Vincotech

30-F2127PA075SC-L178E09
datasheet

*flow*7PACK 2	1200 V / 75 A

Topology features

- Inverter
- Brake Chopper
- Open Emitter configuration
- Kelvin Emitter for improved switching performance
- Temperature sensor

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
- Convex shaped baseplate for superior thermal contact
- Cu baseplate
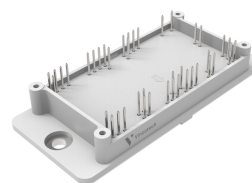- Thermo-mechanical push-and-pull force relief
- Solder pin
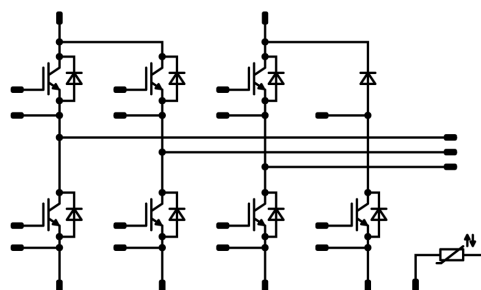
Target applications

- Motor Drive
- Power Generation

Types

- 30-F2127PA075SC-L178E09

flow 2 17 mm housing

Schematic

Vincotech

Maximum Ratings

T_j = 25 °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 °C	86	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}		225	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	232	W
Gate-emitter voltage	V_{GES}			±20	V
Short circuit ratings	t_{SC}	V_{GE} = 15 V, V_{CC} = 800 V	T_j = 150 °C	10	µs
Maximum junction temperature	T_{jmax}			175	°C
Inverter Diode					
Peak repetitive reverse voltage	V_{RRM}			1200	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s = 80 °C	85	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}		150	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	154	W
Maximum junction temperature	T_{jmax}			175	°C
Brake Switch					
Collector-emitter voltage	V_{CES}			1200	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$	T_s = 80 °C	66	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}		150	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	185	W
Gate-emitter voltage	V_{GES}			±20	V
Short circuit ratings	t_{SC}	V_{GE} = 15 V, V_{CC} = 800 V	T_j = 150 °C	10	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}			1200	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s = 80 °C	38	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}		50	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	87	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 °C	15 [1]	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}		15	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	38	W
Maximum junction temperature	T_{jmax}			150	°C

[1] limited by I_{FRM}

Module Properties

Thermal Properties

Storage temperature	T_{stg}			-40...+125	°C
Operation temperature under switching condition	T_{jop}			-40...+(T_{jmax} - 25)	°C

Isolation Properties

Isolation voltage	V_{isol}	DC Test Voltage*	t_p = 2 s	6000	V
Creepage distance				>12,7	mm
Clearance				>12,7	mm
Comparative Tracking Index	CTI			≥ 200	

*100 % tested in production

![Vincotech logo]

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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	

Inverter Switch

Static

Parameter	Symbol	Conditions	V_{GE}/V_{GS} [V]	V_{CE}/V_{DS}/V_{F} [V]	I_{C}/I_{D}/I_{F} [A]	T_{j} [°C]	Min	Typ	Max	Unit
Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,0026	25	5,3	5,8	6,3	V
Collector-emitter saturation voltage	V_{CEsat}		15		75	25 150	1,58	1,92 2,39	2,07[2]	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}							10		Ω
Input capacitance	C_{ies}	f = 1 Mhz	0	25		25		4300		pF
Reverse transfer capacitance	C_{res}							160		pF
Gate charge	Q_{g}		±15		0	25		570		nC

Thermal

Parameter	Symbol	Conditions	V_{GE}/V_{GS} [V]	V_{CE}/V_{DS}/V_{F} [V]	I_{C}/I_{D}/I_{F} [A]	T_{j} [°C]	Min	Typ	Max	Unit
Thermal resistance junction to sink[3]	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,41		K/W

Dynamic

Parameter	Symbol	Conditions	V_{GE}/V_{GS} [V]	V_{CE}/V_{DS}/V_{F} [V]	I_{C}/I_{D}/I_{F} [A]	T_{j} [°C]	Min	Typ	Max	Unit
Turn-on delay time	$t_{d(on)}$	R_{gon} = 4 Ω R_{goff} = 4 Ω	±15	600	75	25 150		178,2 196,4		ns
Rise time	t_{r}					25 150		34 36,4		ns
Turn-off delay time	$t_{d(off)}$					25 150		284,4 373		ns
Fall time	t_{f}					25 150		62,65 123,73		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=6,62 µC Q_{rFWD}=14,08 µC				25 150		6,17 9,39		mWs
Turn-off energy (per pulse)	E_{off}					25 150		4,01 6,99		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

Parameter	Symbol	Conditions					Values			Unit
Forward voltage	V_F				75	25 150	1,35	1,75 1,72	2,05[2]	V
Reverse leakage current	I_R	V_r = 1200 V				25			14	µA

Thermal

Parameter	Symbol	Conditions					Values			Unit
Thermal resistance junction to sink[3]	$R_{th(j\text{-}s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,62		K/W

Dynamic

Parameter	Symbol	Conditions					Values			Unit
Peak recovery current	I_{RM}	di/dt=2443 A/µs di/dt=2277 A/µs	±15	600	75	25 150		69,44 86,22		A
Reverse recovery time	t_{rr}					25 150		275,11 457		ns
Recovered charge	Q_r					25 150		6,62 14,08		µC
Reverse recovered energy	E_{rec}					25 150		2,29 5,22		mWs
Peak rate of fall of recovery current	$(\mathrm{d}i_{rr}/\mathrm{d}t)_{max}$					25 150		1859 723,78		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

Parameter	Symbol	V_{GE}/V_{GS}	V_{CE}/V_{DS}/V_{F}	I_C/I_D/I_F	T_j	Min	Typ	Max	Unit
Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}$		0,0017	25	5,3	5,8	6,3	V
Collector-emitter saturation voltage	V_{CEsat}	15		50	25 150	1,58	1,85 2,28	2,07[2]	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}						4		Ω
Input capacitance	C_{ies}	f = 1 Mhz	0	25		25		2800		pF
Reverse transfer capacitance	C_{res}						100		pF
Gate charge	Q_{g}	±15		0	25		380		nC

Thermal

Parameter	Symbol	Conditions				Min	Typ	Max	Unit
Thermal resistance junction to sink[3]	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)					0,51		K/W

Dynamic

Parameter	Symbol	Conditions	V_{GE}/V_{GS}	V_{CE}/V_{DS}/V_{F}	I_C/I_D/I_F	T_j	Min	Typ	Max	Unit
Turn-on delay time	$t_{d(on)}$	R_{gon} = 8 Ω R_{goff} = 8 Ω	±15	600	50	25 150		98 103		ns
Rise time	t_{r}					25 150		18,4 24,6		ns
Turn-off delay time	$t_{d(off)}$					25 150		208 284,2		ns
Fall time	t_{f}					25 150		66,31 111,88		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=3,07 µC Q_{rFWD}=6,3 µC				25 150		2,42 3,46		mWs
Turn-off energy (per pulse)	E_{off}					25 150		2,45 4,23		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

Parameter	Symbol	Conditions					Min	Typ	Max	Unit
Forward voltage	V_{F}				25	25 125 150	1,35	1,9 1,9 1,88	2,05[2]	V
Reverse leakage current	I_{R}	V_{r} = 1200 V				25			5,2	µA

Thermal

Parameter	Symbol	Conditions					Min	Typ	Max	Unit
Thermal resistance junction to sink[3]	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						1,09		K/W

Dynamic

Parameter	Symbol	Conditions					Min	Typ	Max	Unit
Peak recovery current	I_{RM}	di/dt=3312 A/µs di/dt=2285 A/µs	±15	600	50	25 150		51,02 51,67		A
Reverse recovery time	t_{rr}					25 150		151,95 327,74		ns
Recovered charge	Q_{r}					25 150		3,07 6,3		µC
Reverse recovered energy	E_{rec}					25 150		1,16 2,66		mWs
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$					25 150		3443 806,13		A/µs

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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 Sw. Protection Diode

Static

Forward voltage	V_F				7,5	25 125	1,23	1,66 1,62	1,97[2]	V
Reverse leakage current	I_R	V_r = 1200 V				25			27	µA

Thermal

Thermal resistance junction to sink[3]	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						1,83		K/W

Thermistor

Static

Rated resistance	R					25		22		kΩ
Deviation of R100	$\Delta_{R/R}$	R_{100} = 1484 Ω				100	-5		5	%
Power dissipation	P					25		130		mW
Power dissipation constant	d					25		1,5		mW/K
B-value	$B_{(25/50)}$	Tol. ±1 %						3962		K
B-value	$B_{(25/100)}$	Tol. ±1 %						4000		K
Vincotech Thermistor Reference									I	

