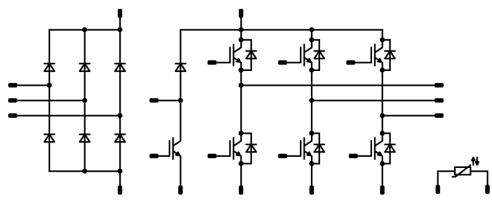




Vincotech

flowPIM E2	650 V / 50 A
Topology features <ul style="list-style-type: none">• Open Emitter configuration• Temperature sensor• Converter+Brake+Inverter	flow E2 12 mm housing
Component features <ul style="list-style-type: none">• Easy paralleling• Low collector emitter saturation voltage• Low turn-off losses• Positive temperature coefficient	
Housing features <ul style="list-style-type: none">• Base isolation: Al₂O₃• Convex shaped substrate for superior thermal contact• Compact housing• CTI600 housing material• Thermo-mechanical push-and-pull force relief• Press-fit pin• Reliable cold welding connection	Schematic 
Target applications <ul style="list-style-type: none">• Industrial Drives	
Types <ul style="list-style-type: none">• 10-EY07PMA050I7-L184A28T	



Vincotech

Maximum Ratings

$T_j = 25^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
Inverter Switch				
Collector-emitter voltage	V_{CES}		650	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$ $T_s = 80^\circ\text{C}$	56	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	150	A
Turn off safe operating area		$T_j = 150^\circ\text{C}$, $V_{CE} = 1200\text{ V}$	150	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80^\circ\text{C}$	81	W
Gate-emitter voltage	V_{GES}		± 20	V
Short circuit ratings	t_{SC}	$V_{GE} = 15\text{ V}$, $V_{CC} = 400\text{ V}$ $T_j = 150^\circ\text{C}$	3	μs
Maximum junction temperature	T_{jmax}		175	$^\circ\text{C}$

Inverter Diode

Peak repetitive reverse voltage	V_{RRM}		650	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$ $T_s = 80^\circ\text{C}$	42	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	150	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80^\circ\text{C}$	61	W
Maximum junction temperature	T_{jmax}		175	$^\circ\text{C}$

Brake Switch

Collector-emitter voltage	V_{CES}		650	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$ $T_s = 80^\circ\text{C}$	56	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	150	A
Turn off safe operating area		$T_j = 150^\circ\text{C}$, $V_{CE} = 1200\text{ V}$	150	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80^\circ\text{C}$	81	W
Gate-emitter voltage	V_{GES}		± 20	V
Short circuit ratings	t_{SC}	$V_{GE} = 15\text{ V}$, $V_{CC} = 400\text{ V}$ $T_j = 150^\circ\text{C}$	3	μs
Maximum junction temperature	T_{jmax}		175	$^\circ\text{C}$



Vincotech

Maximum Ratings

$T_j = 25 \text{ }^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
Brake Diode				
Peak repetitive reverse voltage	V_{RRM}		650	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	25	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	60	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	41	W
Maximum junction temperature	T_{jmax}		175	$^\circ\text{C}$

Rectifier Diode

Peak repetitive reverse voltage	V_{RRM}		1600	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	58	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, $t_p = 10 \text{ ms}$	400	A
Surge current capability	I^t	$T_j = 150 \text{ }^\circ\text{C}$	800	A^2s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	68	W
Maximum junction temperature	T_{jmax}		150	$^\circ\text{C}$

Module Properties

Thermal Properties				
Storage temperature	T_{stg}		-40...+125	$^\circ\text{C}$
Operation temperature under switching condition	T_{jop}		-40...+($T_{jmax} - 25$)	$^\circ\text{C}$

Isolation Properties

Isolation voltage	V_{isol}	DC Test Voltage*	$t_p = 2 \text{ s}$	6000	V
Creepage distance				>12,7	mm
Clearance				8,83	mm
Comparative Tracking Index	CTI			≥ 600	

*100 % tested in production



Vincotech

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	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,0005	25	4,35	5	5,65	V
Collector-emitter saturation voltage	$V_{CE(sat)}$		15		50	25 125 150		1,3 1,36 1,38	1,65 ⁽¹⁾	V
Collector-emitter cut-off current	I_{CES}		0	650		25			20	µA
Gate-emitter leakage current	I_{GES}		20	0		25			100	nA
Internal gate resistance	r_g							None		Ω
Input capacitance	C_{res}	$f = 1 \text{ MHz}$	0	25	25	25	3050		pF	
Output capacitance	C_{ces}									
Reverse transfer capacitance	C_{res}									
Gate charge	Q_g	$V_{CC} = 520 \text{ V}$	15		50	25		290		nC

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 3,4 \text{ W/mK}$ (PSX)						1,17		K/W
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Dynamic

Turn-on delay time	$t_{d(on)}$	$R_{gon} = 4 \Omega$ $R_{goff} = 4 \Omega$	± 15	300	50	25		60,79		
Rise time	t_r					125		64,41		ns
						150		65,69		
Turn-off delay time	$t_{d(off)}$					25		27,12		
						125		29,04		
Fall time	t_f					150		29,23		ns
Turn-on energy (per pulse)	E_{on}	$Q_{tFWD}=0,889 \mu\text{C}$ $Q_{rFWD}=2,03 \mu\text{C}$ $Q_{fFWD}=2,38 \mu\text{C}$				25		120,07		
						125		149,77		
						150		155,45		
Turn-off energy (per pulse)	E_{off}					25		29,98		
						125		54,2		
						150		61,97		ns
						25		0,781		
						125		1,06		mWs
						150		1,15		
						25		0,669		
						125		1,02		mWs
						150		1,13		



Vincotech

Characteristic Values

Parameter	Symbol	Conditions						Values			Unit
		V_{GE} [V]	V_{GS} [V]	V_{CE} [V]	V_{DS} [V]	I_C [A]	I_D [A]	T_j [°C]	Min	Typ	Max

Inverter Diode

Static

Forward voltage	V_F				50	25 125 150		1,68 1,58 1,56	2 ⁽¹⁾	V
Reverse leakage current	I_R	$V_r = 650$ V			25			20	μ A	

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						1,57		K/W
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Dynamic

Peak recovery current	I_{RM}	$di/dt=1324$ A/ μ s $di/dt=1330$ A/ μ s $di/dt=1286$ A/ μ s	± 15	300	50	25 125 150		17,13 26,09 28,27		A
Reverse recovery time	t_{rr}					25 125 150		88,19 131,34 144,52		ns
Recovered charge	Q_r					25 125 150		0,889 2,03 2,38		μ C
Reverse recovered energy	E_{rec}					25 125 150		0,139 0,347 0,42		mWs
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$					25 125 150		696,24 388,79 321,58		A/ μ s



Vincotech

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	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,0005	25	4,35	5	5,65	V
Collector-emitter saturation voltage	$V_{CE(sat)}$		15		50	25 125 150		1,3 1,36 1,38	1,65 ⁽¹⁾	V
Collector-emitter cut-off current	I_{CES}		0	650		25			20	µA
Gate-emitter leakage current	I_{GES}		20	0		25			100	nA
Internal gate resistance	r_g							None		Ω
Input capacitance	C_{res}	$f = 1 \text{ MHz}$	0	25	25	25	3050		pF	
Output capacitance	C_{ces}									
Reverse transfer capacitance	C_{res}									
Gate charge	Q_g	$V_{CC} = 520 \text{ V}$	15		50	25		290		nC

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 3,4 \text{ W/mK}$ (PSX)						1,17		K/W
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Dynamic

Turn-on delay time	$t_{d(on)}$	$R_{gon} = 4 \Omega$ $R_{goff} = 4 \Omega$	0/15	400	50	25		19,51		
Rise time	t_r					125		21,44		ns
						150		21,76		
Turn-off delay time	$t_{d(off)}$					25		32,4		
						125		33,26		
Fall time	t_f					150		33,24		ns
Turn-on energy (per pulse)	E_{on}	$Q_{tFWD}=0,617 \mu\text{C}$ $Q_{fFWD}=1,37 \mu\text{C}$ $Q_{ffwd}=1,59 \mu\text{C}$				25		200,98		
						125		236,87		
						150		245,87		
Turn-off energy (per pulse)	E_{off}					25		18,98		
						125		40,64		
						150		48,27		ns
						25		1,15		
						125		1,45		
						150		1,52		mWs
						25		0,843		
						125		1,29		
						150		1,42		mWs



Vincotech

Characteristic Values

Parameter	Symbol	Conditions						Values			Unit
		V_{GE} [V]	V_{GS} [V]	V_{CE} [V]	V_{DS} [V]	I_C [A]	I_D [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	μ A	

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						2,32		K/W
--	---------------	---------------------------------------	--	--	--	--	--	------	--	-----

Dynamic

Peak recovery current	I_{RM}	$di/dt=994$ A/ μ s $di/dt=1073$ A/ μ s $di/dt=1113$ A/ μ s	0/15	400	50	25 125 150		10,77 15,83 16,89		A
Reverse recovery time	t_{rr}					25 125 150		95,93 139,24 155,48		ns
Recovered charge	Q_r					25 125 150		0,617 1,37 1,59		μ C
Reverse recovered energy	E_{rec}					25 125 150		0,139 0,345 0,404		mWs
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$					25 125 150		386,89 203,31 166,65		A/ μ s



Vincotech

Characteristic Values

Parameter	Symbol	Conditions						Values			Unit
		V_{GE} [V]	V_{GS} [V]	V_{CE} [V]	V_{DS} [V]	I_C [A]	I_D [A]	T_j [°C]	Min	Typ	Max

Rectifier Diode

Static

Forward voltage	V_F				5	25 125 150		0,875 0,764 0,748	1,1 ⁽¹⁾	V
Reverse leakage current	I_R	$V_r = 1600$ V				25 150			100 2000	µA

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						1,03		K/W
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Thermistor

