



Vincotech

10-F0127PA008SC-L156E09

datasheet

flow7PACK 0

1200 V / 8 A

Topology features

- Open Emitter configuration
- Temperature sensor
- Brake+Inverter

Component features

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

Housing features

- Base isolation: Al_2O_3
- Clip-in, reliable mechanical connection, qualified for wave soldering
- Convex shaped substrate for superior thermal contact
- Thermo-mechanical push-and-pull force relief
- Solder pin

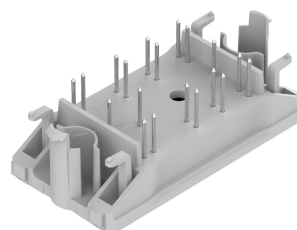
Target applications

- Motor Drives
- Power Generation

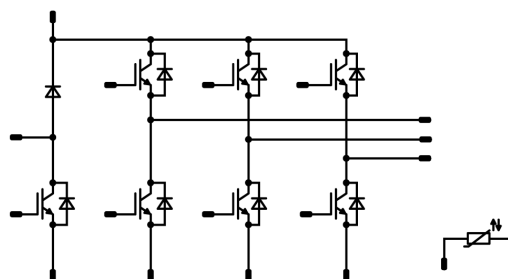
Types

- 10-F0127PA008SC-L156E09

flow 0 17 mm housing



Schematic





Vincotech

Maximum Ratings

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

Parameter	Symbol	Conditions	Value	Unit
Inverter Switch				
Collector-emitter voltage	V_{CES}		1200	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	16	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	24	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	61	W
Gate-emitter voltage	V_{GES}		± 20	V
Short circuit ratings	t_{SC}	$V_{GE} = 15\text{ V}$, $V_{CC} = 800\text{ V}$ $T_j = 150\text{ °C}$	10	μs
Maximum junction temperature	T_{jmax}		175	$^{\circ}\text{C}$

Inverter Diode

Peak repetitive reverse voltage	V_{RRM}		1200	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	20	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	20	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	46	W
Maximum junction temperature	T_{jmax}		175	$^{\circ}\text{C}$

Brake Switch

Collector-emitter voltage	V_{CES}		1200	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	16	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	24	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	61	W
Gate-emitter voltage	V_{GES}		± 20	V
Short circuit ratings	t_{SC}	$V_{GE} = 15\text{ V}$, $V_{CC} = 800\text{ V}$ $T_j = 150\text{ °C}$	10	μs
Maximum junction temperature	T_{jmax}		175	$^{\circ}\text{C}$



Vincotech

Maximum Ratings

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

Parameter	Symbol	Conditions	Value	Unit
Brake Diode				
Peak repetitive reverse voltage	V_{RRM}		1200	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	20	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	20	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	46	W
Maximum junction temperature	T_{jmax}		175	°C

Brake Sw. Protection Diode

Peak repetitive reverse voltage	V_{RRM}		1200	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	10	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	6	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	25	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* $t_p = 2\text{ s}$	6000	V
Isolation voltage	V_{isol}	AC Voltage $t_p = 1\text{ min}$	2500	V
Creepage distance			>12,7	mm
Clearance			>12,7	mm
Comparative Tracking Index	CTI		≥ 200	

*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	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,00015	25	5,3	5,8	6,3	V
Collector-emitter saturation voltage	V_{CEsat}		15		8	25 150	1,58	1,86 2,24	2,07 ⁽¹⁾	V
Collector-emitter cut-off current	I_{CES}		0	1200		25			1	µA
Gate-emitter leakage current	I_{GES}		20	0		25			120	nA
Internal gate resistance	r_g							None		Ω
Input capacitance	C_{ies}	$f = 1 \text{ Mhz}$	0	25		25		490		pF
Reverse transfer capacitance	C_{res}							30		pF

Thermal

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

Dynamic

Turn-on delay time	$t_{d(on)}$	$R_{gon} = 32 \Omega$ $R_{goff} = 32 \Omega$	± 15	600	8	25 125		71,4 70,6		ns
Rise time	t_r					25 125		18,6 22,8		ns
Turn-off delay time	$t_{d(off)}$					25 125		194,4 236,4		ns
Fall time	t_f					25 125		78,46 108,16		ns
Turn-on energy (per pulse)	E_{on}	$Q_{tFWD} = 0,885 \mu\text{C}$ $Q_{tFWD} = 1,57 \mu\text{C}$				25 125		0,499 0,748		mWs
Turn-off energy (per pulse)	E_{off}					25 125		0,435 0,624		mWs



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 Diode

Static

Forward voltage	V_F				10	25 150	1,35	1,77 1,69	2,05 ⁽¹⁾	V
Reverse leakage current	I_R	$V_r = 1200$ V				25			2,7	μA

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						2,07		K/W
--	---------------	---------------------------------------	--	--	--	--	--	------	--	-----

Dynamic

Peak recovery current	I_{RRM}	$di/dt=452$ A/μs $di/dt=399$ A/μs	± 15	600	8	25 125		8,46 9,88		A
Reverse recovery time	t_{rr}					25 125		250,51 382,73		ns
Recovered charge	Q_r					25 125		0,885 1,57		μC
Reverse recovered energy	E_{rec}					25 125		0,345 0,634		mWs
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$					25 125		83,99 69,05		A/μs



Vincotech

10-F0127PA008SC-L156E09
datasheet

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	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,00015	25		5,3	5,8	6,3	V
Collector-emitter saturation voltage	V_{CEsat}		15		8	25 150		1,58	1,86 2,24	2,07 ⁽¹⁾	V
Collector-emitter cut-off current	I_{CES}		0	1200		25				1	µA
Gate-emitter leakage current	I_{GES}		20	0		25				120	nA
Internal gate resistance	r_g								None		Ω
Input capacitance	C_{ies}	$f = 1 \text{ Mhz}$	0	25		25			490		pF
Reverse transfer capacitance	C_{res}								30		pF

Thermal

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

Dynamic

Turn-on delay time	$t_{d(on)}$	$R_{gon} = 32 \Omega$ $R_{goff} = 32 \Omega$	± 15	600	8	25 125		71,4 70,6		ns
Rise time	t_r					25 125		18,6 22,8		ns
Turn-off delay time	$t_{d(off)}$					25 125		194,4 236,4		ns
Fall time	t_f					25 125		78,46 108,16		ns
Turn-on energy (per pulse)	E_{on}	$Q_{tFWD} = 0,885 \mu C$ $Q_{tFWD} = 1,57 \mu C$				25 125		0,499 0,748		mWs
Turn-off energy (per pulse)	E_{off}					25 125		0,435 0,624		mWs



Vincotech

10-F0127PA008SC-L156E09
datasheet

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				10	25 150	1,35	1,77 1,69	2,05 ⁽¹⁾	V
Reverse leakage current	I_R	$V_r = 1200$ V				25			2,7	μA

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						2,07		K/W
--	---------------	---------------------------------------	--	--	--	--	--	------	--	-----

Dynamic

Peak recovery current	I_{RRM}	$di/dt=452$ A/μs $di/dt=399$ A/μs	± 15	600	8	25 125		8,46 9,88		A
Reverse recovery time	t_{rr}					25 125		250,51 382,73		ns
Recovered charge	Q_r					25 125		0,885 1,57		μC
Reverse recovered energy	E_{rec}					25 125		0,345 0,634		mWs
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$					25 125		83,99 69,05		A/μs

Brake Sw. Protection Diode

Static

Forward voltage	V_F				3	25 150	1,23	1,65 1,52	1,97 ⁽¹⁾	V
Reverse leakage current	I_R	$V_r = 1200$ V				25			27	μA

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						2,8		K/W
--	---------------	---------------------------------------	--	--	--	--	--	-----	--	-----



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	

Thermistor

Static

Rated resistance	R					25		22		kΩ
Deviation of R_{100}	$\Delta_{R/R}$	$R_{100} = 1484 \Omega$				100	-5		5	%
Power dissipation	P					25		130		mW
Power dissipation constant	d					25		1,5		mW/K
B-value	$B_{(25/50)}$	Tol. $\pm 1 \%$						3962		K
B-value	$B_{(25/100)}$	Tol. $\pm 1 \%$						4000		K
Vincotech Thermistor Reference									I	

