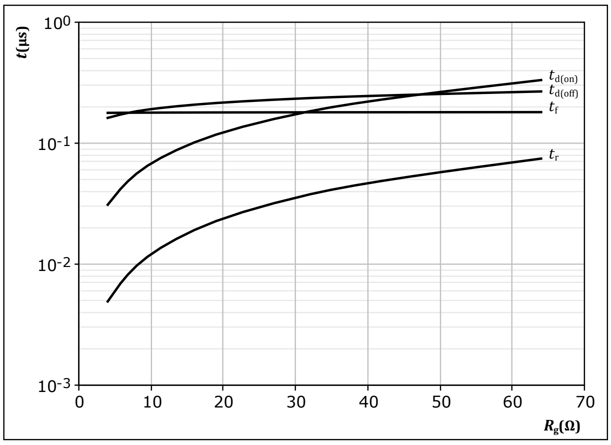
With an inductive load at

T_j =	150	°C
V_{CE} =	600	V
V_{GE} =	±15	V
R_{gon} =	16	Ω
R_{goff} =	16	Ω

figure 21. **IGBT**

Typical switching times as a function of gate resistor

t = f(R_g)



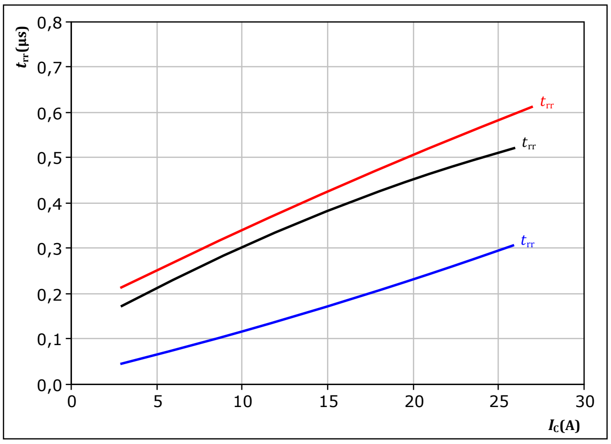
With an inductive load at

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

figure 22. **FWD**

Typical reverse recovery time as a function of collector current

t_{rr} = f(I_C)



With an inductive load at

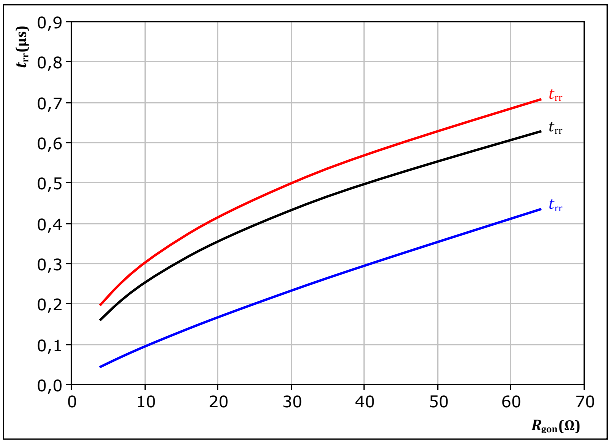
V_{CE} =	600	V
V_{GE} =	±15	V
R_{gon} =	16	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 23. **FWD**

Typical reverse recovery time as a function of IGBT turn on gate resistor

t_{rr} = f(R_{gon})



With an inductive load at

V_{CE} =	600	V
V_{GE} =	±15	V
I_C =	15	A

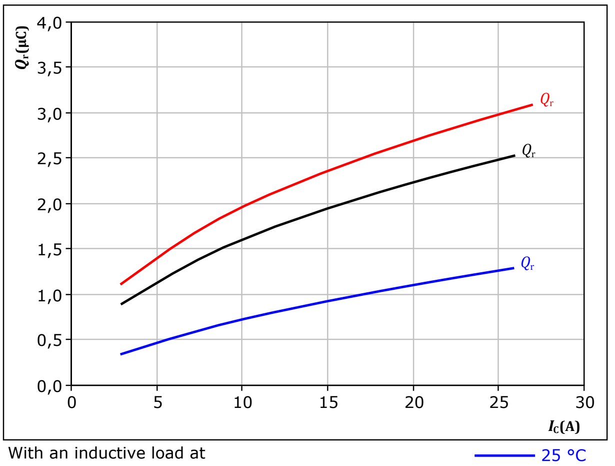
T_j: 25 °C, 125 °C, 150 °C

Inverter Switching Characteristics 2

figure 24. **FWD**

Typical recovered charge as a function of collector current

Q_r = f(I_C)



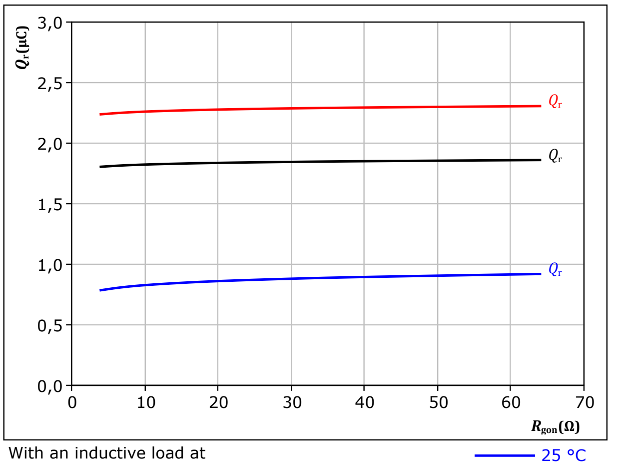
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	16	Ω		150 °C

figure 25. **FWD**

Typical recovered charge as a function of turn on gate resistor

Q_r = f(R_{gon})