Static

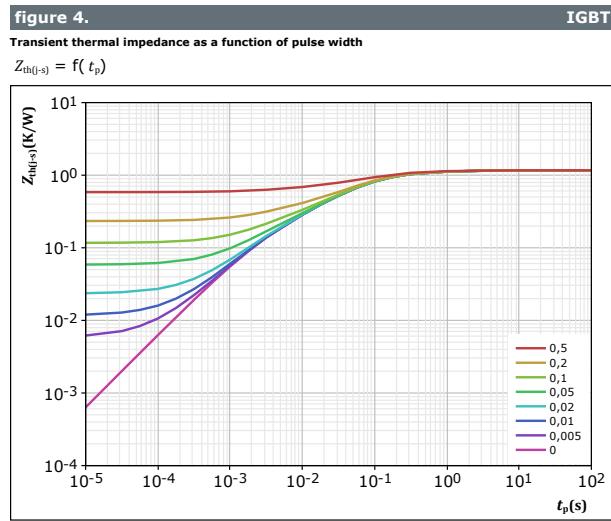
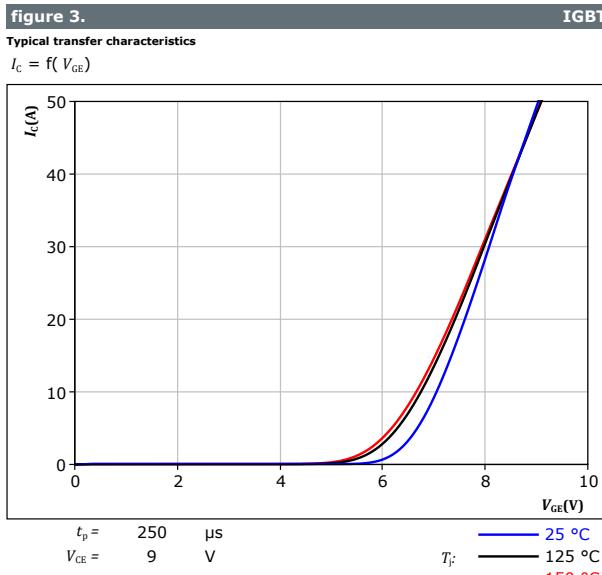
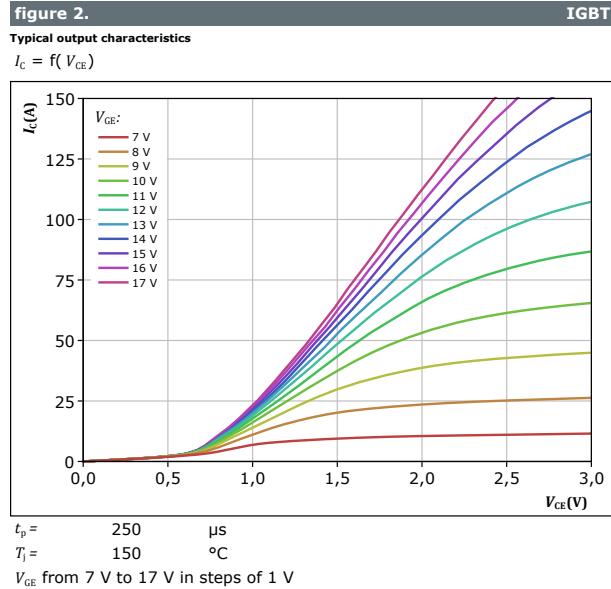
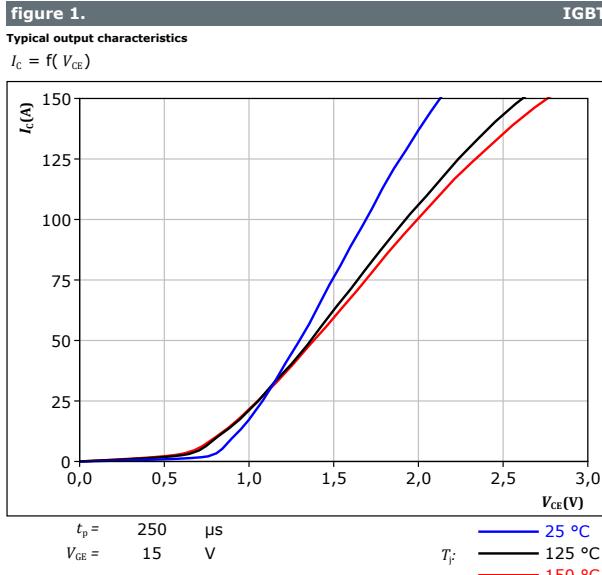
Rated resistance	R					25		5		kΩ
Deviation of R100	$A_{R/R}$	$R_{100} = 499$ Ω				100	3,2		3,3	%
Power dissipation	P					25		130		mW
Power dissipation constant	d					25		1,3		mW/K
B-value	$B_{(25/50)}$	Tol. ±1 %						3380		K
Vincotech Thermistor Reference									V	

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



Vincotech

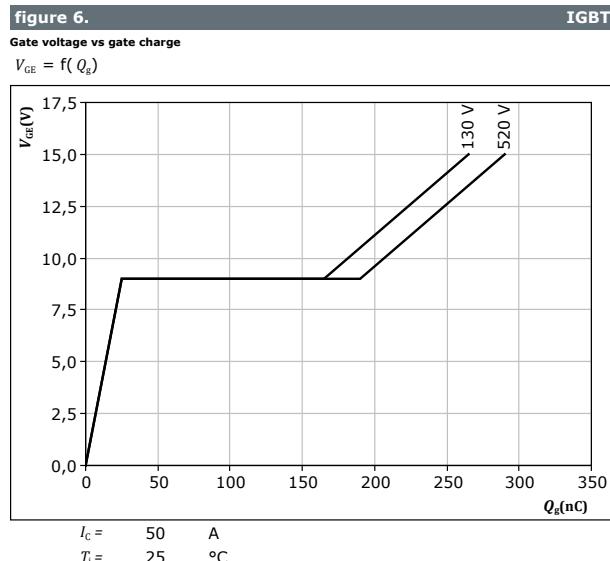
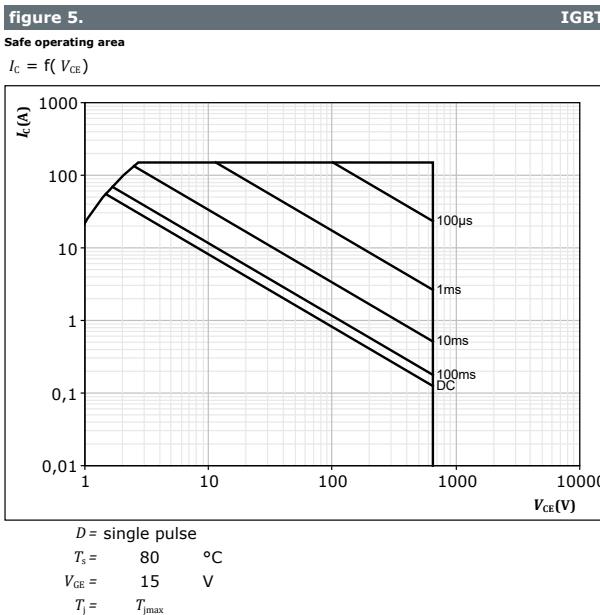
Inverter Switch Characteristics





Vincotech

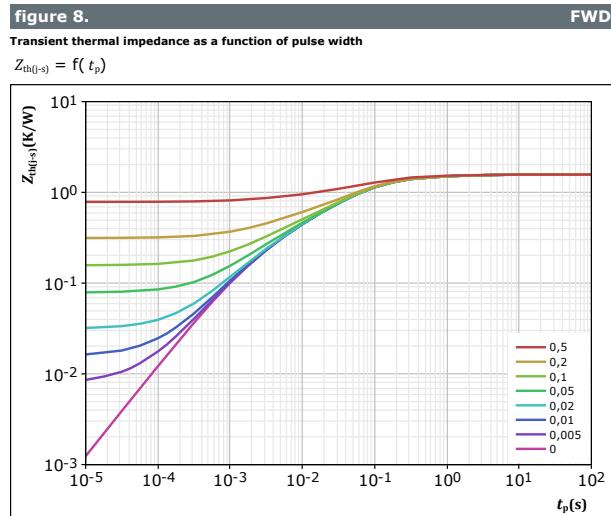
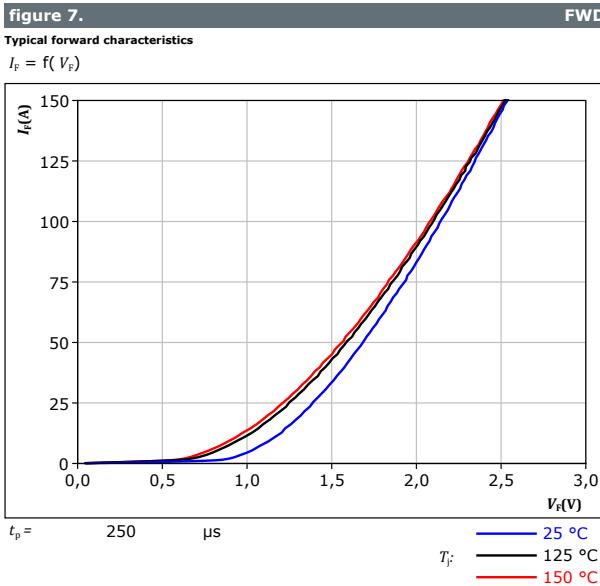
Inverter Switch Characteristics