⁽¹⁾ Value at chip level

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



Vincotech

10-F0127PA008SC-L156E09 datasheet

Inverter Switch Characteristics

figure 1. IGBT

Typical output characteristics

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

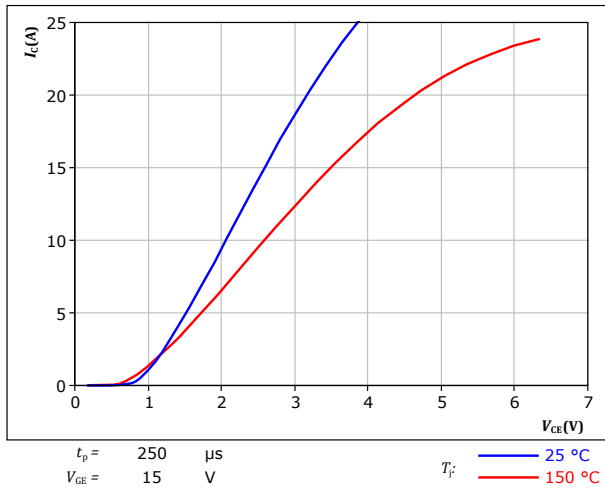


figure 2. IGBT

Typical output characteristics

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

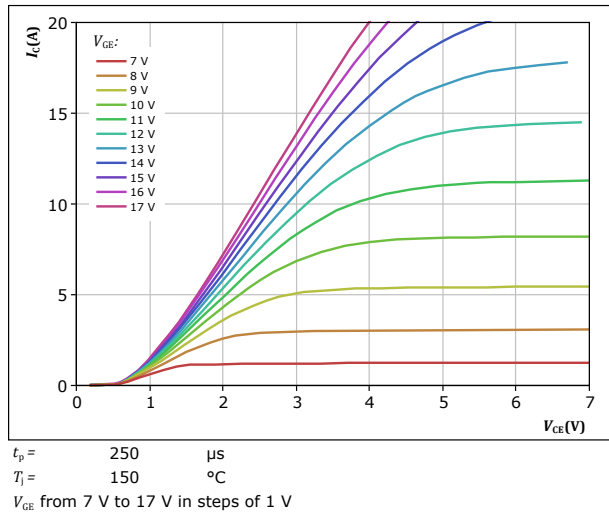


figure 3. IGBT

Typical transfer characteristics

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

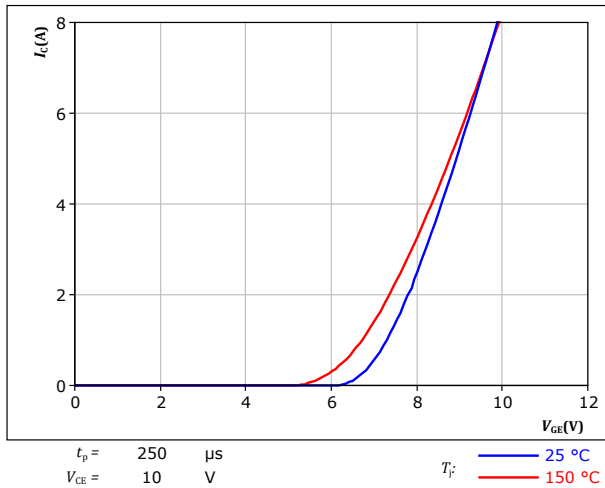
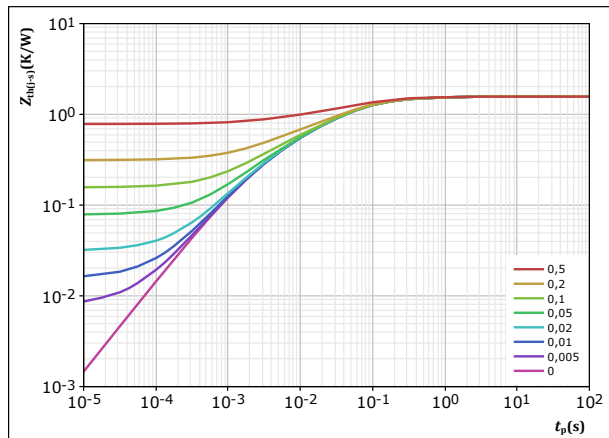


figure 4. IGBT

Transient thermal impedance as a function of pulse width

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



$D =$	t_p / T	K/W
$R_{th(j-s)} =$	1,566	
IGBT thermal model values		
R (K/W)	τ (s)	
1,42E-01	5,98E-01	
6,32E-01	7,71E-02	
3,98E-01	2,43E-02	
2,86E-01	6,16E-03	
1,08E-01	1,44E-03	



Vincotech

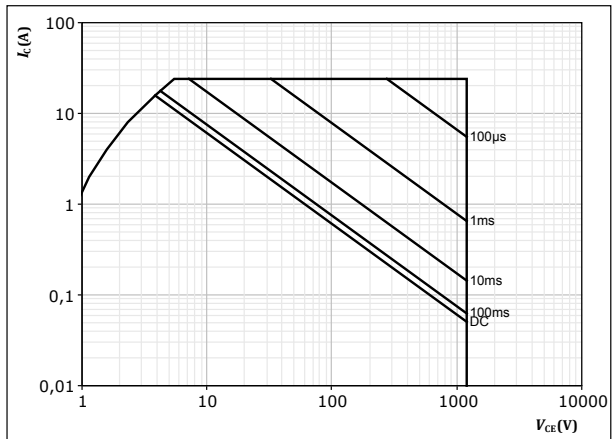
10-F0127PA008SC-L156E09
datasheet

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

$T_j = T_{jmax}$



Vincotech

Inverter Diode Characteristics

figure 6.

FWD

Typical forward characteristics

$$I_F = f(V_F)$$

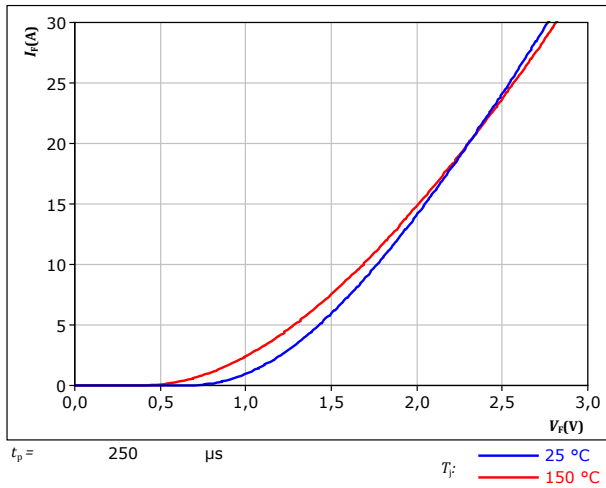
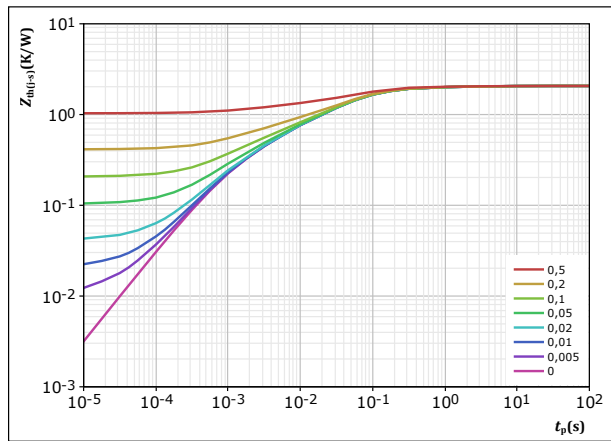


figure 7.

FWD

Transient thermal impedance as a function of pulse width

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



$D =$	t_p / T	
$R_{th(j-s)} =$	2,066	K/W
FWD thermal model values		
R (K/W)	τ (s)	
5,09E-02	4,26E+00	
1,55E-01	5,03E-01	
7,75E-01	7,89E-02	
5,33E-01	2,68E-02	
3,54E-01	5,03E-03	
1,97E-01	9,09E-04	