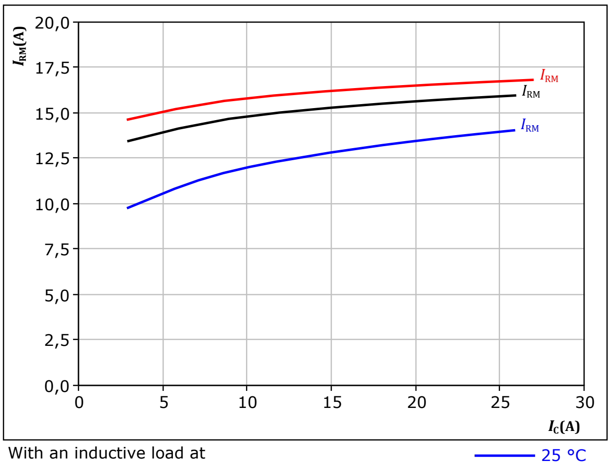
With an inductive load at

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

figure 26. **FWD**

Typical peak reverse recovery current as a function of collector current

I_{RM} = f(I_C)



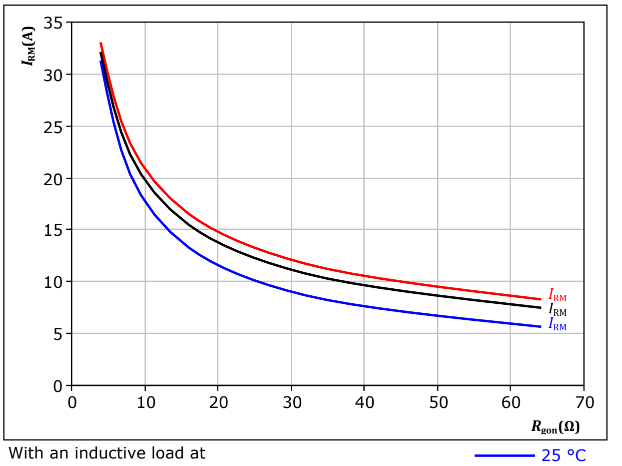
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	16	Ω		150 °C

figure 27. **FWD**

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

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



With an inductive load at

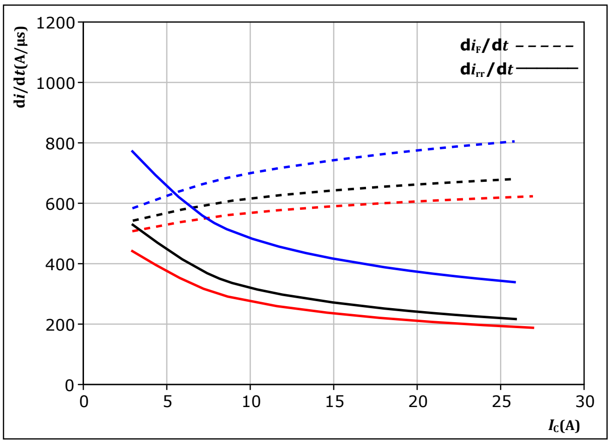
V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	15	A		150 °C

Inverter Switching Characteristics 2

figure 28. **FWD**

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

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



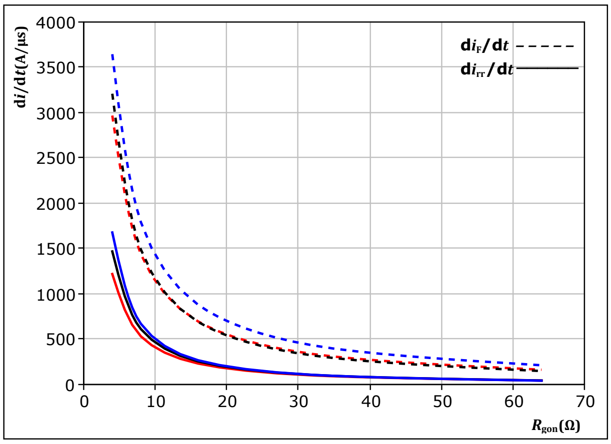
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	16	Ω		150 °C

figure 29. **FWD**

Typical rate of fall of forward and reverse recovery current as a function of turn on gate resistor