Vincotech

Inverter Diode Characteristics





Vincotech

Brake Switch Characteristics

figure 9. IGBT

Typical output characteristics
 $I_C = f(V_{CE})$

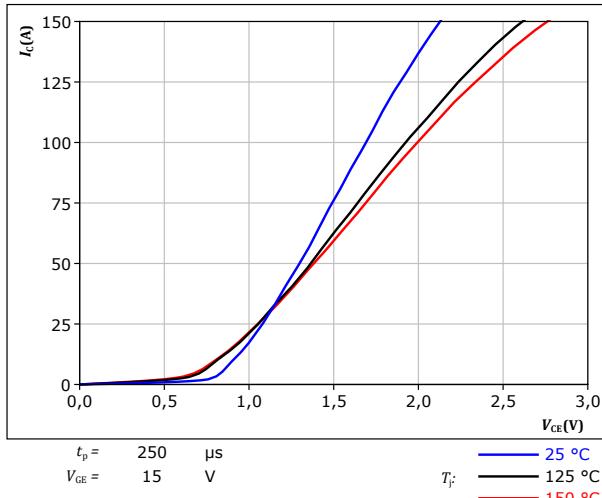


figure 10. IGBT

Typical output characteristics
 $I_C = f(V_{CE})$

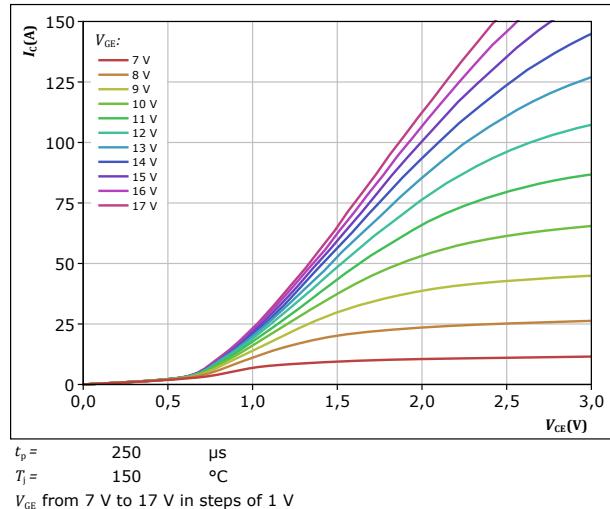


figure 11. IGBT

Typical transfer characteristics
 $I_C = f(V_{GE})$

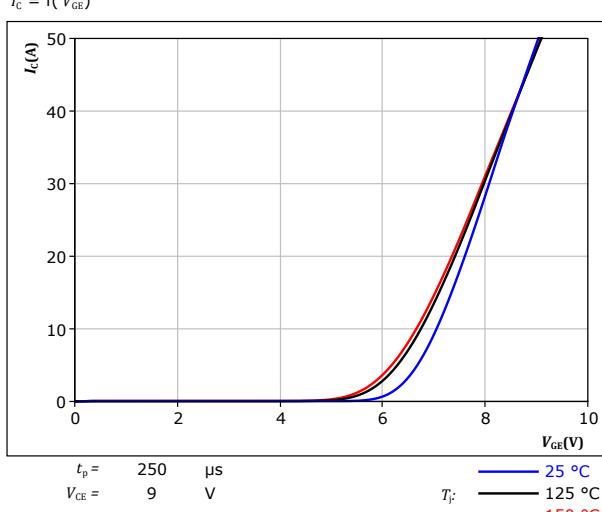
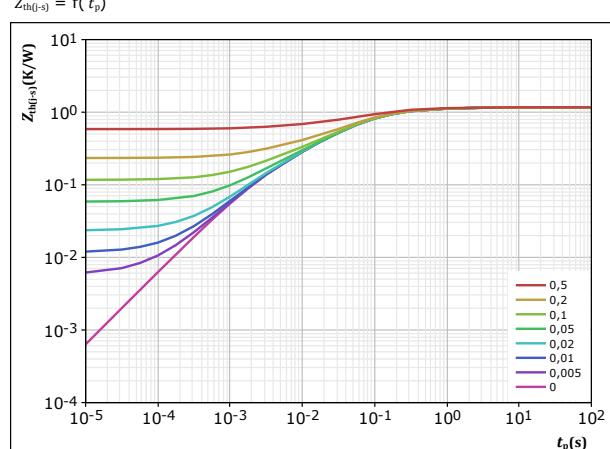


figure 12. IGBT

Transient thermal impedance as a function of pulse width
 $Z_{th(j-s)} = f(t_p)$



IGBT thermal model values

R (K/W)	τ (s)
6,39E-02	2,27E+00
2,30E-01	2,73E-01
5,97E-01	6,47E-02
2,01E-01	1,18E-02
7,68E-02	2,11E-03



Brake Switch Characteristics

figure 13.

Safe operating area

$$I_C = f(V_{CE})$$

IGBT

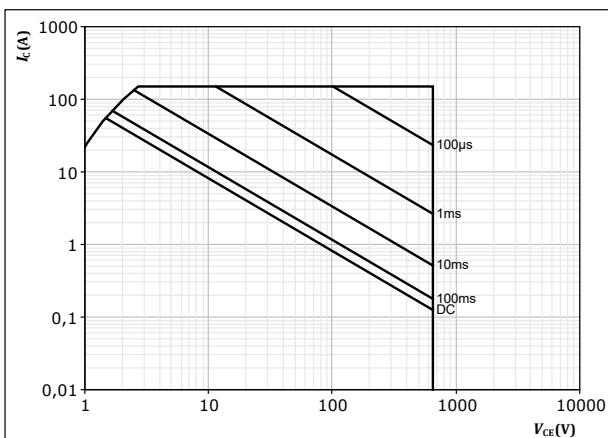
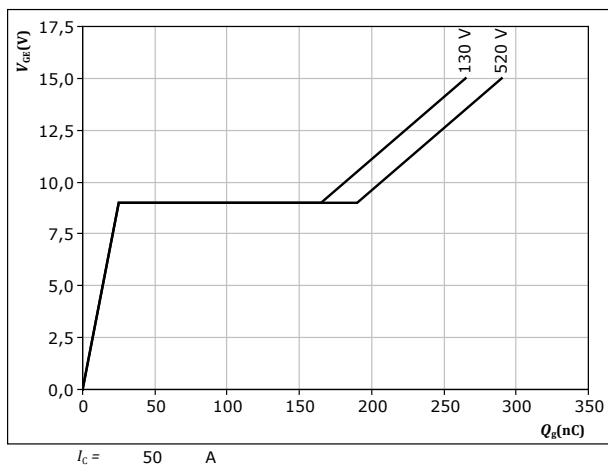


figure 14.

Gate voltage vs gate charge

$$V_{GE} = f(Q_g)$$

IGBT





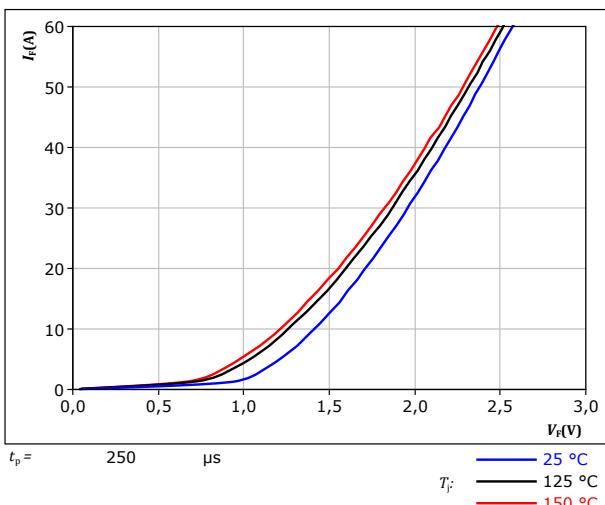
Brake Diode Characteristics

figure 15.

Typical forward characteristics

$$I_F = f(V_F)$$

FWD



$$t_p = 250 \mu\text{s}$$

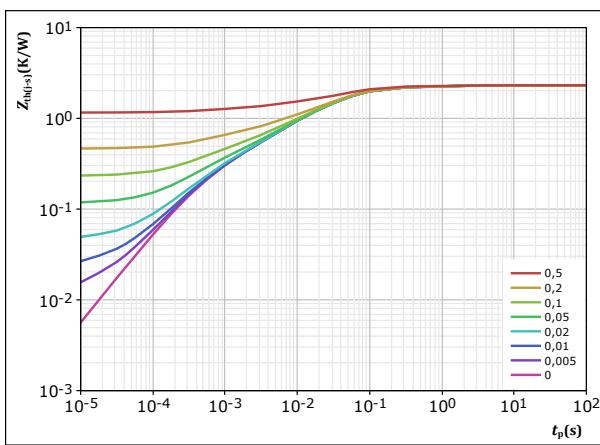
T_F :
— 25 °C
— 125 °C
— 150 °C

figure 16.

Transient thermal impedance as a function of pulse width

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

FWD



$$D = \frac{t_p}{T} = 2,315$$

K/W

FWD thermal model values

R (K/W)	τ (s)
1,13E-01	1,64E+00
4,74E-01	1,08E-01
1,12E+00	2,89E-02
4,12E-01	4,03E-03
1,94E-01	4,61E-04



Rectifier Diode Characteristics

figure 17.

Typical forward characteristics

$$I_F = f(V_F)$$

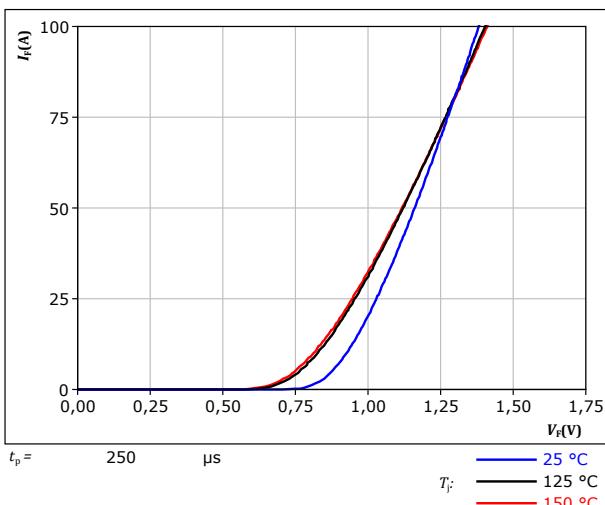
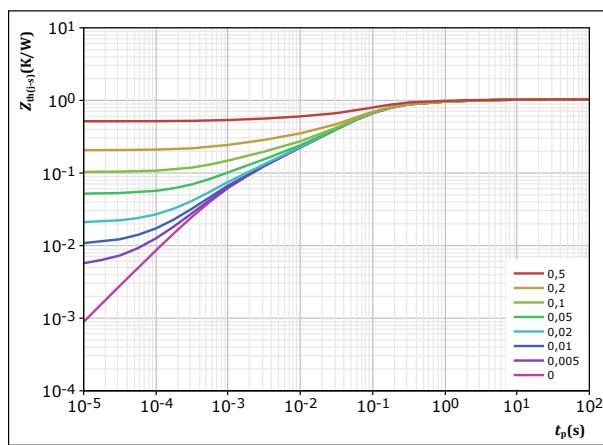


figure 18.

