Vincotech

80-M107PMA030I701-K205B61
datasheet

MiniSKiiP® PIM 1 **650 V / 30 A**

Topology features

- Open Emitter configuration
- Temperature sensor
- Single-phase Converter+Brake+Inverter

Component features

- Easy paralleling
- Low collector emitter saturation voltage
- Low turn-off losses
- Positive temperature coefficient

Housing features

- Base isolation: Al_2O_3
- Easy assembly in one mounting step
- Flexible PCB design w/o pin holes
- Rugged solderless spring contacts

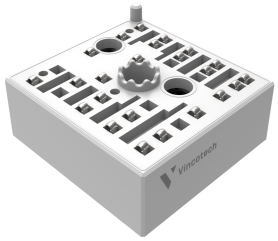
Target applications

- Embedded Drives
- Industrial Drives

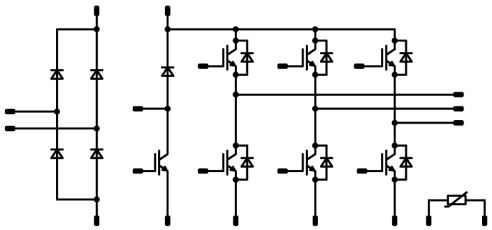
Types

- 80-M107PMA030I701-K205B61

MiniSKiiP® 1 16 mm housing



Schematic



Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
Inverter Switch				
Collector-emitter voltage	V_{CES}		650	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$ T_s = 80 °C	39	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	90	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ T_s = 80 °C	63	W
Gate-emitter voltage	V_{GES}		±20	V
Short circuit ratings	t_{SC}	V_{GE} = 15 V, V_{CC} = 400 V T_j = 150 °C	3	µs
Maximum junction temperature	T_{jmax}		175	°C
Inverter Diode				
Peak repetitive reverse voltage	V_{RRM}		650	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$ T_s = 80 °C	33	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	90	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ T_s = 80 °C	50	W
Maximum junction temperature	T_{jmax}		175	°C
Brake Switch				
Collector-emitter voltage	V_{CES}		650	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$ T_s = 80 °C	39	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	90	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ T_s = 80 °C	63	W
Gate-emitter voltage	V_{GES}		±20	V
Short circuit ratings	t_{SC}	V_{GE} = 15 V, V_{CC} = 400 V T_j = 150 °C	3	µs
Maximum junction temperature	T_{jmax}		175	°C

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
Brake Diode				
Peak repetitive reverse voltage	V_{RRM}		650	V
Forward current (DC current)	I_F	T_j = T_{jmax} T_s = 80 °C	25	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	60	A
Total power dissipation	P_{tot}	T_j = T_{jmax} T_s = 80 °C	41	W
Maximum junction temperature	T_{jmax}		175	°C
Rectifier Diode				
Peak repetitive reverse voltage	V_{RRM}		1600	V
Forward current (DC current)	I_F	T_j = T_{jmax} T_s = 80 °C	64	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, t_p = 10 ms T_j = 150 °C	270	A
Surge current capability	I^2t		365	A^2s
Total power dissipation	P_{tot}	T_j = T_{jmax} T_s = 80 °C	89	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	5500	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					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 Switch										
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$	V_{CE} = V_{GE}			0,0003	25	4,35	5	5,65	V
Collector-emitter saturation voltage	V_{CEsat}		15		30	25 125 150		1,3 1,37 1,39	1,65(1)	V
Collector-emitter cut-off current	I_{CES}		0	650		25			20	µA
Gate-emitter leakage current	I_{GES}		0	650		25			100	nA
Internal gate resistance	r_g							None		Ω
Input capacitance	C_{ies}	f = 1 Mhz	0	25		25		1900		pF
Output capacitance	C_{oes}							62		pF
Reverse transfer capacitance	C_{res}							20		pF
Gate charge	Q_g	V_{CC} = 520 V	15		30	25		180		nC
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 2,5 W/mK (HPTP)						1,5		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 16 Ω R_{goff} = 16 Ω	±15	350	30	25 125 150		126,75 130,28 131,14		ns
Rise time	t_r					25 125 150		58,45 57,05 56,71		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		162,65 193,75 199,65		ns
Fall time	t_f					25 125 150		30,07 55,68 63,63		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=0,503 µC Q_{rFWD}=1,2 µC Q_{rFWD}=1,43 µC				25 125 150		1,05 1,37 1,48		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,48 0,735 0,799		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				30	25 125 150		1,63 1,53 1,5	2[1]	V
Reverse leakage current	I_R	V_r = 650 V				25			20	µA
Thermal										
Thermal resistance junction to sink[2]	$R_{th(j-s)}$	λ_{paste} = 2,5 W/mK (HPTP)						1,91		K/W
Dynamic										
Peak recovery current	I_{RM}	di/dt=381 A/µs di/dt=358 A/µs di/dt=449 A/µs	±15	350	30	25 125 150		7,28 11,89 12,97		A
Reverse recovery time	t_{rr}					25 125 150		106,37 159,66 175,74		ns
Recovered charge	Q_r					25 125 150		0,503 1,2 1,43		µC
Reverse recovered energy	E_{rec}					25 125 150		0,084 0,207 0,253		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		359,7 343,96 261,92		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	
Brake Switch										
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$	V_{CE} = V_{GE}			0,0003	25	4,35	5	5,65	V
Collector-emitter saturation voltage	V_{CEsat}		15		30	25 125 150		1,3 1,37 1,39	1,65(1)	V
Collector-emitter cut-off current	I_{CES}		0	650		25			20	µA
Gate-emitter leakage current	I_{GES}		0	650		25			100	nA
Internal gate resistance	r_g							None		Ω
Input capacitance	C_{ies}	f = 1 Mhz	0	25		25		1900		pF
Output capacitance	C_{oes}							62		pF
Reverse transfer capacitance	C_{res}							20		pF
Gate charge	Q_g	V_{CC} = 520 V	15		30	25		180		nC
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 2,5 W/mK (HPTP)						1,5		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 8 Ω R_{goff} = 8 Ω	0/15	400	30	25 125 150		24,37 28,44 28,61		ns
Rise time	t_r					25 125 150		40,56 40,09 40,24		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		198,83 231,2 240,11		ns
Fall time	t_f					25 125 150		23,56 48,7 56,42		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=0,478 µC Q_{rFWD}=1,09 µC Q_{rFWD}=1,28 µC				25 125 150		0,857 1,12 1,17		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,501 0,776 0,841		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	
Brake Diode										
Static										
Forward voltage	V_F				20	25 125 150		1,71 1,6 1,55	2[1]	V
Reverse leakage current	I_R	V_r = 650 V				25			20	µA
Thermal										
Thermal resistance junction to sink[2]	$R_{th(j-s)}$	λ_{paste} = 2,5 W/mK (HPTP)						2,32		K/W
Dynamic										
Peak recovery current	I_{RM}	di/dt=622 A/µs di/dt=456 A/µs di/dt=513 A/µs	0/15	400	30	25 125 150		8,38 12,56 13,59		A
Reverse recovery time	t_{rr}					25 125 150		89,61 140,99 155,19		ns
Recovered charge	Q_r					25 125 150		0,478 1,09 1,28		µC
Reverse recovered energy	E_{rec}					25 125 150		0,103 0,247 0,297		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		532,01 265,23 197,53		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	
Rectifier Diode										
Static										
Forward voltage	V_F				28	25 125 150		1,13 1,07 1,06	1,5(1)	V
Reverse leakage current	I_R	V_r = 1600 V				25 150			50 1000	µA
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 2,5 W/mK (HPTP)						1,06		K/W
Thermistor										
Static										
Rated resistance	R					25		1		kΩ
Deviation of R100	$\Delta_{R/R}$	R_{100} = 1670 Ω				100	-2		2	%
Maximum Current	I_{max}							3		mA
Power dissipation constant	d					25		0,76		mW/K
A-value	A							$7{,}635 \times 10^{-3}$		1/K
B-value	B							$1{,}73 \times 10^{-5}$		$1/K^2$
Vincotech Thermistor Reference									E	

(1) Value at chip level

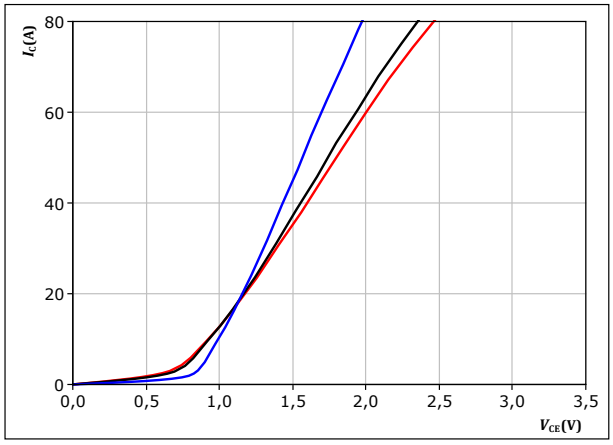
(2) Only valid with pre-applied Vincotech thermal interface material.