Vincotech

10-F0127PA008SC-L156E09 datasheet

Brake Switch Characteristics

figure 8. IGBT

Typical output characteristics

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

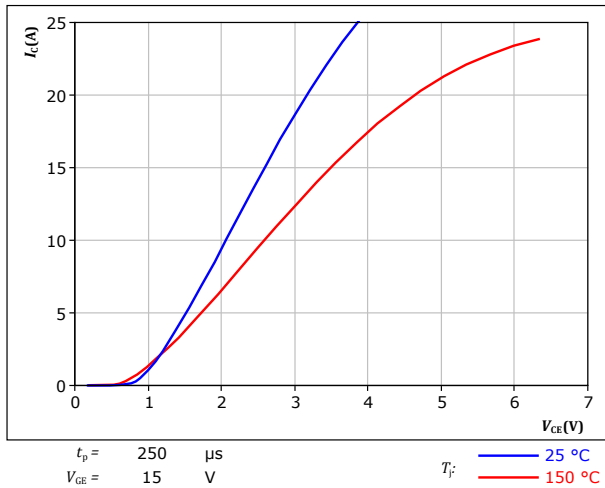


figure 9. IGBT

Typical output characteristics

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

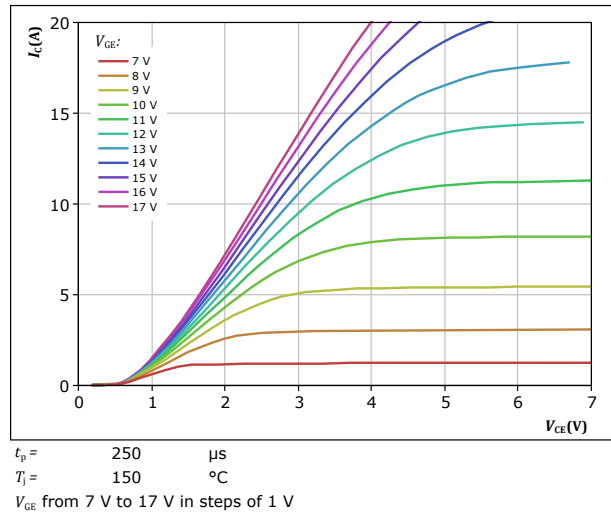


figure 10. IGBT

Typical transfer characteristics

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

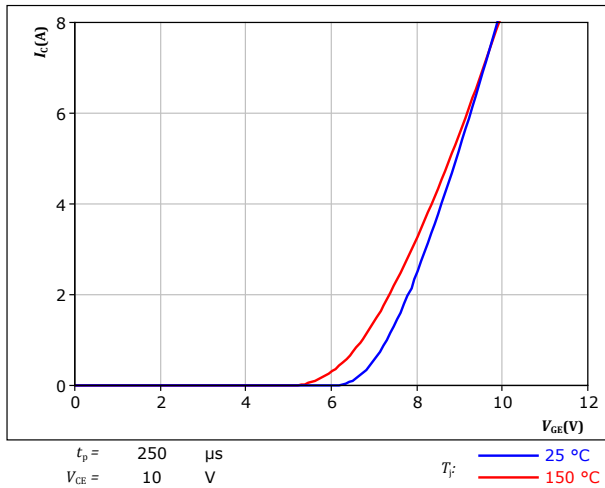
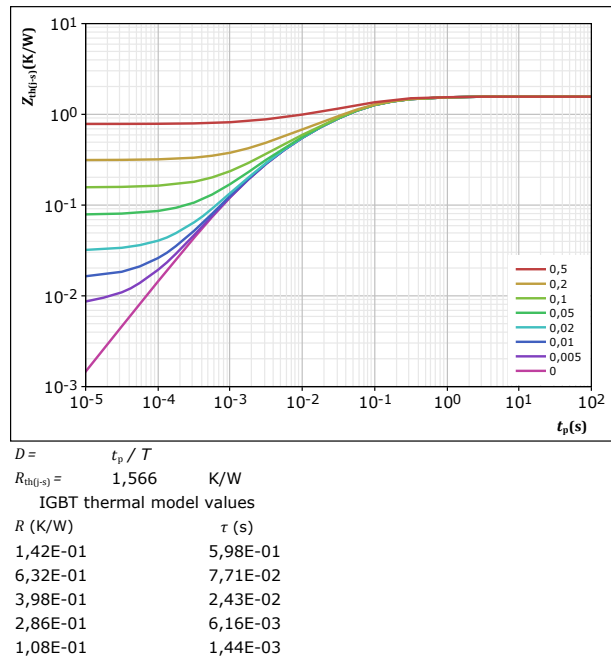


figure 11. IGBT

Transient thermal impedance as a function of pulse width

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





Vincotech

10-F0127PA008SC-L156E09
datasheet

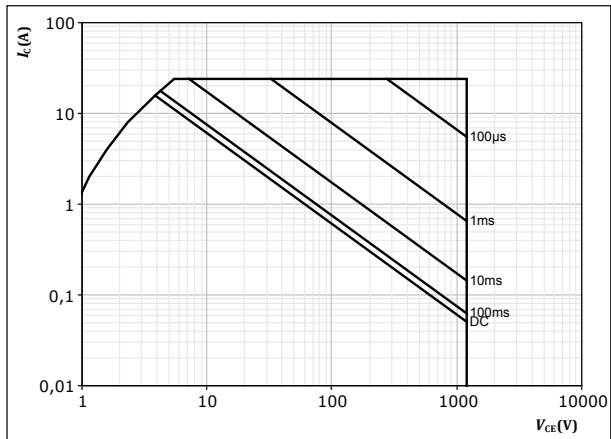
Brake Switch Characteristics

figure 12.

IGBT

Safe operating area

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



$D =$ single pulse

$T_s = 80$ °C

$V_{GE} = 15$ V

$T_j = T_{jmax}$



Vincotech

Brake Diode Characteristics

figure 13.

FWD

Typical forward characteristics

$$I_F = f(V_F)$$

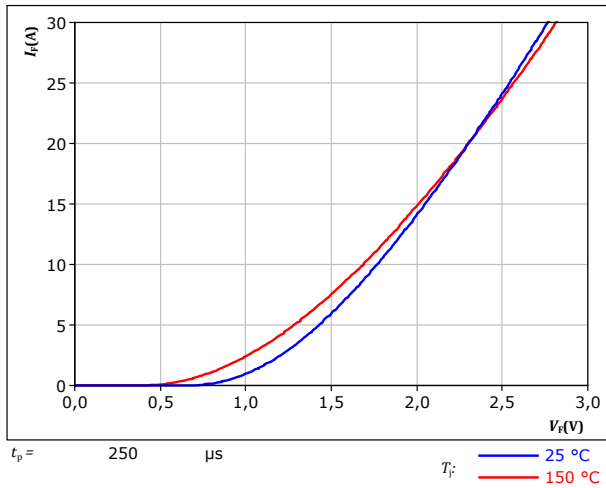
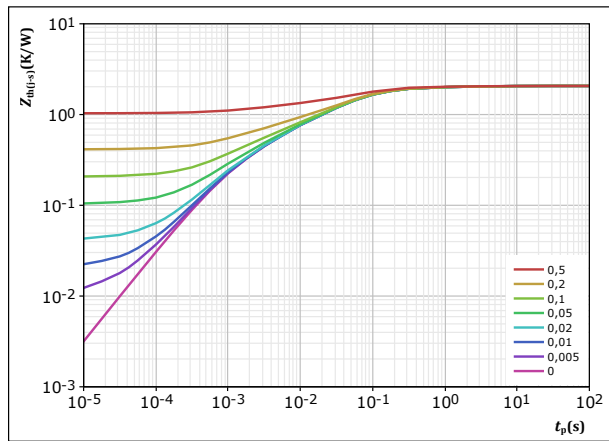


figure 14.

FWD

Transient thermal impedance as a function of pulse width

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



$D =$	t_p / T	
$R_{th(j-s)} =$	2,066	K/W
FWD thermal model values		
R (K/W)	τ (s)	
5,09E-02	4,26E+00	
1,55E-01	5,03E-01	
7,75E-01	7,89E-02	
5,33E-01	2,68E-02	
3,54E-01	5,03E-03	
1,97E-01	9,09E-04	



Vincotech

Brake Sw. Protection Diode Characteristics

figure 15.

FWD

Typical forward characteristics

$$I_F = f(V_F)$$

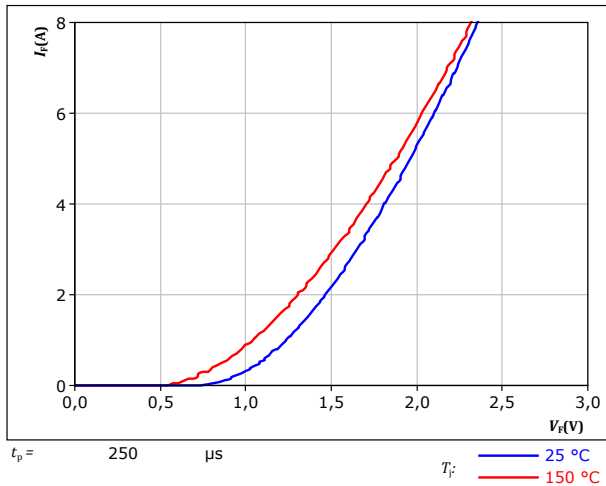
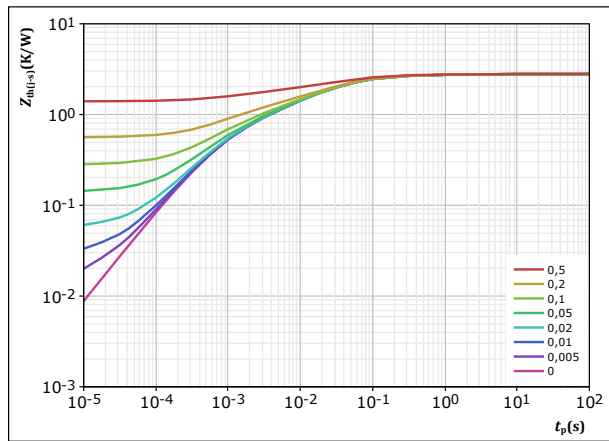


figure 16.