[2] Value at chip level

[3] 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 — 150 °C
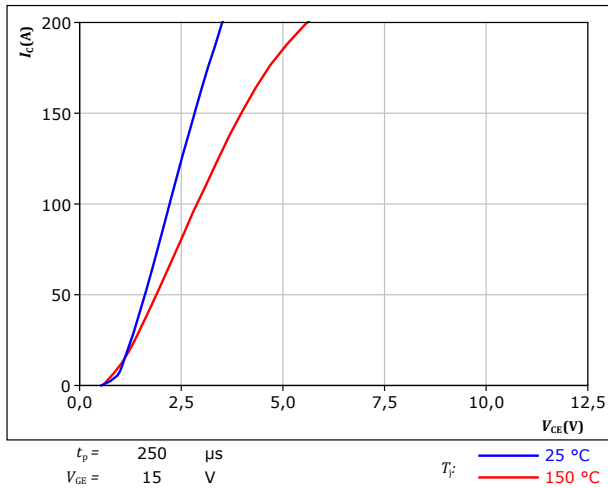
figure 2. IGBT

Typical output characteristics

$I_C = f(V_{CE})$

V_{GE}: 7 V, 8 V, 9 V, 10 V, 11 V, 12 V, 13 V, 14 V, 15 V, 16 V, 17 V

| t_p = | 250 | μs |
| T_j = | 150 | °C |

V_{GE} from 7 V to 17 V in steps of 1 V
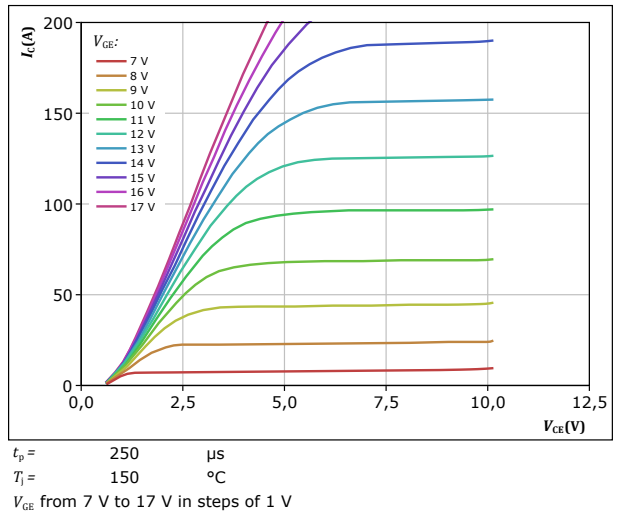
figure 3. IGBT

Typical transfer characteristics

$I_C = f(V_{GE})$

| | t_p = | 250 | μs |
| | V_{CE} = | 10 | V |

T_j: — 25 °C — 150 °C
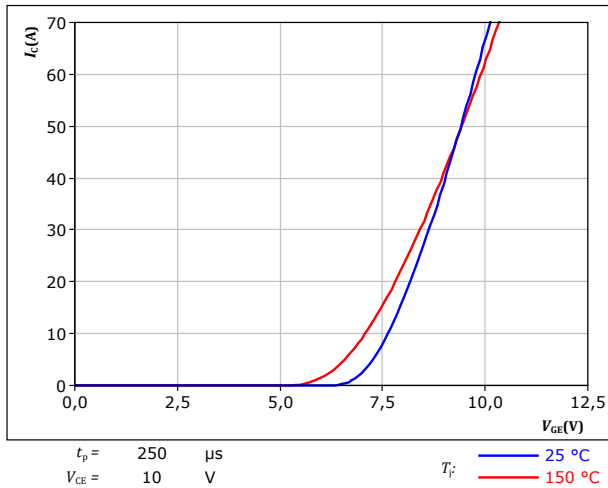
figure 4. IGBT

Transient thermal impedance as a function of pulse width

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

0,5; 0,2; 0,1; 0,05; 0,02; 0,01; 0,005; 0

| D = | t_p / T | |
| $R_{th(j-s)}$ = | 0,409 | K/W |
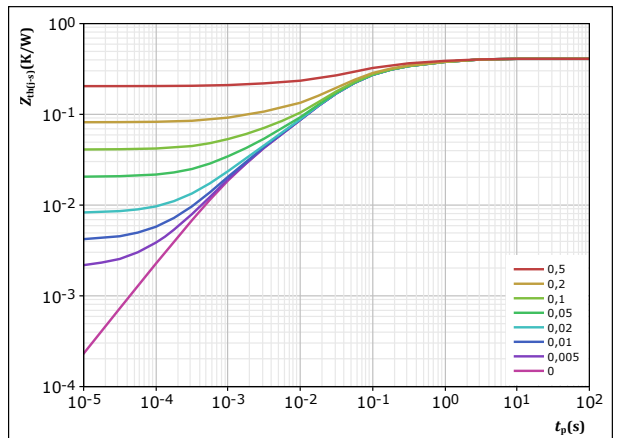
IGBT thermal model values

R (K/W)	τ (s)
6,08E-02	1,41E+00
9,91E-02	1,99E-01
1,78E-01	4,61E-02
5,03E-02	1,41E-02
2,16E-02	1,42E-03

Inverter Switch Characteristics

figure 5. | **IGBT**

Safe operating area

I_C = f(V_{CE})
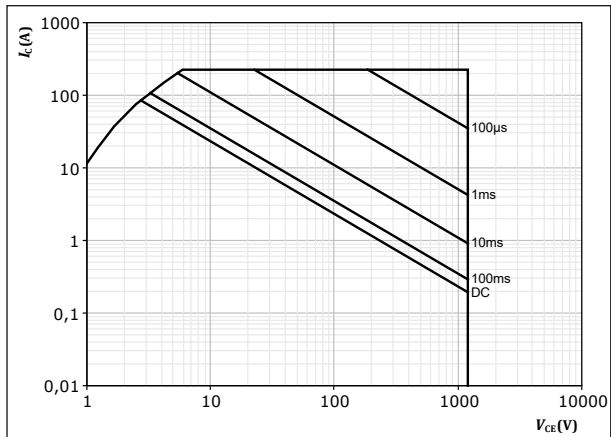
D = single pulse

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

Inverter Diode Characteristics

figure 6. **FWD**

Typical forward characteristics

$I_F = f(V_F)$

$t_p =$ 250 µs

T_j: —— 25 °C
—— 150 °C
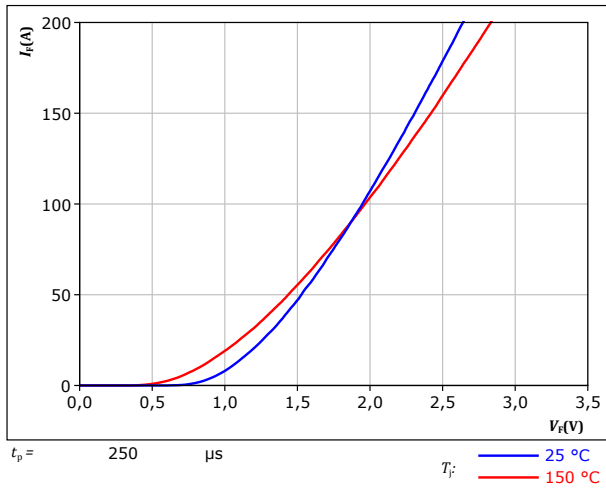
figure 7. **FWD**

Transient thermal impedance as a function of pulse width

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

		0,5
		0,2
		0,1
		0,05
		0,02
		0,01
		0,005
		0
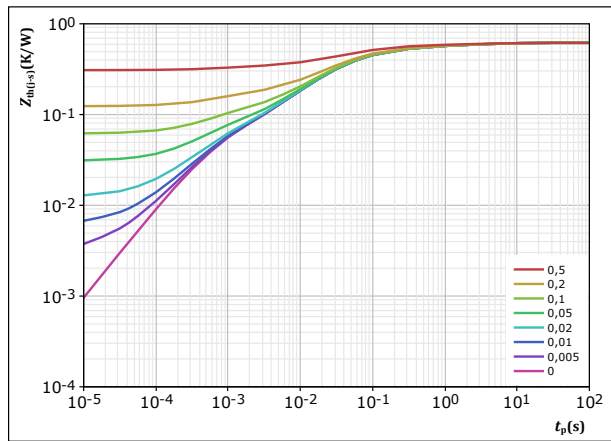
$D =$ t_p / T

$R_{th(j-s)} =$ 0,617 K/W

FWD thermal model values

R (K/W)	τ (s)
4,35E-02	4,66E+00
7,48E-02	5,44E-01
1,95E-01	8,13E-02
2,13E-01	2,26E-02
4,51E-02	5,48E-03
4,51E-02	5,92E-04

Brake Switch Characteristics

figure 8. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$

t_p =	250	µs		
V_{GE} =	15	V		25 °C
			T_j:	150 °C
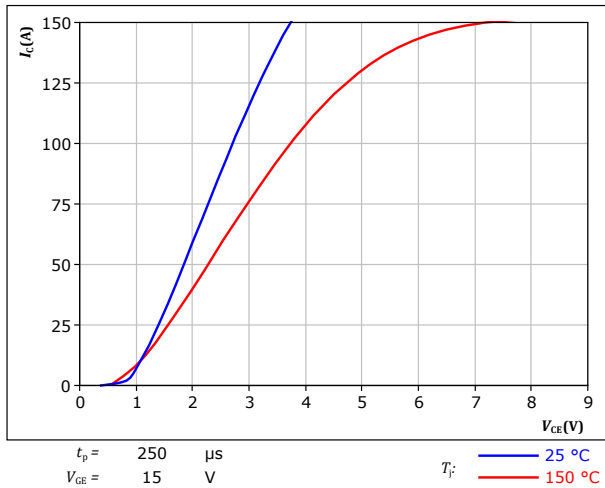
figure 9. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$