Inverter Switch Characteristics

figure 1. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$

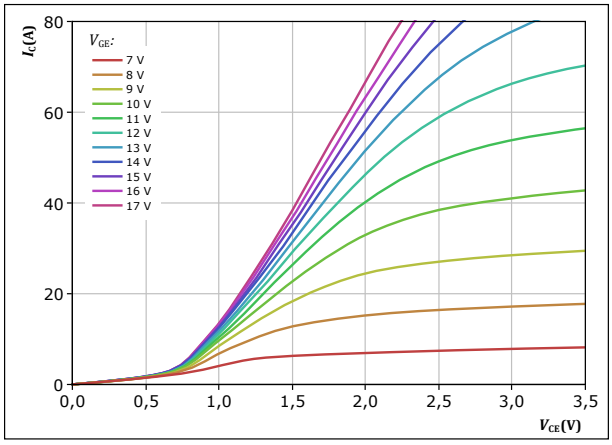


t_p =	250	µs		
V_{GE} =	15	V	T_j:	25 °C 125 °C 150 °C

figure 2. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$



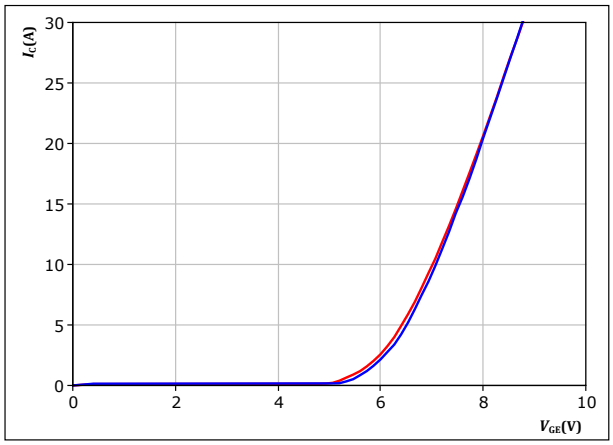
t_p =	250	µs
T_j =	150	°C

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

figure 3. **IGBT**

Typical transfer characteristics

$I_C = f(V_{GE})$

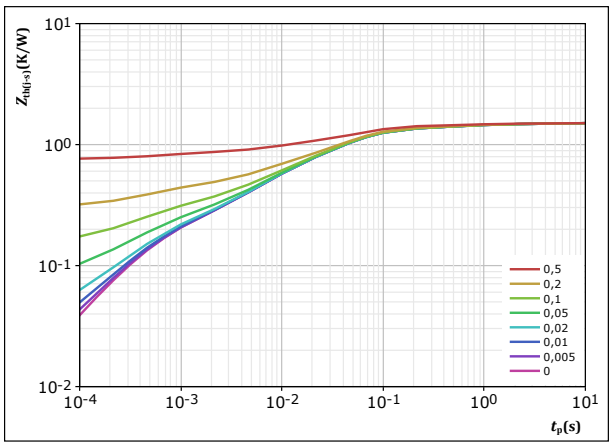


t_p =	250	µs		
V_{CE} =	9	V	T_j:	125 °C 150 °C

figure 4. **IGBT**

Transient thermal impedance as a function of pulse width

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



D =	t_p / T	
$R_{th(j-s)}$ =	1,505	K/W

IGBT thermal model values

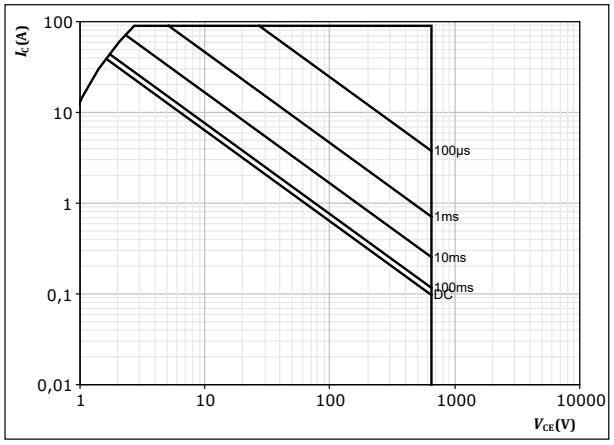
R (K/W)	τ (s)
5,00E-02	4,73E+00
1,56E-01	4,56E-01
8,46E-01	4,30E-02
2,99E-01	6,39E-03
1,60E-01	4,44E-04

Inverter Switch Characteristics

figure 5. **IGBT**

Safe operating area

$I_C = f(V_{CE})$

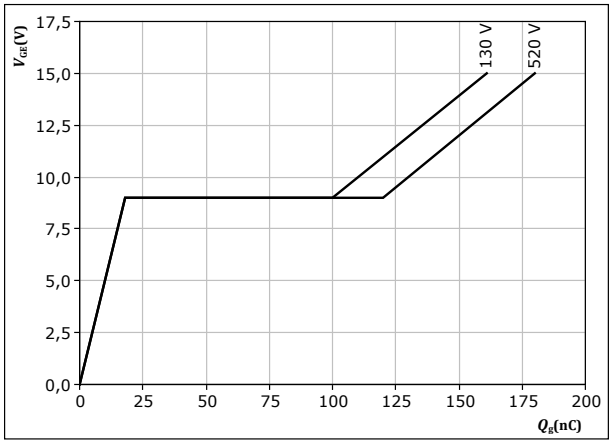


D =	single pulse	
T_s =	80	°C
V_{GE} =	15	V
T_j =	T_{jmax}	

figure 6. **IGBT**

Gate voltage vs gate charge

$V_{GE} = f(Q_g)$



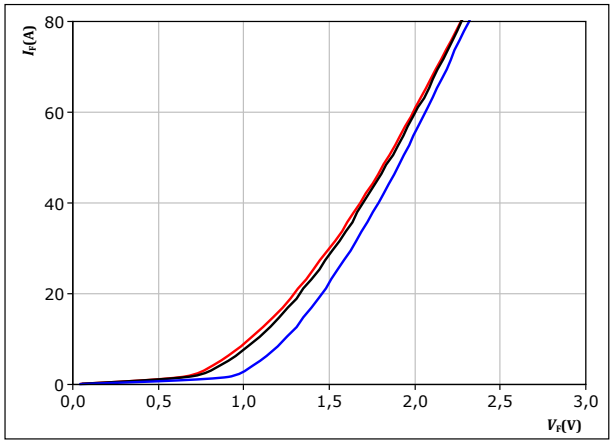
I_C =	30	A
T_j =	25	°C

Inverter Diode Characteristics

figure 7. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



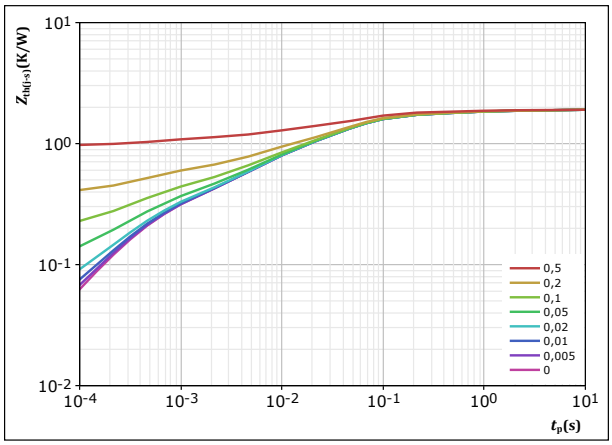
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 8. **FWD**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 1,907 K/W

FWD thermal model values

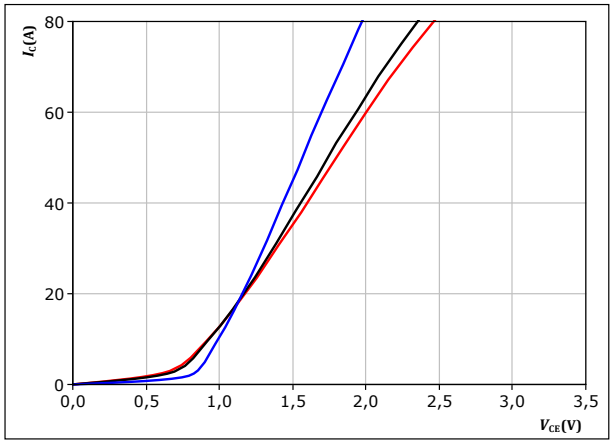
R (K/W)	τ (s)
6,67E-02	5,34E+00
1,88E-01	4,27E-01
9,96E-01	4,46E-02
4,20E-01	5,56E-03
2,45E-01	4,13E-04