FWD

Transient thermal impedance as a function of pulse width

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



$D =$	t_p / T	
$R_{th(j-s)} =$	2,796	K/W
FWD thermal model values		
R (K/W)	τ (s)	
7,82E-02	2,45E+00	
1,95E-01	2,65E-01	
9,84E-01	4,77E-02	
6,58E-01	1,23E-02	
5,09E-01	2,70E-03	
3,71E-01	5,98E-04	



Vincotech

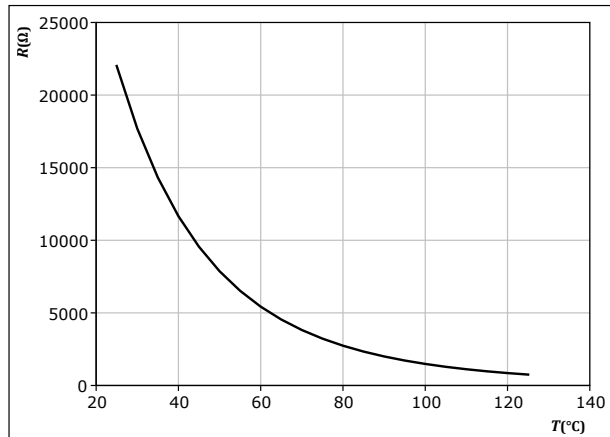
10-F0127PA008SC-L156E09
datasheet

Thermistor Characteristics

figure 17. Thermistor

Typical NTC characteristic as function of temperature

$$R_T = f(T)$$





Vincotech

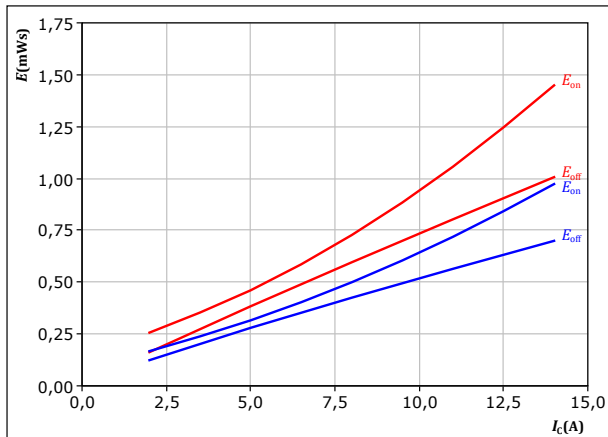
10-F0127PA008SC-L156E09
datasheet

Inverter Switching Characteristics

figure 18. IGBT

Typical switching energy losses as a function of collector current

$$E = f(I_C)$$



With an inductive load at

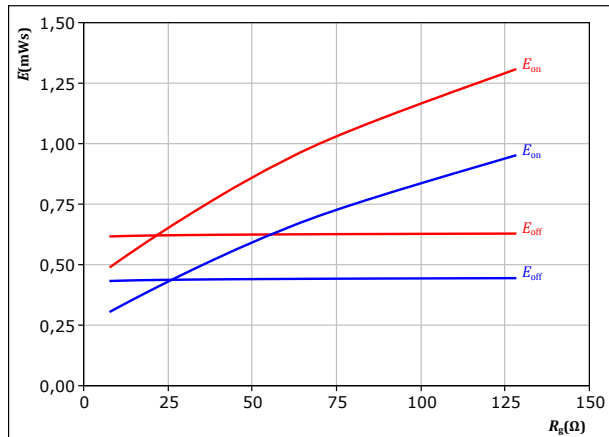
$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 32$ Ω
 $R_{goff} = 32$ Ω

T_j : — 25 °C
— 125 °C

figure 19. IGBT

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

$$E = f(R_g)$$



With an inductive load at

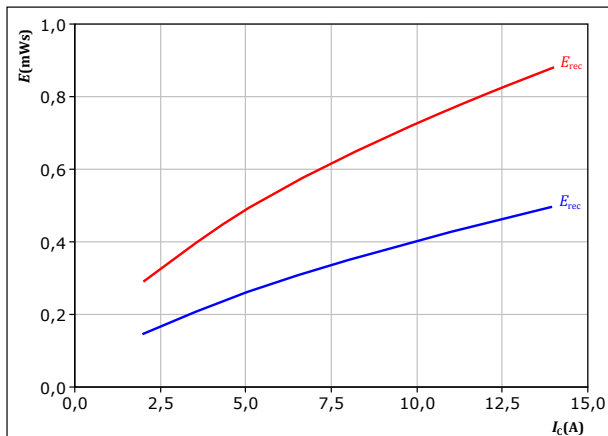
$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $I_C = 8$ A

T_j : — 25 °C
— 125 °C

figure 20. FWD

Typical reverse recovered energy loss as a function of collector current

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



With an inductive load at

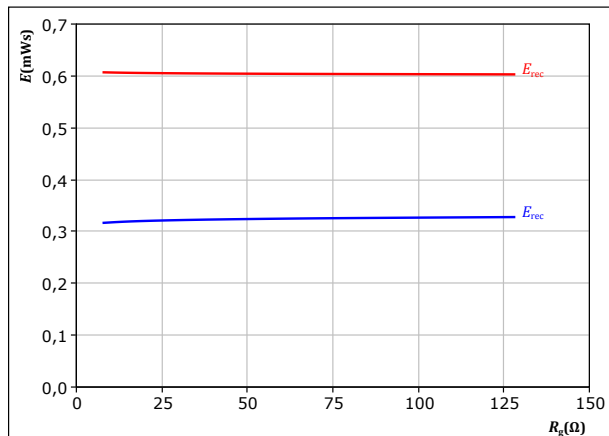
$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 32$ Ω

T_j : — 25 °C
— 125 °C

figure 21. 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

$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $I_C = 8$ A

T_j : — 25 °C
— 125 °C



Vincotech

10-F0127PA008SC-L156E09
datasheet

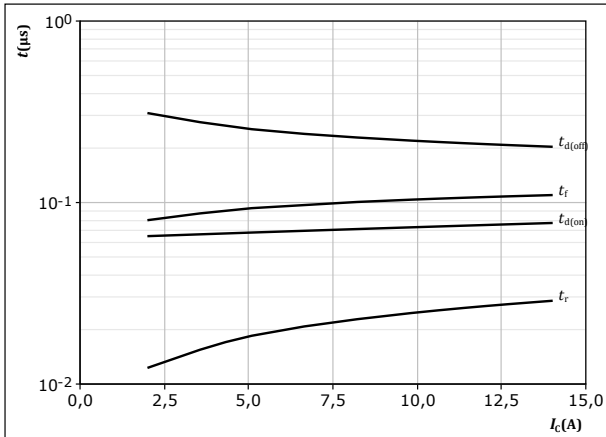
Inverter Switching Characteristics

figure 22.

IGBT

Typical switching times as a function of collector current

$$t = f(I_C)$$



With an inductive load at

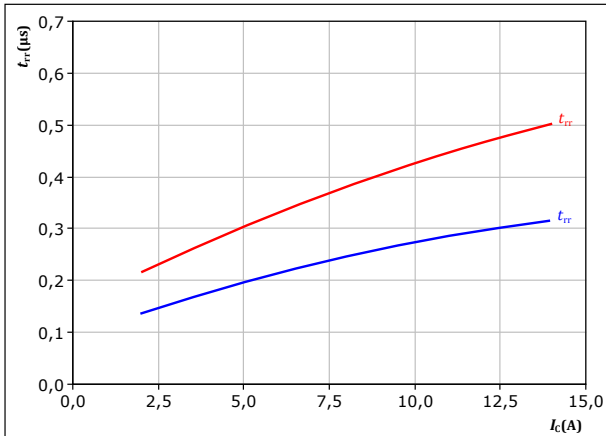
$T_j =$	125	°C
$V_{CE} =$	600	V
$V_{GE} =$	±15	V
$R_{gon} =$	32	Ω
$R_{goff} =$	32	Ω

figure 24.

FWD

Typical reverse recovery time as a function of collector current

$$t_{rr} = f(I_C)$$



With an inductive load at

$V_{CE} =$	600	V
$V_{GE} =$	±15	V
$R_{gon} =$	32	Ω

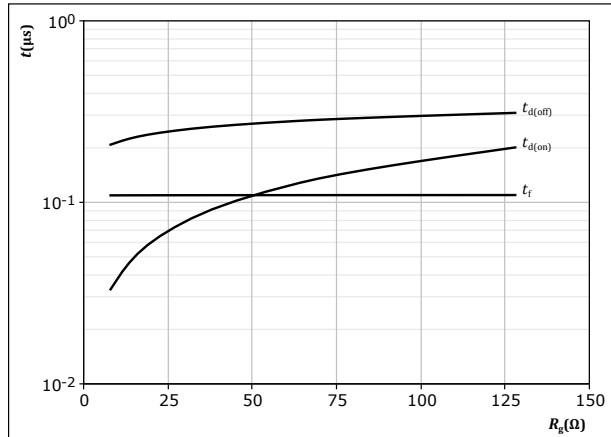
T_j :
— 25 °C
— 125 °C

figure 23.