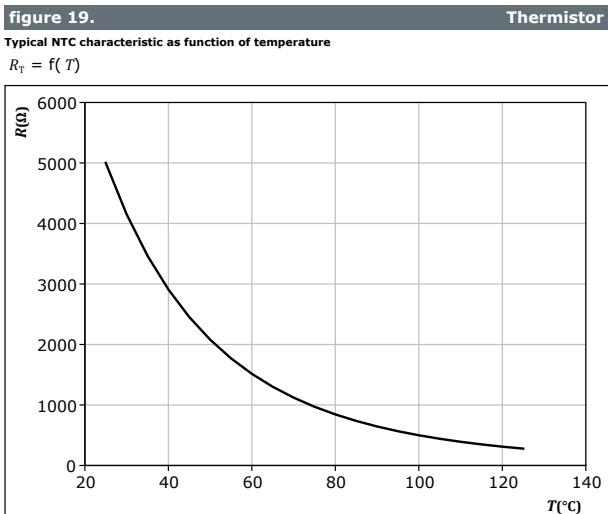
Transient thermal impedance as a function of pulse width

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





Thermistor Characteristics





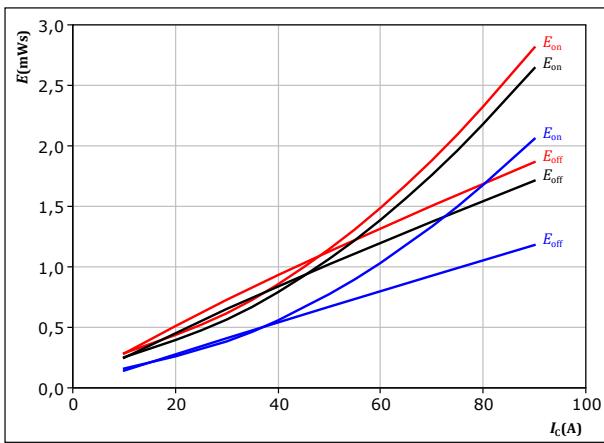
Vincotech

Inverter Switching Characteristics

figure 20.

Typical switching energy losses as a function of collector current

$$E = f(I_c)$$

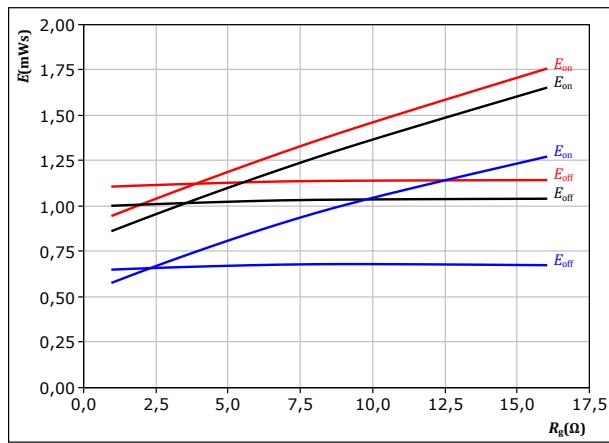


IGBT

figure 21.

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

$$E = f(R_g)$$

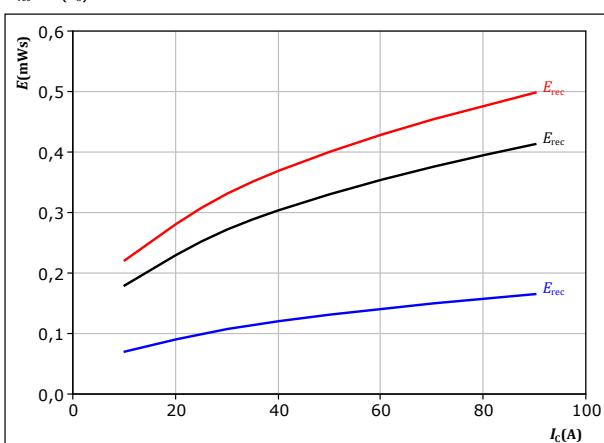


IGBT

figure 22.

Typical reverse recovered energy loss as a function of collector current

$$E_{rec} = f(I_c)$$

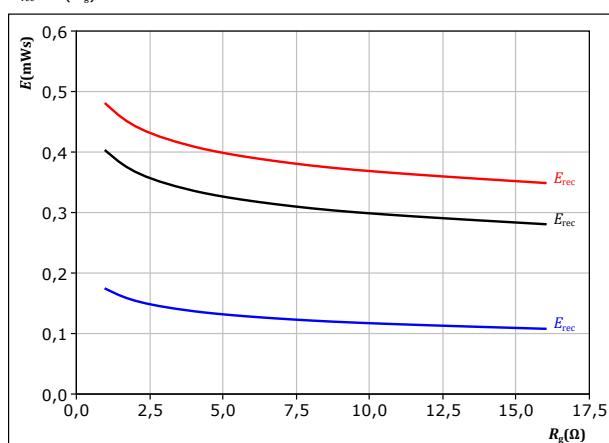


FWD

figure 23.

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

$$E_{rec} = f(R_g)$$



FWD



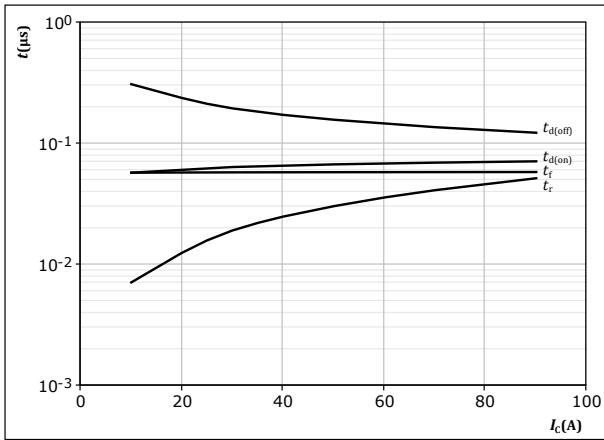
Vincotech

Inverter Switching Characteristics

figure 24.

IGBT

Typical switching times as a function of collector current
 $t = f(I_C)$



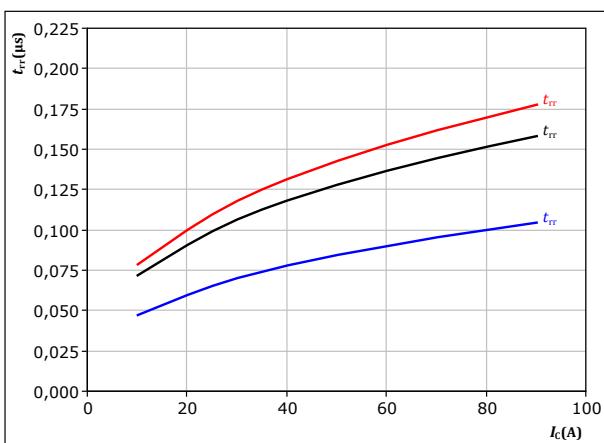
With an inductive load at

T_j = 150 °C
V_{CE} = 300 V
V_{GE} = ±15 V
R_{gon} = 4 Ω
R_{gorf} = 4 Ω

figure 26.

FWD

Typical reverse recovery time as a function of collector current
 $t_{rr} = f(I_C)$



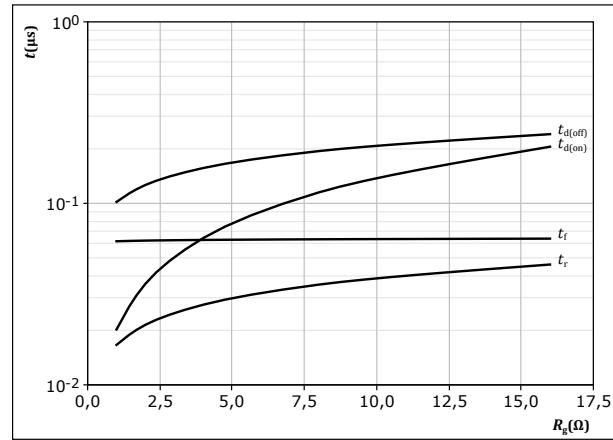
With an inductive load at

V_{CE} = 300 V
V_{GE} = ±15 V
R_{gon} = 4 Ω

figure 25.

IGBT

Typical switching times as a function of IGBT turn on gate resistor
 $t = f(R_g)$



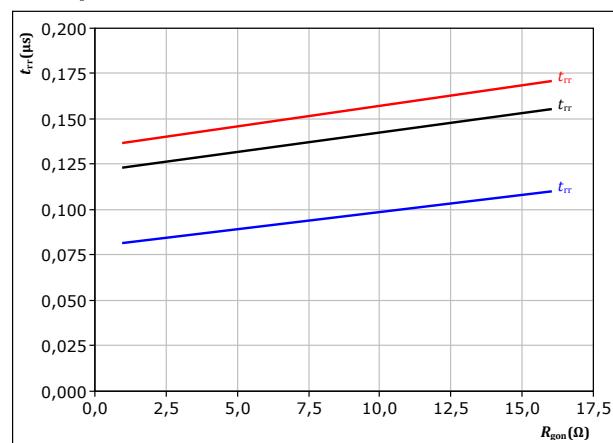
With an inductive load at

T_j = 150 °C
V_{CE} = 300 V
V_{GE} = ±15 V
I_C = 50 A

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} = 300 V
V_{GE} = ±15 V
I_C = 50 A



Vincotech

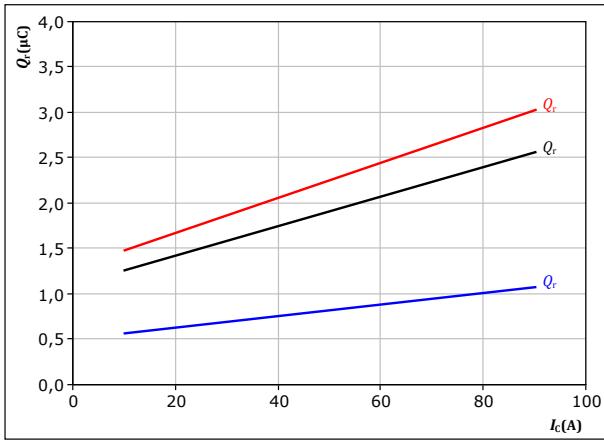
Inverter Switching Characteristics

figure 28.

FWD

Typical recovered charge as a function of collector current

$$Q_r = f(I_c)$$



With an inductive load at

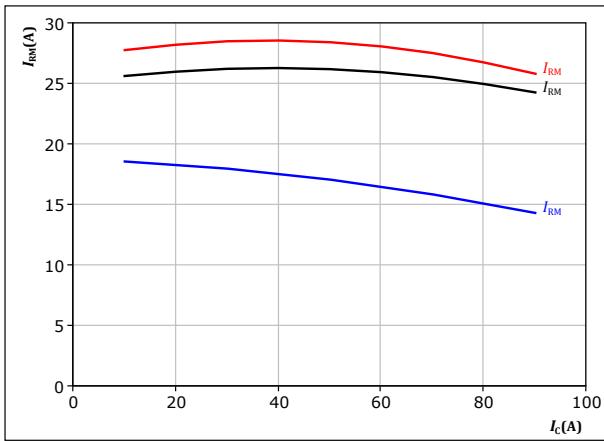
$V_{CE} = 300 \text{ V}$ $T_f: 25 \text{ }^{\circ}\text{C}$
 $V_{GE} = \pm 15 \text{ V}$ $125 \text{ }^{\circ}\text{C}$
 $R_{gon} = 4 \Omega$ $150 \text{ }^{\circ}\text{C}$

figure 30.