V_{GE}:
- 7 V
- 8 V
- 9 V
- 10 V
- 11 V
- 12 V
- 13 V
- 14 V
- 15 V
- 16 V
- 17 V

t_p =	250	µs
T_j =	150	°C

V_{GE} from 7 V to 17 V in steps of 1 V
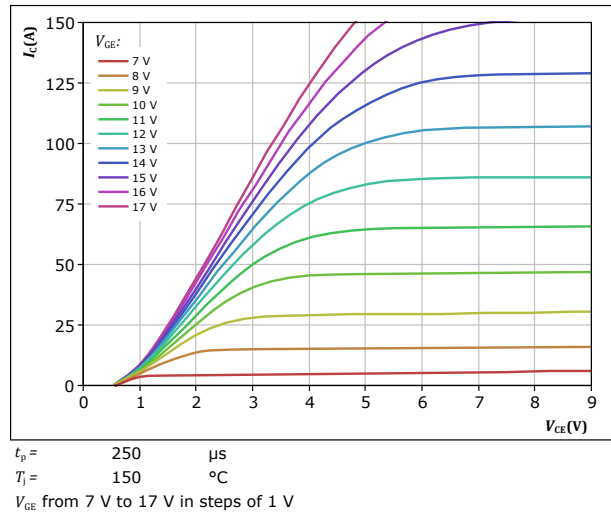
figure 10. **IGBT**

Typical transfer characteristics

$I_C = f(V_{GE})$

t_p =	250	µs		
V_{CE} =	10	V		25 °C
			T_j:	150 °C
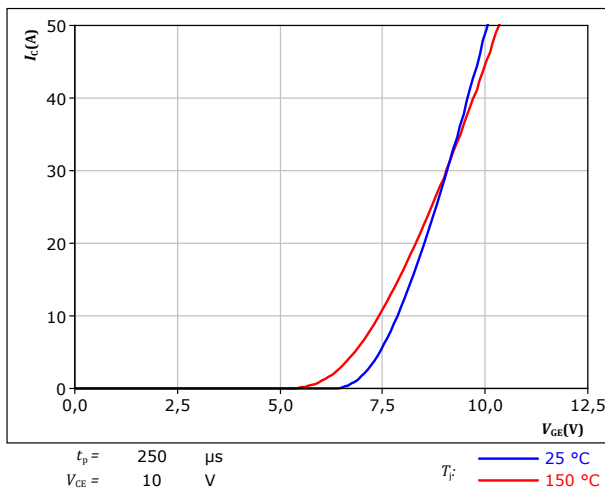
figure 11. **IGBT**

Transient thermal impedance as a function of pulse width

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

- 0,5
- 0,2
- 0,1
- 0,05
- 0,02
- 0,01
- 0,005
- 0

D =	t_p / T	
$R_{th(j-s)}$ =	0,512	K/W

IGBT thermal model values

R (K/W)	τ (s)
7,12E-02	1,13E+00
1,15E-01	1,65E-01
2,22E-01	3,78E-02
6,59E-02	1,21E-02
3,86E-02	9,52E-04
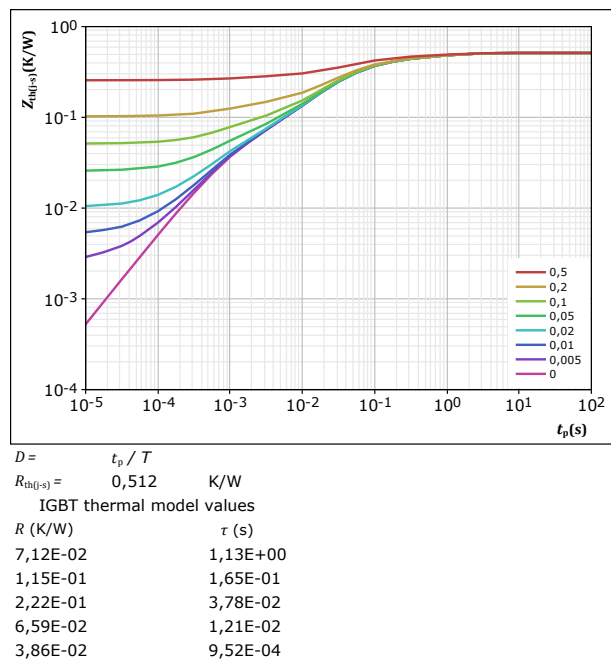
Brake Switch Characteristics

figure 12.   IGBT

Safe operating area

$I_C = f(V_{CE})$
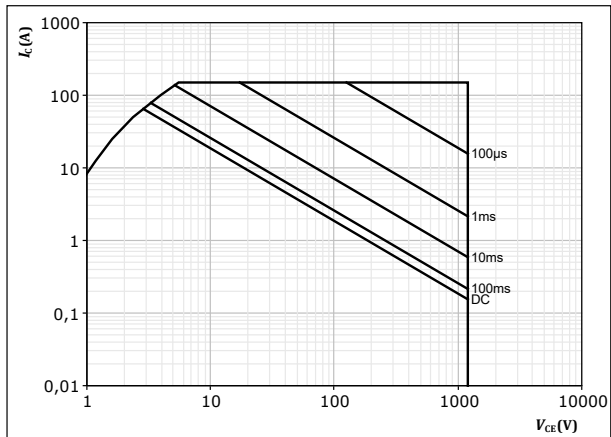
D = single pulse

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

Brake Diode Characteristics

figure 13.	FWD

Typical forward characteristics

$I_F = f(V_F)$
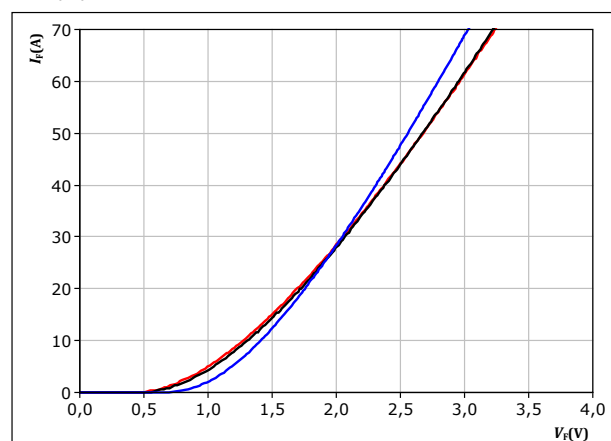
$t_p = $ 250 µs

T_j:

25 °C
125 °C
150 °C

figure 14.	FWD

Transient thermal impedance as a function of pulse width

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

	0,5
	0,2
	0,1
	0,05
	0,02
	0,01
	0,005
	0
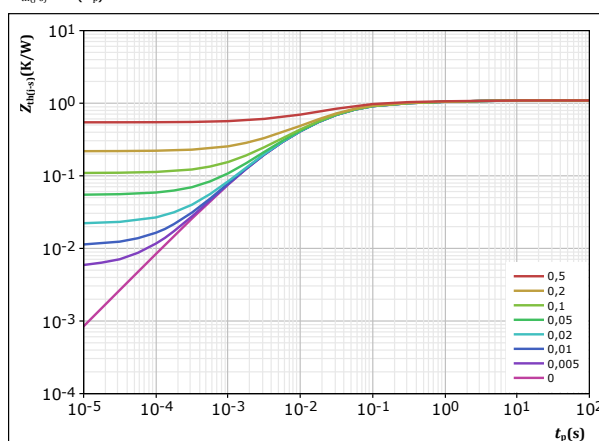
$D = $ t_p / T

$R_{th(j-s)} = $ 1,091 K/W

FWD thermal model values

R (K/W)	τ (s)
5,34E-02	2,93E+00
9,71E-02	3,59E-01
4,43E-01	4,79E-02
3,93E-01	1,21E-02
1,05E-01	2,46E-03

Brake Sw. Protection Diode Characteristics

figure 15.	FWD

Typical forward characteristics

$I_F = f(V_F)$

$t_p = $ 250 µs

T_j: ——— 25 °C   ——— 125 °C
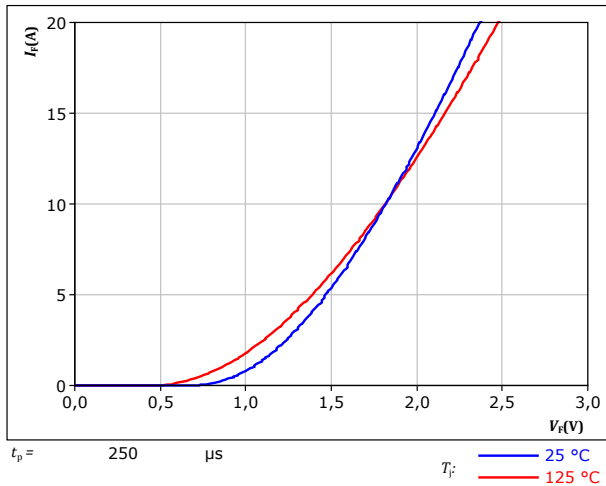
figure 16.	FWD