IGBT

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

$$t = f(R_g)$$



With an inductive load at

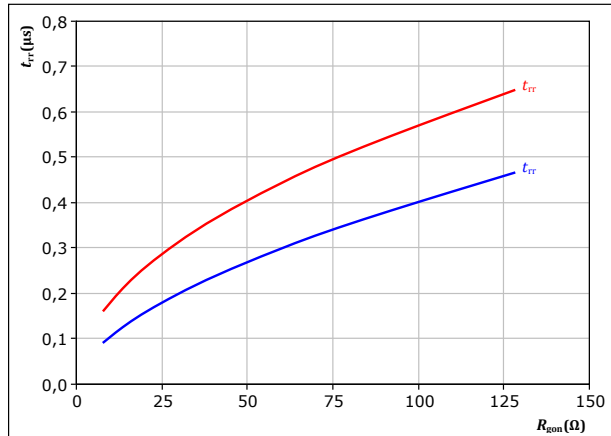
$T_j =$	125	°C
$V_{CE} =$	600	V
$V_{GE} =$	±15	V
$I_C =$	8	A

figure 25.

FWD

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

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



With an inductive load at

$V_{CE} =$	600	V
$V_{GE} =$	±15	V
$I_C =$	8	A

T_j :
— 25 °C
— 125 °C



Vincotech

10-F0127PA008SC-L156E09
datasheet

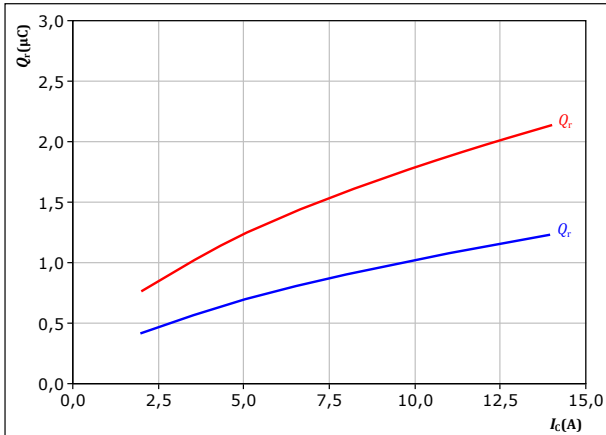
Inverter Switching Characteristics

figure 26.

FWD

Typical recovered charge as a function of collector current

$$Q_r = f(I_c)$$



With an inductive load at

$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 32$ Ω

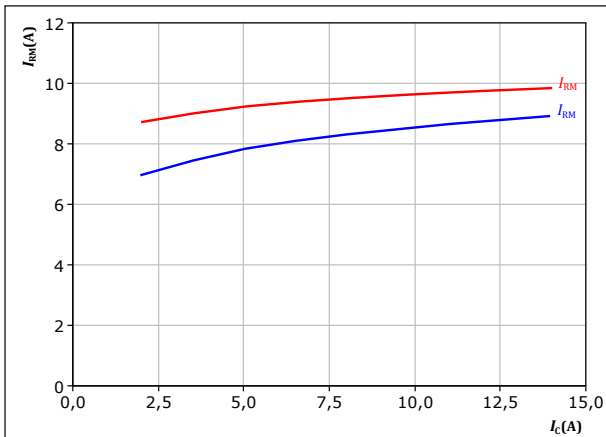
T_j : — 25 °C
— 125 °C

figure 28.

FWD

Typical peak reverse recovery current as a function of collector current

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



With an inductive load at

$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 32$ Ω

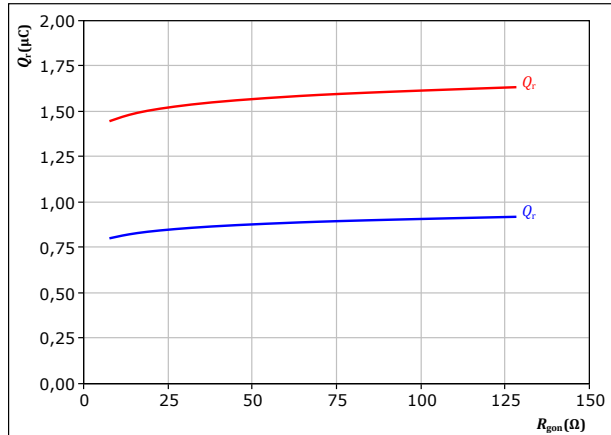
T_j : — 25 °C
— 125 °C

figure 27.

FWD

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

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



With an inductive load at

$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $I_c = 8$ A

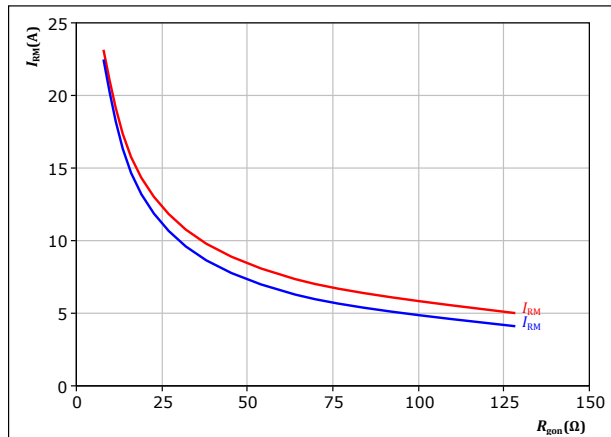
T_j : — 25 °C
— 125 °C

figure 29.

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

$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $I_c = 8$ A

T_j : — 25 °C
— 125 °C



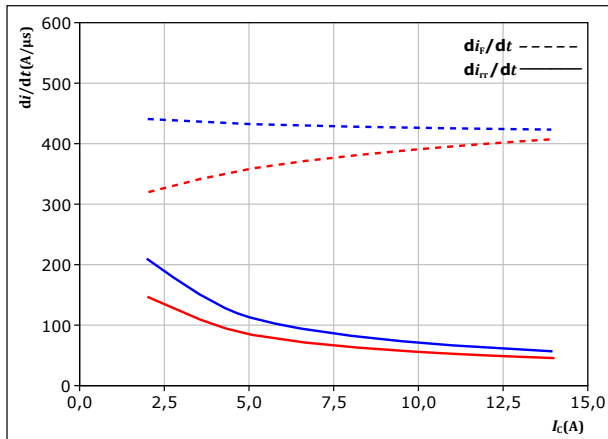
Vincotech

10-F0127PA008SC-L156E09
datasheet

Inverter Switching Characteristics

figure 30. FWD

Typical rate of fall of forward and reverse recovery current as a function of collector current
 $di_f/dt, di_r/dt = f(I_C)$



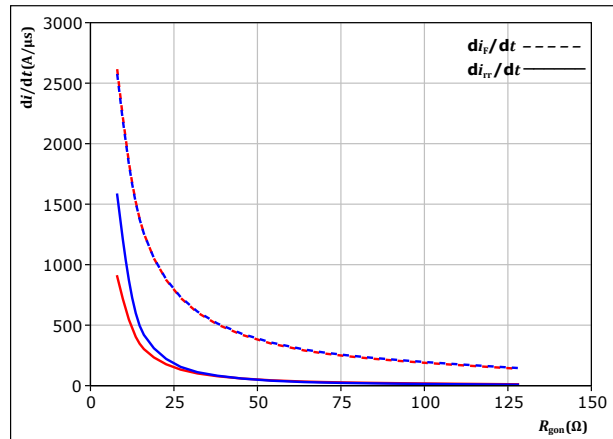
With an inductive load at

$V_{CE} = 600 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $R_{gon} = 32 \text{ } \Omega$

T_j : 25 °C
125 °C

figure 31. FWD

Typical rate of fall of forward and reverse recovery current as a function of turn on gate resistor
 $di_f/dt, di_r/dt = f(R_{gon})$



With an inductive load at

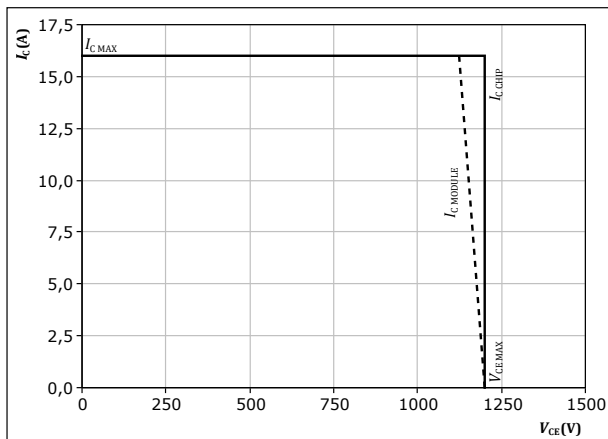
$V_{CE} = 600 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $I_C = 8 \text{ A}$

T_j : 25 °C
125 °C

figure 32. IGBT

Reverse bias safe operating area

$I_C = f(V_{CE})$



At $T_j = 125 \text{ } ^\circ\text{C}$
 $R_{gon} = 32 \text{ } \Omega$
 $R_{goff} = 32 \text{ } \Omega$



Vincotech

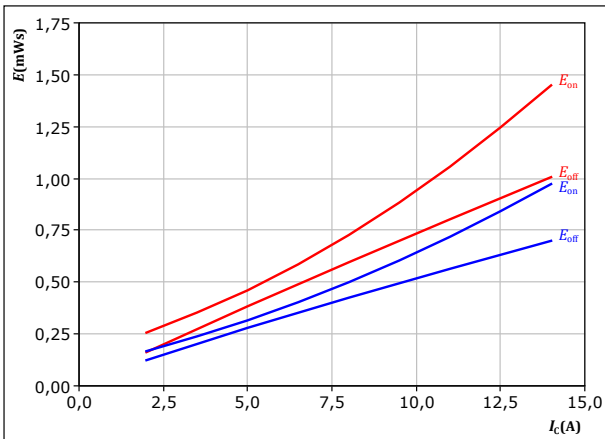
Brake Switching Characteristics

figure 33.