FWD

Typical peak reverse recovery current as a function of collector current

$$I_{RM} = f(I_c)$$



With an inductive load at

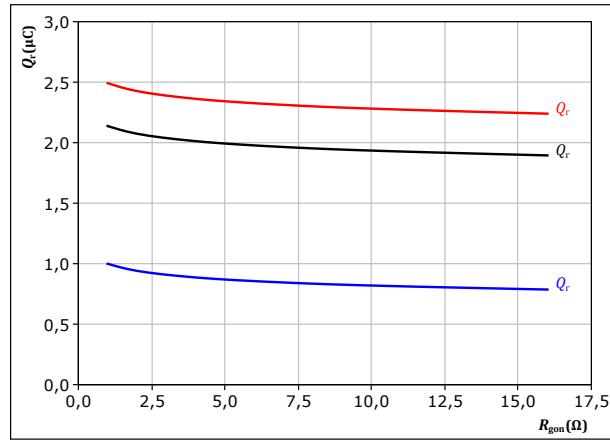
$V_{CE} = 300 \text{ V}$ $T_f: 25 \text{ }^{\circ}\text{C}$
 $V_{GE} = \pm 15 \text{ V}$ $125 \text{ }^{\circ}\text{C}$
 $R_{gon} = 4 \Omega$ $150 \text{ }^{\circ}\text{C}$

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

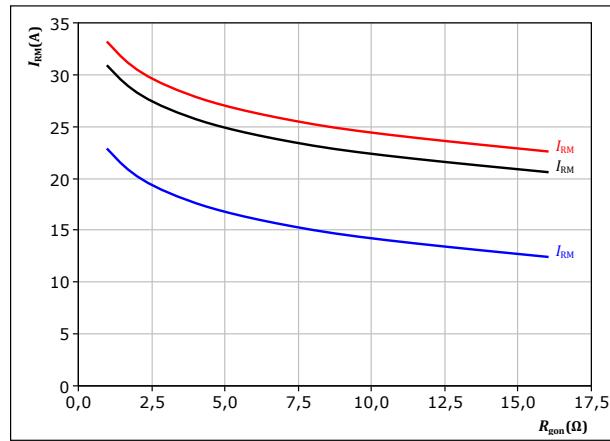
$V_{CE} = 300 \text{ V}$ $T_f: 25 \text{ }^{\circ}\text{C}$
 $V_{GE} = \pm 15 \text{ V}$ $125 \text{ }^{\circ}\text{C}$
 $I_c = 50 \text{ A}$ $150 \text{ }^{\circ}\text{C}$

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

$V_{CE} = 300 \text{ V}$ $T_f: 25 \text{ }^{\circ}\text{C}$
 $V_{GE} = \pm 15 \text{ V}$ $125 \text{ }^{\circ}\text{C}$
 $I_c = 50 \text{ A}$ $150 \text{ }^{\circ}\text{C}$



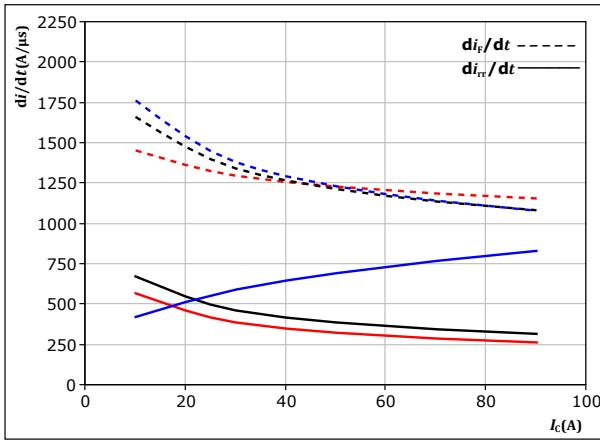
Vincotech

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

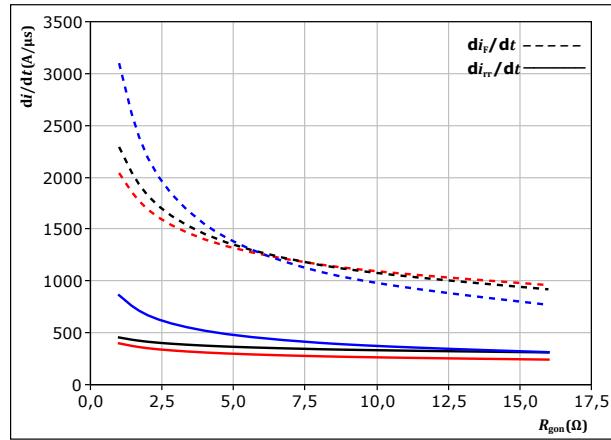
$V_{CE} = 300 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $R_{gon} = 4 \Omega$

$T_j = 25^\circ\text{C}$
 $T_j = 125^\circ\text{C}$
 $T_j = 150^\circ\text{C}$

figure 33. FWD

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

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



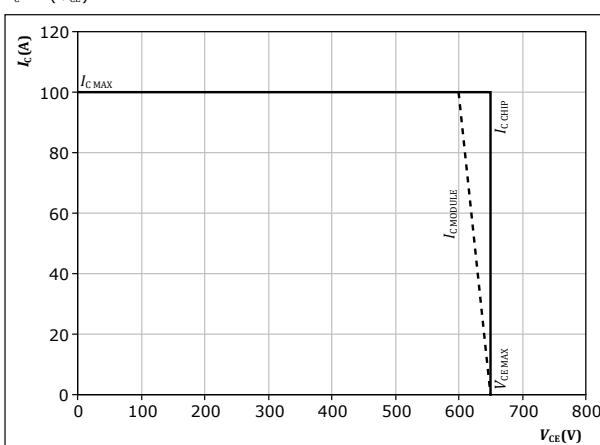
With an inductive load at

$V_{CE} = 300 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $I_c = 50 \text{ A}$

figure 34. IGBT

Reverse bias safe operating area

$I_c = f(V_{CE})$



At $T_j = 150^\circ\text{C}$
 $R_{gon} = 4 \Omega$
 $R_{goff} = 4 \Omega$

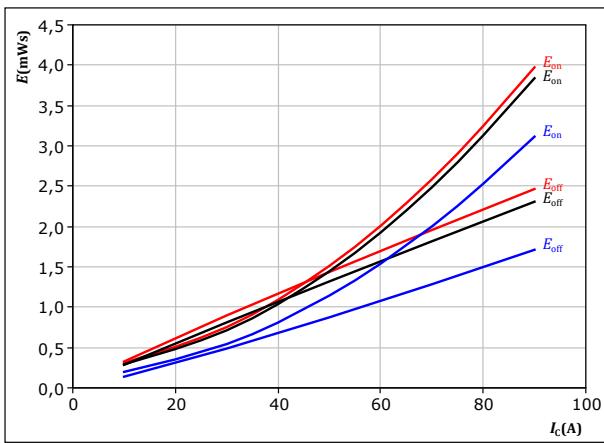


Vincotech

Brake Switching Characteristics

figure 35.

Typical switching energy losses as a function of collector current
 $E = f(I_c)$

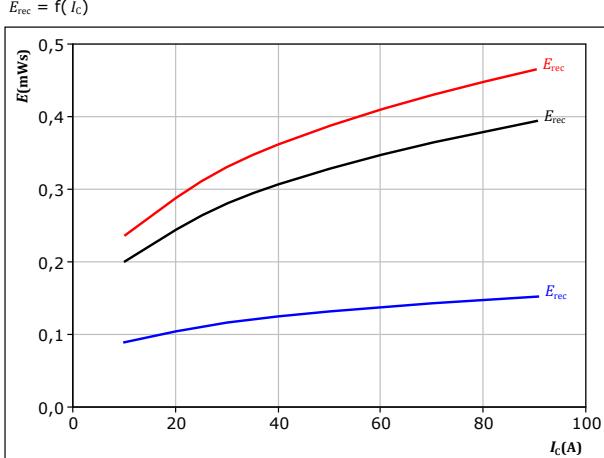


With an inductive load at

$V_{CE} = 400$ V $T_f = 25, 125, 150$ °C
 $V_{GE} = 0/15$ V
 $R_{gon} = 4$ Ω
 $R_{goff} = 4$ Ω

figure 37.

Typical reverse recovered energy loss as a function of collector current
 $E_{rec} = f(I_c)$

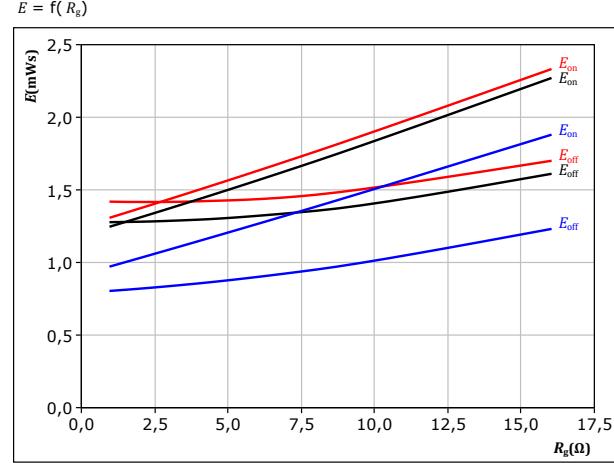


With an inductive load at

$V_{CE} = 400$ V $T_f = 25, 125$ °C
 $V_{GE} = 0/15$ V
 $R_{gon} = 4$ Ω

figure 36.