Brake Switch Characteristics

figure 9. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$

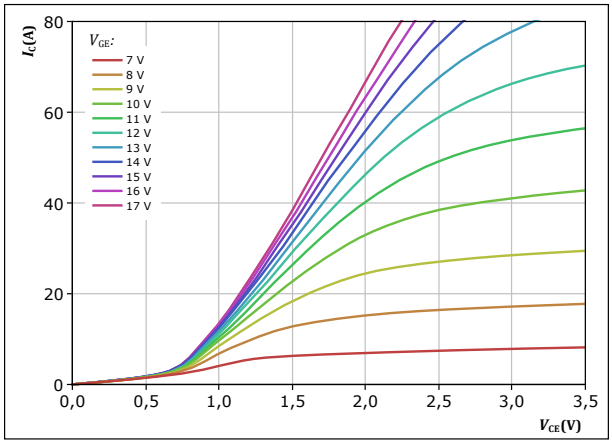


t_p =	250	µs		
V_{GE} =	15	V	T_j:	25 °C
				125 °C
				150 °C

figure 10. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$



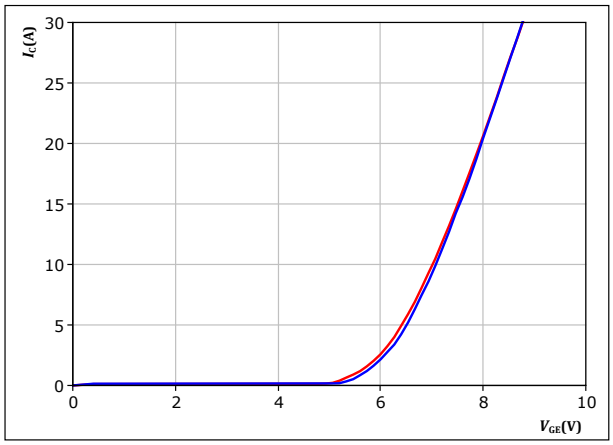
t_p =	250	µs
T_j =	150	°C

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

figure 11. **IGBT**

Typical transfer characteristics

$I_C = f(V_{GE})$

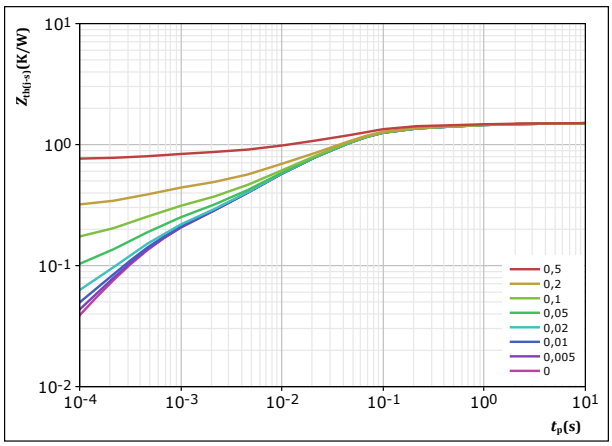


t_p =	250	µs		
V_{CE} =	9	V	T_j:	125 °C
				150 °C

figure 12. **IGBT**

Transient thermal impedance as a function of pulse width

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



D =	t_p / T	
$R_{th(j-s)}$ =	1,505	K/W

IGBT thermal model values

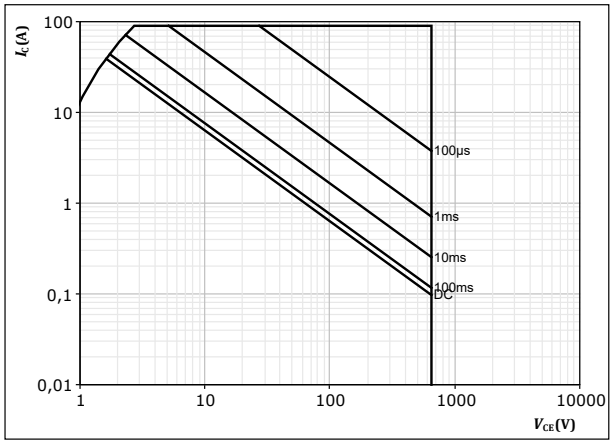
R (K/W)	τ (s)
5,00E-02	4,73E+00
1,56E-01	4,56E-01
8,46E-01	4,30E-02
2,99E-01	6,39E-03
1,60E-01	4,44E-04

Brake Switch Characteristics

figure 13. **IGBT**

Safe operating area

$I_C = f(V_{CE})$

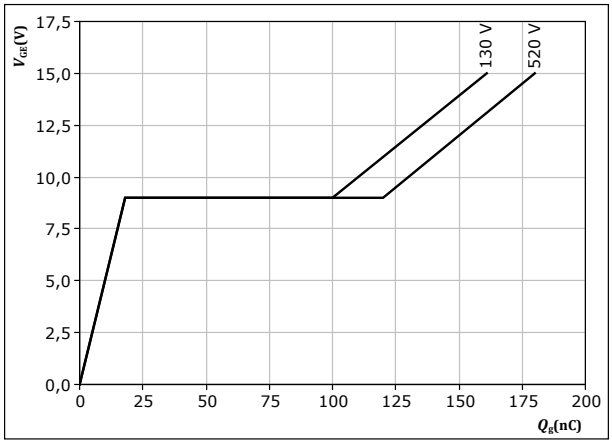


D = single pulse
T_s = 80 °C
V_{GE} = 15 V
T_j = T_{jmax}

figure 14. **IGBT**

Gate voltage vs gate charge

$V_{GE} = f(Q_g)$



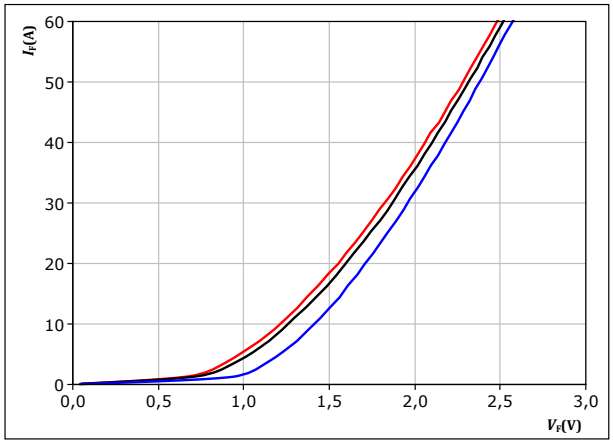
I_C = 30 A
T_j = 25 °C

Brake Diode Characteristics

figure 15. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



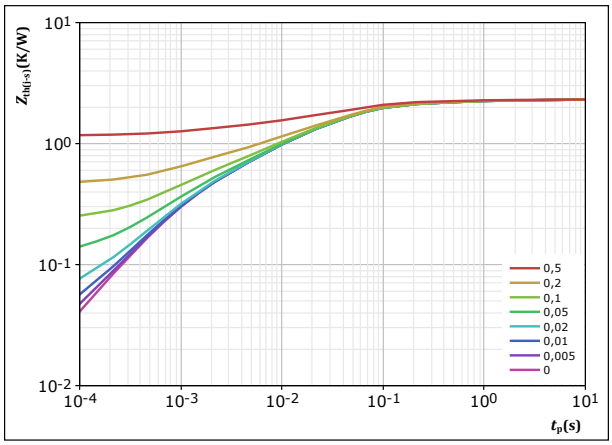
t_p = 250 µs

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

$R_{th(j-s)}$ = 2,316 K/W

FWD thermal model values

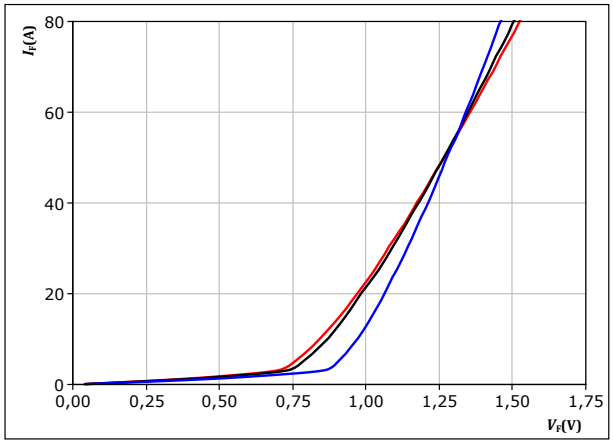
R (K/W)	τ (s)
7,35E-02	5,86E+00
2,20E-01	3,79E-01
1,16E+00	4,28E-02
5,71E-01	7,06E-03
3,05E-01	9,62E-04

Rectifier Diode Characteristics

figure 17. **Rectifier**

Typical forward characteristics

$I_F = f(V_F)$



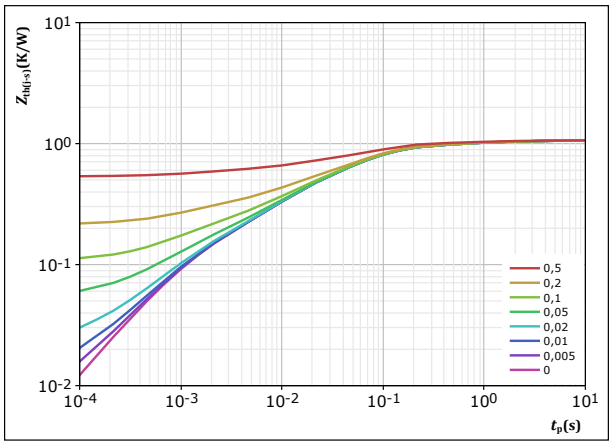
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 18. **Rectifier**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 1,064 K/W