Transient thermal impedance as a function of pulse width

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

0,5
0,2
0,1
0,05
0,02
0,01
0,005
0
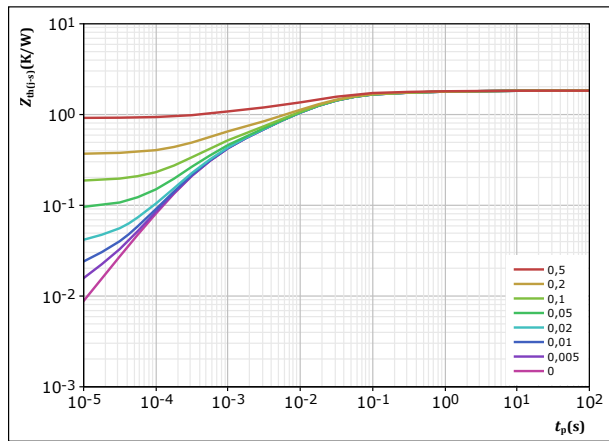
$D = $ t_p / T

$R_{th(j-s)} = $ 1,833 K/W

FWD thermal model values

R (K/W)	τ (s)
4,59E-02	4,62E+00
1,15E-01	3,62E-01
5,63E-01	3,63E-02
6,02E-01	8,92E-03
2,37E-01	1,88E-03
2,71E-01	3,97E-04

Thermistor Characteristics

figure 17.	Thermistor

Typical NTC characteristic as function of temperature
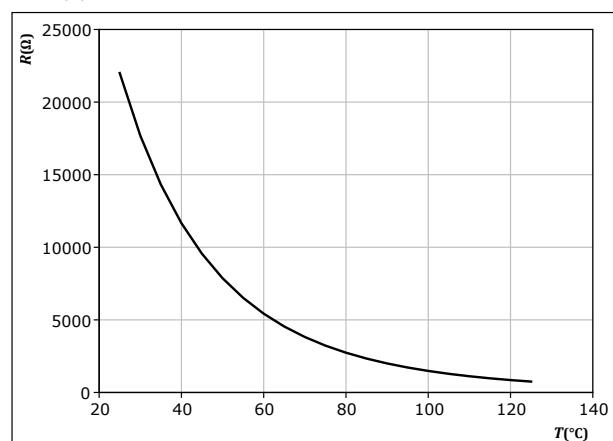
$R_T = f(T)$

Inverter Switching Characteristics

figure 18.	IGBT

Typical switching energy losses as a function of collector current

$E = f(I_C)$
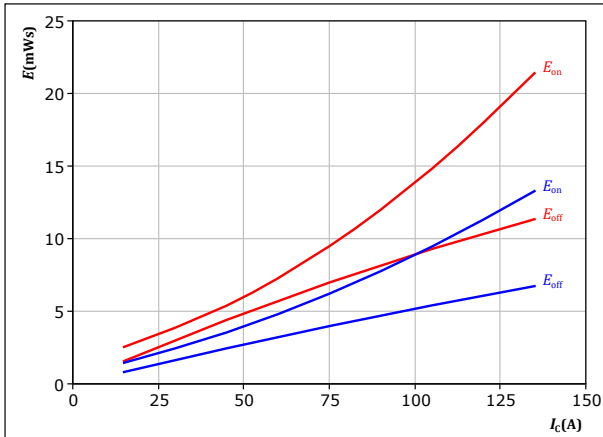
With an inductive load at

V_{CE} =	600	V
V_{GE} =	±15	V
R_{gon} =	4	Ω
R_{goff} =	4	Ω

T_j: —— 25 °C —— 150 °C

figure 19.	IGBT

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

$E = f(R_g)$
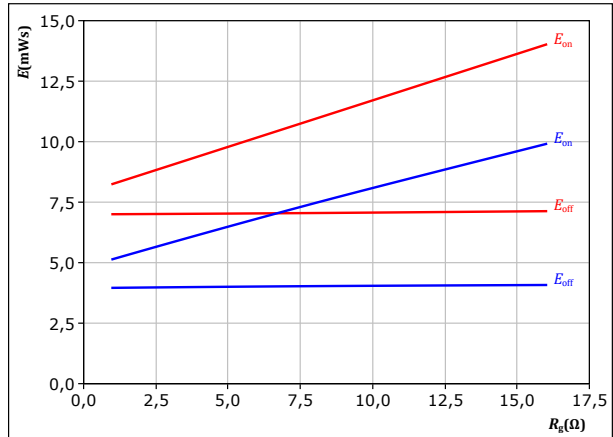
With an inductive load at

V_{CE} =	600	V
V_{GE} =	±15	V
I_C =	75	A

T_j: —— 25 °C —— 150 °C

figure 20.	FWD

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$
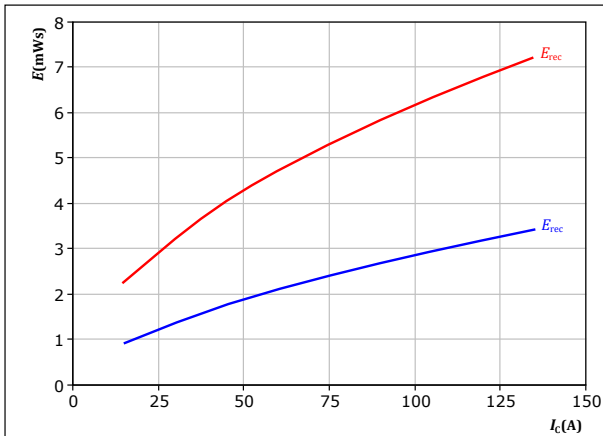
With an inductive load at

V_{CE} =	600	V
V_{GE} =	±15	V
R_{gon} =	4	Ω

T_j: —— 25 °C —— 150 °C

figure 21.	FWD

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

$E_{rec} = f(R_g)$
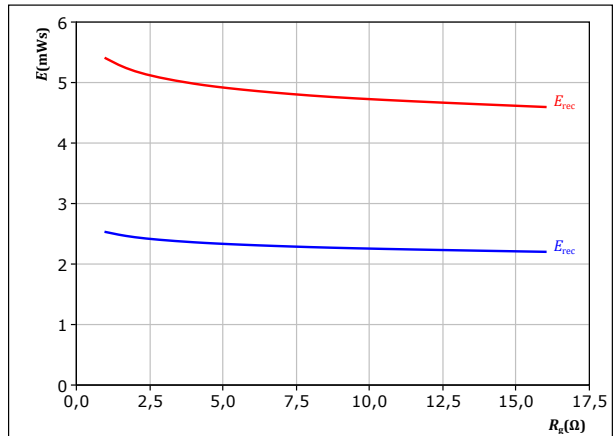
With an inductive load at

V_{CE} =	600	V
V_{GE} =	±15	V
I_C =	75	A

T_j: —— 25 °C —— 150 °C

Inverter Switching Characteristics

figure 22.	IGBT

Typical switching times as a function of collector current

$t = f(I_C)$
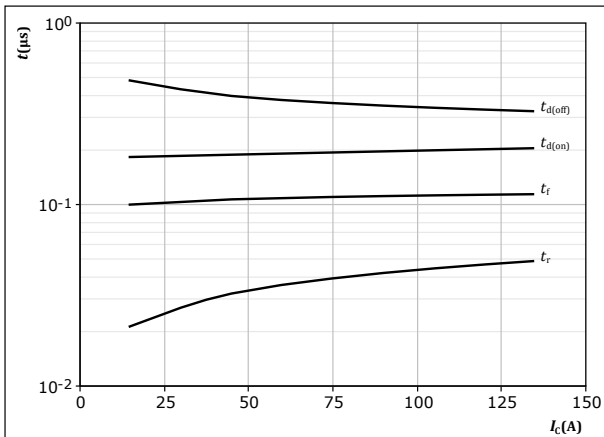
With an inductive load at

T_j =	150	°C
V_{CE} =	600	V
V_{GE} =	±15	V
R_{gon} =	4	Ω
R_{goff} =	4	Ω

figure 23.	IGBT

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

$t = f(R_g)$
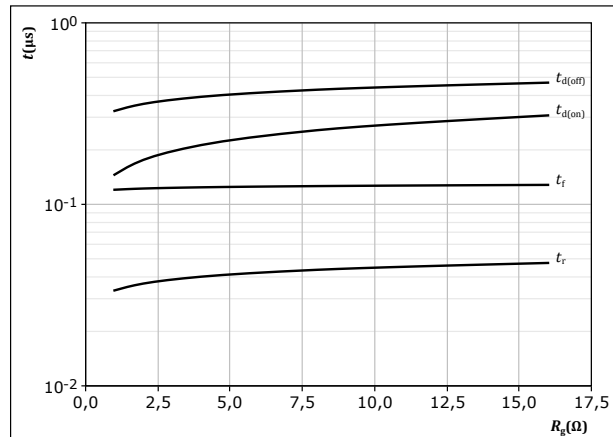
With an inductive load at

T_j =	150	°C
V_{CE} =	600	V
V_{GE} =	±15	V
I_C =	75	A

figure 24.	FWD

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_C)$
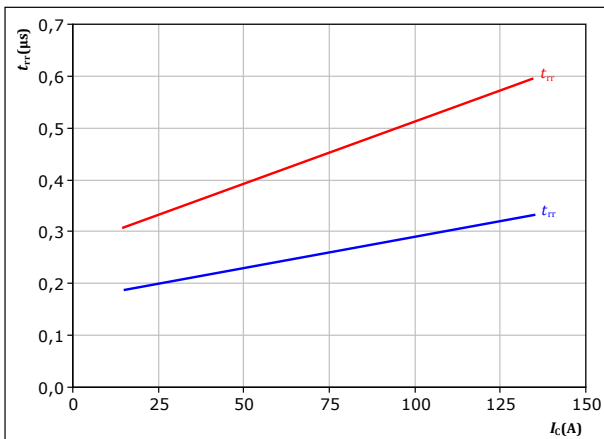
With an inductive load at