Typical switching energy losses as a function of IGBT turn on gate resistor
 $E = f(R_g)$

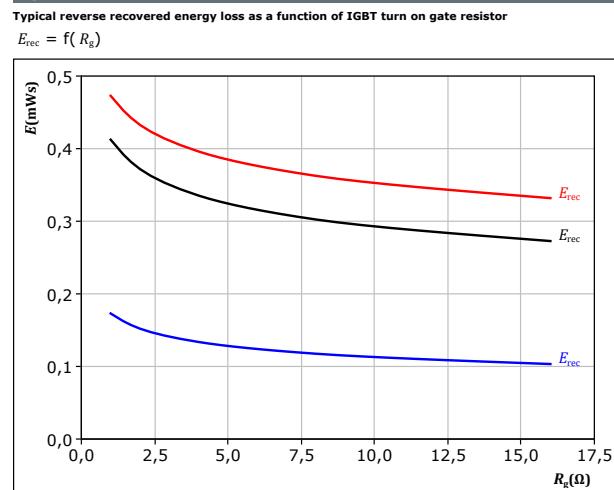


With an inductive load at

$V_{CE} = 400$ V $T_f = 25, 125, 150$ °C
 $V_{GE} = 0/15$ V

figure 38.

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 $T_f = 25, 125$ °C
 $V_{GE} = 0/15$ V
 $I_c = 50$ A

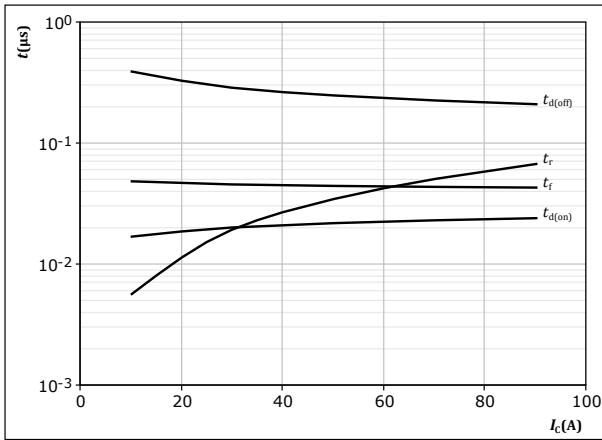


Vincotech

Brake Switching Characteristics

figure 39.

Typical switching times as a function of collector current
 $t = f(I_C)$



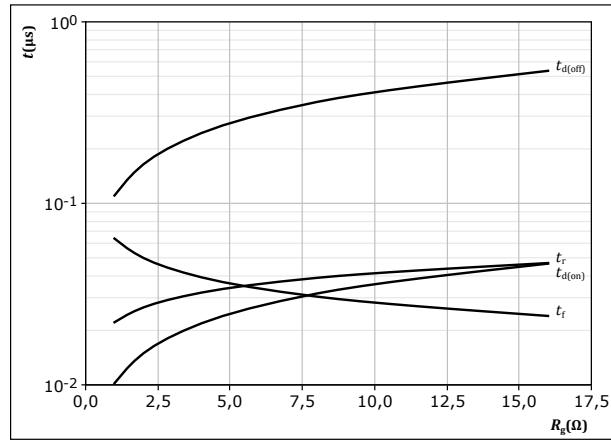
With an inductive load at

$T_j =$	150	°C
$V_{CE} =$	400	V
$V_{GE} =$	0/15	V
$R_{gon} =$	4	Ω
$R_{goff} =$	4	Ω

IGBT

figure 40.

Typical switching times as a function of IGBT turn on gate resistor
 $t = f(R_g)$



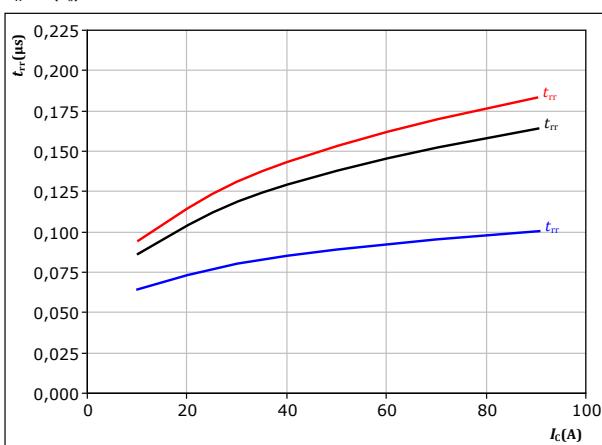
With an inductive load at

$T_j =$	150	°C
$V_{CE} =$	400	V
$V_{GE} =$	0/15	V
$I_C =$	50	A

IGBT

figure 41.

Typical reverse recovery time as a function of collector current
 $t_{rr} = f(I_C)$



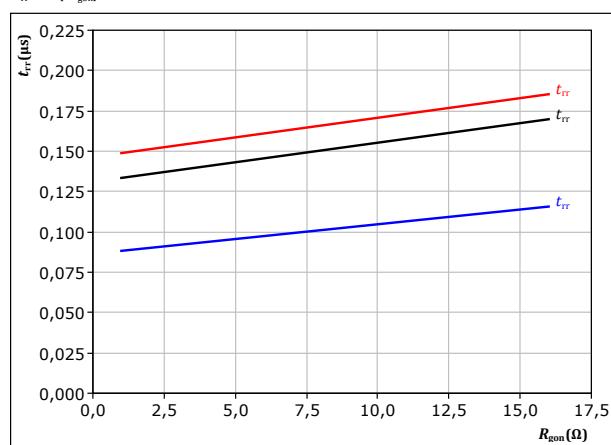
With an inductive load at

$V_{CE} =$	400	V
$V_{GE} =$	0/15	V
$R_{gon} =$	4	Ω

FWD

figure 42.

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
$I_C =$	50	A

FWD



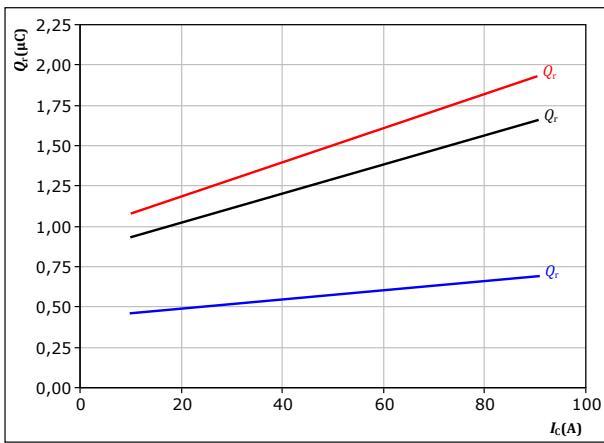
Vincotech

Brake Switching Characteristics

figure 43.

Typical recovered charge as a function of collector current

$$Q_r = f(I_c)$$



With an inductive load at

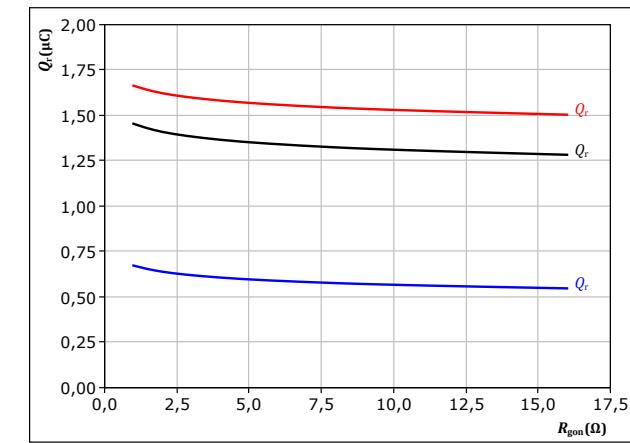
$$\begin{aligned} V_{CE} &= 400 \text{ V} \\ V_{GE} &= 0/15 \text{ V} \\ R_{gon} &= 4 \Omega \end{aligned}$$

FWD

figure 44.

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

$$Q_r = f(R_{gon})$$



With an inductive load at

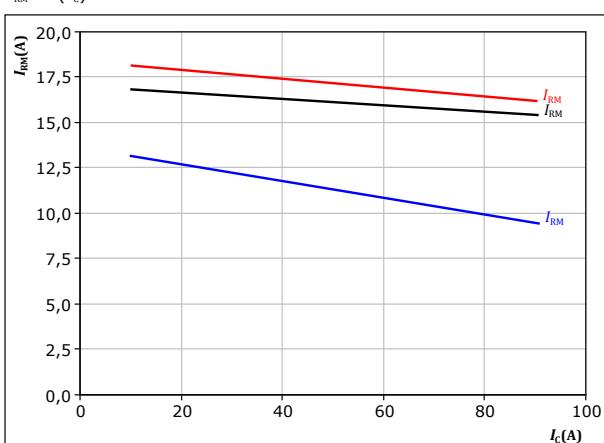
$$\begin{aligned} V_{CE} &= 400 \text{ V} \\ V_{GE} &= 0/15 \text{ V} \\ I_c &= 50 \text{ A} \end{aligned}$$

FWD

figure 45.

Typical peak reverse recovery current as a function of collector current

$$I_{RM} = f(I_c)$$



With an inductive load at

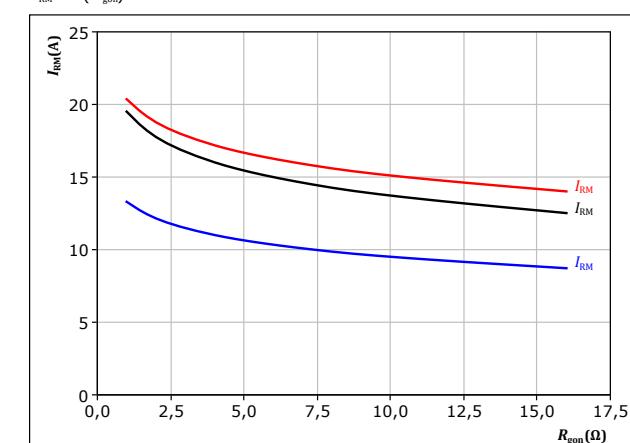
$$\begin{aligned} V_{CE} &= 400 \text{ V} \\ V_{GE} &= 0/15 \text{ V} \\ R_{gon} &= 4 \Omega \end{aligned}$$

FWD

figure 46.