Rectifier thermal model values

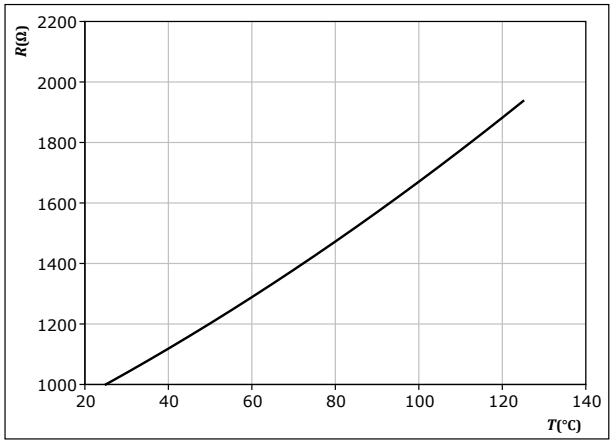
R (K/W)	τ (s)
3,59E-02	4,94E+00
1,20E-01	5,58E-01
5,78E-01	6,45E-02
2,37E-01	1,02E-02
9,84E-02	1,05E-03

Thermistor Characteristics

figure 19. **Thermistor**

Typical PTC characteristic as function of temperature

$R_T = f(T)$

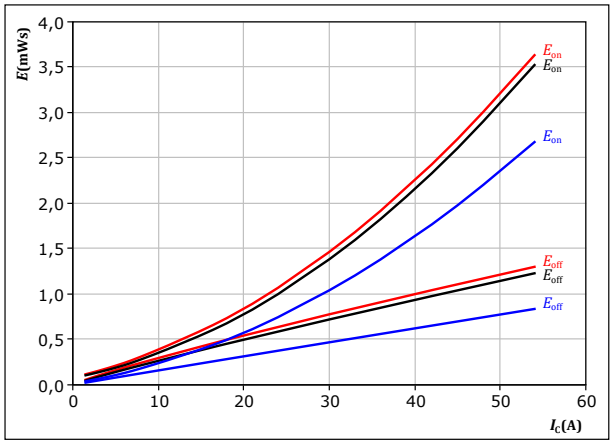


Inverter Switching Characteristics

figure 20. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



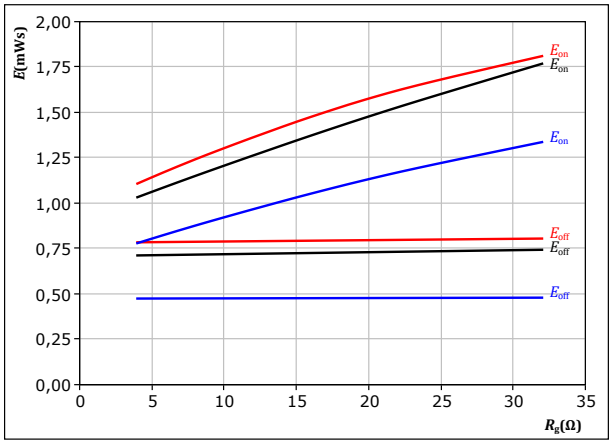
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	16	Ω		150 °C
R_{goff} =	16	Ω		

figure 21. **IGBT**

Typical switching energy losses as a function of IGBT turn on gate resistor

$E = f(R_g)$



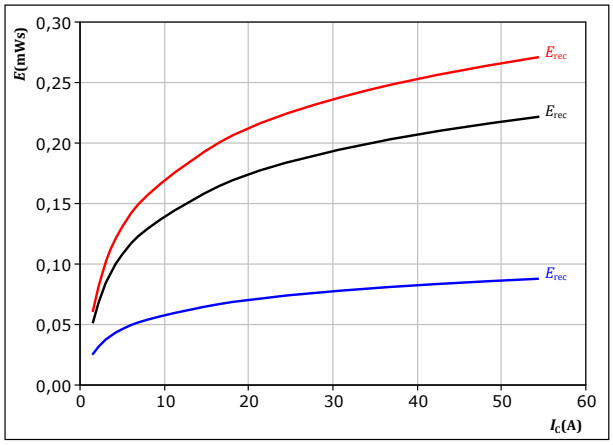
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	30	A		150 °C

figure 22. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



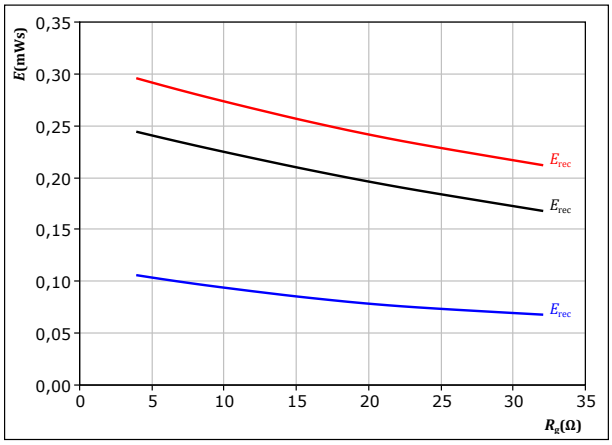
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	16	Ω		150 °C

figure 23. **FWD**

Typical reverse recovered energy loss as a function of IGBT turn on gate resistor

$E_{rec} = f(R_g)$



With an inductive load at

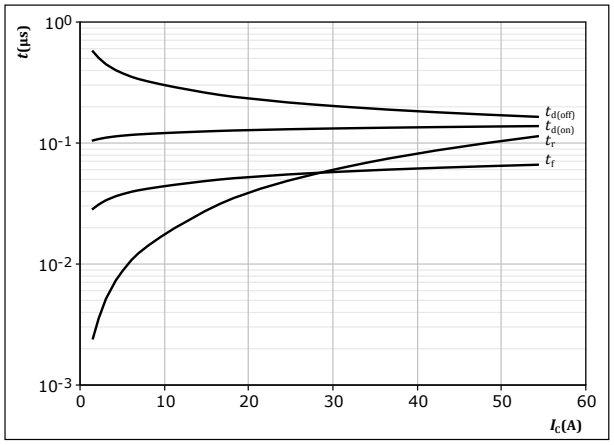
V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	30	A		150 °C

Inverter Switching Characteristics

figure 24. **IGBT**

Typical switching times as a function of collector current

$t = f(I_C)$



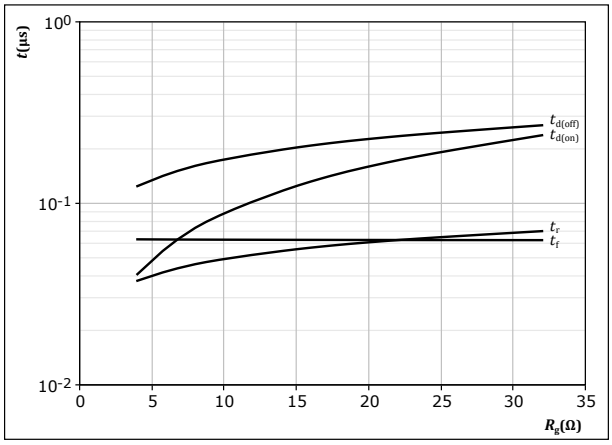
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	16	Ω
R_{goff} =	16	Ω

figure 25. **IGBT**

Typical switching times as a function of IGBT turn on gate resistor

$t = f(R_g)$



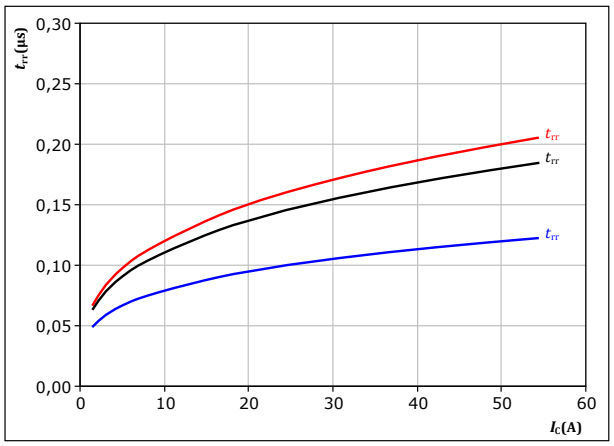
With an inductive load at

T_j =	150	°C
V_{CE} =	350	V
V_{GE} =	±15	V
I_C =	30	A

figure 26. **FWD**

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_C)$



With an inductive load at

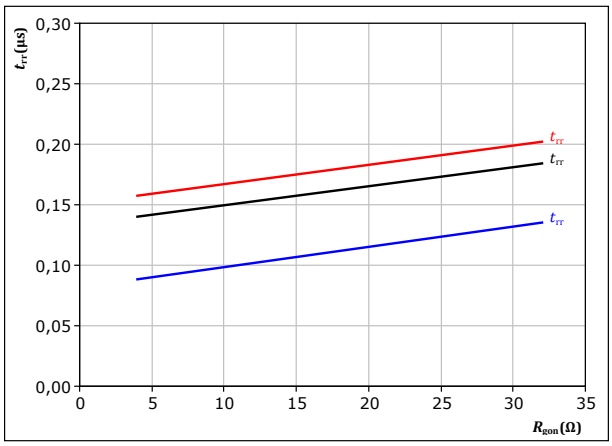
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	16	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 27. **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 =	30	A