V_{CE} =	600	V
V_{GE} =	±15	V
R_{gon} =	4	Ω

T_j: — 25 °C — 150 °C

figure 25.	FWD

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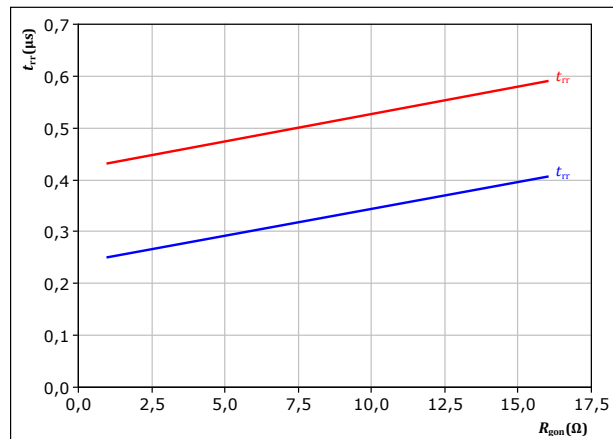
$t_{rr} = f(R_{gon})$

With an inductive load at

V_{CE} =	600	V
V_{GE} =	±15	V
I_C =	75	A

T_j: — 25 °C — 150 °C

Inverter Switching Characteristics

figure 26. FWD

Typical recovered charge as a function of collector current

$Q_r = f(I_c)$
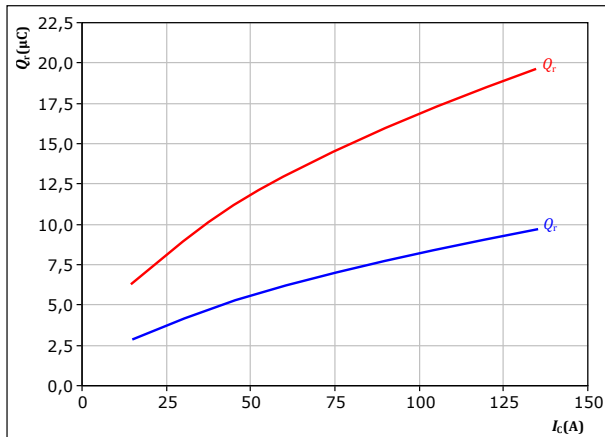
With an inductive load at

V_{CE} =	600	V
V_{GE} =	±15	V
R_{gon} =	4	Ω

T_j: — 25 °C — 150 °C

figure 27. FWD

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

$Q_r = f(R_{gon})$
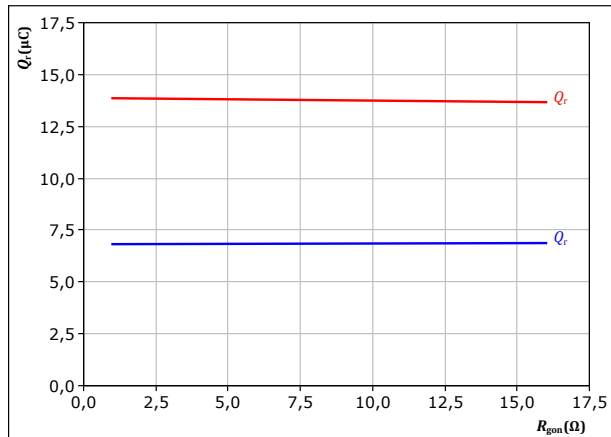
With an inductive load at

V_{CE} =	600	V
V_{GE} =	±15	V
I_c =	75	A

T_j: — 25 °C — 150 °C

figure 28. FWD

Typical peak reverse recovery current as a function of collector current

$I_{RM} = f(I_c)$
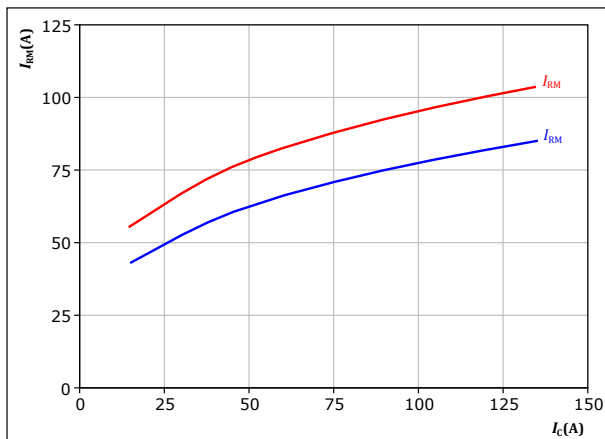
With an inductive load at

V_{CE} =	600	V
V_{GE} =	±15	V
R_{gon} =	4	Ω

T_j: — 25 °C — 150 °C

figure 29. FWD

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

$I_{RM} = f(R_{gon})$
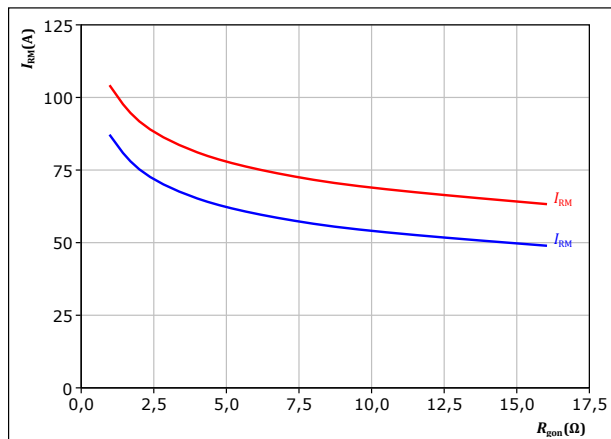
With an inductive load at

V_{CE} =	600	V
V_{GE} =	±15	V
I_c =	75	A

T_j: — 25 °C — 150 °C

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, $di_{rr}/dt = f(I_C)$
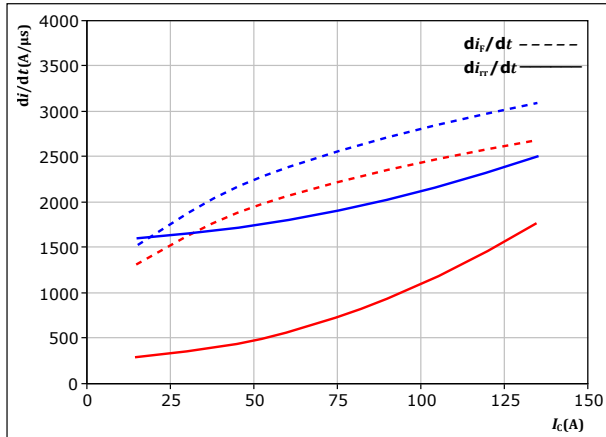
With an inductive load at

$V_{CE} =$	600	V
$V_{GE} =$	±15	V
$R_{gon} =$	4	Ω

figure 31.	FWD

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

di_F/dt, $di_{rr}/dt = f(R_{gon})$
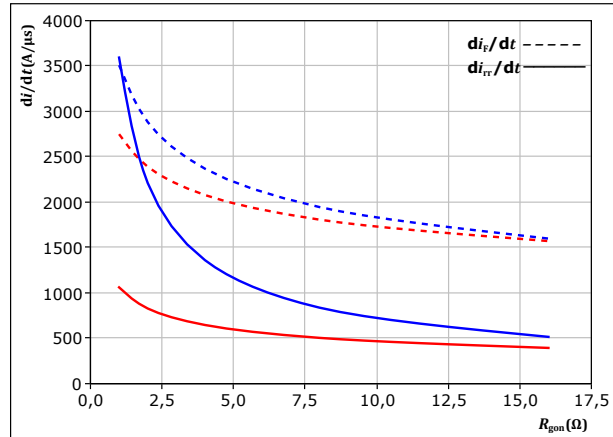
With an inductive load at

