



Vincotech

10-FY12PMA025M7-P588A78
10-PY12PMA025M7-P588A78Y
10-F112PMA025M7-P588A79
10-P112PMA025M7-P588A79Y
datasheet

flow PIM 1

1200 V / 25 A

Features

- IGBT M7 with low V_{CEsat} and improved EMC behavior
- Open emitter configuration
- Compact and low inductive design
- Built-in NTC

Target applications

- Industrial Drives

Types

- 10-FY12PMA025M7-P588A78
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flow 1 housing

12 mm



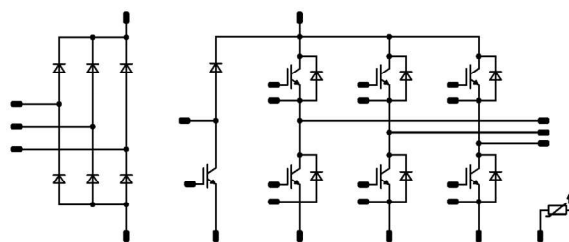
17 mm



Solder pins

Press-fit pins

Schematic



Maximum Ratings

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

Parameter	Symbol	Condition	Value	Unit
Rectifier Diode				
Peak Repetitive Reverse Voltage	V_{RRM}		1600	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	46	A
Surge (non-repetitive) forward current	I_{FSM}	50 Hz Single Half Sine Wave $t_p = 10\text{ ms}$ $T_j = 150\text{ °C}$	270	A
Surge current capability	I_{pt}		370	A ² s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	56	W
Maximum Junction Temperature	T_{jmax}		150	°C



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Maximum Ratings

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

Parameter	Symbol	Condition	Value	Unit
Inverter Switch				
Collector-emitter voltage	V_{CES}		1200	V
Collector current	I_C	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	34	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	50	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	82	W
Gate-emitter voltage	V_{GES}		± 20	V
Short circuit ratings	t_{SC}	$V_{GE} = 15\text{ V}$ $V_{CE} = 800\text{ V}$ $T_j = 150\text{ °C}$	9,5	μs
Maximum junction temperature	T_{jmax}		175	$^{\circ}\text{C}$

Inverter Diode				
Peak repetitive reverse voltage	V_{RRM}		1200	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	33	A
Repetitive peak forward current	I_{FRM}	T_j limited by T_{jmax}	50	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	62	W
Maximum junction temperature	T_{jmax}		175	$^{\circ}\text{C}$

Brake Switch				
Collector-emitter voltage	V_{CES}		1200	V
Collector current	I_C	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	21	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	30	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	60	W
Gate-emitter voltage	V_{GES}		± 20	V
Short circuit ratings	t_{SC}	$V_{GE} = 15\text{ V}$ $V_{CE} = 800\text{ V}$ $T_j = 150\text{ °C}$	9,5	μs
Maximum junction temperature	T_{jmax}		175	$^{\circ}\text{C}$

Brake Diode				
Peak repetitive reverse voltage	V_{RRM}		1200	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	14	A
Repetitive peak forward current	I_{FRM}	T_j limited by T_{jmax}	20	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	50	W
Maximum junction temperature	T_{jmax}		175	$^{\circ}\text{C}$



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Maximum Ratings

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

Parameter	Symbol	Condition	Value	Unit
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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
		AC Voltage $t_p = 1\text{ min}$	2500	V
Creepage distance			min. 12,7	mm
Clearance		for 12 mm solder pins	7,91	mm
		for 12 mm press-fit pins	7,96	
		for 17 mm housing	min. 12,7	
Comparative Tracking Index	CTI		> 200	

*100 % tested in production



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Characteristic Values

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

Rectifier Diode

Static

Forward voltage	V_F				35	25 125		1,17 1,13		V
Reverse leakage current	I_r			1600		25			50	μA

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4 \text{ W/mK}$ (PSX)						1,25		K/W
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Characteristic Values

Parameter	Symbol	Conditions					Value			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	$V_{GE(th)}$	$V_{CE} = 10 \text{ V}$			0,0025	25	5,4	6	6,6	V
Collector-emitter saturation voltage	V_{CEsat}		15		25	25 125 150		1,65 1,89 1,95	2,15	V
Collector-emitter cut-off current	I_{CES}		0	1200		25			70	µA
Gate-emitter leakage current	I_{GES}		20	0		25			500	nA
Input capacitance	C_{ies}		0	10		25		4800		pF
Output capacitance	C_{oes}							170		
Reverse transfer capacitance	C_{res}							57		
Gate charge	Q_g		15	600	25	25		180		nC

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4 \text{ W/mK}$ (PSX)						1,16		K/W
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Dynamic

Turn-on delay time	$t_{d(on)}$	$R_{goff} = 16 \Omega$ $R_{gon} = 16 \Omega$	± 15	600	25	25 125 150		147 149 145		ns
Rise time	t_r					25 125 150		29 33 34		
Turn-off delay time	$t_{d(off)}$					25 125 150		171 191 196		
Fall time	t_f					25 125 150		95 110 115		
Turn-on energy (per pulse)	E_{on}					25 125 150		2,06 2,66 2,82		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		1,67 2,18 2,29		



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Characteristic Values

Parameter	Symbol	Conditions					Value			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				25	25 125 150		1,63 1,70 1,69	2,1	V
Reverse leakage current	I_R			1200		25			35	μA

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4 \text{ W/mK}$ (PSX)						1,54		K/W
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Dynamic

Peak recovery current	I_{RRM}	$di/dt = 645 \text{ A/}\mu\text{s}$ $di/dt = 673 \text{ A/}\mu\text{s}$ $di/dt = 633 \text{ A/}\mu\text{s}$	± 15	600	25	25 125 150		21 23 23		A
Reverse recovery time	t_{rr}					25 125 150		254 367 404		ns
Recovered charge	Q_r					25 125 150		2,54 3,88 4,28		μC
Reverse recovered energy	E_{rec}					25 125 150		0,88 1,45 1,61		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		217 134 132		A/μs



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Characteristic Values

Parameter	Symbol	Conditions					Value			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	$V_{GE(th)}$	$V_{CE} = 10 \text{ V}$			0,0015	25	5,4	6	6,6	V
Collector-emitter saturation voltage	V_{CEsat}		15		15	25 125 150		1,70 1,95 2,01	2,15	V
Collector-emitter cut-off current	I_{CES}		0	1200		25			60	μA
Gate-emitter leakage current	I_{GES}		20	0		25			500	nA
Internal gate resistance	r_g							none		Ω
Input capacitance	C_{ies}		0	10		25		2900		pF
Output capacitance	C_{oes}							120		
Reverse transfer capacitance	C_{res}							34		
Gate charge	Q_g		15	600	15	25		110		nC

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4 \text{ W/mK}$ (PSX)						1,60		K/W
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Dynamic

Turn-on delay time	$t_{d(on)}$	$R_{goff} = 32 \Omega$ $R_{gon} = 32 \Omega$	15/0	700	15	25 125 150		293 257 246		ns
Rise time	t_r					25 125 150		185 200 203		
Turn-off delay time	$t_{d(off)}$					25 125 150		398 442 450		
Fall time	t_f					25 125 150		66 88 92		
Turn-on energy (per pulse)	E_{on}	$Q_{rFWD} = 1,1 \mu\text{C}$ $Q_{rFWD} = 1,9 \mu\text{C}$ $Q_{rFWD} = 2,1 \mu\text{C}$				25 125 150		2,95 3,57 3,74		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		1,33 1,71 1,81		



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Characteristic Values

Parameter	Symbol	Conditions					Value			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	25 125 150			1,61 1,69 1,69	2,1	V
Reverse leakage current	I_R		1200		25				25	µA

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4 \text{ W/mK}$ (PSX)						1,91		K/W
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Dynamic

Peak recovery current	I_{RRM}	$di/dt = 69 \text{ A/}\mu\text{s}$ $di/dt = 69 \text{ A/}\mu\text{s}$ $di/dt = 67 \text{ A/}\mu\text{s}$	15/0	700	15	25 125 150		6 7 7		A
Reverse recovery time	t_{rr}					25 125 150		295 485 544		ns
Recovered charge	Q_r					25 125 150		1,140 1,882 2,120		µC
Reverse recovered energy	E_{rec}					25 125 150		0,422 0,781 0,895		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		44 29 25		A/µs

Thermistor

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

figure 1. Rectifier Diode

Typical forward characteristics

$$I_F = f(V_F)$$

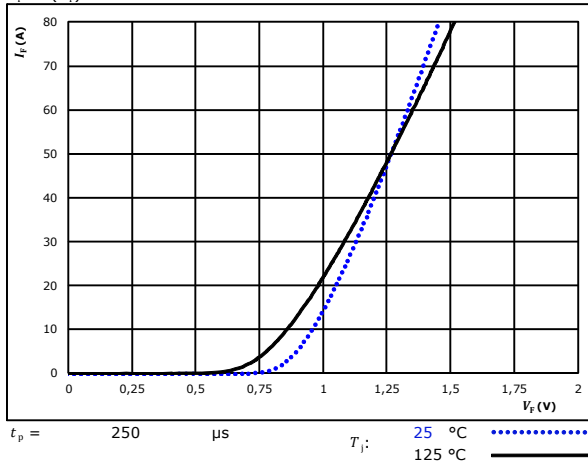
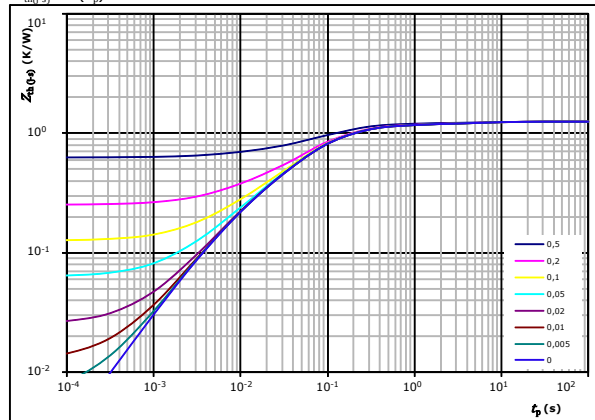


figure 2. Rectifier Diode

Transient thermal impedance as a function of pulse width

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



Diode thermal model values

R (K/W)	τ (s)
8,00E-02	5,22E+00
1,56E-01	4,18E-01
6,95E-01	8,82E-02
2,23E-01	3,07E-02
9,97E-02	5,99E-03



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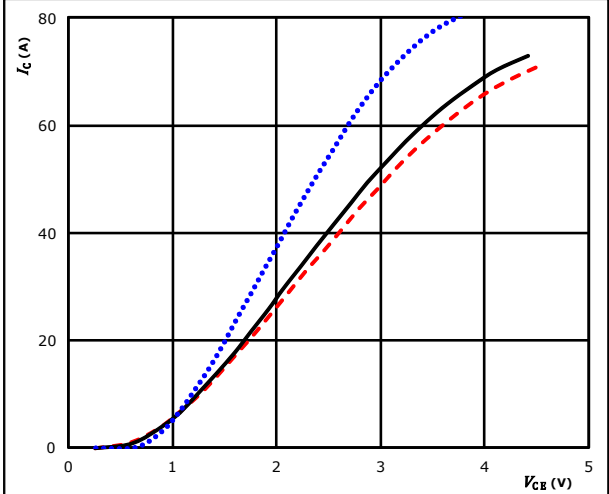
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Inverter Switch Characteristics