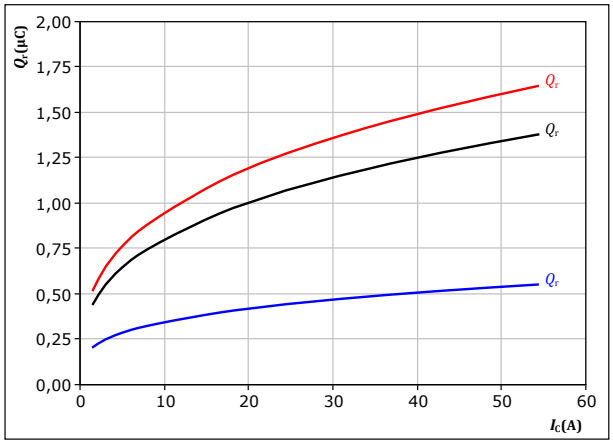
T_j: 25 °C, 125 °C, 150 °C

Inverter Switching Characteristics

figure 28. **FWD**

Typical recovered charge as a function of collector current

$Q_r = f(I_C)$



With an inductive load at

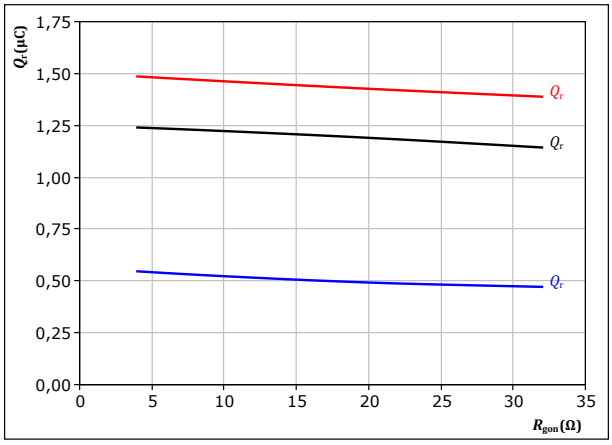
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	16	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 29. **FWD**

Typical recovered charge as a function of IGBT turn on gate resistor

$Q_r = f(R_{gon})$



With an inductive load at

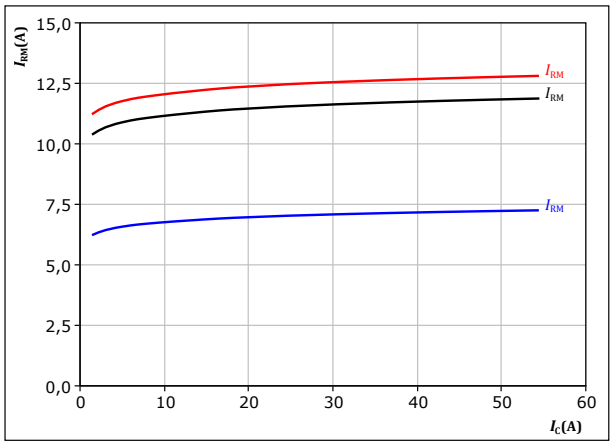
V_{CE} =	350	V
V_{GE} =	±15	V
I_C =	30	A

T_j: 25 °C, 125 °C, 150 °C

figure 30. **FWD**

Typical peak reverse recovery current as a function of collector current

$I_{RM} = f(I_C)$



With an inductive load at

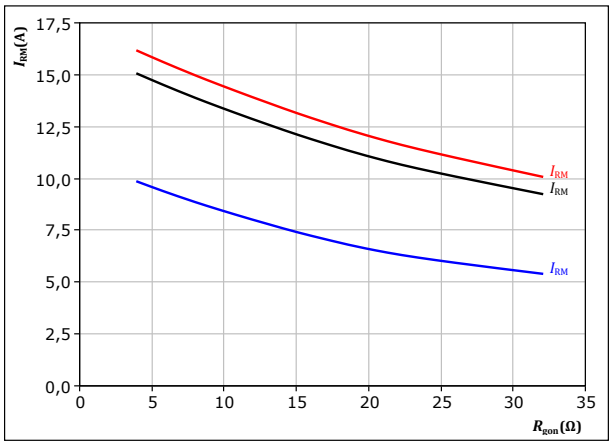
V_{CE} =	350	V
V_{GE} =	±15	V
R_{gon} =	16	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 31. **FWD**

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

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



With an inductive load at

V_{CE} =	350	V
V_{GE} =	±15	V
I_C =	30	A

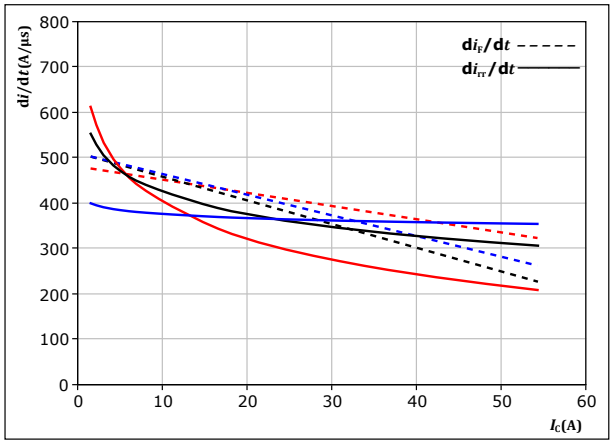
T_j: 25 °C, 125 °C, 150 °C

Inverter Switching Characteristics

figure 32. **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)



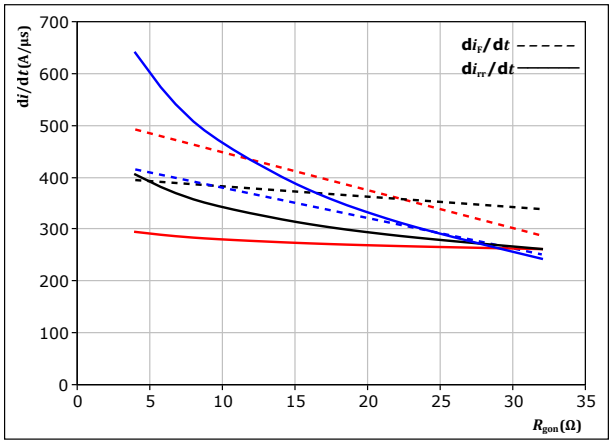
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	16	Ω		150 °C

figure 33. **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})



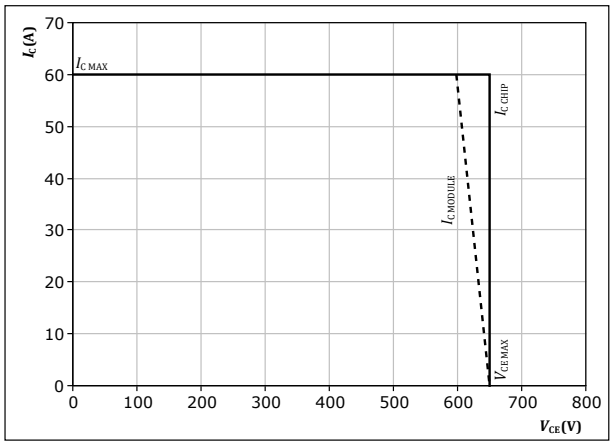
With an inductive load at

V_{CE} =	350	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	30	A		150 °C

figure 34. **IGBT**

Reverse bias safe operating area

I_C = f(V_{CE})



At

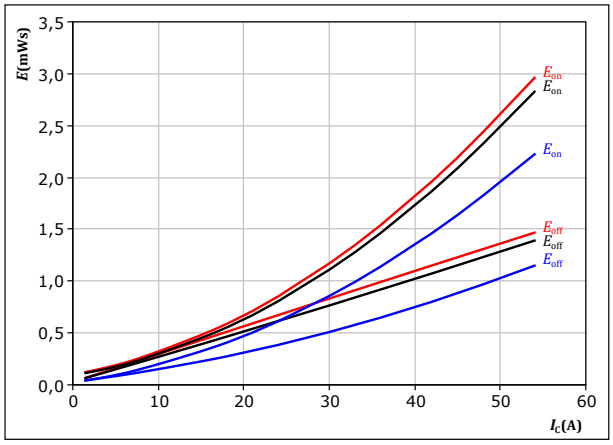
T_j =	150	°C	
R_{gon} =	16	Ω	
R_{goff} =	16	Ω	