IGBT

Typical switching energy losses as a function of collector current

$$E = f(I_C)$$



With an inductive load at

$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 32$ Ω
 $R_{goff} = 32$ Ω

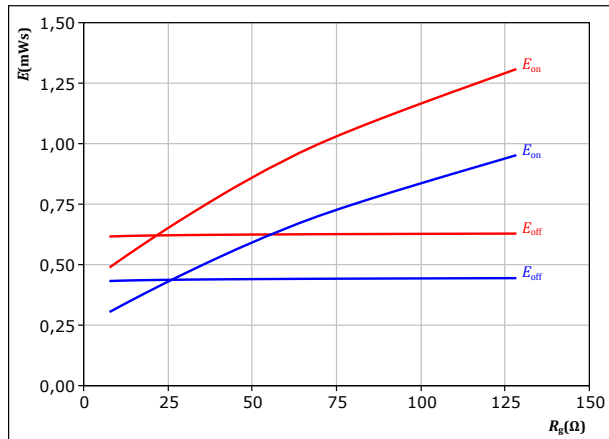
T_j : — 25 °C
— 125 °C

figure 34.

IGBT

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

$$E = f(R_g)$$



With an inductive load at

$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $I_C = 8$ A

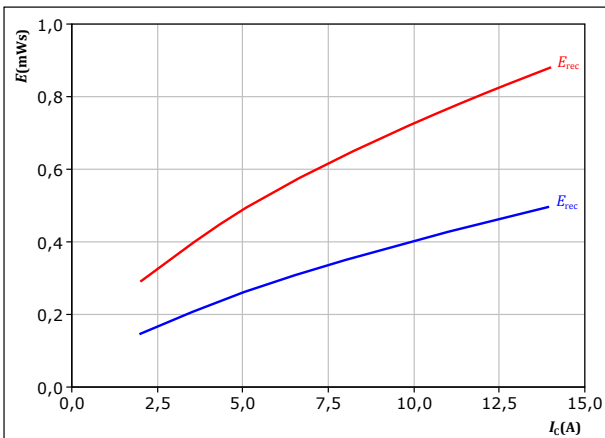
T_j : — 25 °C
— 125 °C

figure 35.

FWD

Typical reverse recovered energy loss as a function of collector current

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



With an inductive load at

$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 32$ Ω

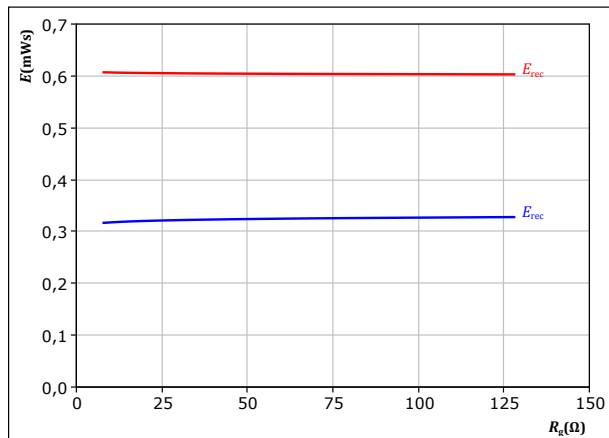
T_j : — 25 °C
— 125 °C

figure 36.

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

$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $I_C = 8$ A

T_j : — 25 °C
— 125 °C



Vincotech

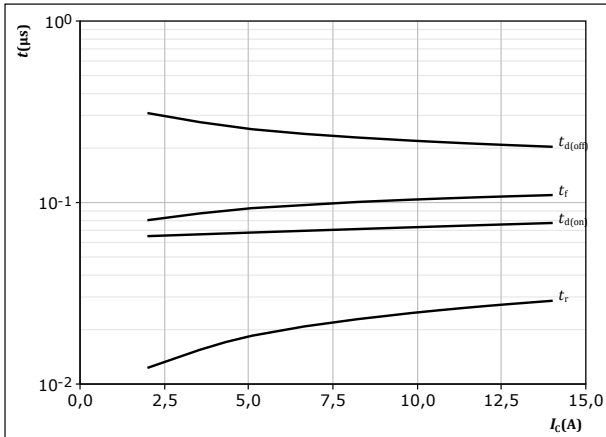
10-F0127PA008SC-L156E09
datasheet

Brake Switching Characteristics

figure 37.

IGBT

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



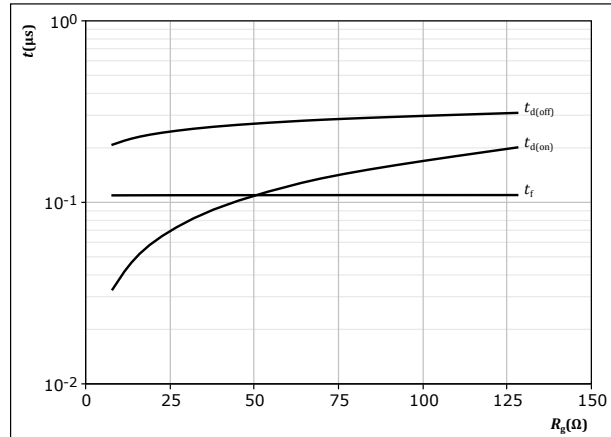
With an inductive load at

$T_j = 125$ °C
 $V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 32$ Ω
 $R_{goff} = 32$ Ω

figure 38.

IGBT

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



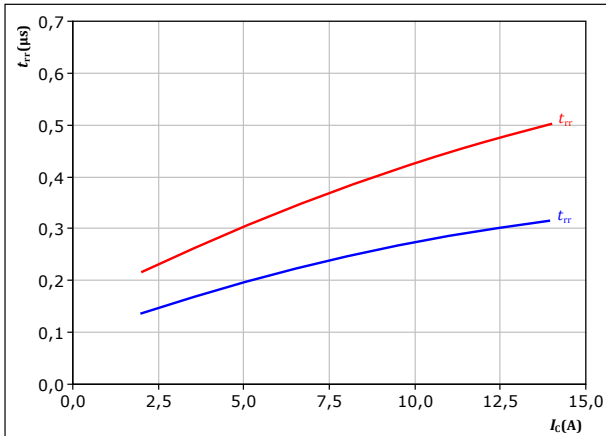
With an inductive load at

$T_j = 125$ °C
 $V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $I_C = 8$ A

figure 39.

FWD

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



With an inductive load at

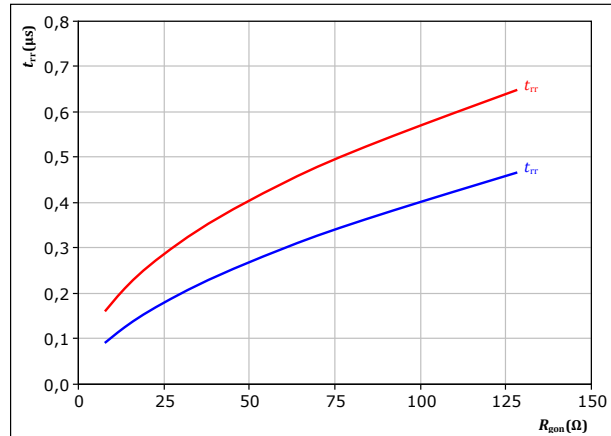
$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 32$ Ω

T_j : — 25 °C
— 125 °C

figure 40.

FWD

Typical reverse recovery time as a function of IGBT turn on gate resistor
 $t_{rr} = f(R_{gon})$



With an inductive load at

$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $I_C = 8$ A

T_j : — 25 °C
— 125 °C



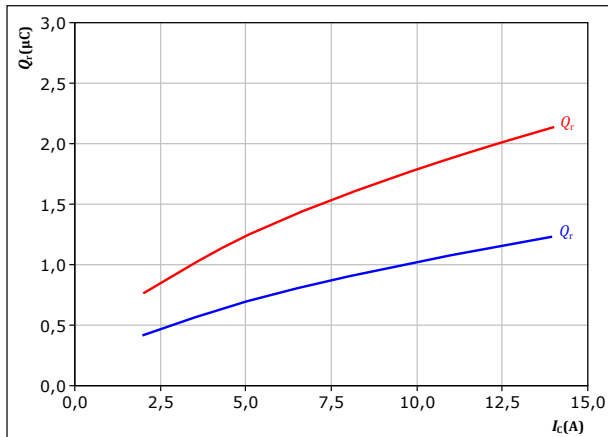
Brake Switching Characteristics

figure 41.