$V_{CE} =$	600	V
$V_{GE} =$	±15	V
$I_C =$	75	A

figure 32.	IGBT

Reverse bias safe operating area

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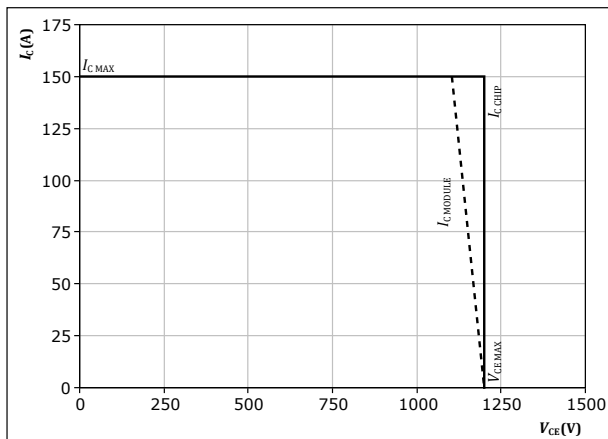
At

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

Brake Switching Characteristics

figure 33.	IGBT

Typical switching energy losses as a function of collector current

$E = f(I_C)$
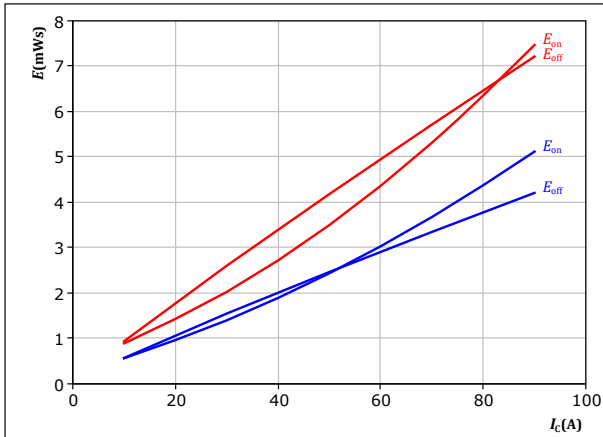
With an inductive load at

V_{CE} =	600	V
V_{GE} =	±15	V
R_{gon} =	8	Ω
R_{goff} =	8	Ω

T_j:
— 25 °C
— 150 °C

figure 34.	IGBT

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

$E = f(R_g)$
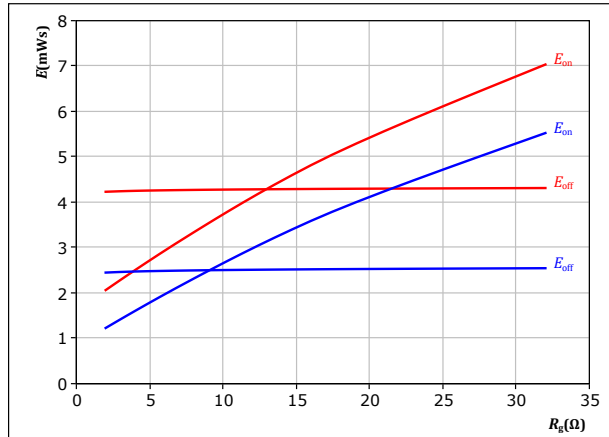
With an inductive load at

V_{CE} =	600	V
V_{GE} =	±15	V
I_C =	50	A

T_j:
— 25 °C
— 150 °C

figure 35.	FWD

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$
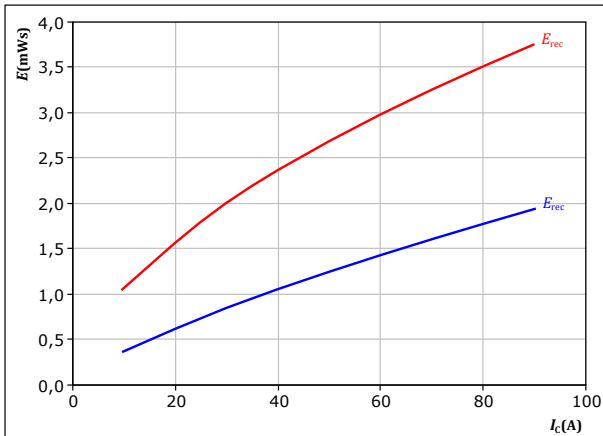
With an inductive load at

V_{CE} =	600	V
V_{GE} =	±15	V
R_{gon} =	8	Ω

T_j:
— 25 °C
— 150 °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} =	±15	V
I_C =	50	A

T_j:
— 25 °C
— 150 °C
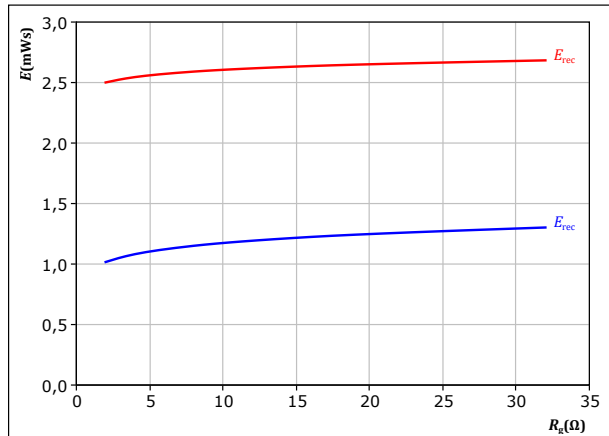
Brake Switching Characteristics

figure 37.   **IGBT**

Typical switching times as a function of collector current

$t = f(I_C)$
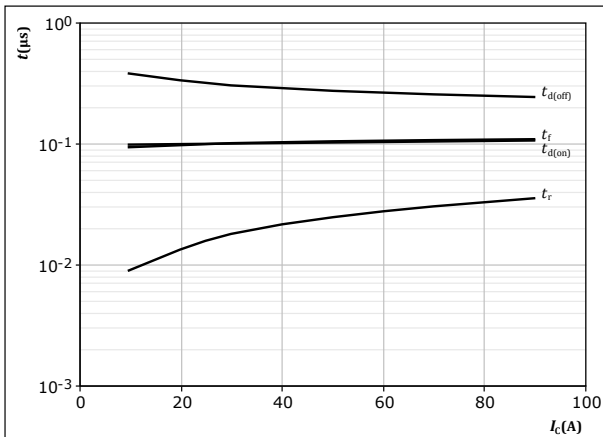
With an inductive load at

$T_j =$	150	°C
$V_{CE} =$	600	V
$V_{GE} =$	±15	V
$R_{gon} =$	8	Ω
$R_{goff} =$	8	Ω

figure 38.   **IGBT**

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

$t = f(R_g)$
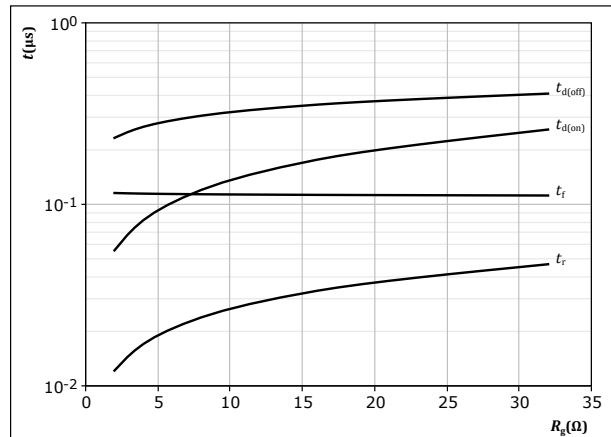
With an inductive load at

$T_j =$	150	°C
$V_{CE} =$	600	V
$V_{GE} =$	±15	V
$I_C =$	50	A

figure 39.   **FWD**

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_C)$
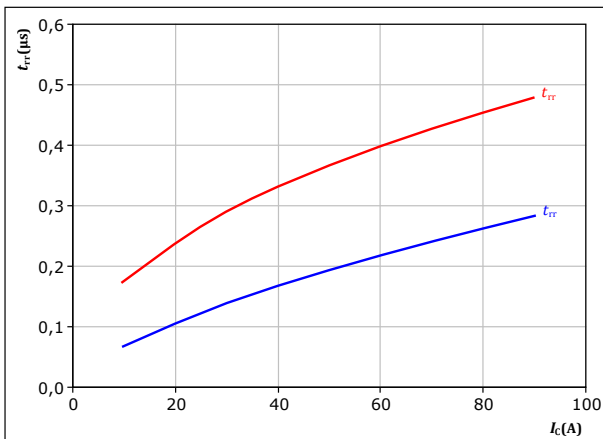
With an inductive load at