figure 1. IGBT

Typical output characteristics

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

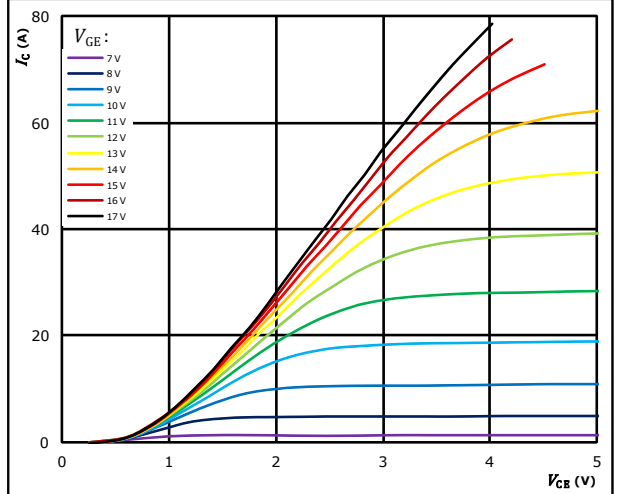


$t_p = 250 \mu s$
 $V_{GE} = 15 V$
 $T_j: 25 \text{ } ^\circ C$ (blue dotted)
 $125 \text{ } ^\circ C$ (black solid)
 $150 \text{ } ^\circ C$ (red dashed)

figure 2. IGBT

Typical output characteristics

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

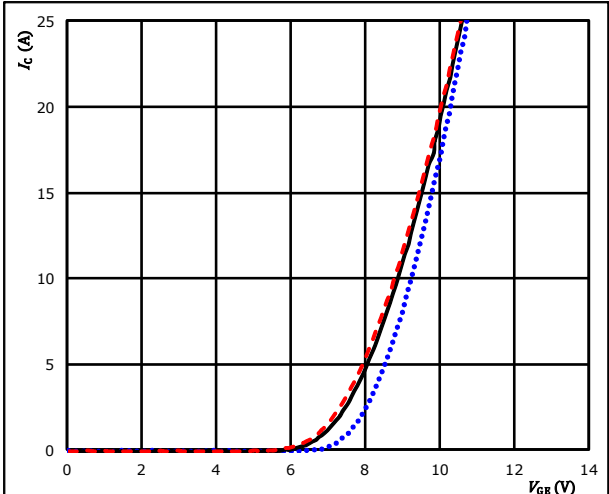


$t_p = 250 \mu s$
 $T_j = 125 \text{ } ^\circ C$
 V_{GE} from 7 V to 17 V in steps of 1 V

figure 3. IGBT

Typical transfer characteristics

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

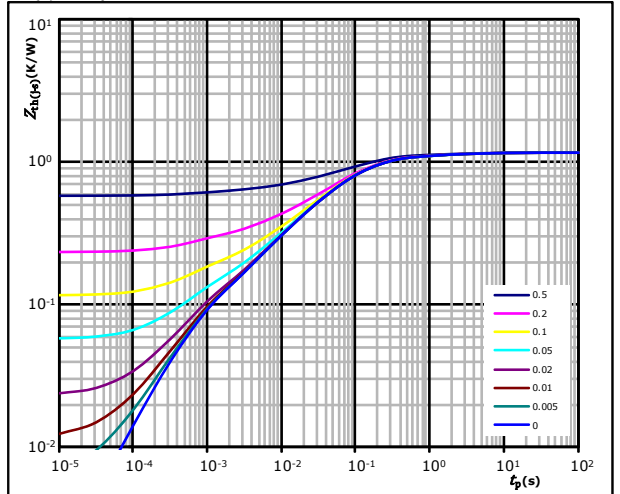


$t_p = 100 \mu s$
 $V_{CE} = 10 V$
 $T_j: 25 \text{ } ^\circ C$ (blue dotted)
 $125 \text{ } ^\circ C$ (black solid)
 $150 \text{ } ^\circ C$ (red dashed)

figure 4. IGBT

Transient thermal impedance as function of pulse duration

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



$D = t_p / T$
 $R_{th(j-s)} = 1,16 \text{ K/W}$

IGBT thermal model values

$R \text{ (K/W)}$	$\tau \text{ (s)}$
5,33E-02	3,54E+00
1,07E-01	5,75E-01
5,05E-01	1,04E-01
2,68E-01	3,30E-02
1,51E-01	7,35E-03
7,80E-02	6,52E-04



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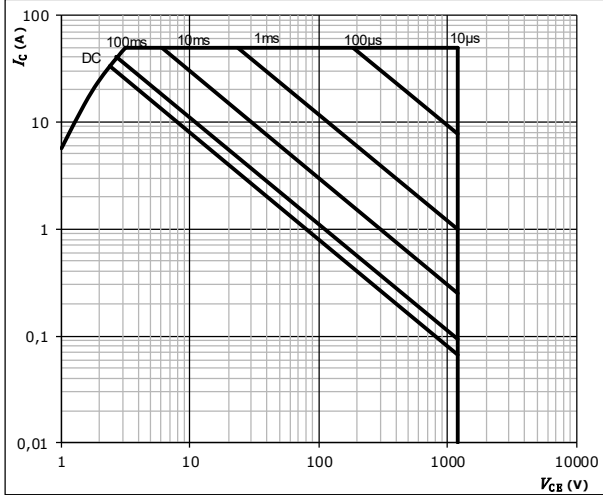
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Inverter Switch Characteristics

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}



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Inverter Diode Characteristics

figure 1. FWD

Typical forward characteristics

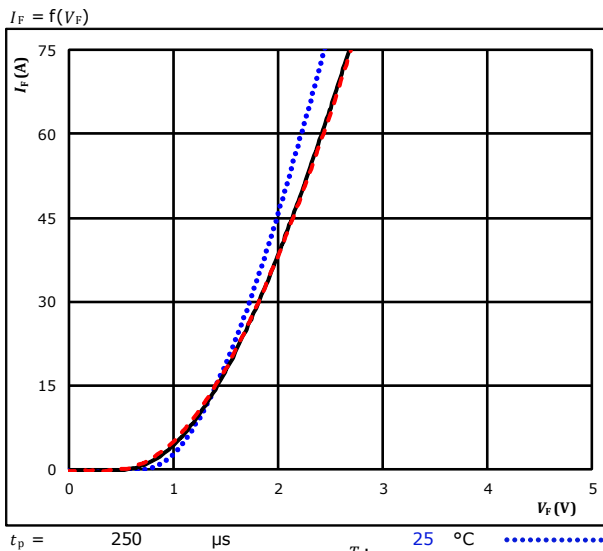
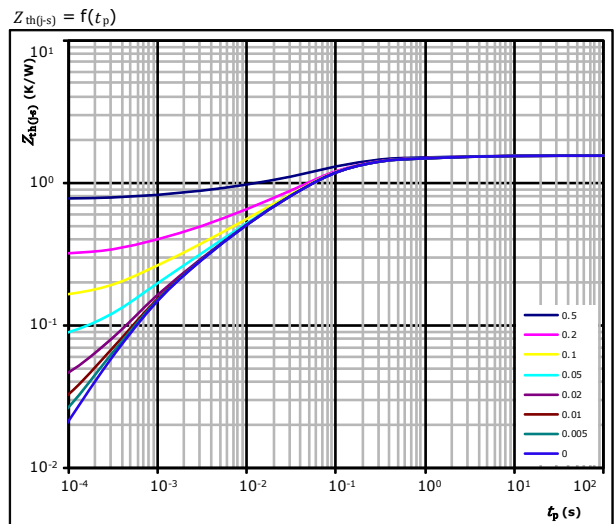


figure 2. FWD

Transient thermal impedance as a function of pulse width



FWD thermal model values

$R \text{ (K/W)}$	$\tau \text{ (s)}$
4,69E-02	5,05E+00
1,06E-01	7,09E-01
5,57E-01	1,01E-01
4,68E-01	3,22E-02
2,35E-01	5,52E-03
8,77E-02	1,01E-03
4,01E-02	5,52E-04



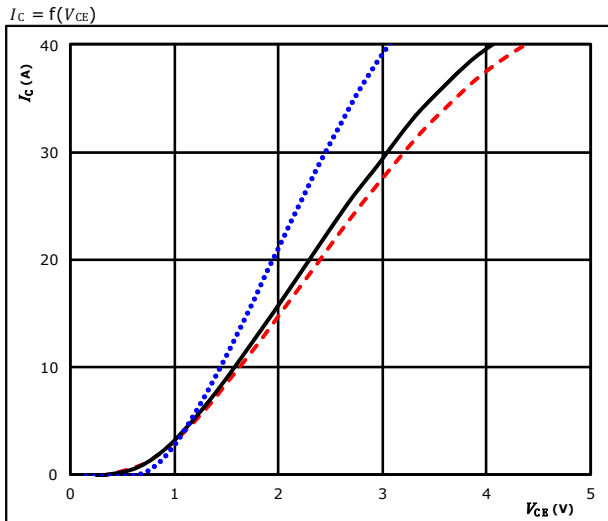
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Brake Switch Characteristics

figure 1. IGBT

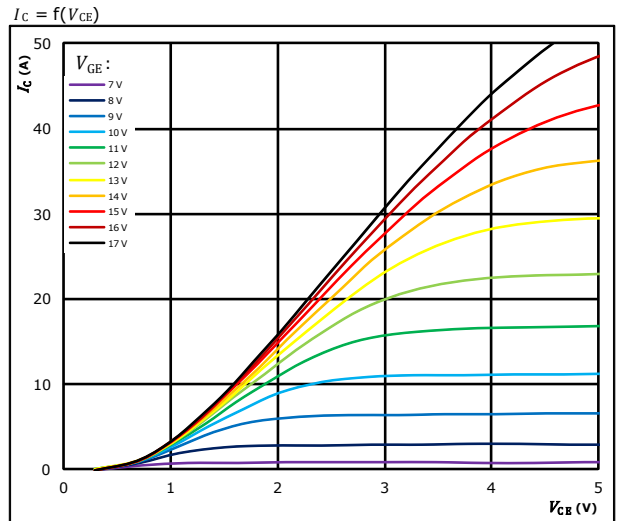
Typical output characteristics



$t_p = 250 \mu s$
 $V_{GE} = 15 V$
 $T_j: 25 \text{ } ^\circ C$ (blue dotted line)
 $125 \text{ } ^\circ C$ (black solid line)
 $150 \text{ } ^\circ C$ (red dashed line)

figure 2. IGBT

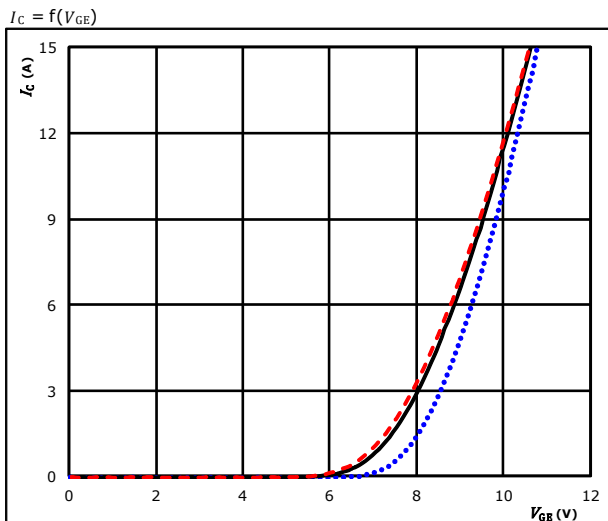
Typical output characteristics



$t_p = 250 \mu s$
 $T_j = 150 \text{ } ^\circ C$
 V_{GE} from 7 V to 17 V in steps of 1 V