FWD

Typical recovered charge as a function of collector current

$$Q_r = f(I_c)$$



With an inductive load at

$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 32$ Ω

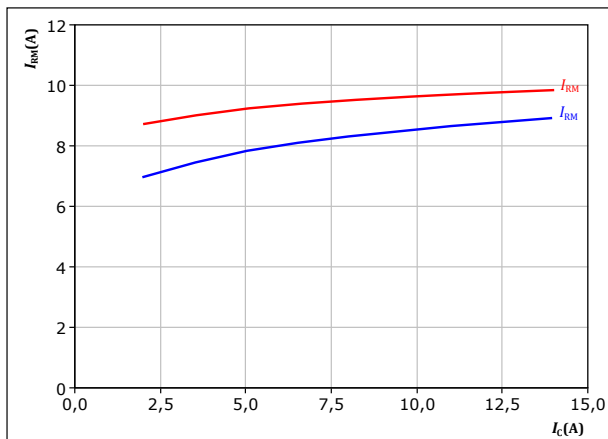
T_j : — 25 °C
— 125 °C

figure 43.

FWD

Typical peak reverse recovery current as a function of collector current

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



With an inductive load at

$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 32$ Ω

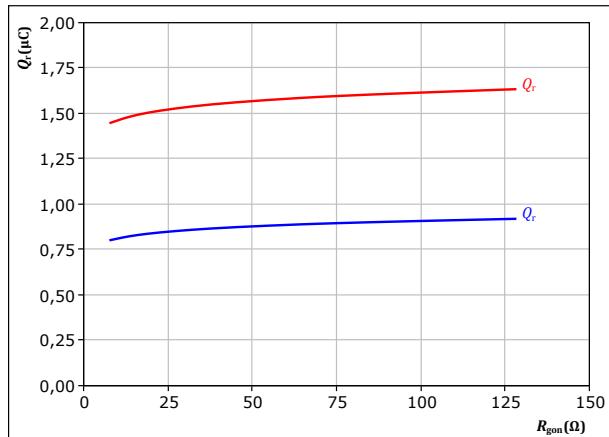
T_j : — 25 °C
— 125 °C

figure 42.

FWD

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

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



With an inductive load at

$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $I_c = 8$ A

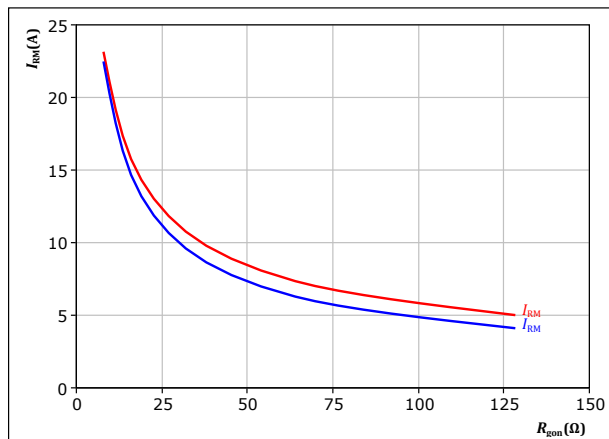
T_j : — 25 °C
— 125 °C

figure 44.

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

$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $I_c = 8$ A

T_j : — 25 °C
— 125 °C



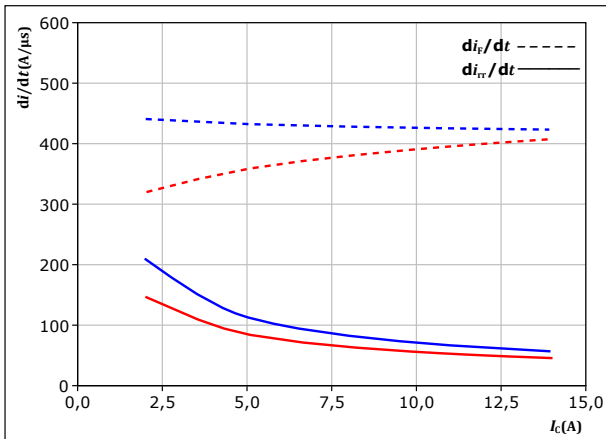
Vincotech

10-F0127PA008SC-L156E09
datasheet

Brake Switching Characteristics

figure 45. FWD

Typical rate of fall of forward and reverse recovery current as a function of collector current
 $di_f/dt, di_r/dt = f(I_C)$



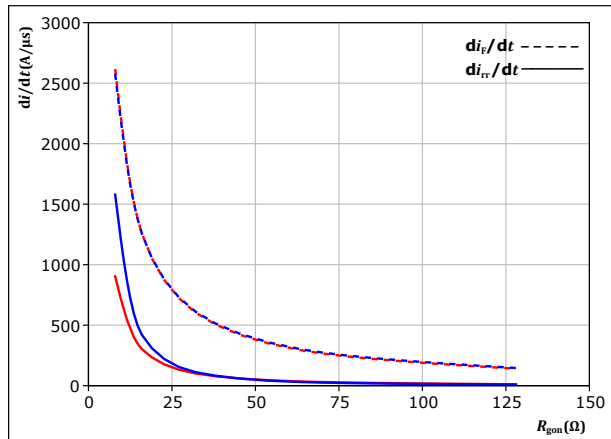
With an inductive load at

$V_{CE} = 600 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $R_{gon} = 32 \text{ } \Omega$

T_j : — 25 °C
— 125 °C

figure 46. FWD

Typical rate of fall of forward and reverse recovery current as a function of turn on gate resistor
 $di_f/dt, di_r/dt = f(R_{gon})$



With an inductive load at

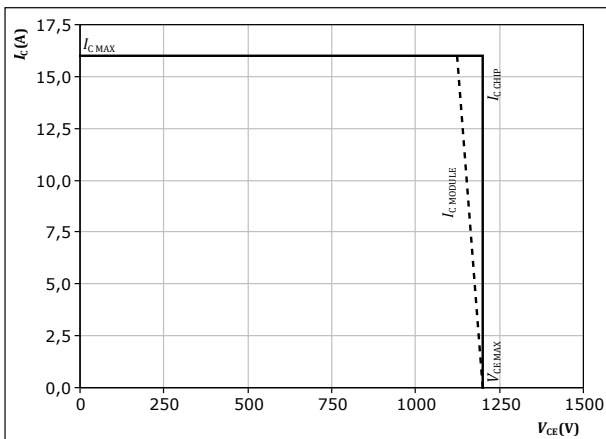
$V_{CE} = 600 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $I_C = 8 \text{ A}$

T_j : — 25 °C
— 125 °C

figure 47. IGBT

Reverse bias safe operating area

$I_C = f(V_{CE})$



At $T_j = 125 \text{ } ^\circ\text{C}$
 $R_{gon} = 32 \text{ } \Omega$
 $R_{goff} = 32 \text{ } \Omega$



Vincotech

Switching Definitions

figure 48. IGBT

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

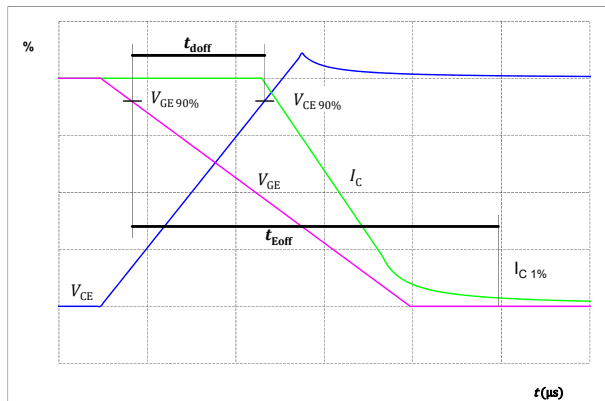


figure 49. IGBT

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

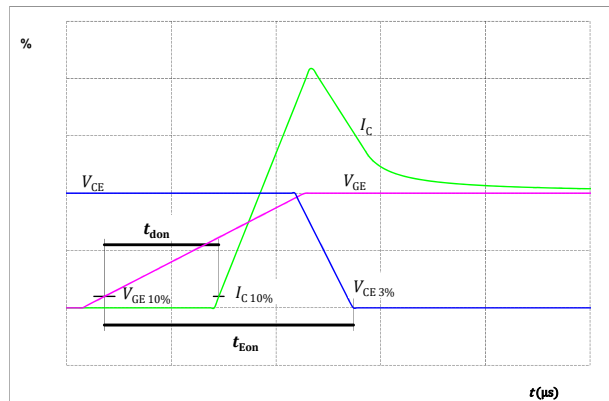


figure 50. IGBT

Turn-off Switching Waveforms & definition of t_f

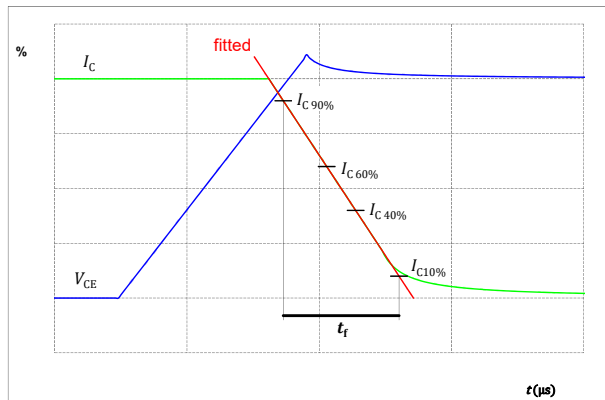
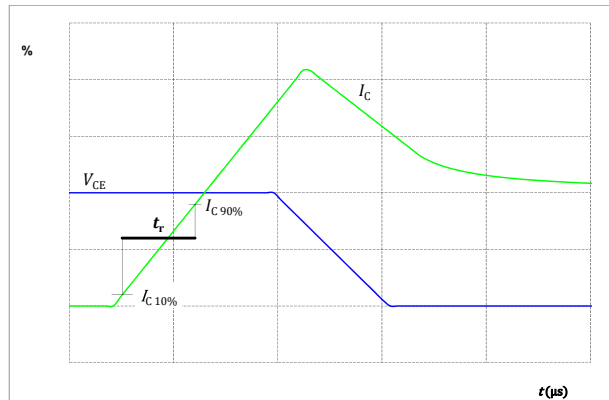


figure 51. IGBT

Turn-on Switching Waveforms & definition of t_r





Vincotech

Switching Definitions

figure 52.