$V_{CE} =$	600	V
$V_{GE} =$	±15	V
$R_{gon} =$	8	Ω

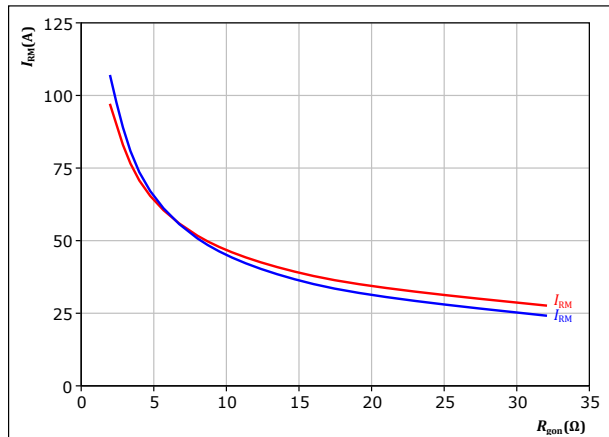T_j: — 25 °C — 150 °C

figure 40.   **FWD**

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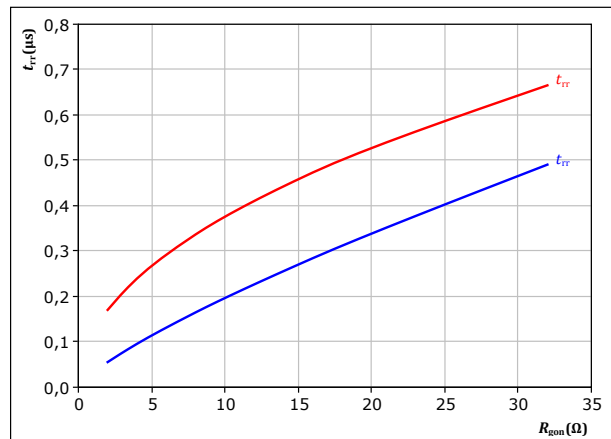
$t_{rr} = f(R_{gon})$

With an inductive load at

$V_{CE} =$	600	V
$V_{GE} =$	±15	V
$I_C =$	50	A

T_j: — 25 °C — 150 °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} =	±15	V
R_{gon} =	8	Ω

T_j: — 25 °C — 150 °C

figure 42. **FWD**

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

$Q_r = f(R_{gon})$
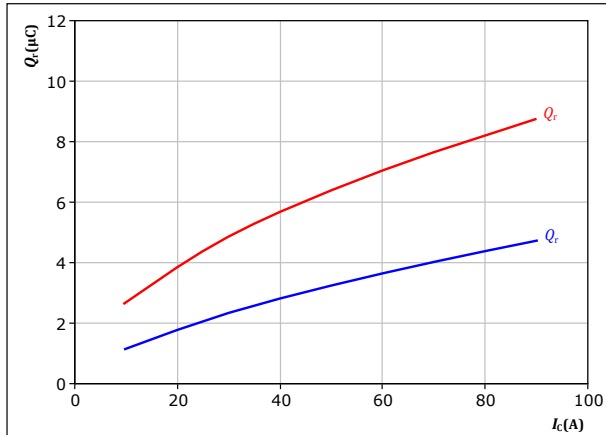
With an inductive load at

V_{CE} =	600	V
V_{GE} =	±15	V
I_C =	50	A

T_j: — 25 °C — 150 °C

figure 43. **FWD**

Typical peak reverse recovery current as a function of collector current

$I_{RM} = f(I_C)$
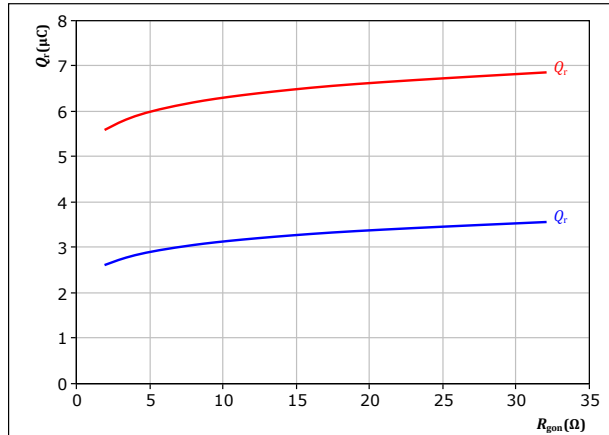
With an inductive load at

V_{CE} =	600	V
V_{GE} =	±15	V
R_{gon} =	8	Ω

T_j: — 25 °C — 150 °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} =	±15	V
I_C =	50	A

T_j: — 25 °C — 150 °C

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

di_F/dt $-----$
di_{rr}/dt $-----$

With an inductive load at

V_{CE} =	600	V
V_{GE} =	±15	V
R_{gon} =	8	Ω

T_j: —— 25 °C   —— 150 °C

figure 46. **FWD**

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

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

di_F/dt $-----$
di_{rr}/dt $-----$
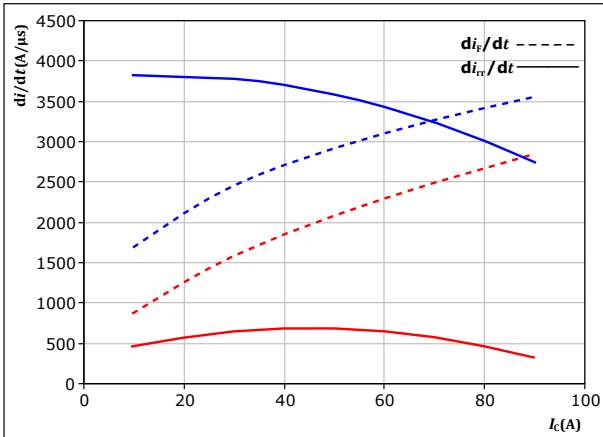
With an inductive load at

V_{CE} =	600	V
V_{GE} =	±15	V
I_C =	50	A

T_j: —— 25 °C   —— 150 °C

figure 47. **IGBT**

Reverse bias safe operating area

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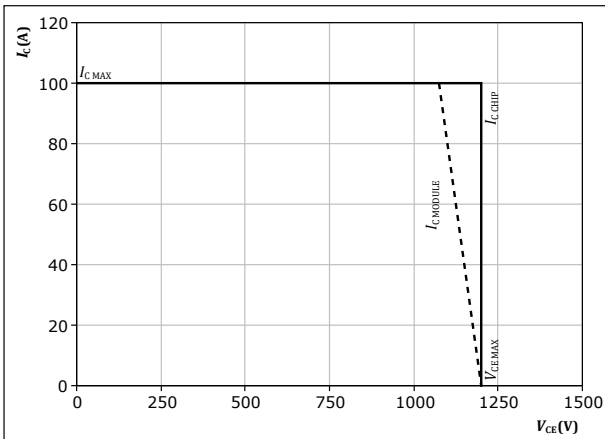
At

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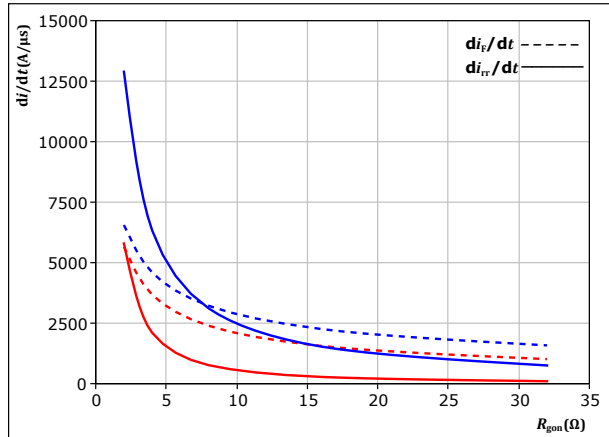
Switching Definitions

figure 48.   **IGBT**

Turn-off Switching Waveforms & definition of t_{doff}, t_{Eoff} (t_{tEoff} = integrating time for E_{off})
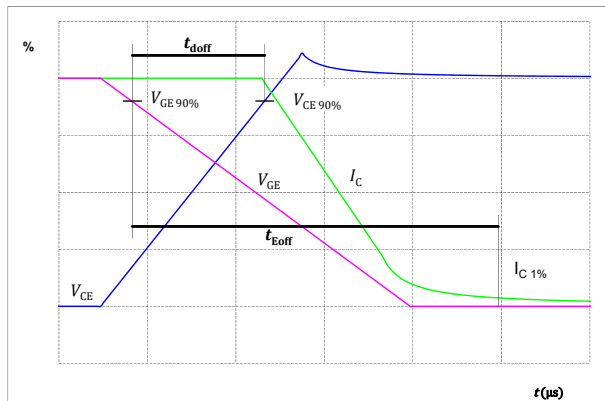
figure 49.   **IGBT**
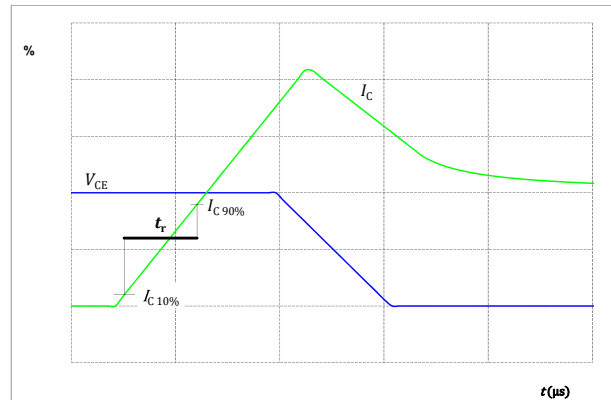
Turn-on Switching Waveforms & definition of t_{don}, t_{Eon} (t_{Eon} = integrating time for E_{on})
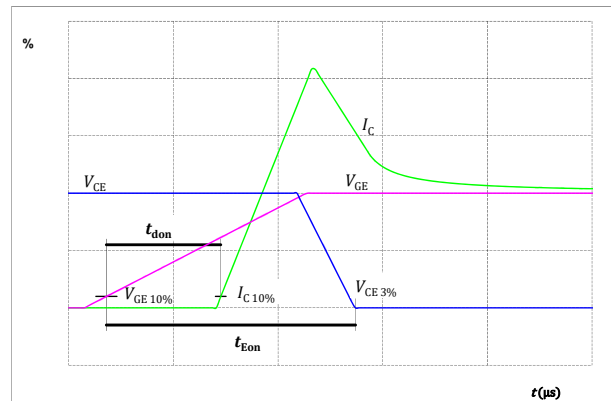
figure 50.   **IGBT**