$di_F/dt,\ di_{rr}/dt = f(R_{gon})$



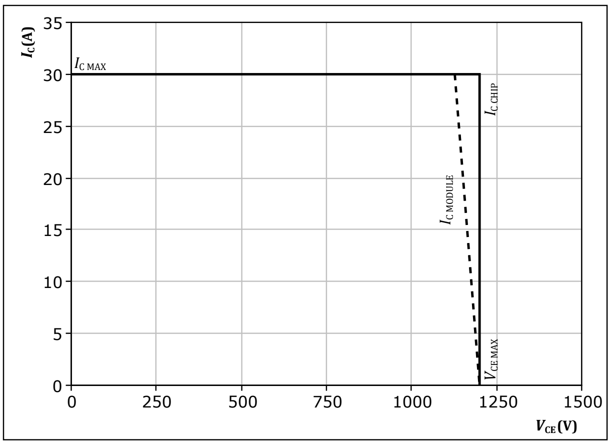
With an inductive load at

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

figure 30. **IGBT**

Reverse bias safe operating area

$I_C = f(V_{CE})$



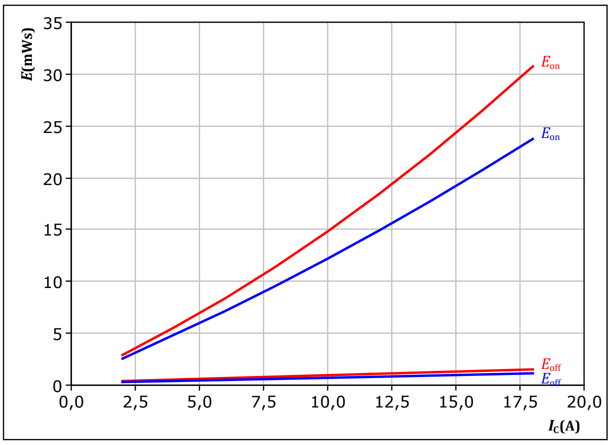
At	T_j =	150	°C
	R_{gon} =	16	Ω
	R_{goff} =	16	Ω

Inverter Switching Characteristics

figure 31. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



With an inductive load at

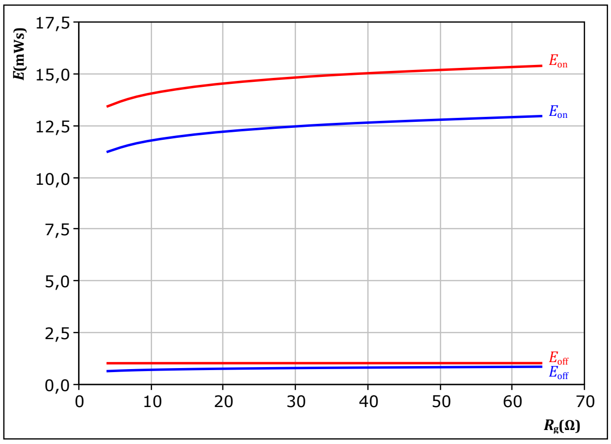
T_j: 25 °C (blue), 125 °C (red)

V_{CE} =	600	V
V_{GE} =	±15	V
R_{gon} =	16	Ω
R_{goff} =	16	Ω

figure 32. **IGBT**

Typical switching energy losses as a function of gate resistor

$E = f(R_g)$



With an inductive load at

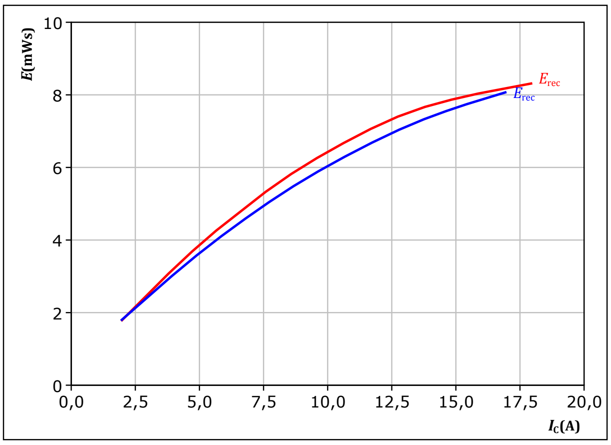
T_j: 25 °C (blue), 125 °C (red)

V_{CE} =	600	V
V_{GE} =	±15	V
I_C =	10	A

figure 33. **Rectifier**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



With an inductive load at

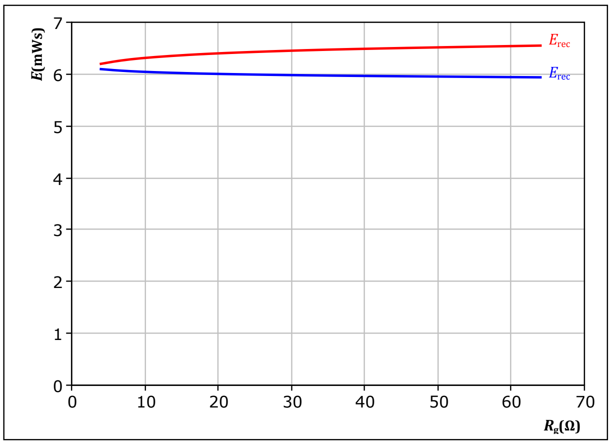
T_j: 25 °C (blue), 125 °C (red)