FWD

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

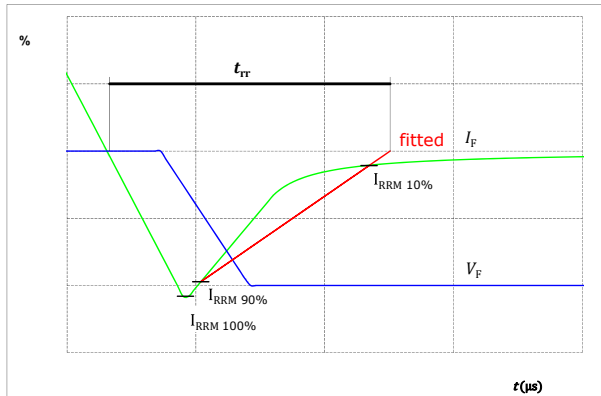
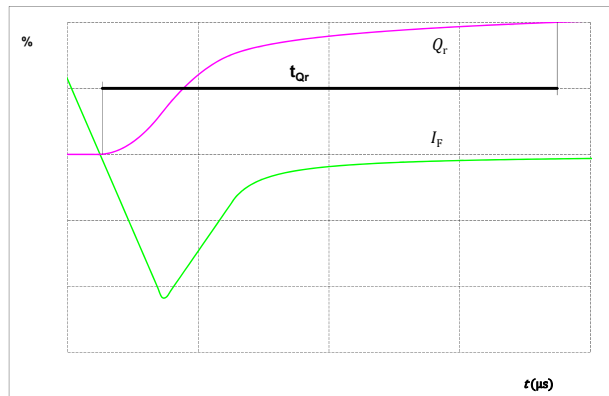


figure 53.

FWD

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





datasheet

Ordering Code	
Version	Ordering Code
Without thermal paste	10-F0127PA008SC-L156E09
With thermal paste (5,2 W/mK, PTM6000HV)	10-F0127PA008SC-L156E09-/7/
With thermal paste (3,4 W/mK, PSX-P7)	10-F0127PA008SC-L156E09-/3/

Marking							
	Text	Name		Date code	UL & VIN	Lot	Serial
		NN-NNNNNNNNNNNNNN- TTTTTV		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	0	22,5	BRCE
2	3	22,5	BRCG
3	13,5	19,5	GI6
4	13,5	22,5	EI6
5	23,5	19,5	GI5
6	23,5	22,5	EI5
7	33,5	19,5	GI4
8	33,5	22,5	EI4
9	33,5	11	INV+
10	33,5	3	GI1
11	33,5	0	U
12	25	3	GI2
13	25	0	V
14	16,5	3	GI3
15	16,5	0	W
16	3	0	NTC1
17	0	0	NTC2
18	7,9	9,3	BRC+
19	0	11	INV+

Side view of the sensor module. The base is 213 ±0,5 mm high. The pins are 1 ±0,05 mm in diameter. The pins are numbered 1 to 19.

Top view of the sensor module. The pins are numbered 1 to 19. The dimensions are 11,25 mm for the width of the pin array and 16,75 mm for the width of the base. The coordinate axis X1 is shown.

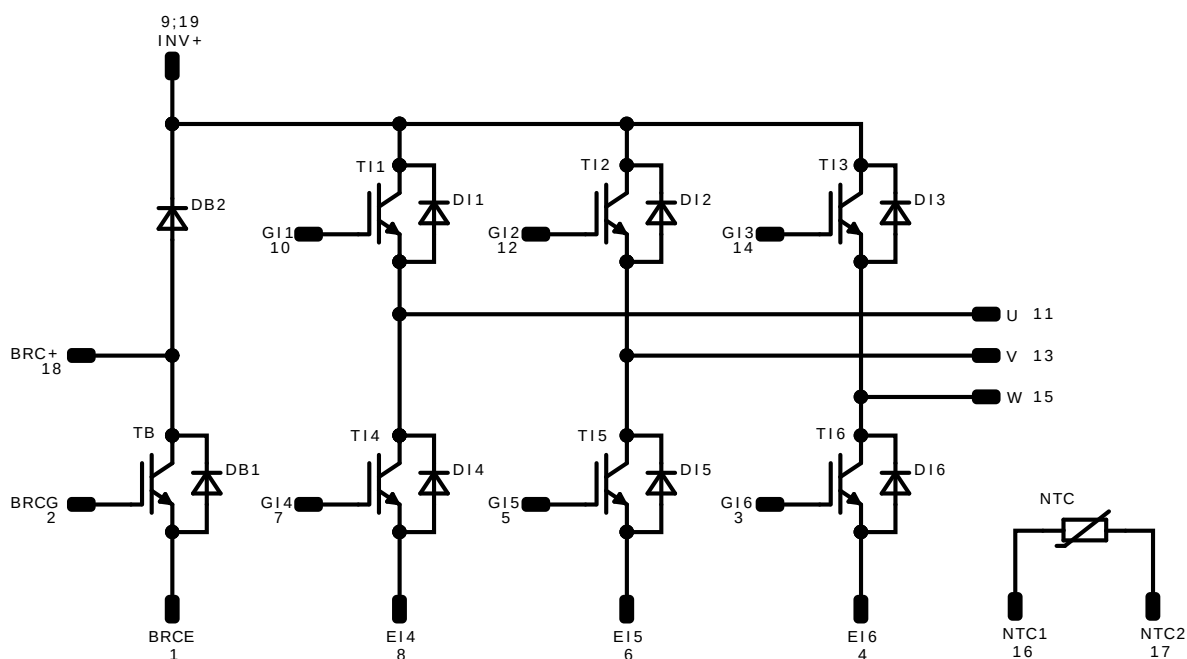
Tolerance of pinpositions: ±0,5mm at the end of pins
Dimension of coordinate axis is only offset without tolerance



Vincotech

10-F0127PA008SC-L156E09
datasheet

Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T14, T11, T15, T12, T16, T13	IGBT	1200 V	8 A	Inverter Switch	
DI1, DI4, DI2, DI5, DI3, DI6	FWD	1200 V	10 A	Inverter Diode	
TB	IGBT	1200 V	8 A	Brake Switch	
DB2	FWD	1200 V	10 A	Brake Diode	
DB1	FWD	1200 V	3 A	Brake Sw. Protection Diode	
NTC	Thermistor			Thermistor	



Vincotech

10-F0127PA008SC-L156E09
datasheet

Packaging instruction				
Standard packaging quantity (SPQ) 135	>SPQ	Standard	<SPQ	Sample

Handling instruction
Handling instructions for <i>flow 0</i> packages see vincotech.com website.

Package data
Package data for <i>flow 0</i> packages see vincotech.com website.

Vincotech thermistor reference
See Vincotech thermistor reference table at vincotech.com website.

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



Document No.:	Date:	Modification:	Pages
10-F0127PA008SC-L156E09-D5-14	1 May. 2022	New Datasheet format, module is unchanged	

DISCLAIMER

The information, specifications, procedures, methods and recommendations herein (together "information") are presented by Vincotech to reader in good faith, are believed to be accurate and reliable, but may well be incomplete and/or not applicable to all conditions or situations that may exist or occur. Vincotech reserves the right to make any changes without further notice to any products to improve reliability, function or design. No representation, guarantee or warranty is made to reader as to the accuracy, reliability or completeness of said information or that the application or use of any of the same will avoid hazards, accidents, losses, damages or injury of any kind to persons or property or that the same will not infringe third parties rights or give desired results. It is reader's sole responsibility to test and determine the suitability of the information and the product for reader's intended use.

LIFE SUPPORT POLICY

Vincotech products are not authorised for use as critical components in life support devices or systems without the express written approval of Vincotech.

As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in labelling can be reasonably expected to result in significant injury to the user.
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.