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

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



With an inductive load at

$$\begin{aligned} V_{CE} &= 400 \text{ V} \\ V_{GE} &= 0/15 \text{ V} \\ I_c &= 50 \text{ A} \end{aligned}$$

FWD



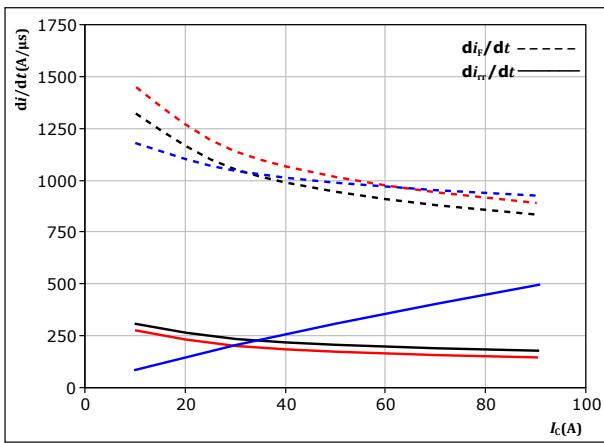
Vincotech

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

$T_j = 25^\circ\text{C}$

$V_{GE} = 0/15$ V

$R_{gon} = 4$ Ω

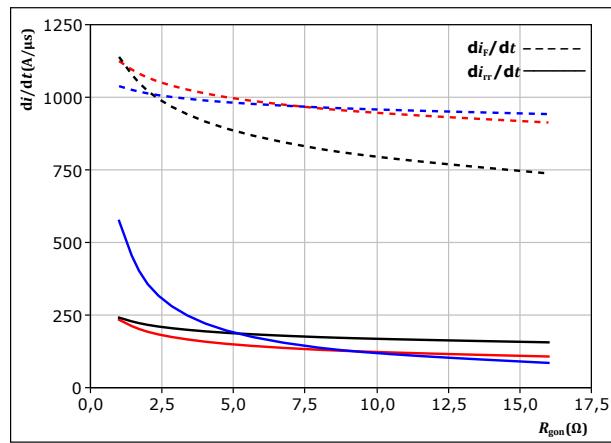
$T_j = 125^\circ\text{C}$

$T_j = 150^\circ\text{C}$

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

$V_{GE} = 0/15$ V

$I_c = 50$ A

$T_j = 25^\circ\text{C}$

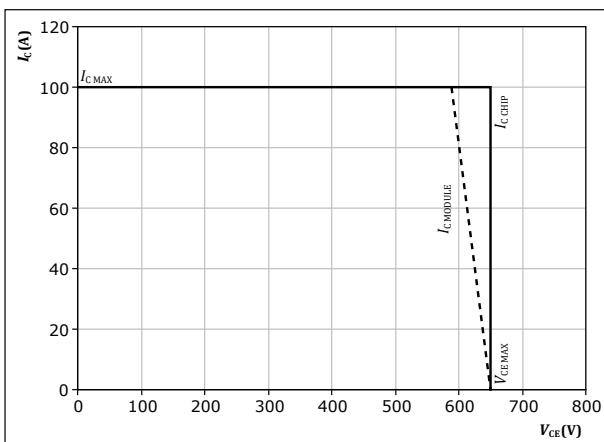
$T_j = 125^\circ\text{C}$

$T_j = 150^\circ\text{C}$

figure 49. IGBT

Reverse bias safe operating area

$I_c = f(V_{CE})$



At $T_j = 150^\circ\text{C}$

$R_{gon} = 4$ Ω

$R_{goff} = 4$ Ω



Vincotech

Switching Definitions

figure 50. IGBT

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

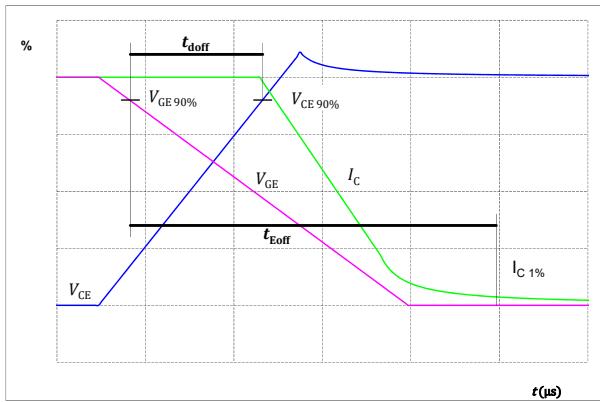


figure 51. IGBT

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

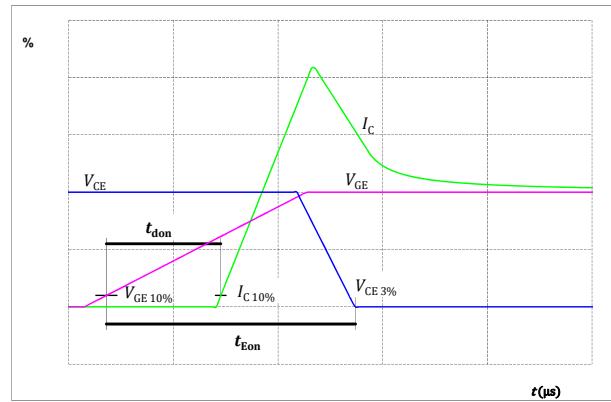


figure 52. IGBT

Turn-off Switching Waveforms & definition of t_f

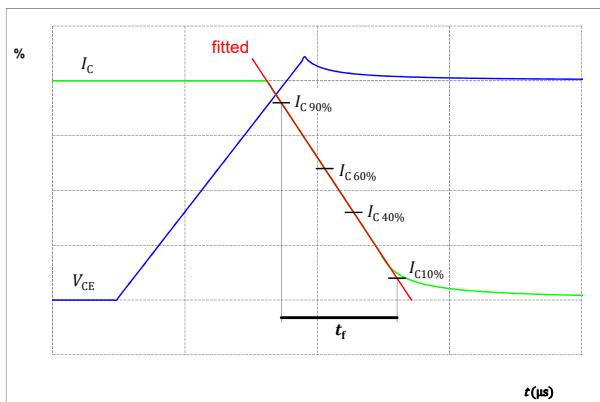
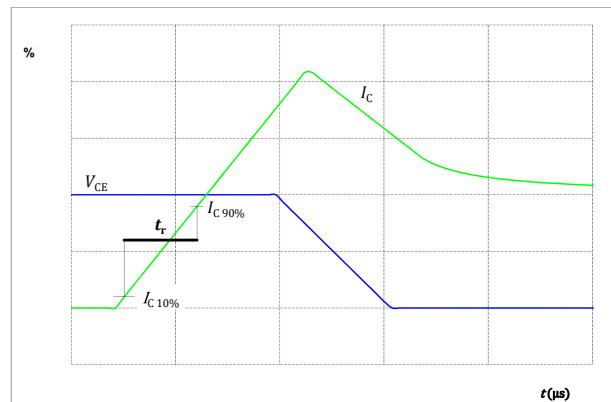


figure 53. IGBT

Turn-on Switching Waveforms & definition of t_r





Vincotech

Switching Definitions

figure 54.
Turn-off Switching Waveforms & definition of t_{tr}

FWD

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

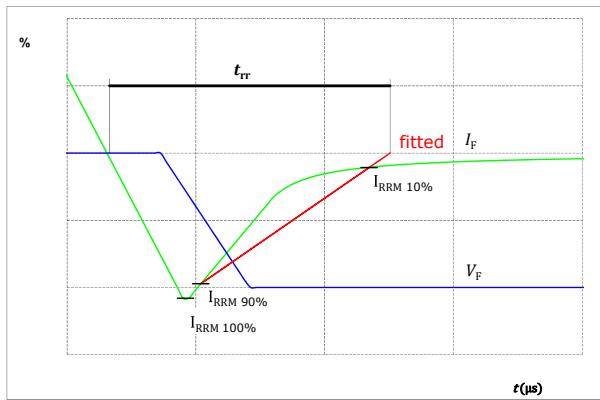
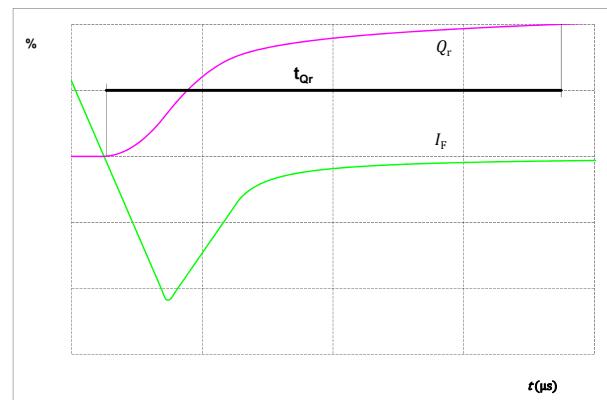


figure 55.
Turn-on Switching Waveforms & definition of t_{Qr} (t_{Qr} = integrating time for Q_r)

FWD

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



**10-EY07PMA050I7-L184A28T**

datasheet

Vincotech**Ordering Code**

Version	Ordering Code
Without thermal paste	10-EY07PMA050I7-L184A28T
With thermal paste (5,2 W/mK, PTM6000HV)	10-EY07PMA050I7-L184A28T-/7

Marking

Text	Name		Date code	UL & VIN	Lot	Serial
	NNNNNNNNNNNNNN TTTTTTVVVWY JL	VIN LLLL SSSS	WWYY	UL VIN	LLLLL	SSSS
Datamatrix	Type&Ver	Lot number	Serial	Date code		
	TTTTTTVVV	LLLLL	SSSS	WWYY		