figure 3. IGBT

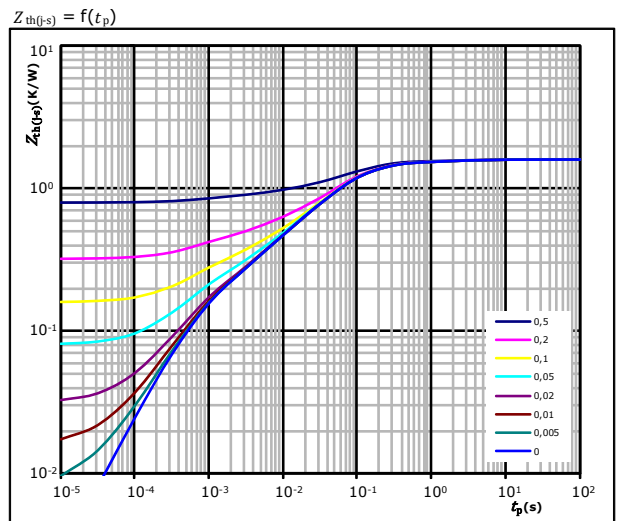
Typical transfer characteristics



$t_p = 100 \mu s$
 $V_{CE} = 10 V$
 $T_j: 25 \text{ } ^\circ C$ (blue dotted line)
 $125 \text{ } ^\circ C$ (black solid line)
 $150 \text{ } ^\circ C$ (red dashed line)

figure 4. IGBT

Transient thermal impedance as function of pulse duration



$D = t_p / T$
 $R_{th(j-s)} = 1,60 \text{ K/W}$

IGBT thermal model values

$R \text{ (K/W)}$	$\tau \text{ (s)}$
4,90E-02	4,40E+00
1,40E-01	5,34E-01
8,04E-01	8,02E-02
2,98E-01	2,57E-02
1,69E-01	5,09E-03
1,35E-01	6,41E-04



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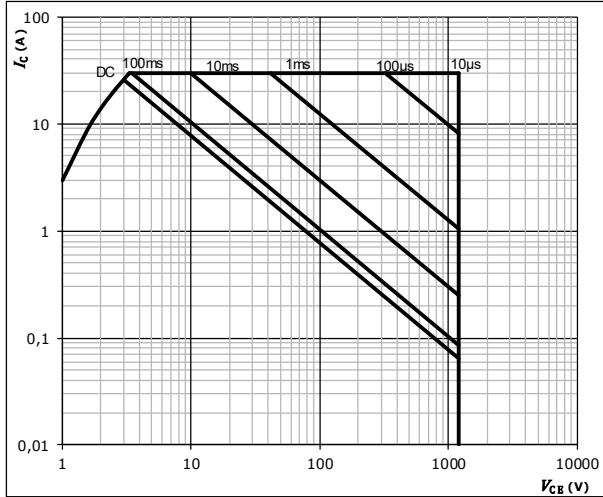
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Brake Switch Characteristics

figure 5. IGBT

Safe operating area

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



$D =$ single pulse
 $T_s =$ 80 °C
 $V_{GE} =$ 0 V
 $T_j =$ T_{jmax}



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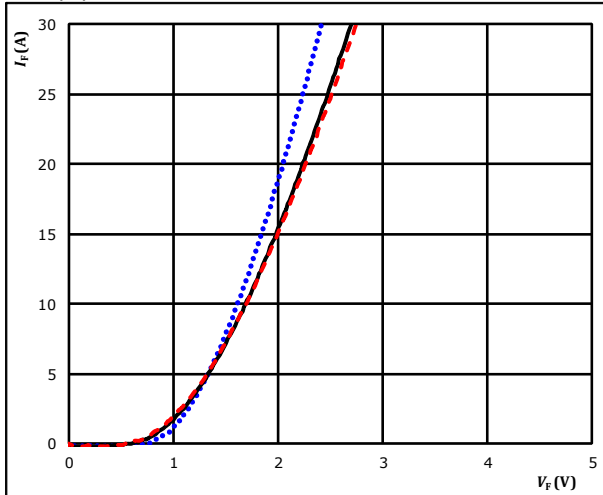
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Brake Diode Characteristics

figure 1. FWD

Typical forward characteristics

$$I_F = f(V_F)$$

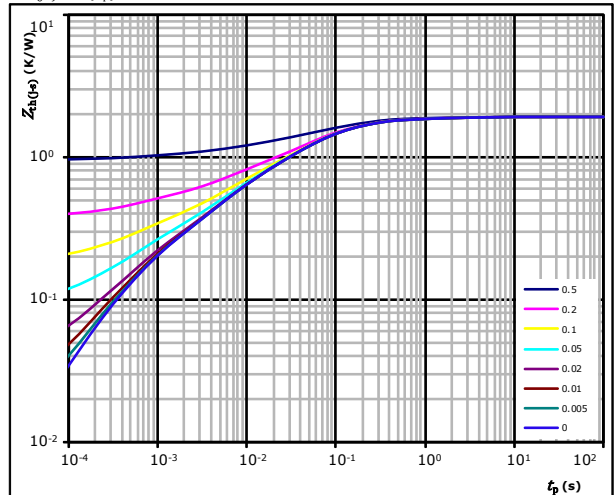


$t_p = 250 \mu s$
 T_j : 25 °C (blue dotted line)
125 °C (black solid line)
150 °C (red dashed line)

figure 2. FWD

Transient thermal impedance as a function of pulse width

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



$$D = \frac{t_p}{T}$$

$$R_{th(j-s)} = 1,91 \text{ K/W}$$

FWD thermal model values

R (K/W)	τ (s)
9,38E-02	2,25E+00
3,43E-01	2,12E-01
8,53E-01	5,82E-02
3,59E-01	9,80E-03
1,37E-01	2,88E-03
1,26E-01	4,78E-04

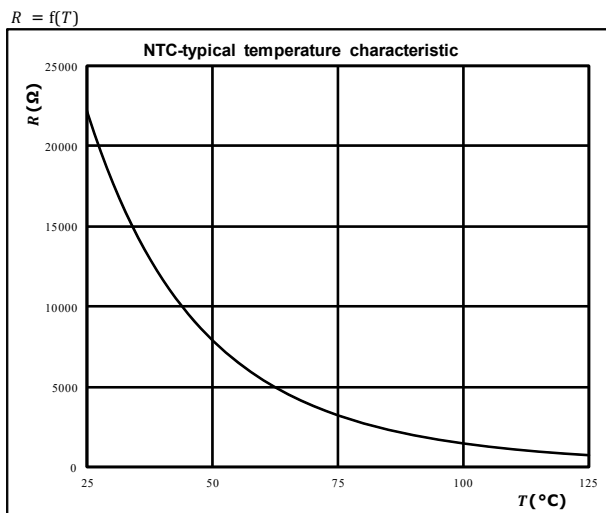


Vincotech

10-FY12PMA025M7-P588A78
10-PY12PMA025M7-P588A78Y
10-F112PMA025M7-P588A79
10-P112PMA025M7-P588A79Y
datasheet

Thermistor Characteristics

figure 1. Thermistor
Typical NTC characteristic as a function of temperature





Vincotech

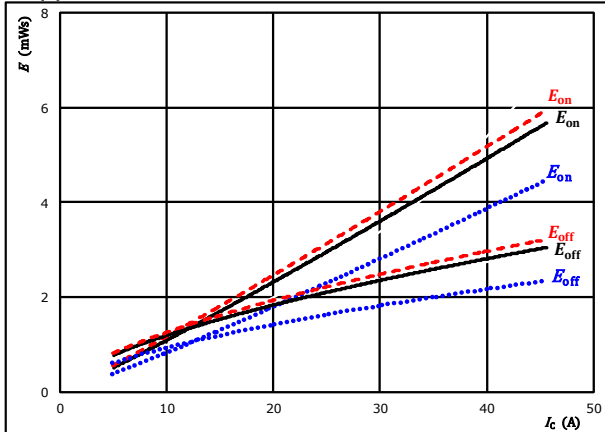
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10-PY12PMA025M7-P588A78Y
10-F112PMA025M7-P588A79
10-P112PMA025M7-P588A79Y
datasheet

Inverter Switching Characteristics

figure 1. IGBT

Typical switching energy losses as a function of collector current

$$E = f(I_C)$$



With an inductive load at

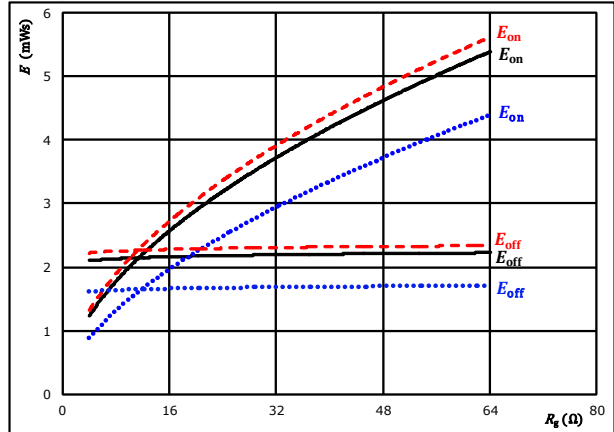
$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 16$ Ω
 $R_{goff} = 16$ Ω

T_J : 25 °C (blue dotted)
125 °C (black solid)
150 °C (red dashed)

figure 2. IGBT

Typical switching energy losses as a function of gate resistor

$$E = f(R_g)$$



With an inductive load at

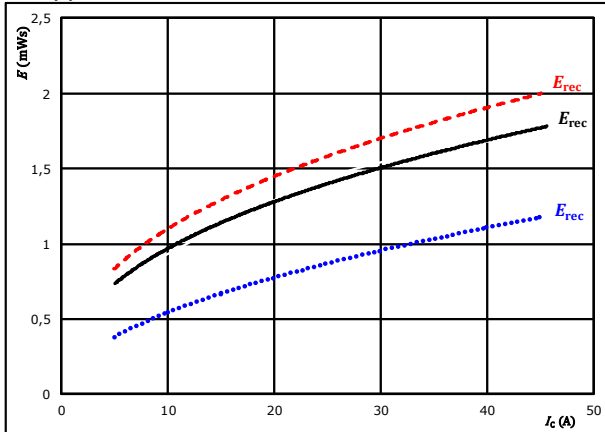
$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $I_C = 25$ A