Brake Switching Characteristics

figure 35. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



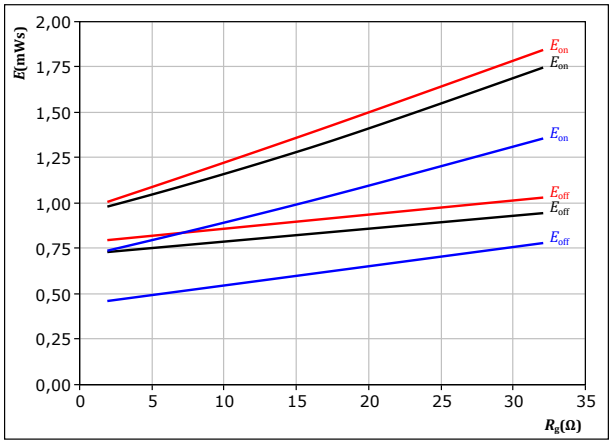
With an inductive load at

V_{CE} =	400	V	T_j: 25 °C
V_{GE} =	0/15	V	125 °C
R_{gon} =	8	Ω	150 °C
R_{goff} =	8	Ω	

figure 36. **IGBT**

Typical switching energy losses as a function of IGBT turn on gate resistor

$E = f(R_g)$



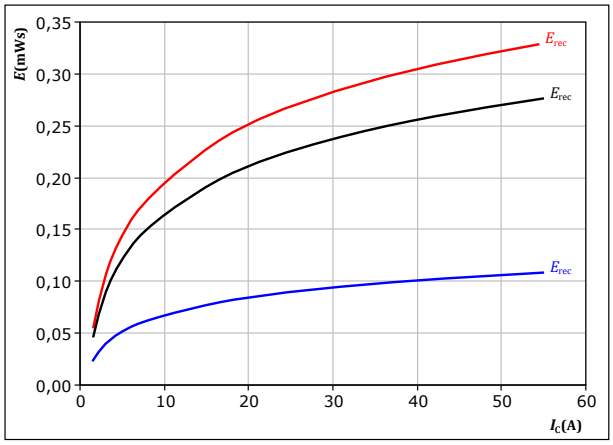
With an inductive load at

V_{CE} =	400	V	T_j: 25 °C
V_{GE} =	0/15	V	125 °C
I_C =	30	A	150 °C

figure 37. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



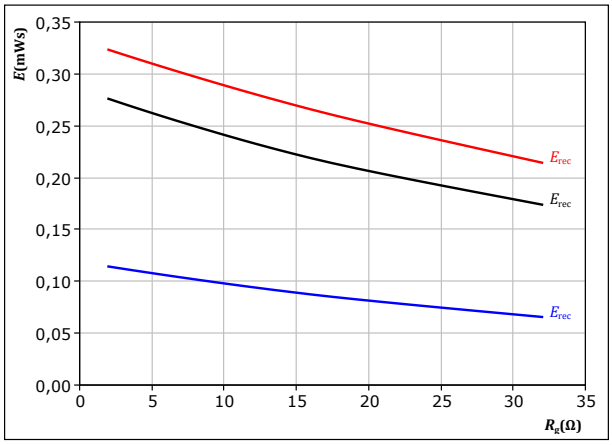
With an inductive load at

V_{CE} =	400	V	T_j: 25 °C
V_{GE} =	0/15	V	125 °C
R_{gon} =	8	Ω	150 °C

figure 38. **FWD**

Typical reverse recovered energy loss as a function of IGBT turn on gate resistor

$E_{rec} = f(R_g)$



With an inductive load at

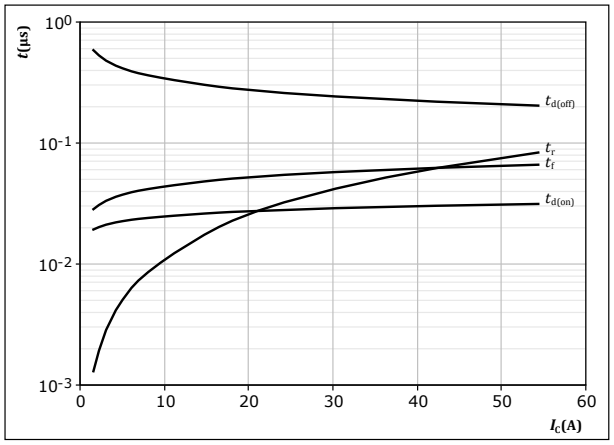
V_{CE} =	400	V	T_j: 25 °C
V_{GE} =	0/15	V	125 °C
I_C =	30	A	150 °C

Brake Switching Characteristics

figure 39. **IGBT**

Typical switching times as a function of collector current

$t = f(I_C)$



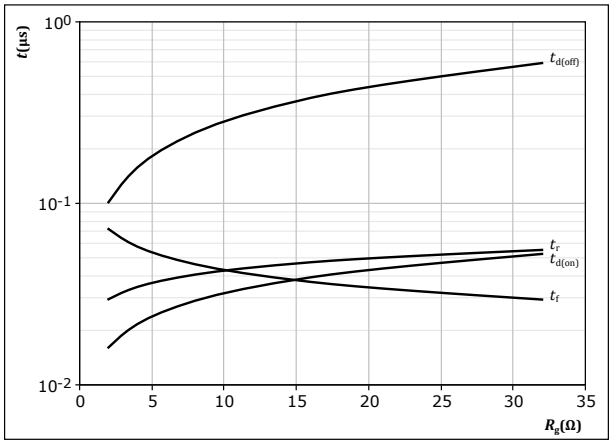
With an inductive load at

T_j =	150	°C
V_{CE} =	400	V
V_{GE} =	0/15	V
R_{gon} =	8	Ω
R_{goff} =	8	Ω

figure 40. **IGBT**

Typical switching times as a function of IGBT turn on gate resistor

$t = f(R_g)$



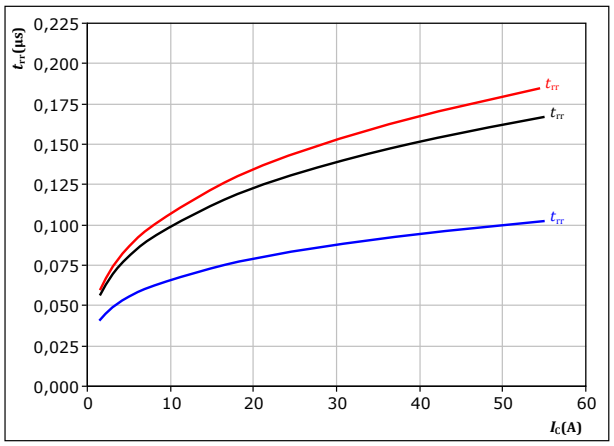
With an inductive load at

T_j =	150	°C
V_{CE} =	400	V
V_{GE} =	0/15	V
I_C =	30	A

figure 41. **FWD**

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_C)$



With an inductive load at

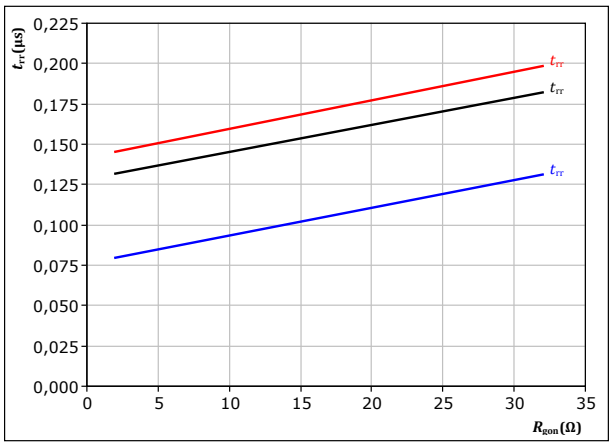
V_{CE} =	400	V
V_{GE} =	0/15	V
R_{gon} =	8	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 42. **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} =	400	V
V_{GE} =	0/15	V
I_C =	30	A