V_{CE} =	600	V
V_{GE} =	±15	V
R_{gon} =	16	Ω

figure 34. **Rectifier**

Typical reverse recovered energy loss as a function of gate resistor

$E_{rec} = f(R_g)$



With an inductive load at

T_j: 25 °C (blue), 125 °C (red)

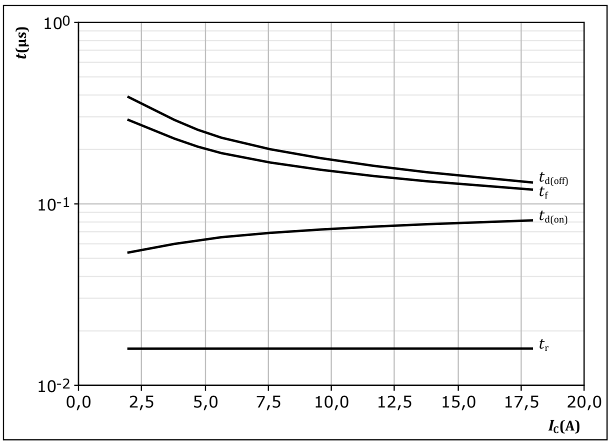
V_{CE} =	600	V
V_{GE} =	±15	V
I_C =	10	A

Inverter Switching Characteristics

figure 35. **IGBT**

Typical switching times as a function of collector current

$t = f(I_C)$



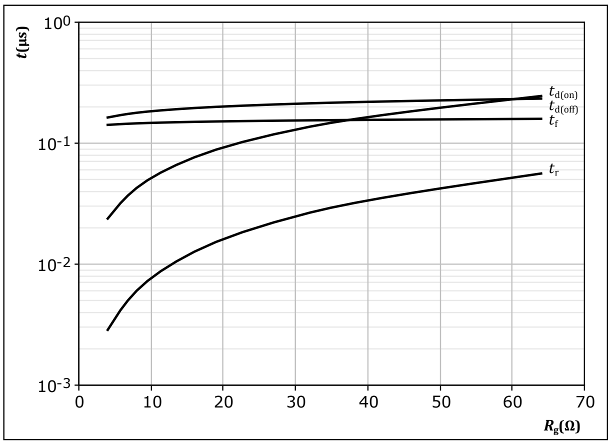
With an inductive load at

T_j =	125	°C
V_{CE} =	600	V
V_{GE} =	±15	V
R_{gon} =	16	Ω
R_{goff} =	16	Ω

figure 36. **IGBT**

Typical switching times as a function of gate resistor

$t = f(R_g)$



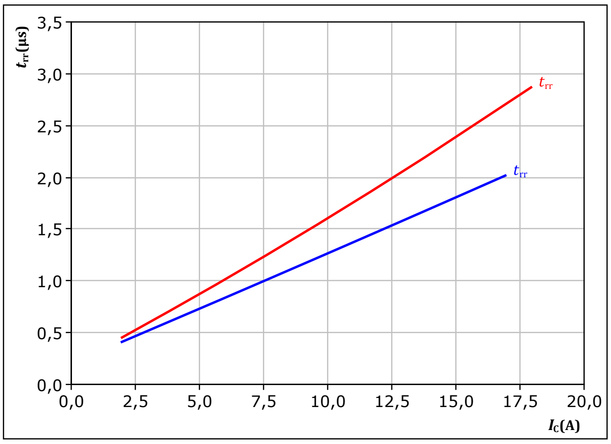
With an inductive load at

T_j =	125	°C
V_{CE} =	600	V
V_{GE} =	±15	V
I_C =	10	A

figure 37. **Rectifier**

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_C)$



With an inductive load at

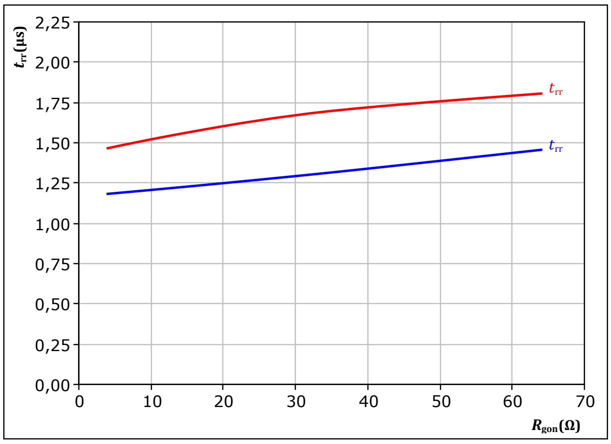
V_{CE} =	600	V
V_{GE} =	±15	V
R_{gon} =	16	Ω