T_J : 25 °C (blue dotted)
125 °C (black solid)
150 °C (red dashed)

figure 3. FWD

Typical reverse recovered energy loss as a function of collector current

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



With an inductive load at

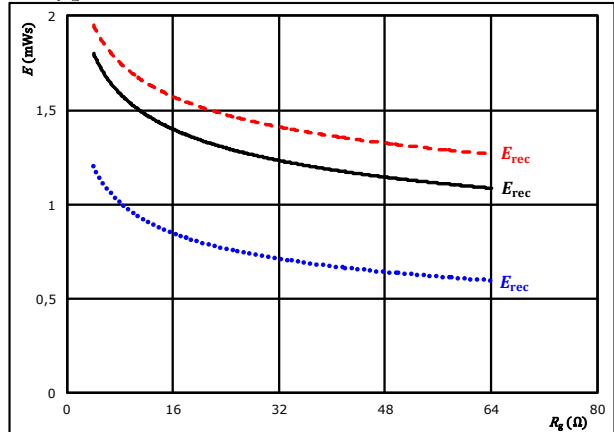
$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 16$ Ω

T_J : 25 °C (blue dotted)
125 °C (black solid)
150 °C (red dashed)

figure 4. FWD

Typical reverse recovered energy loss as a function of gate resistor

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



With an inductive load at

$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $I_C = 25$ A

T_J : 25 °C (blue dotted)
125 °C (black solid)
150 °C (red dashed)



Vincotech

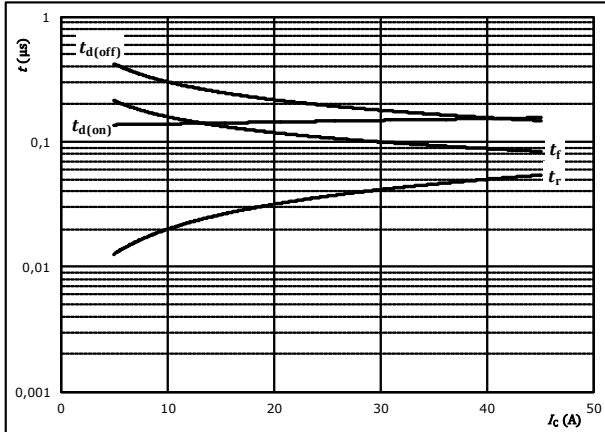
10-FY12PMA025M7-P588A78
10-PY12PMA025M7-P588A78Y
10-F112PMA025M7-P588A79
10-P112PMA025M7-P588A79Y
 datasheet

Inverter Switching Characteristics

figure 5. IGBT

Typical switching times as a function of collector current

$$t = f(I_C)$$



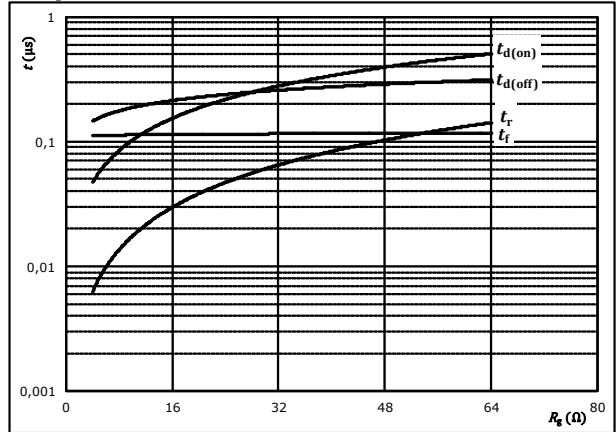
With an inductive load at

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

figure 6. IGBT

Typical switching times as a function of gate resistor

$$t = f(R_g)$$



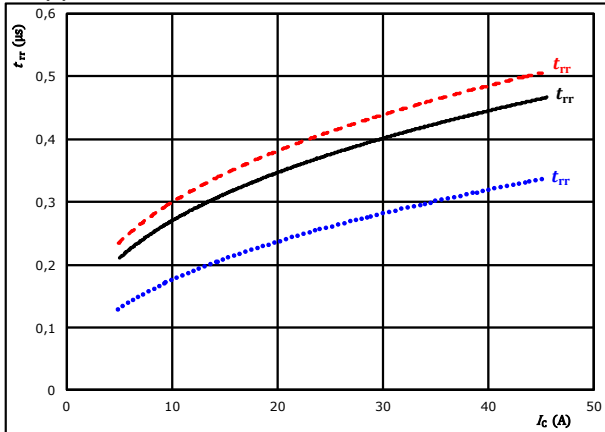
With an inductive load at

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

figure 7. FWD

Typical reverse recovery time as a function of collector current

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

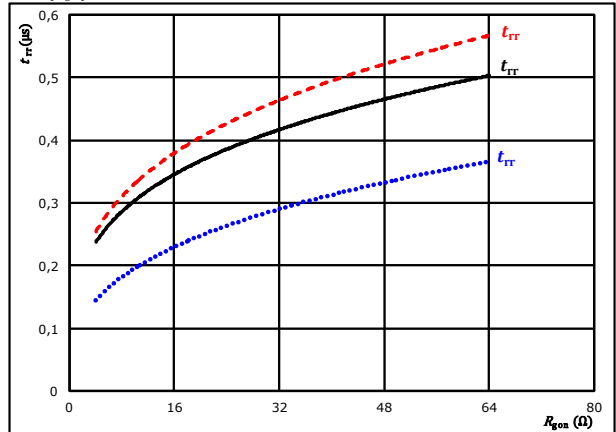


At	$V_{CE} =$	600	V	$T_j =$	25 °C	
	$V_{GE} =$	±15	V		125 °C	————
	$R_{gon} =$	16	Ω		150 °C	-----

figure 8. FWD

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

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



At	$V_{CE} =$	600	V	$T_j =$	25 °C	
	$V_{GE} =$	±15	V		125 °C	————
	$I_C =$	25	A		150 °C	-----



Vincotech

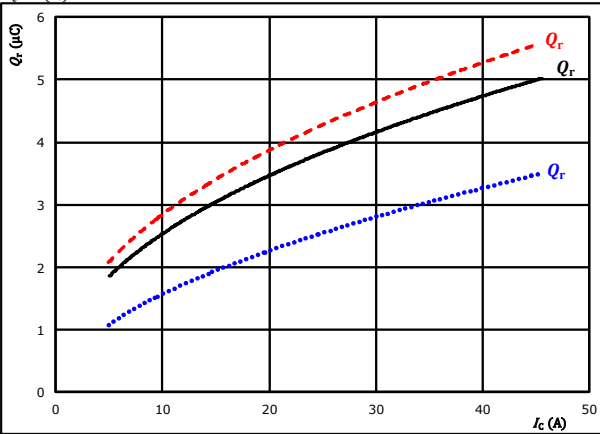
10-FY12PMA025M7-P588A78
10-PY12PMA025M7-P588A78Y
10-F112PMA025M7-P588A79
10-P112PMA025M7-P588A79Y
 datasheet

Inverter Switching Characteristics

figure 9. FWD

Typical recovered charge as a function of collector current

$$Q_r = f(I_C)$$

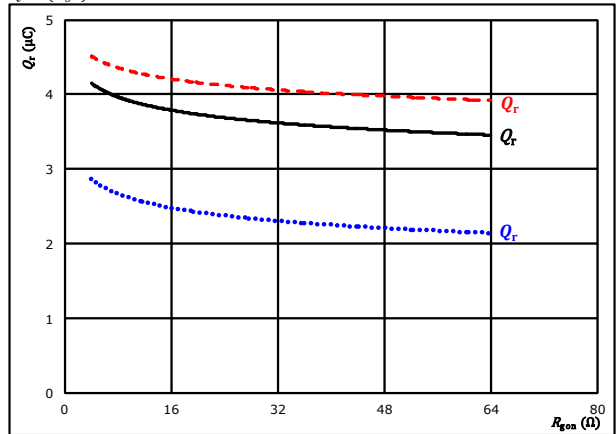


At $V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 16$ Ω
 $T_j = 25$ °C
 125 °C
 150 °C - - - - -

figure 10. FWD

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

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

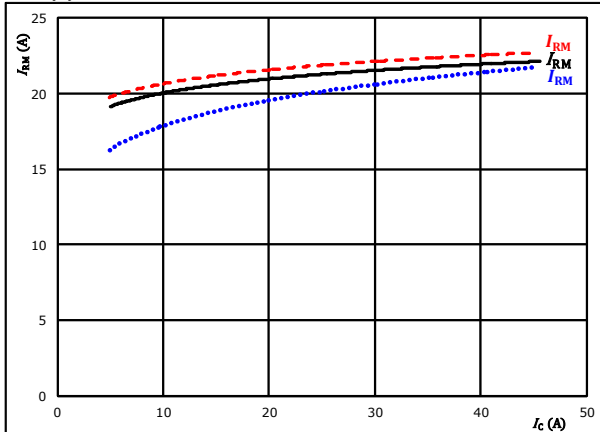


At $V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $I_C = 25$ A
 $T_j = 25$ °C
 125 °C
 150 °C - - - - -

figure 11. FWD

Typical peak reverse recovery current as a function of collector current

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

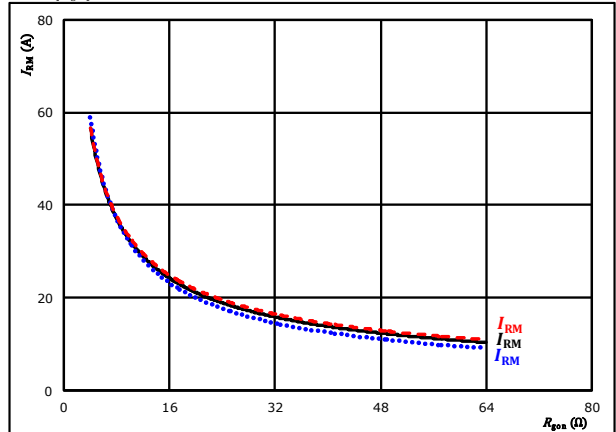


At $V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 16$ Ω
 $T_j = 25$ °C
 125 °C
 150 °C - - - - -

figure 12. FWD

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

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



At $V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $I_C = 25$ A
 $T_j = 25$ °C
 125 °C
 150 °C - - - - -



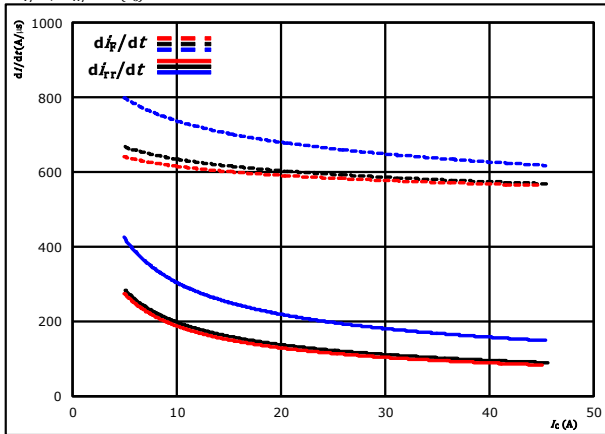
Vincotech

10-FY12PMA025M7-P588A78
10-PY12PMA025M7-P588A78Y
10-F112PMA025M7-P588A79
10-P112PMA025M7-P588A79Y
 datasheet