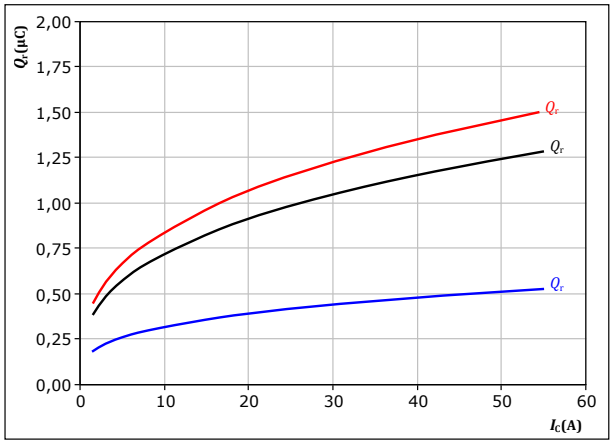
T_j: 25 °C, 125 °C, 150 °C

Brake Switching Characteristics

figure 43. **FWD**

Typical recovered charge as a function of collector current

$Q_r = f(I_C)$



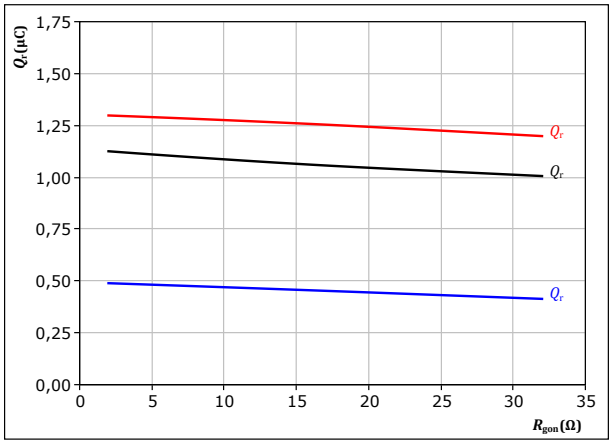
With an inductive load at

V_{CE} =	400	V	T_j: 25 °C
V_{GE} =	0/15	V	125 °C
R_{gon} =	8	Ω	150 °C

figure 44. **FWD**

Typical recovered charge as a function of IGBT turn on gate resistor

$Q_r = f(R_{gon})$



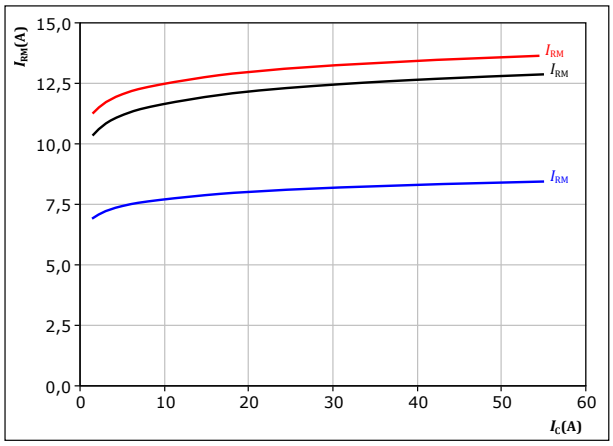
With an inductive load at

V_{CE} =	400	V	T_j: 25 °C
V_{GE} =	0/15	V	125 °C
I_C =	30	A	150 °C

figure 45. **FWD**

Typical peak reverse recovery current as a function of collector current

$I_{RM} = f(I_C)$



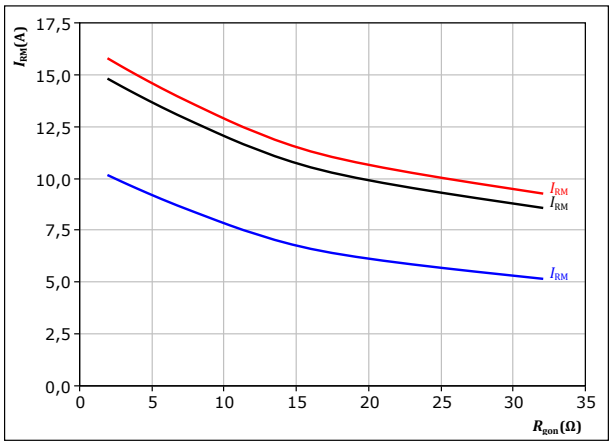
With an inductive load at

V_{CE} =	400	V	T_j: 25 °C
V_{GE} =	0/15	V	125 °C
R_{gon} =	8	Ω	150 °C

figure 46. **FWD**

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

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



With an inductive load at

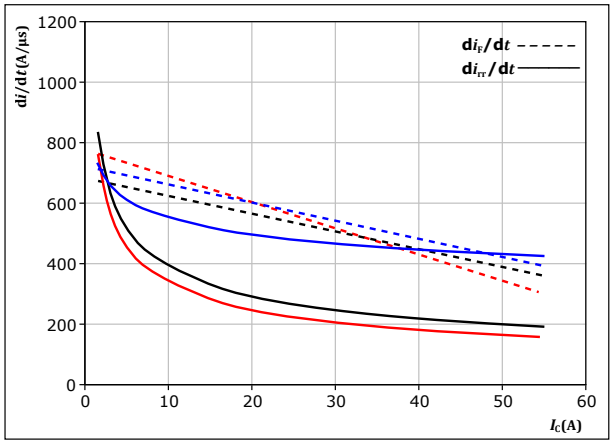
V_{CE} =	400	V	T_j: 25 °C
V_{GE} =	0/15	V	125 °C
I_C =	30	A	150 °C

Brake Switching Characteristics

figure 47. **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)



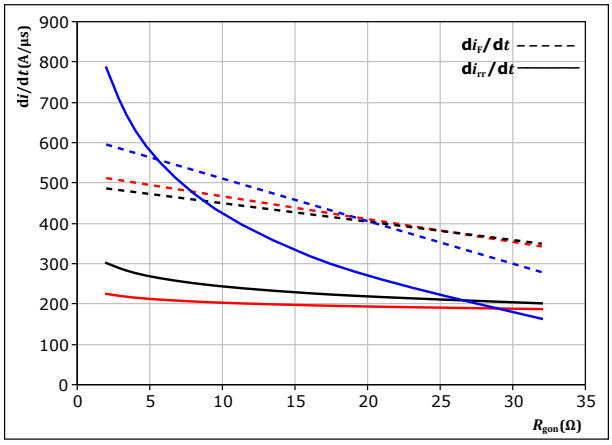
With an inductive load at

V_{CE} =	400	V	T_j:	25 °C
V_{GE} =	0/15	V		125 °C
R_{gon} =	8	Ω		150 °C

figure 48. **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})



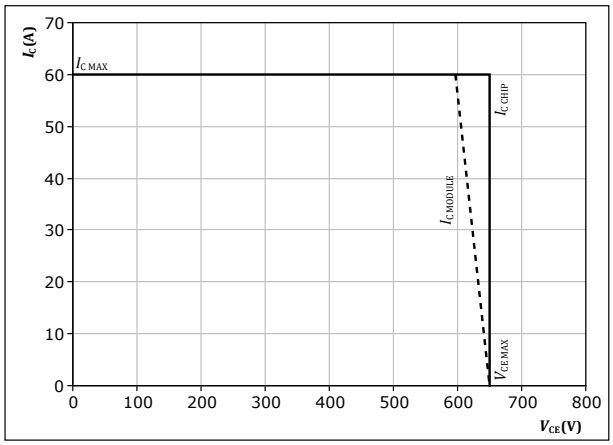
With an inductive load at

V_{CE} =	400	V	T_j:	25 °C
V_{GE} =	0/15	V		125 °C
I_C =	30	A		150 °C

figure 49. **IGBT**

Reverse bias safe operating area

I_C = f(V_{CE})