Turn-off Switching Waveforms & definition of t_f
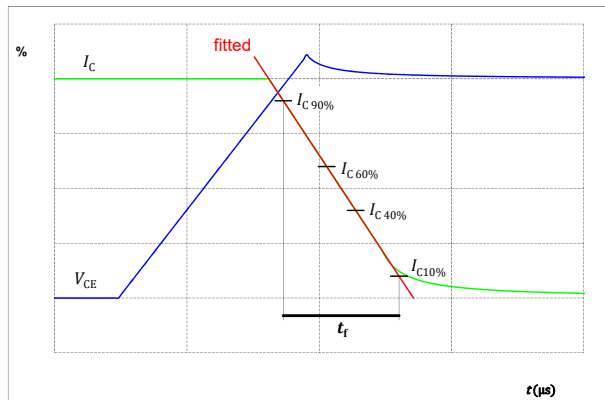
figure 51.   **IGBT**

Turn-on Switching Waveforms & definition of t_r

Switching Definitions

figure 52. FWD

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

figure 53. FWD

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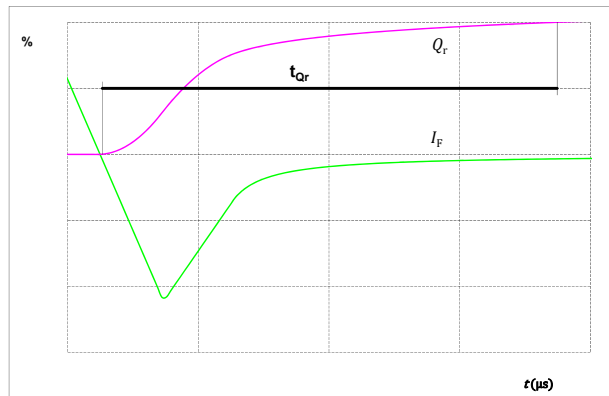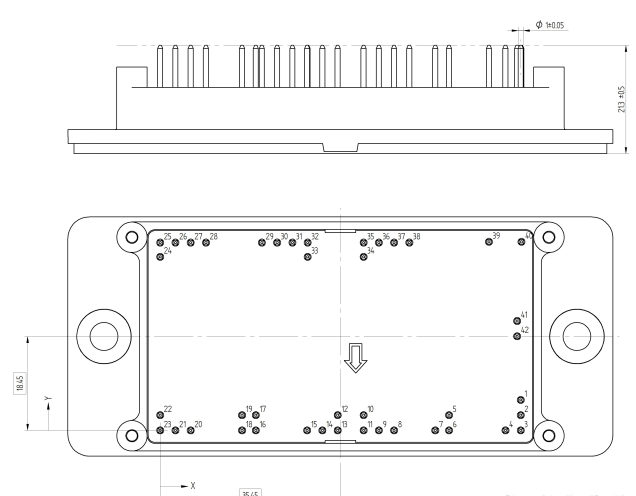
Ordering Code

Version	Ordering Code
Without thermal paste	30-F2127PA075SC-L178E09
With thermal paste (3,4 W/mK, PSX-P7)	30-F2127PA075SC-L178E09-/3/

Marking

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

Outline

Pin	X	Y	Function
1	70,9	6	BRCE
2	70,9	3	BRCE
3	70,9	0	BRCG
4	67,9	0	BRCS
5	56,8	3	INV+
6	56,8	0	INV+
7	54,1	0	INV+
8	46	0	SI6
9	43	0	GI6
10	40	3	EI6
11	40	0	EI6
12	34,9	3	EI5
13	34,9	0	EI5
14	31,9	0	GI5
15	28,9	0	SI5
16	18,8	0	INV+
17	18,8	3	INV+
18	16,1	0	INV+
19	16,1	3	INV+
20	6	0	SI4
21	3	0	GI4
22	0	3	EI4
23	0	0	EI4
24	0	34,1	U
25	0	36,9	U
26	3	36,9	U
27	6	36,9	SI1
28	9	36,9	GI1
29	20	36,9	GI2
30	23	36,9	SI2
31	26	36,9	V
32	29	36,9	V
33	29	34,1	V
34	40	34,1	W
35	40	36,9	W
36	43	36,9	W
37	46	36,9	SI3
38	49	36,9	GI3
39	64,65	37,05	NTC1
40	71,05	37,05	NTC2
41	70,2	21,5	BRC+
42	70,2	18,5	BRC+

Vincotech

Pinout
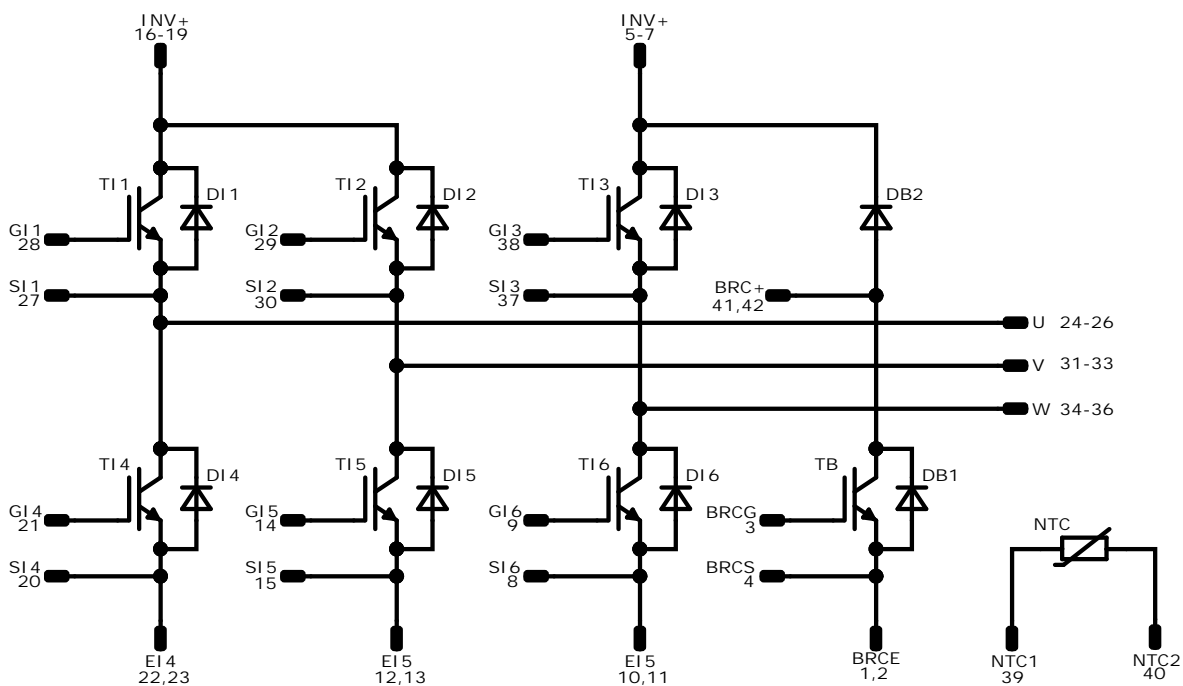
Identification

ID	Component	Voltage	Current	Function	Comment
TB	IGBT	1200 V	50 A	Brake Switch	
DB2	FWD	1200 V	25 A	Brake Diode	
DB1	FWD	1200 V	7,5 A	Brake Sw. Protection Diode	
TI4, TI1, TI5, TI2, TI6, TI3	IGBT	1200 V	75 A	Inverter Switch	
DI1, DI4, DI2, DI5, DI3, DI6	FWD	1200 V	75 A	Inverter Diode	
NTC	Thermistor			Thermistor	

Vincotech

Packaging instruction					
Standard packaging quantity (SPQ) 36		>SPQ	Standard	<SPQ	Sample

Handling instruction
Handling instructions for *flow* 2 packages see vincotech.com website.

Package data
Package data for *flow* 2 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°C and up to 3500VAC/1min isolation voltage. For more information see vincotech.com website.	UL

Document No.:	**Date:**	**Modification:**	**Pages**
30-F2127PA075SC-L178E09-D5-14	30 Nov. 2021	Brake switch static values correction Brake switch protection diode Rth corrected Thermistor change New datasheet format	
30-F2127PA075SC-L178E09-D6-14	15 Mar. 2026	Correct swapped coordinates of Pin16-19, Pin 32-33. Module is unchanged	