Inverter Switching Characteristics

figure 13. FWD

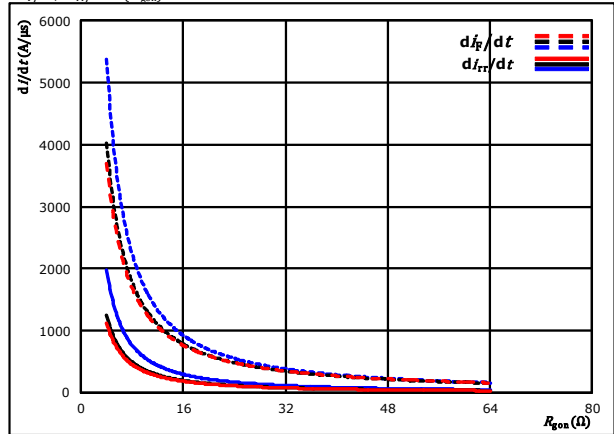
Typical rate of fall of forward and reverse recovery current as a function of collector current
 $di_F/dt, di_{rr}/dt = f(I_C)$



At $V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $R_{g0n} = 16$ Ω
 $T_J = 25^\circ\text{C}$ (dotted blue)
 125°C (solid black)
 150°C (dashed red)

figure 14. FWD

Typical rate of fall of forward and reverse recovery current as a function of IGBT turn on gate resistor
 $di_F/dt, di_{rr}/dt = f(R_{g0n})$

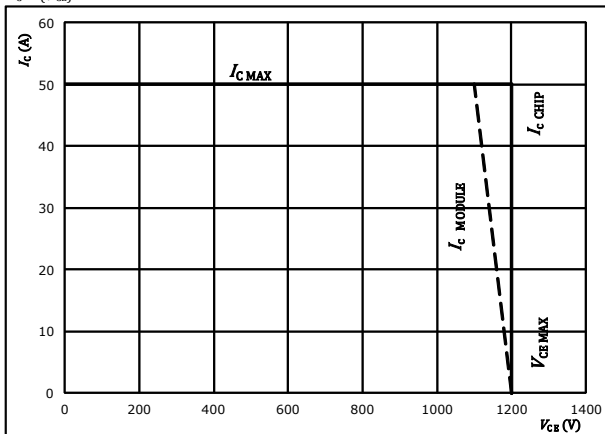


At $V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $I_C = 25$ A
 $T_J = 25^\circ\text{C}$ (dotted blue)
 125°C (solid black)
 150°C (dashed red)

figure 15. IGBT

Reverse bias safe operating area

$I_C = f(V_{CB})$



At $T_J = 175^\circ\text{C}$
 $R_{g0n} = 16$ Ω
 $R_{g0ff} = 16$ Ω



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10-F112PMA025M7-P588A79
10-P112PMA025M7-P588A79Y
 datasheet

Inverter Switching Definitions

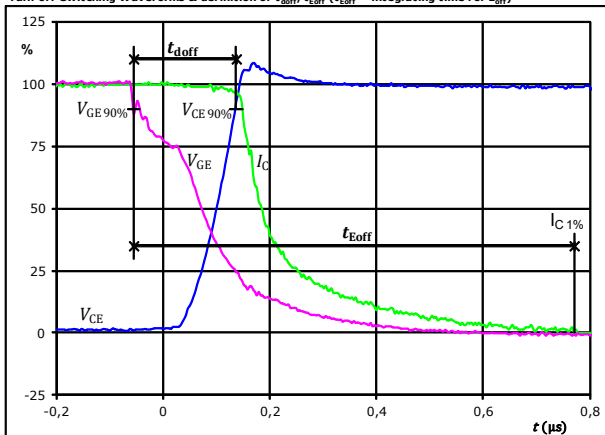
General conditions

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

figure 1.

IGBT

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

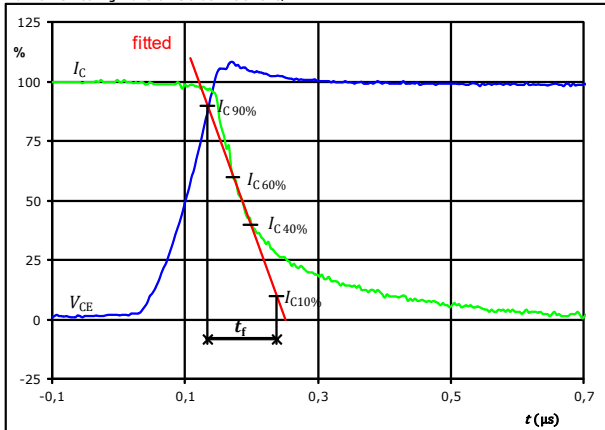


$V_{GE}(0\%) =$	-15	V
$V_{GE}(100\%) =$	15	V
$V_C(100\%) =$	600	V
$I_C(100\%) =$	25	A
$t_{doff} =$	0,191	μs
$t_{Eoff} =$	0,826	μs

figure 3.

IGBT

Turn-off Switching Waveforms & definition of t_f

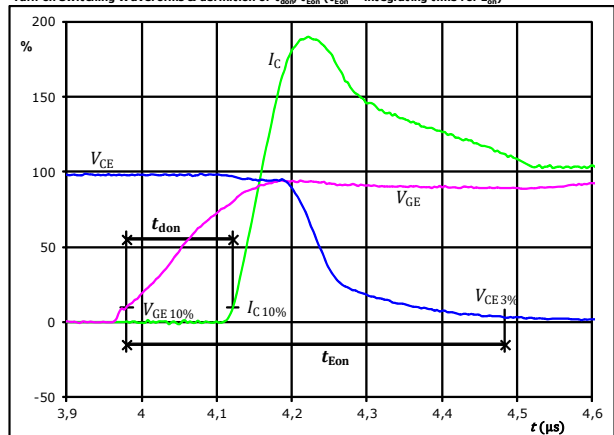


$V_C(100\%) =$	600	V
$I_C(100\%) =$	25	A
$t_f =$	0,110	μs

figure 2.

IGBT

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

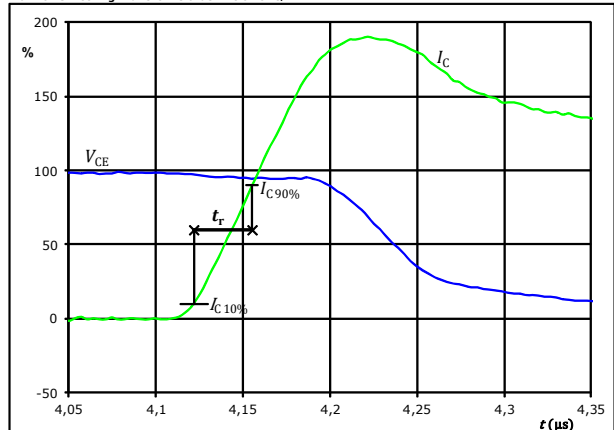


$V_{GE}(0\%) =$	-15	V
$V_{GE}(100\%) =$	15	V
$V_C(100\%) =$	600	V
$I_C(100\%) =$	25	A
$t_{don} =$	0,149	μs
$t_{Eon} =$	0,504	μs

figure 4.

IGBT

Turn-on Switching Waveforms & definition of t_r



$V_C(100\%) =$	600	V
$I_C(100\%) =$	25	A
$t_r =$	0,033	μs



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10-P112PMA025M7-P588A79Y
 datasheet

Inverter Switching Characteristics

figure 5. IGBT

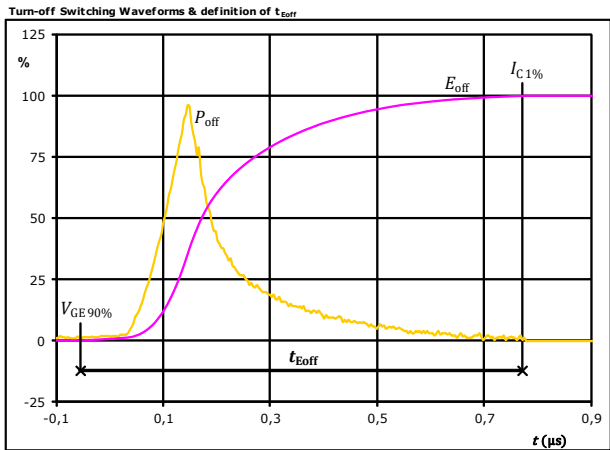


figure 6. IGBT

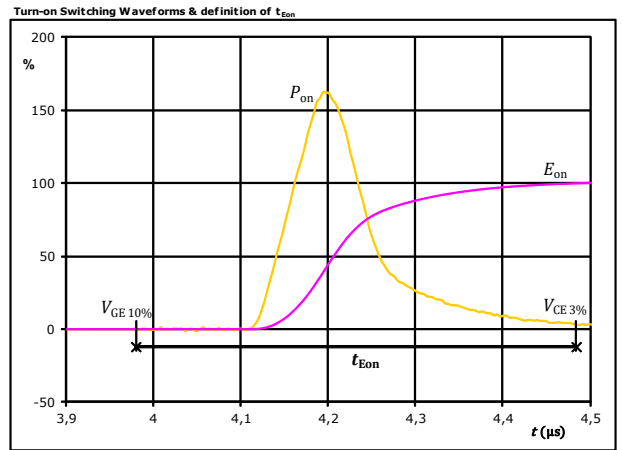
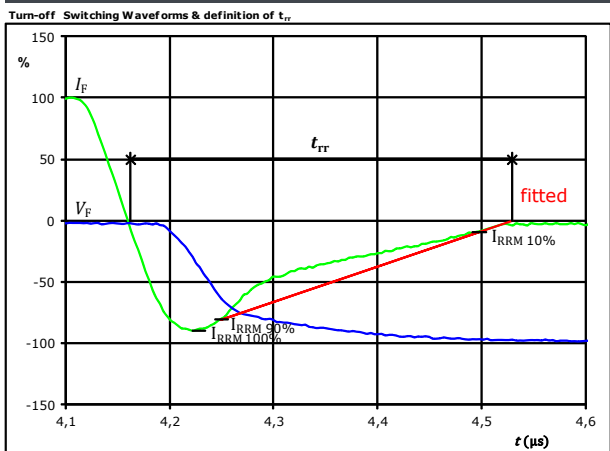


figure 7. FWD





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10-FY12PMA025M7-P588A78
10-PY12PMA025M7-P588A78Y
10-F112PMA025M7-P588A79
10-P112PMA025M7-P588A79Y
 datasheet