T_j: 25 °C, 125 °C

figure 38. **Rectifier**

Typical reverse recovery time as a function of IGBT turn on gate resistor

$t_{rr} = f(R_{gon})$



With an inductive load at

V_{CE} =	600	V
V_{GE} =	±15	V
I_C =	10	A

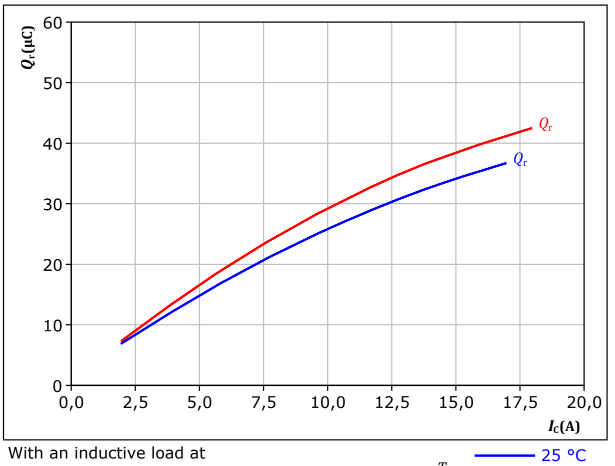
T_j: 25 °C, 125 °C

Inverter Switching Characteristics

figure 39. **Rectifier**

Typical recovered charge as a function of collector current

Q_r = f(I_C)



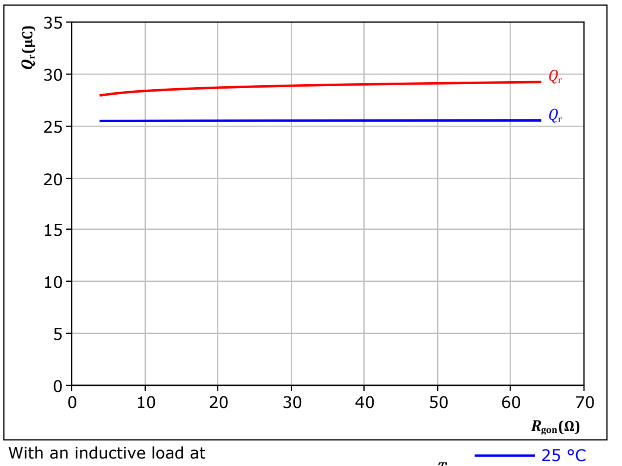
With an inductive load at

V_{CE} =	600	V	T_j:		25 °C
V_{GE} =	±15	V			125 °C
R_{gon} =	16	Ω			

figure 40. **Rectifier**

Typical recovered charge as a function of turn on gate resistor

Q_r = f(R_{gon})



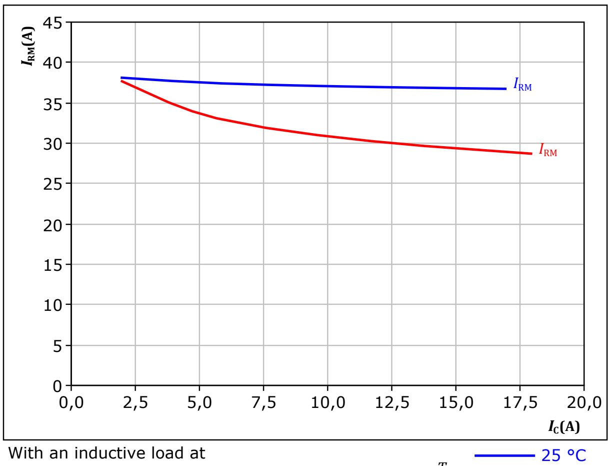
With an inductive load at

V_{CE} =	600	V	T_j:		25 °C
V_{GE} =	±15	V			125 °C
I_C =	10	A			

figure 41. **Rectifier**

Typical peak reverse recovery current as a function of collector current

I_{RM} = f(I_C)



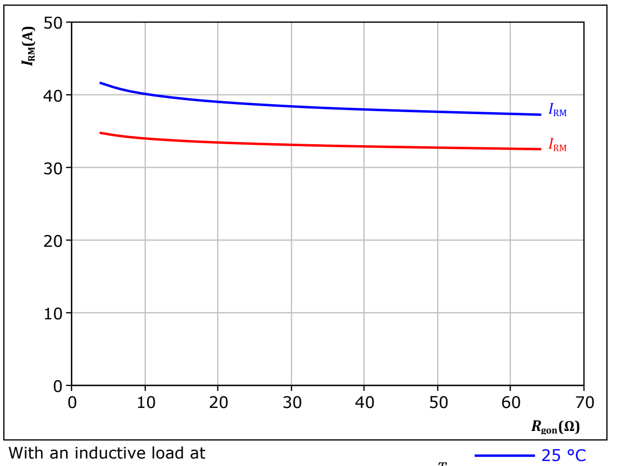
With an inductive load at

V_{CE} =	600	V	T_j:		25 °C
V_{GE} =	±15	V			125 °C
R_{gon} =	16	Ω			

figure 42. **Rectifier**

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

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



With an inductive load at

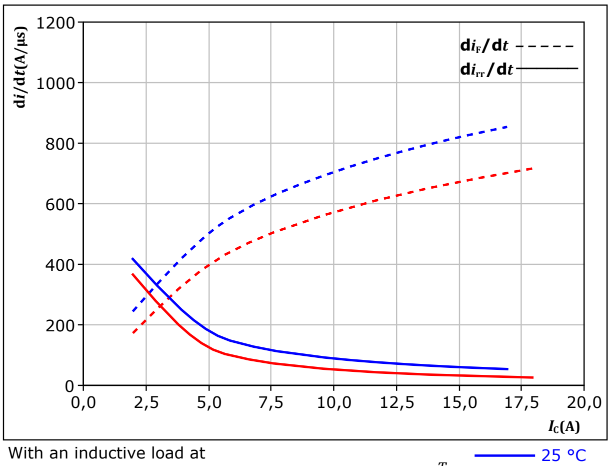
V_{CE} =	600	V	T_j:		25 °C
V_{GE} =	±15	V			125 °C
I_C =	10	A			