At

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

Switching Definitions

figure 50. **IGBT**

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

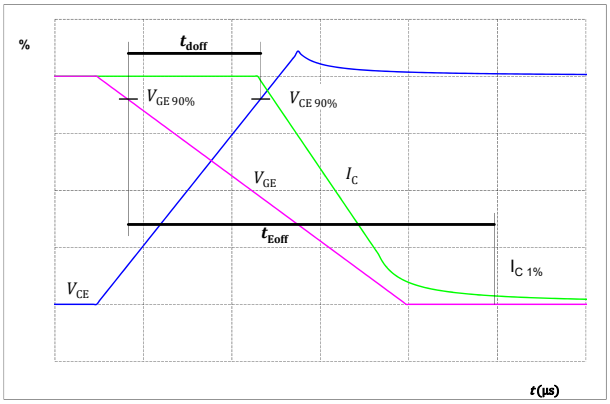


figure 51. **IGBT**

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

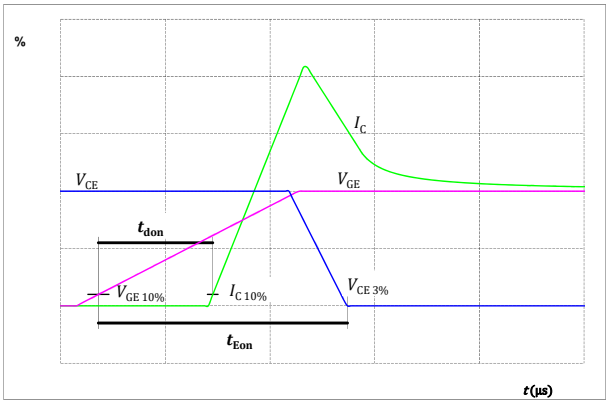


figure 52. **IGBT**

Turn-off Switching Waveforms & definition of t_f

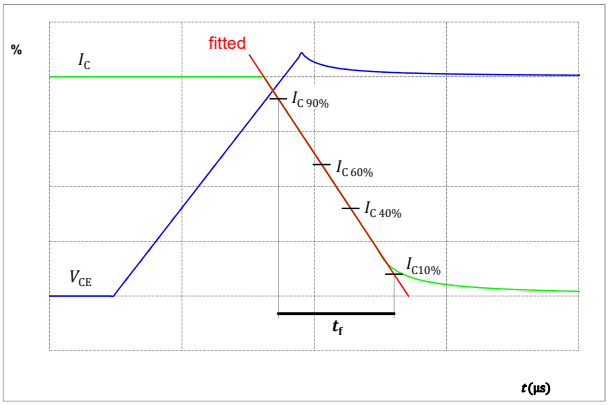
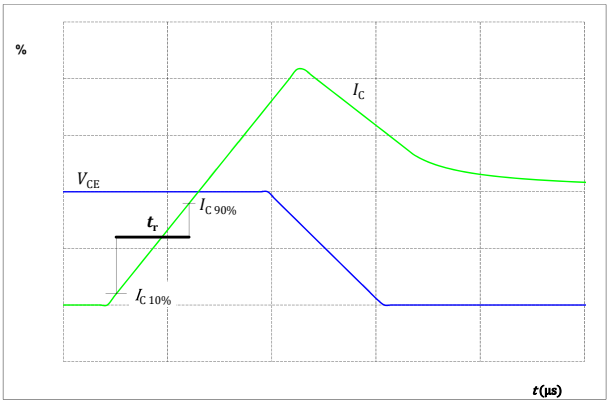


figure 53. **IGBT**

Turn-on Switching Waveforms & definition of t_r



Switching Definitions

figure 54. **FWD**

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

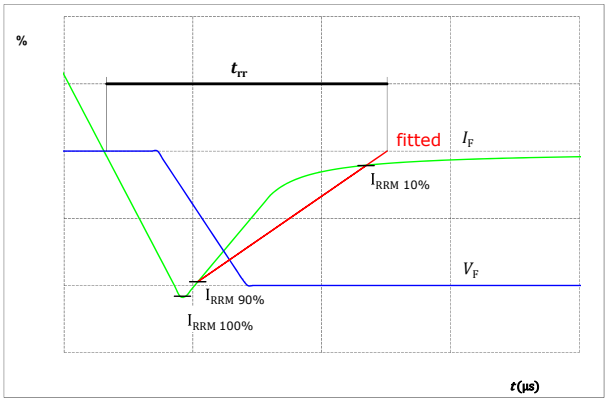
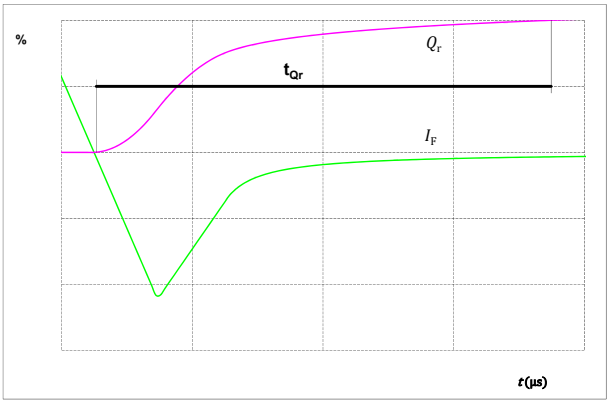


figure 55. **FWD**

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-M107PMA030I701-K205B61-/0A/
With thin lid (2.8mm height) + no thermal grease	80-M107PMA030I701-K205B61-/0B/
With std lid (6.5mm height) + thermal grease (0,8 W/mK, P12, silicone-based)	80-M107PMA030I701-K205B61-/1A/
With thin lid (2.8mm height) + thermal grease (0,8 W/mK, P12, silicone-based)	80-M107PMA030I701-K205B61-/1B/
With std lid (6.5mm height) + thermal grease (2,5 W/mK, TG20032, silicone-free)	80-M107PMA030I701-K205B61-/4A/
With thin lid (2.8mm height) + thermal grease (2,5 W/mK, TG20032, silicone-free)	80-M107PMA030I701-K205B61-/4B/
With std lid (6.5mm height) + thermal grease (2,5 W/mK, HPTP, silicone-based)	80-M107PMA030I701-K205B61-/5A/
With thin lid (2.8mm height) + thermal grease (2,5 W/mK, HPTP, silicone-based)	80-M107PMA030I701-K205B61-/5B/

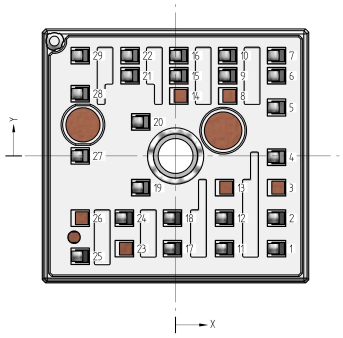
Marking



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

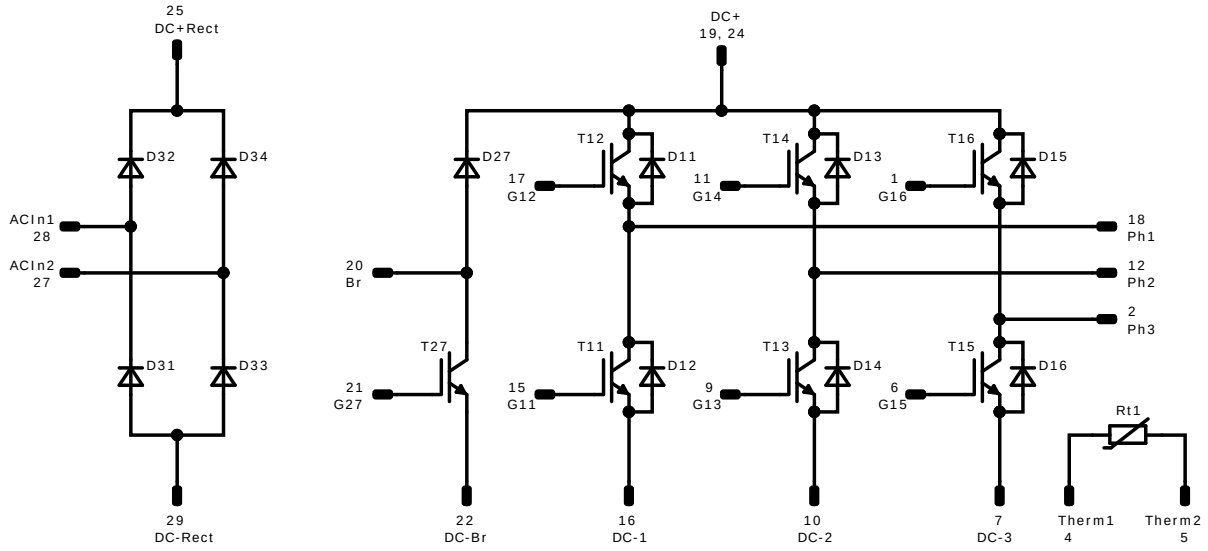
Outline

Pin table [mm]			
Pin	X	Y	Function
1	15,93	-14,6	G16
2	15,93	-9,8	Ph3
3	not assembled		
4	15,93	-0,2	Therm1
5	15,93	7,62	Therm2
6	15,93	12,62	G15
7	15,93	15,8	DC-3
8	not assembled		
9	8,23	12,62	G13
10	8,23	15,8	DC-2
11	7,73	-14,6	G14
12	7,73	-9,8	Ph2
13	not assembled		
14	not assembled		
15	0,53	12,62	G11
16	0,53	15,8	DC-1
17	-0,47	-14,6	G12
18	-0,47	-9,8	Ph1
19	-5,47	-5	DC+
20	-5,47	5,35	Br
21	-7,17	12,62	G27
22	-7,17	15,8	DC-Br
23	not assembled		
24	-8,07	-9,8	DC+
25	-15,02	-15,8	DC+Rect
26	not assembled		
27	-15,02	0	ACIn2
28	-15,02	9,8	ACIn1
29	-15,02	15,8	DC-Rect



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

Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T11, T12, T13, T14, T15, T16	IGBT	650 V	30 A	Inverter Switch	
D11, D12, D13, D14, D15, D16	FWD	650 V	30 A	Inverter Diode	
T27	IGBT	650 V	30 A	Brake Switch	
D27	FWD	650 V	20 A	Brake Diode	
D31, D32, D33, D34	Rectifier	1600 V	28 A	Rectifier Diode	
Rt	Thermistor			Thermistor	

Packaging instruction				
Standard packaging quantity (SPQ) 120	>SPQ	Standard	<SPQ	Sample

Handling instruction
Handling instructions for MiniSKiiP® 1 packages see vincotech.com website.

Package data
Package data for MiniSKiiP® 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 UL 1557 recognized under E192116 up to a junction temperature under switching condition $T_{j,op}$=150°C and up to 2500VAC/1min isolation voltage. For more information see vincotech.com website.

Document No.:	Date:	Modification:	Pages
80-M107PMA030I701-K205B61-D1-14	1 Oct. 2026	Initial Release	

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2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.