Inverter Switching Characteristics

figure 8. FWD

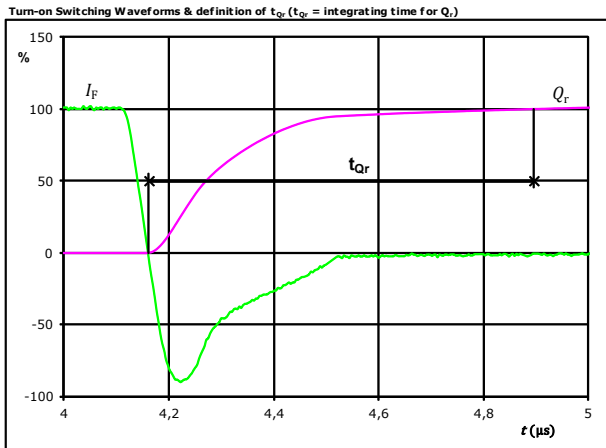
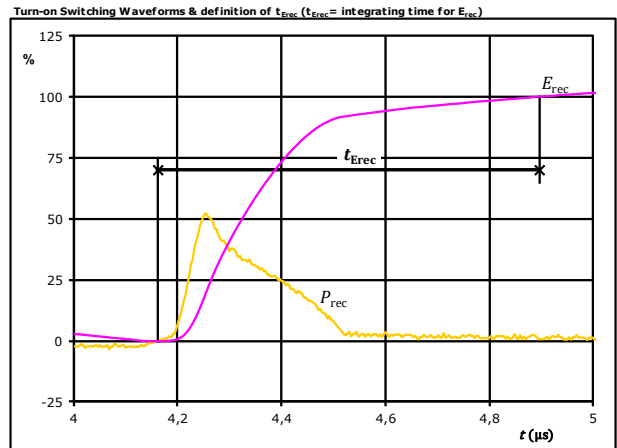


figure 9. FWD





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10-FY12PMA025M7-P588A78
10-PY12PMA025M7-P588A78Y
10-F112PMA025M7-P588A79
10-P112PMA025M7-P588A79Y
 datasheet

Brake Switching Characteristics

figure 1. IGBT

Typical switching energy losses as a function of collector current

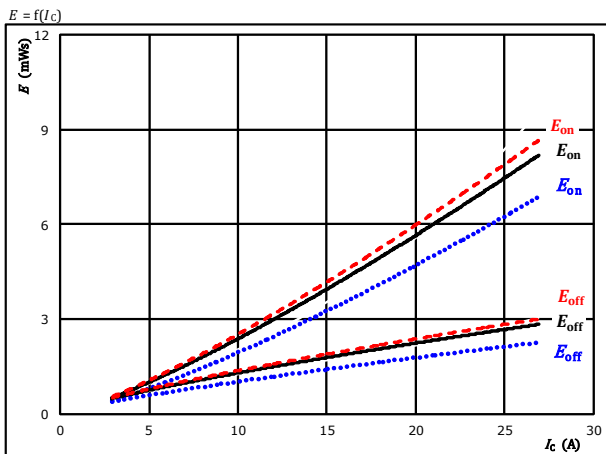


figure 2. IGBT

Typical switching energy losses as a function of gate resistor

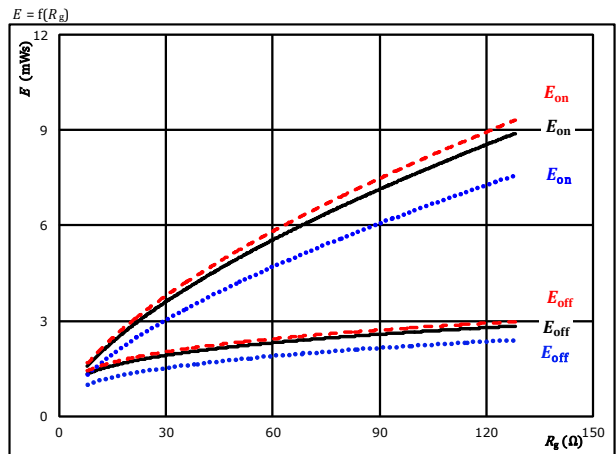


figure 3. FWD

Typical reverse recovered energy loss as a function of collector current

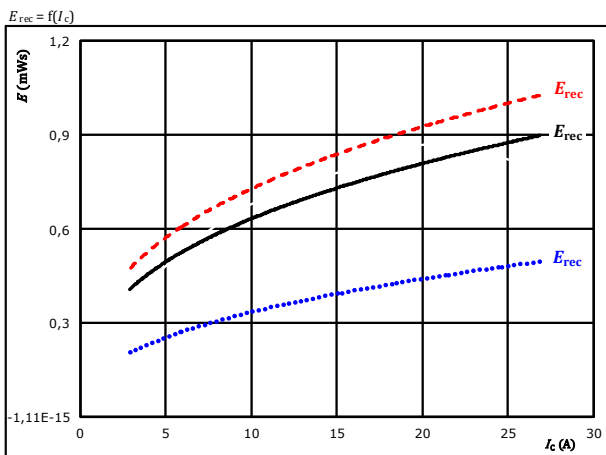
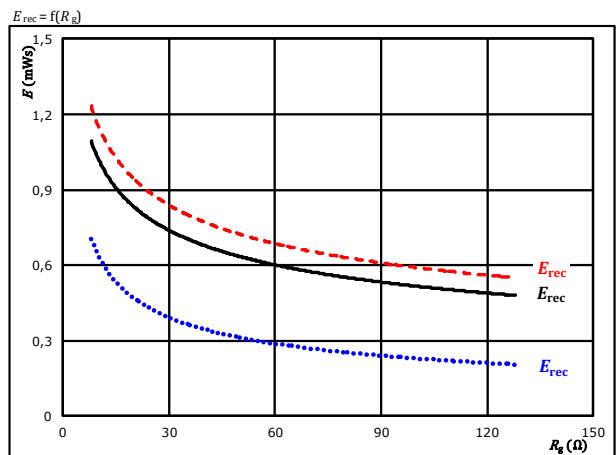


figure 4. FWD

Typical reverse recovered energy loss as a function of gate resistor





Vincotech

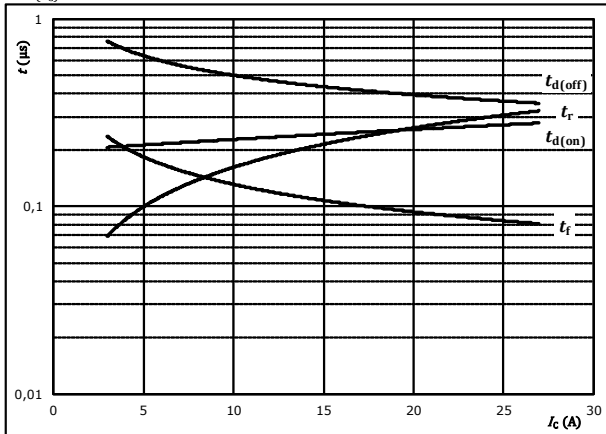
10-FY12PMA025M7-P588A78
10-PY12PMA025M7-P588A78Y
10-F112PMA025M7-P588A79
10-P112PMA025M7-P588A79Y
datasheet

Brake Switching Characteristics

figure 5. IGBT

Typical switching times as a function of collector current

$$t = f(I_C)$$



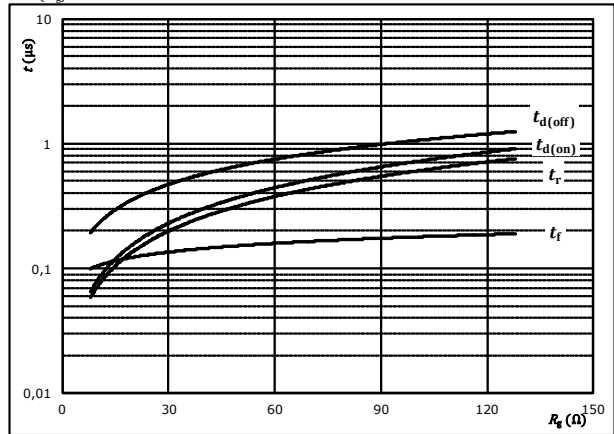
With an inductive load at

$T_j =$	150	°C
$V_{CE} =$	700	V
$V_{GE} =$	15/0	V
$R_{gon} =$	32	Ω
$R_{goff} =$	32	Ω

figure 6. IGBT

Typical switching times as a function of gate resistor

$$t = f(R_g)$$



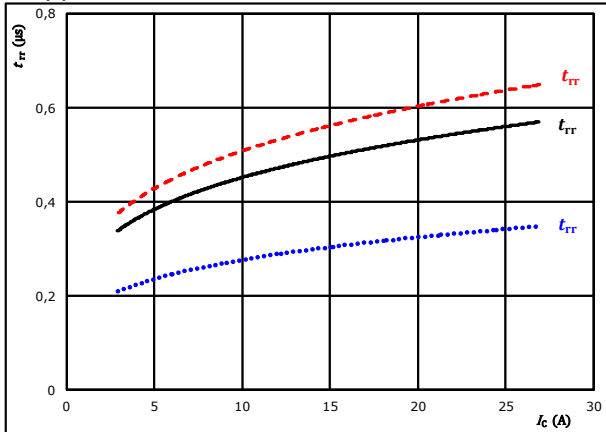
With an inductive load at

$T_j =$	150	°C
$V_{CE} =$	700	V
$V_{GE} =$	15/0	V
$I_C =$	15	A

figure 7. FWD

Typical reverse recovery time as a function of collector current

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

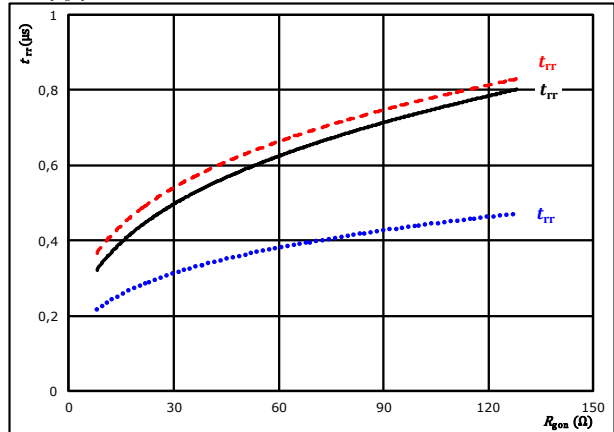


At	$V_{CE} =$	700	V	$T_j:$	25 °C	
	$V_{GE} =$	15/0	V		125 °C	————
	$R_{gon} =$	32	Ω		150 °C	-----

figure 8. FWD

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

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



At	$V_{CE} =$	700	V	$T_j:$	25 °C	
	$V_{GE} =$	15/0	V		125 °C	————
	$I_C =$	15	A		150 °C	-----



Vincotech

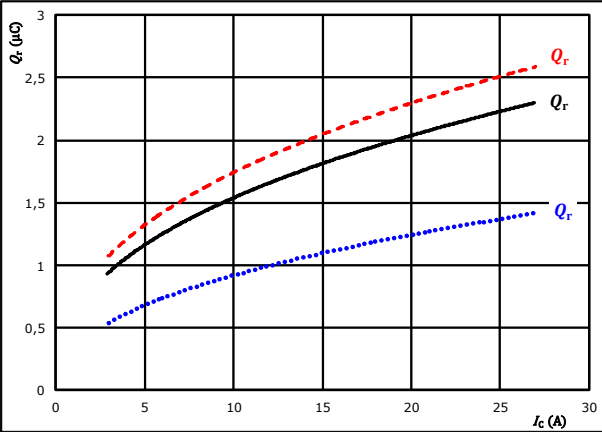
10-FY12PMA025M7-P588A78
10-PY12PMA025M7-P588A78Y
10-F112PMA025M7-P588A79
10-P112PMA025M7-P588A79Y
 datasheet