Inverter Switching Characteristics

figure 43. **Rectifier**

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

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



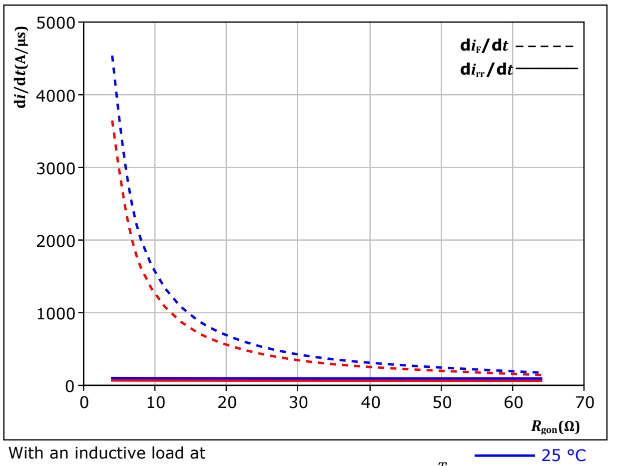
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	16	Ω		

figure 44. **Rectifier**

Typical rate of fall of forward and reverse recovery current as a function of turn on gate resistor

di_F/dt, di_{rr}/dt = f(R_{gon})



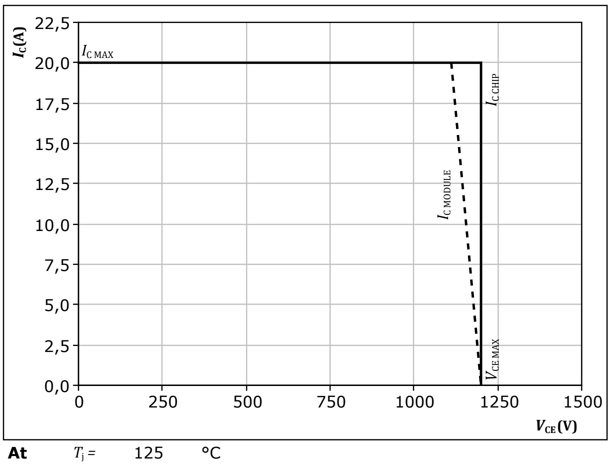
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	10	A		

figure 45. **IGBT**

Reverse bias safe operating area

I_C = f(V_{CE})