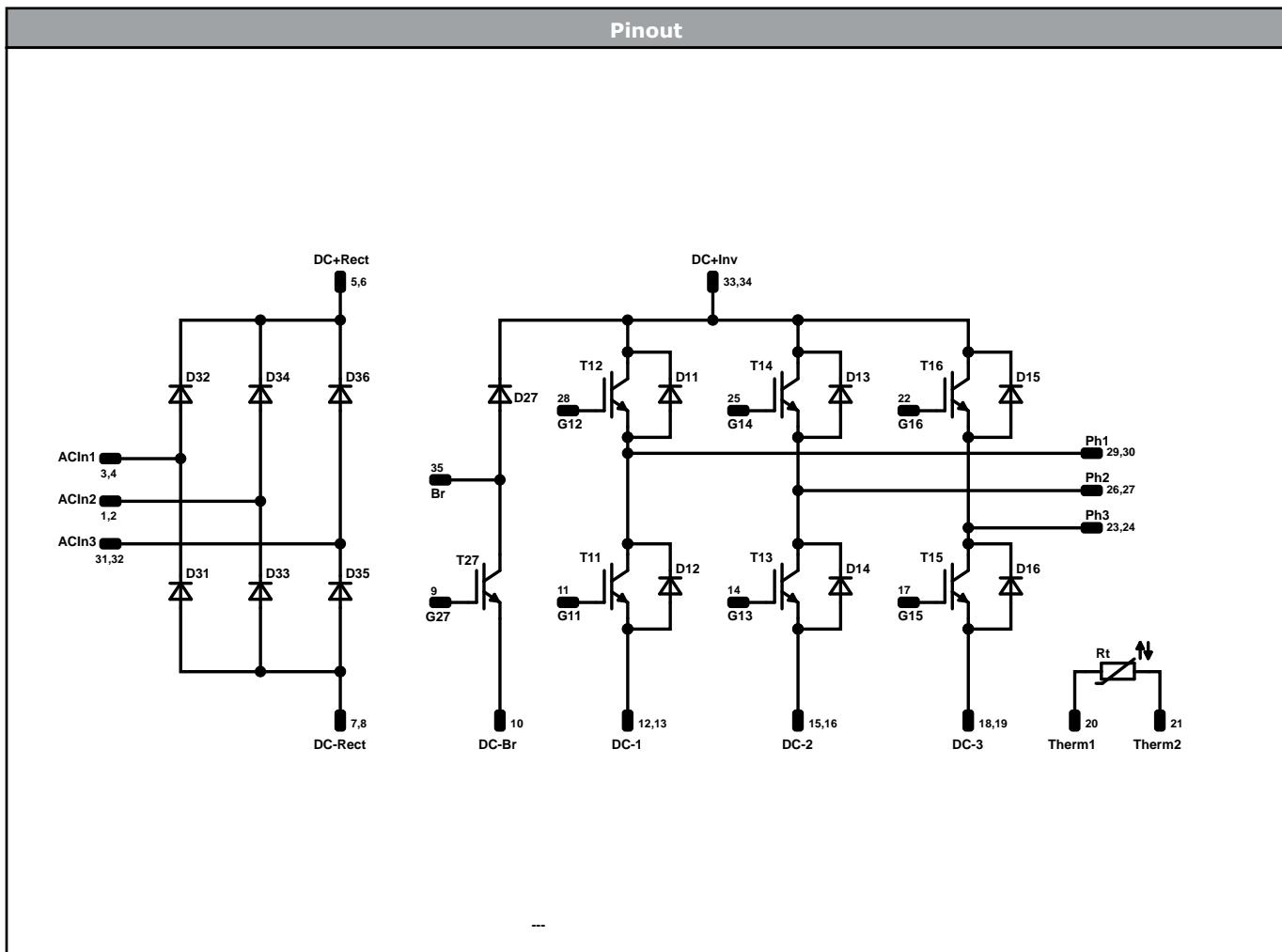
Outline

Pin table [mm]			
Pin	X	Y	Function
1	25,6	6,4	ACIn2
2	22,4	6,4	ACIn2
3	16	9,6	ACIn1
4	12,8	9,6	ACIn1
5	9,6	0	DC+Rect
6	9,6	3,2	DC+Rect
7	0	0	DC-Rect
8	0	3,2	DC-Rect
9	0	16	G27
10	0	19,2	DC-Br
11	0	22,4	G11
12	0	25,6	DC-1
13	0	28,8	DC-1
14	0	32	G13
15	0	35,2	DC-2
16	0	38,4	DC-2
17	0	41,6	G15
18	0	44,8	DC-3
19	0	48	DC-3
20	9,6	48	Therm1
21	19,2	48	Therm2
22	28,8	48	G16
23	32	48	Ph3
24	32	44,8	Ph3
25	32	35,2	G14
26	32	32	Ph2
27	32	28,8	Ph2
28	32	19,2	G12
29	32	16	Ph1
30	32	12,8	Ph1
31	32	3,2	ACIn3
32	32	0	ACIn3
33	22,4	19,2	DC+Inv
34	22,4	16	DC+Inv
35	9,6	19,2	Br

<img alt="Outline drawing of the component showing pin layout and dimensions. It includes a top view of the package with pin numbers, a side view, and a cross-sectional view. Dimensions shown include 36.4-505 mm width, 19.8-50 mm height, and various internal feature locations like 12, 16, 22, 28, 32, 35, 41, 44, 48, 52, 56, 60, 64, 68, 72, 76, 80, 84, 88, 92, 96, 100, 104, 108, 112, 116, 120, 124, 128, 132, 136, 140, 144, 148, 152, 156, 160, 164, 168, 172, 176, 180, 184, 188, 192, 196, 200, 204, 208, 212, 216, 220, 224, 228, 232, 236, 240, 244, 248, 252, 256, 260, 264, 268, 272, 276, 280, 284, 288, 292, 296, 300, 304, 308, 312, 316, 320, 324, 328, 332, 336, 340, 344, 348, 352, 356, 360, 364, 368, 372, 376, 380, 384, 388, 392, 396, 400, 404, 408, 412, 416, 420, 424, 428, 432, 436, 440, 444, 448, 452, 456, 460, 464, 468, 472, 476, 480, 484, 488, 492, 496, 500, 504, 508, 512, 516, 520, 524, 528, 532, 536, 540, 544, 548, 552, 556, 560, 564, 568, 572, 576, 580, 584, 588, 592, 596, 600, 604, 608, 612, 616, 620, 624, 628, 632, 636, 640, 644, 648, 652, 656, 660, 664, 668, 672, 676, 680, 684, 688, 692, 696, 700, 704, 708, 712, 716, 720, 724, 728, 732, 736, 740, 744, 748, 752, 756, 760, 764, 768, 772, 776, 780, 784, 788, 792, 796, 800, 804, 808, 812, 816, 820, 824, 828, 832, 836, 840, 844, 848, 852, 856, 860, 864, 868, 872, 876, 880, 884, 888, 892, 896, 900, 904, 908, 912, 916, 920, 924, 928, 932, 936, 940, 944, 948, 952, 956, 960, 964, 968, 972, 976, 980, 984, 988, 992, 996, 1000, 1004, 1008, 1012, 1016, 1020, 1024, 1028, 1032, 1036, 1040, 1044, 1048, 1052, 1056, 1060, 1064, 1068, 1072, 1076, 1080, 1084, 1088, 1092, 1096, 1100, 1104, 1108, 1112, 1116, 1120, 1124, 1128, 1132, 1136, 1140, 1144, 1148, 1152, 1156, 1160, 1164, 1168, 1172, 1176, 1180, 1184, 1188, 1192, 1196, 1200, 1204, 1208, 1212, 1216, 1220, 1224, 1228, 1232, 1236, 1240, 1244, 1248, 1252, 1256, 1260, 1264, 1268, 1272, 1276, 1280, 1284, 1288, 1292, 1296, 1300, 1304, 1308, 1312, 1316, 1320, 1324, 1328, 1332, 1336, 1340, 1344, 1348, 1352, 1356, 1360, 1364, 1368, 1372, 1376, 1380, 1384, 1388, 1392, 1396, 1400, 1404, 1408, 1412, 1416, 1420, 1424, 1428, 1432, 1436, 1440, 1444, 1448, 1452, 1456, 1460, 1464, 1468, 1472, 1476, 1480, 1484, 1488, 1492, 1496, 1500, 1504, 1508, 1512, 1516, 1520, 1524, 1528, 1532, 1536, 1540, 1544, 1548, 1552, 1556, 1560, 1564, 1568, 1572, 1576, 1580, 1584, 1588, 1592, 1596, 1600, 1604, 1608, 1612, 1616, 1620, 1624, 1628, 1632, 1636, 1640, 1644, 1648, 1652, 1656, 1660, 1664, 1668, 1672, 1676, 1680, 1684, 1688, 1692, 1696, 1700, 1704, 1708, 1712, 1716, 1720, 1724, 1728, 1732, 1736, 1740, 1744, 1748, 1752, 1756, 1760, 1764, 1768, 1772, 1776, 1780, 1784, 1788, 1792, 1796, 1800, 1804, 1808, 1812, 1816, 1820, 1824, 1828, 1832, 1836, 1840, 1844, 1848, 1852, 1856, 1860, 1864, 1868, 1872, 1876, 1880, 1884, 1888, 1892, 1896, 1900, 1904, 1908, 1912, 1916, 1920, 1924, 1928, 1932, 1936, 1940, 1944, 1948, 1952, 1956, 1960, 1964, 1968, 1972, 1976, 1980, 1984, 1988, 1992, 1996, 2000, 2004, 2008, 2012, 2016, 2020, 2024, 2028, 2032, 2036, 2040, 2044, 2048, 2052, 2056, 2060, 2064, 2068, 2072, 2076, 2080, 2084, 2088, 2092, 2096, 2100, 2104, 2108, 2112, 2116, 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5440, 5444, 5448, 5452, 5456, 5460, 5464, 5468, 5472, 5476, 5480, 5484, 5488, 5492, 5496, 5500, 5504, 5508, 5512, 5516, 5520, 5524, 5528, 5532, 5536, 5540, 5544, 5548, 5552, 5556, 5560, 5564, 5568, 5572, 5576, 5580, 5584, 5588, 5592, 5596, 5600, 5604, 5608, 5612, 5616, 5620, 5624, 5628, 5632, 5636, 5640, 5644, 5648, 5652, 5656, 5660, 5664, 5668, 5672, 5676, 5680, 5684, 5688, 5692, 5696, 5700, 5704, 5708, 5712, 5716, 5720, 5724, 5728, 5732, 5736, 5740, 5744, 5748, 5752, 5756, 5760, 5764, 5768, 5772, 5776, 5780, 5784, 5788, 5792, 5796, 5800, 5804, 5808, 5812, 5816, 5820, 5824, 5828, 5



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Identification					
ID	Component	Voltage	Current	Function	Comment
T11, T12, T13, T14, T15, T16	IGBT	650 V	50 A	Inverter Switch	
D11, D12, D13, D14, D15, D16	FWD	650 V	50 A	Inverter Diode	
T27	IGBT	650 V	50 A	Brake Switch	
D27	FWD	650 V	20 A	Brake Diode	
D31, D32, D33, D34, D35, D36	Rectifier	1600 V	35 A	Rectifier Diode	
Rt	Thermistor			Thermistor	

**10-EY07PMA050I7-L184A28T**

datasheet

Vincotech

Packaging instruction

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

Handling instructions for flow E2 packages see vincotech.com website.

Package data

Package data for flow E2 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 $T_{j,op}=175^{\circ}\text{C}$ and up to 3500VAC/1min isolation voltage. For more information see vincotech.com website.



Document No.:	Date:	Modification:	Pages
10-EY07PMA050I7-L184A28T-D1-14	2 Jul. 2025	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.