Brake Switching Characteristics

figure 9. FWD

Typical recovered charge as a function of collector current

$$Q_r = f(I_C)$$

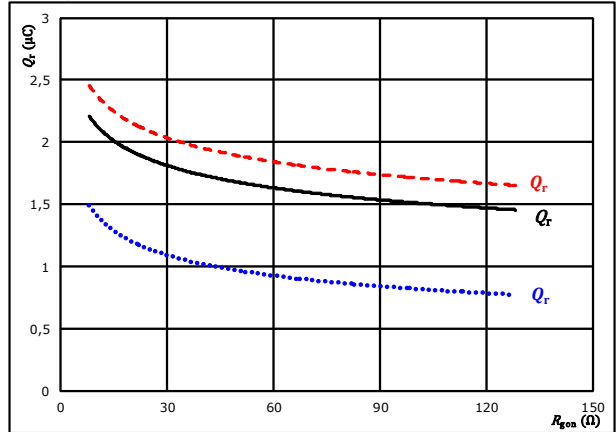


At $V_{CE} = 700$ V
 $V_{GE} = 15/0$ V
 $R_{gon} = 32$ Ω
 $T_j: 25$ °C
 125 °C ———
 150 °C - - - - -

figure 10. FWD

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

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

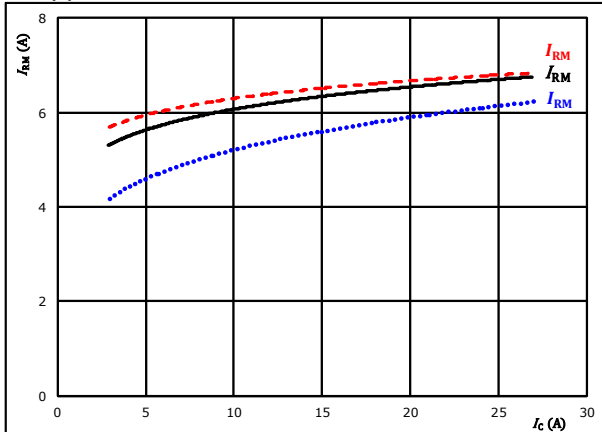


At $V_{CE} = 700$ V
 $V_{GE} = 15/0$ V
 $I_C = 15$ A
 $T_j: 25$ °C
 125 °C ———
 150 °C - - - - -

figure 11. FWD

Typical peak reverse recovery current as a function of collector current

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

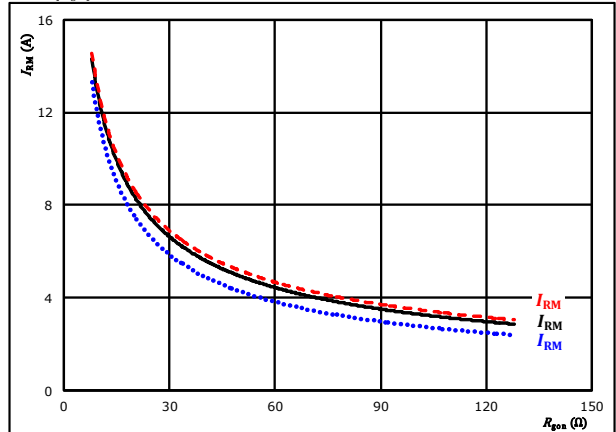


At $V_{CE} = 700$ V
 $V_{GE} = 15/0$ V
 $R_{gon} = 32$ Ω
 $T_j: 25$ °C
 125 °C ———
 150 °C - - - - -

figure 12. FWD

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

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



At $V_{CE} = 700$ V
 $V_{GE} = 15/0$ V
 $I_C = 15$ A
 $T_j: 25$ °C
 125 °C ———
 150 °C - - - - -



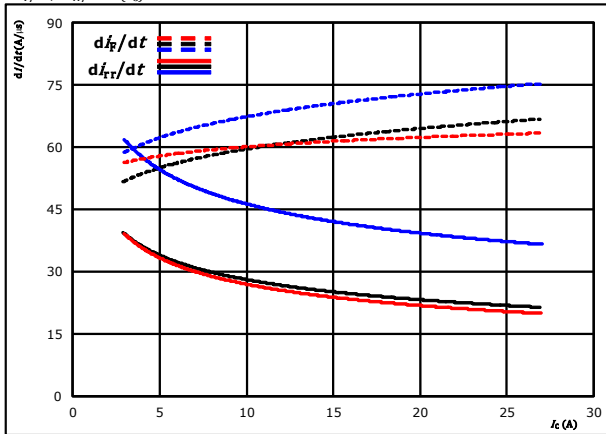
Vincotech

10-FY12PMA025M7-P588A78
10-PY12PMA025M7-P588A78Y
10-F112PMA025M7-P588A79
10-P112PMA025M7-P588A79Y
 datasheet

Brake Switching Characteristics

figure 13. FWD

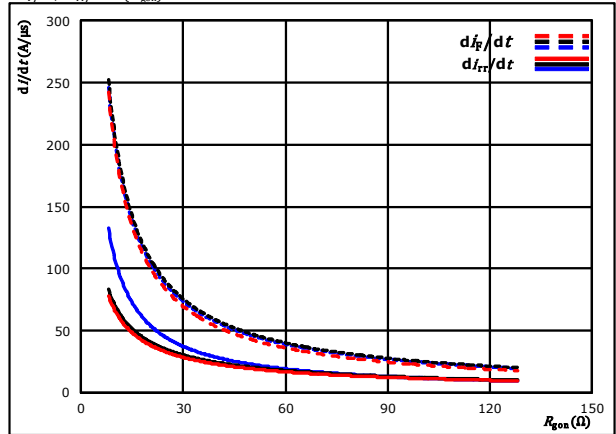
Typical rate of fall of forward and reverse recovery current as a function of collector current
 $di_F/dt, di_{rr}/dt = f(I_C)$



At $V_{CE} = 700$ V
 $V_{GE} = 15/0$ V
 $R_{g0n} = 32$ Ω
 $T_J = 25$ °C
 $T_J = 125$ °C ———
 $T_J = 150$ °C - - - - -

figure 14. FWD

Typical rate of fall of forward and reverse recovery current as a function of IGBT turn on gate resistor
 $di_F/dt, di_{rr}/dt = f(R_{g0n})$

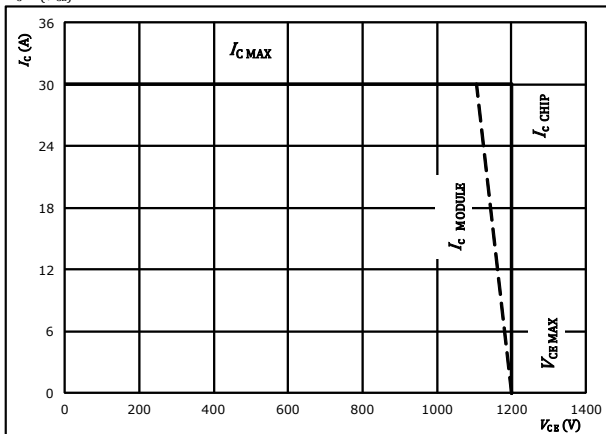


At $V_{CE} = 700$ V
 $V_{GE} = 15/0$ V
 $I_C = 15$ A
 $T_J = 25$ °C
 $T_J = 125$ °C ———
 $T_J = 150$ °C - - - - -

figure 15. IGBT

Reverse bias safe operating area

$I_C = f(V_{CB})$



At $T_J = 175$ °C
 $R_{g0n} = 32$ Ω
 $R_{g0ff} = 32$ Ω



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10-F112PMA025M7-P588A79
10-P112PMA025M7-P588A79Y
 datasheet

Brake Switching Definitions

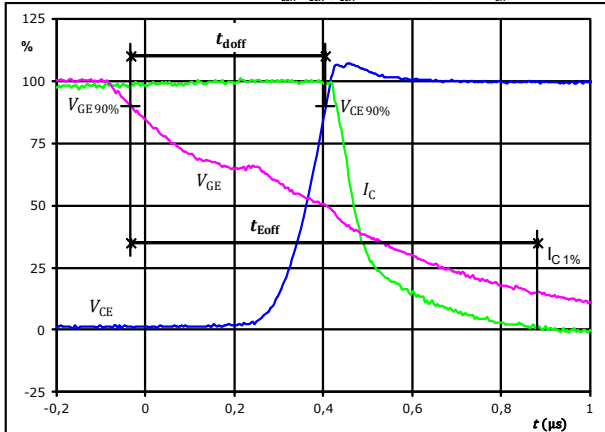
General conditions

T_j	=	125 °C
R_{gon}	=	32 Ω
R_{goff}	=	32 Ω

figure 1.

IGBT

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

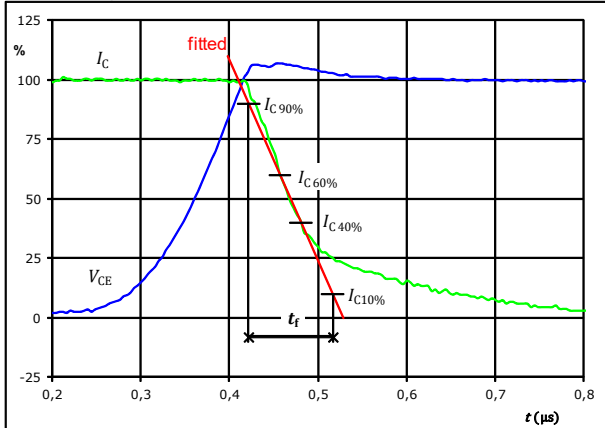


$V_{GE}(0\%) =$	0	V
$V_{GE}(100\%) =$	15	V
$V_C(100\%) =$	700	V
$I_C(100\%) =$	15	A
$t_{doff} =$	0,442	μs
$t_{Eoff} =$	0,915	μs

figure 3.

IGBT

Turn-off Switching Waveforms & definition of t_r

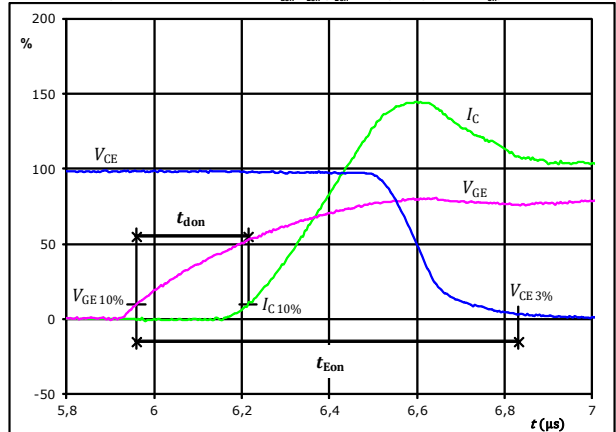


$V_C(100\%) =$	700	V
$I_C(100\%) =$	15	A
$t_r =$	0,088	μs

figure 2.

IGBT

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

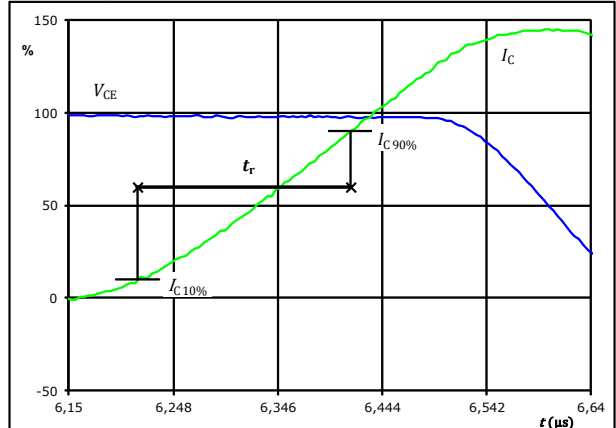


$V_{GE}(0\%) =$	0	V
$V_{GE}(100\%) =$	15	V
$V_C(100\%) =$	700	V
$I_C(100\%) =$	15	A
$t_{don} =$	0,257	μs
$t_{Eon} =$	0,872	μs

figure 4.