At	T_j =	125	°C
	R_{gon} =	16	Ω
	R_{goff} =	16	Ω

Switching Definitions

figure 46. **IGBT**

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

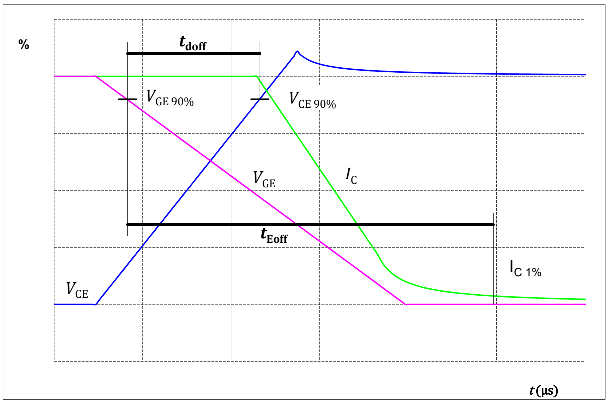


figure 47. **IGBT**

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

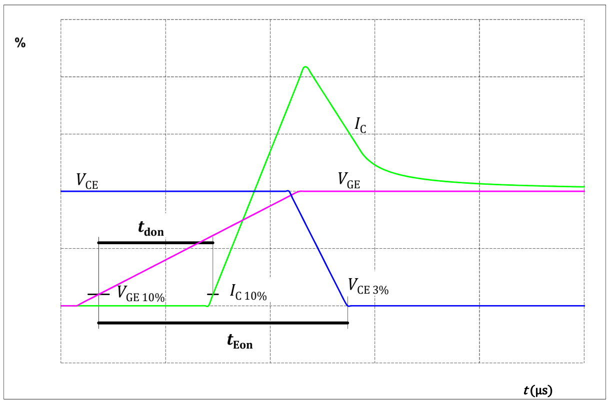


figure 48. **IGBT**

Turn-off Switching Waveforms & definition of t_f

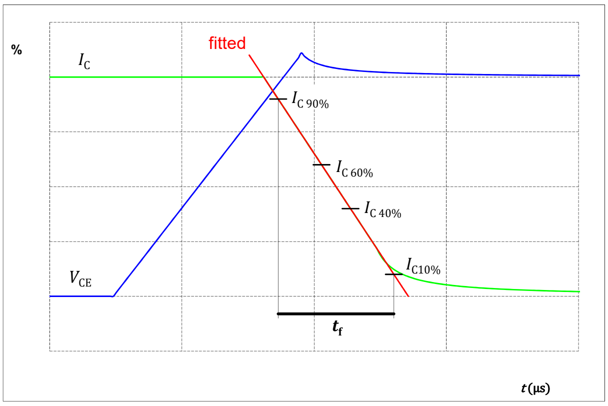
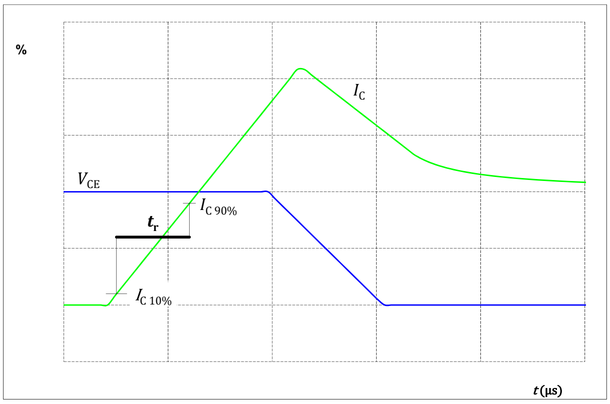


figure 49. **IGBT**

Turn-on Switching Waveforms & definition of t_r



Switching Definitions

figure 50. **FWD**

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

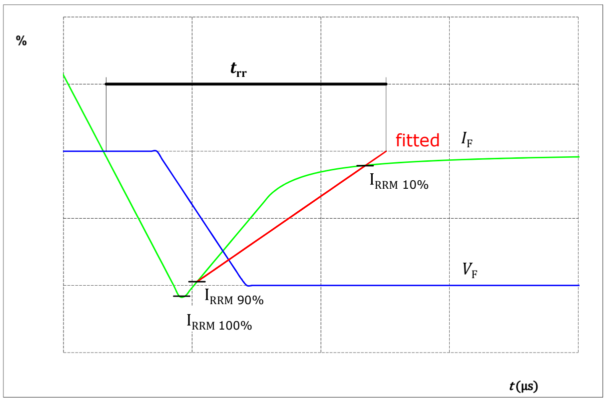
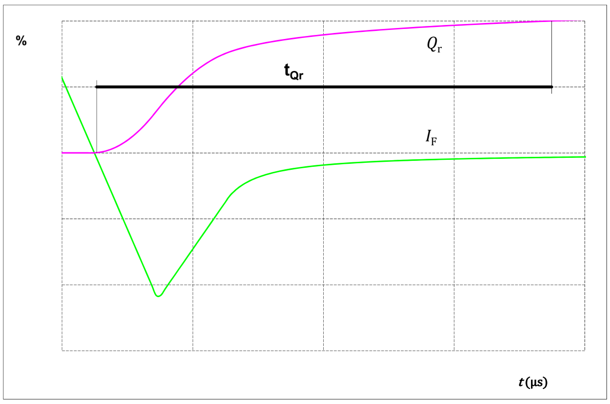


figure 51. **FWD**

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



Ordering Code

Version	Ordering Code
With std lid (6.5mm height) + no thermal grease	80-M212WPA015M7-K757F70-/0A/
With thin lid (2.8mm height) + no thermal grease	80-M212WPA015M7-K757F70-/0B/
With std lid (6.5mm height) + thermal grease (0,8 W/mK, P12, silicone-based)	80-M212WPA015M7-K757F70-/1A/
With thin lid (2.8mm height) + thermal grease (0,8 W/mK, P12, silicone-based)	80-M212WPA015M7-K757F70-/1B/
With std lid (6.5mm height) + thermal grease (3,4 W/mK, PSX-P7, silicone-free)	80-M212WPA015M7-K757F70-/3A/
With thin lid (2.8mm height) + thermal grease (3,4 W/mK, PSX-P7, silicone-free)	80-M212WPA015M7-K757F70-/3B/
With std lid (6.5mm height) + thermal grease (2,5 W/mK, TG20032, silicone-free)	80-M212WPA015M7-K757F70-/4A/
With thin lid (2.8mm height) + thermal grease (2,5 W/mK, TG20032, silicone-free)	80-M212WPA015M7-K757F70-/4B/
With std lid (6.5mm height) + thermal grease (2,5 W/mK, HPTP, silicone-based)	80-M212WPA015M7-K757F70-/5A/
With thin lid (2.8mm height) + thermal grease (2,5 W/mK, HPTP, silicone-based)	80-M212WPA015M7-K757F70-/5B/

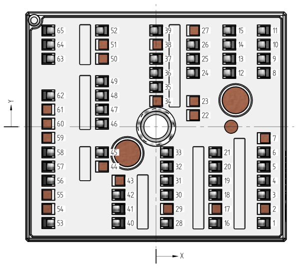
Marking

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

Outline

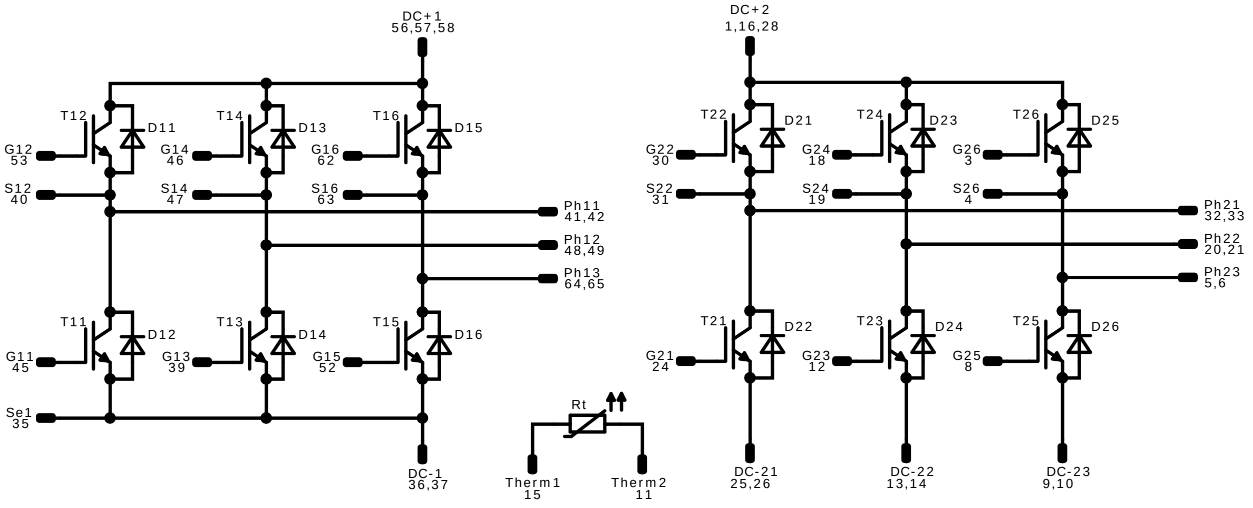
Pin table [mm]

Pin	X	Y	Function	Pin	X	Y	Function
				34	not assembled		
1	24,38	-21,8	DC+2	35	0	9	Se1
2	not assembled			36	0	12,2	DC-1
3	24,38	-15,4	G26	37	0	15,4	DC-1
4	24,38	-12,2	S26	38	not assembled		
5	24,38	-9	Ph23	39	0	21,8	G13
6	24,38	-5,8	Ph23	40	-8,5	-21,8	S12
7	not assembled			41	-8,5	-18,6	Ph11
8	24,38	12,2	G25	42	-8,5	-15,4	Ph11
9	24,38	15,4	DC-23	43	not assembled		
10	24,38	18,6	DC-23	44	not assembled		
11	24,38	21,8	Therm2	45	-12,22	-5,8	G11
12	16,58	12,2	G23	46	-12,22	0,7	G14
13	16,58	15,4	DC-22	47	-12,22	3,9	S14
14	16,58	18,6	DC-22	48	-12,22	7,1	Ph12
15	16,58	21,8	Therm1	49	-12,22	10,3	Ph12
16	13,42	-21,8	DC+2	50	not assembled		
17	not assembled			51	not assembled		
18	13,42	-15,4	G24	52	-12,22	21,8	G15
19	13,42	-12,2	S24	53	-24,38	-21,8	G12
20	13,42	-9	Ph22	54	not assembled		
21	13,42	-5,8	Ph22	55	not assembled		
22	not assembled			56	-24,38	-12,2	DC+1
23	not assembled			57	-24,38	-9	DC+1
24	8,38	12,2	G21	58	-24,38	-5,8	DC+1
25	8,38	15,4	DC-21	59	not assembled		
26	8,38	18,6	DC-21	60	not assembled		
27	not assembled			61	not assembled		
28	2,46	-21,8	DC+2	62	-24,38	7,1	G16
29	not assembled			63	-24,38	15,4	S16
30	2,46	-15,4	G22	64	-24,38	18,6	Ph13
31	2,46	-12,2	S22	65	-24,38	21,8	Ph13
32	2,46	-9	Ph21				
33	2,46	-5,8	Ph21				



Pad positions refers to center point. For more informations on pad design please see package data

Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T21, T22, T23, T24, T25, T26	IGBT	1200 V	15 A	Inverter Switch 2	
D21, D22, D23, D24, D25, D26	FWD	1200 V	15 A	Inverter Diode 2	
T11, T12, T13, T14, T15, T16	IGBT	1200 V	10 A	Inverter Switch	
D11, D12, D13, D14, D15, D16	Rectifier	1600 V	18 A	Inverter Diode	
Rt	Thermistor			Thermistor	

Packaging instruction					
Standard packaging quantity (SPQ) 72	>SPQ	Standard	<SPQ	Sample

Handling instruction
Handling instructions for MiniSKiiP® 2 packages see vincotech.com website.

Package data
Package data for MiniSKiiP® 2 packages see vincotech.com website.

UL recognition and file number
This device is certified according to UL 1557 standard, UL file number E192116. For more information see vincotech.com website.

Document No.:	Date:	Modification:	Pages
80-M212WPA015M7-K757F70-D1-14	23 Apr. 2020		