IGBT

Turn-on Switching Waveforms & definition of t_r



$V_C(100\%) =$	700	V
$I_C(100\%) =$	15	A
$t_r =$	0,200	μs



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Brake Switching Characteristics

figure 5. IGBT

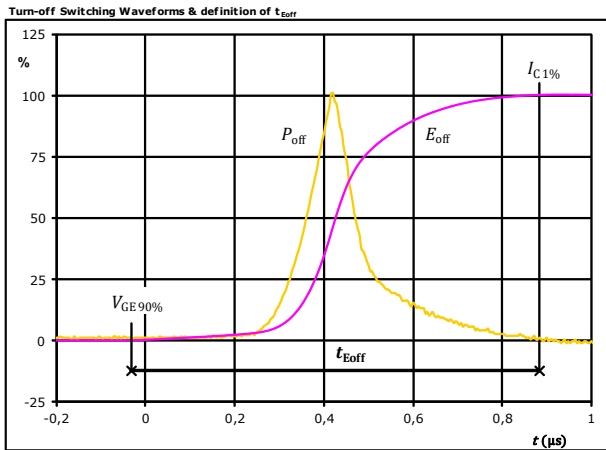


figure 6. IGBT

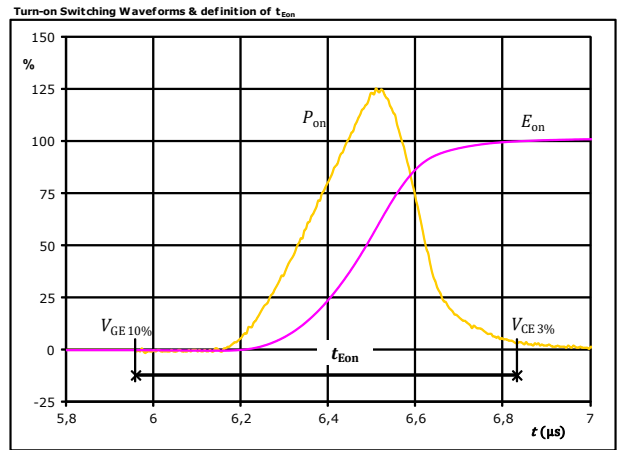
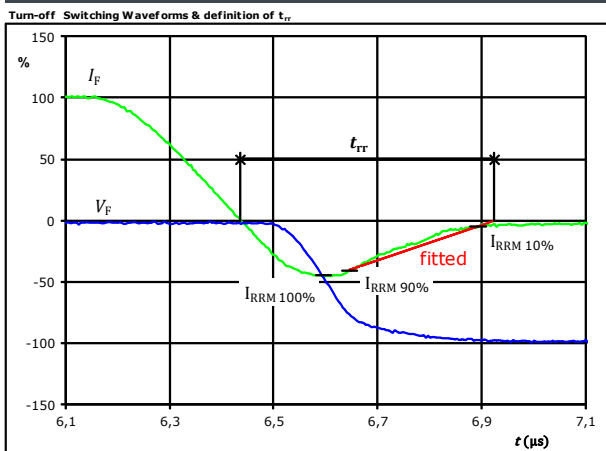


figure 7. FWD





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Brake Switching Characteristics

figure 8. FWD

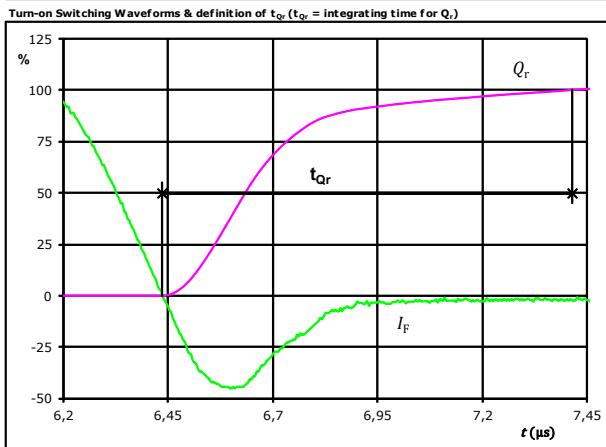
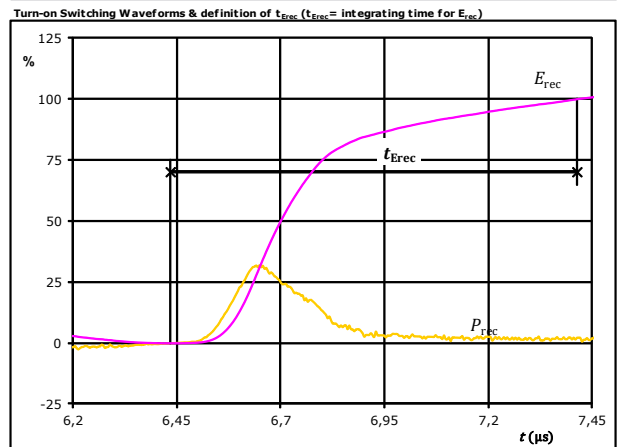


figure 9. FWD





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Ordering Code & Marking						
Version			Ordering Code			
without thermal paste 12 mm housing with solder pins			10-FY12PMA025M7-P588A78			
with thermal paste 12 mm housing with solder pins			10-FY12PMA025M7-P588A78-/3/			
without thermal paste 12 mm housing with Press-fit pins			10-PY12PMA025M7-P588A78Y			
with thermal paste 12 mm housing with Press-fit pins			10-PY12PMA025M7-P588A78Y-/3/			
without thermal paste 17 mm housing with solder pins			10-F112PMA025M7-P588A79			
with thermal paste 17 mm housing with solder pins			10-F112PMA025M7-P588A79-/3/			
without thermal paste 17 mm housing with Press-fit pins			10-P112PMA025M7-P588A79Y			
with thermal paste 17 mm housing with Press-fit pins			10-P112PMA025M7-P588A79Y-/3/			
NN-NNNNNNNNNNNNNN TTTTWW WWYY UL VIN LLLL SSSS				Text	Name	Date code
					NN-NNNNNNNNNNNNNN-TTTTWW	WWYY
					Type&Ver	Lot number
					TTTTWW	LLLL
					Serial	Date code
					SSSS	WWYY

Outline

Pin table			
Pin	X	Y	Function
1	52,55	0	G27
2	47,7	0	DC-Rect
3	44,8	0	DC-Rect
4	37,8	0	DC+Rect
5	37,8	2,8	DC+Rect
6	35	0	DC+Inv
7	35	2,8	DC+Inv
8	28	0	Therm1
9	25,2	0	Therm2
10	22,4	0	DC-3
11	19,6	0	G15
12	16,8	0	S15
13	14	0	DC-2
14	11,2	0	G13
15	8,4	0	S13
16	5,6	0	DC-1
17	2,8	0	G11
18	0	0	S11
19	0	28,5	Ph1
20	2,8	28,5	G12
21	7,5	28,5	S12
22	14,5	28,5	Ph2
23	17,3	28,5	G14
24	22	28,5	S14
25	29	28,5	Ph3
26	31,8	28,5	G16
27	36,5	28,5	S16
28	43,5	28,5	ACIn1
29	52,55	25	ACIn2
30	52,55	16,9	ACIn3
31	52,55	8,6	Br
32	52,55	2,8	DC-Br

P588A79Y

P588A79

P588A78Y

P588A78

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

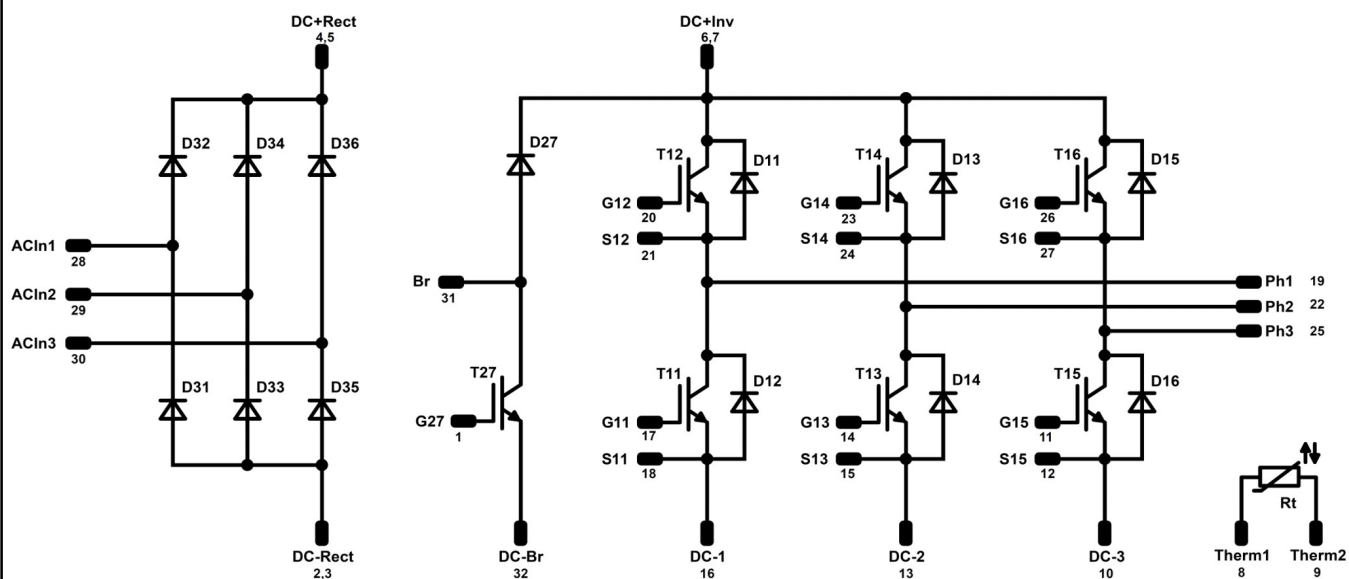
Tolerance of pinpositions: ±0,5mm at the end of pins
 Dimension of coordinate axis is only offset without tolerance



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datasheet

Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
D31, D32, D33, D34, D35, D36	Rectifier	1600 V	35 A	Rectifier Diode	
T11, T12, T13, T14, T15, T16	IGBT	1200 V	25 A	Inverter Switch	
D11, D12, D13, D14, D15, D16	FWD	1200 V	25 A	Inverter Diode	
T27	IGBT	1200 V	15 A	Brake Switch	
D27	FWD	1200 V	10 A	Brake Diode	
Rt	NTC			Thermistor	



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datasheet

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

Handling instruction
Handling instructions for <i>flow 1</i> packages see vincotech.com website.

Package data
Package data for <i>flow 1</i> packages see vincotech.com website.

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

Document No.:	Date:	Modification:	Pages
10-xx12PMA025M7-P588A7xx-D4-14	08 Mar. 2019	Correction of I_C/I_F values	1,2

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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.