Vincotech

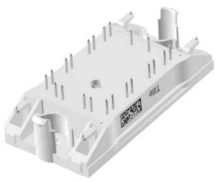
V23990-P627-F88-PM
V23990-P627-F89-PM
datasheet

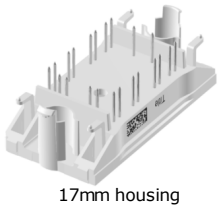
fastPack 0 H **1200 V / 15 A**

Features

- High efficient H-bridge
- High-speed IGBT
- Ultra high switching frequency
- Ultra low inductive design
- Clip-in PCB mounting

flow 0 housing

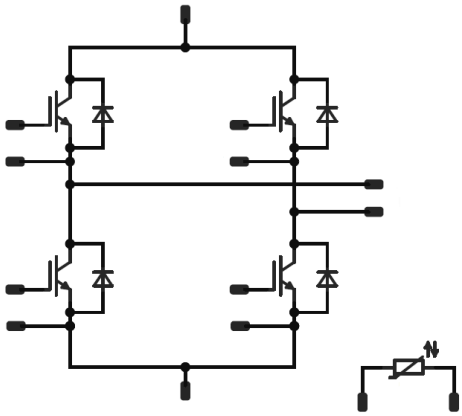

12mm housing


17mm housing

Target applications

- Solar
- SMPS
- UPS
- Welding

Schematic



Types

- V23990-P627-F88-PM
- V23990-P627-F89-PM

Maximum Ratings

T_j=25°C, unless otherwise specified

Parameter	Symbol	Condition		Value	Unit
H-Bridge Switch					
Collector-emitter voltage	V_{CES}			1200	V
Collector current	I_C	$T_j = T_j$max	T_s=80 °C	22	A
Repetitive peak collector current	I_{CRM}	t_p limited by $T_j$max		45	A
Total power dissipation	P_{tot}	$T_j = T_j$max	T_s=80 °C	71	W
Gate-emitter voltage	V_{GES}			±20	V
Maximum Junction Temperature	T_{jmax}			175	°C

Parameter	Symbol	Conditions		Value	Unit
H-Bridge Diode					
Peak Repetitive Reverse Voltage	V_{RRM}			1200	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$	T_h = 80°C	16	A
Surge (non-repetitive) forward current	I_{FSM}	50 Hz Single Half Sine Wave		65	A
Surge current capability	I^2t	t_p = 10 ms 50 Hz sine	T_j = °C	21	A^2s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_h = 80°C	42	W
Maximum Junction Temperature	T_{jmax}			175	°C

Parameter	Symbol	Conditions		Value	Unit
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 voltage	t_p=2s	4000	V
Creepage distance				min 12,7	mm
Clearance		12mm housing / 17mm housing		9,55 / >12,7	mm
Comparative Tracking Index	CTI			>200	

Characteristic Values

Parameter	Symbol	Conditions					Value			Unit
H-Bridge Switch			V_{GE} [V]	V_{CE} [V]	I_C [A]	T_j[°C]	Min	Typ	Max	
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$	V_{GE}=V_{CE}			0,0005	25 125	5,3	5,8	6,3	V
Collector-emitter saturation voltage	V_{CEsat}		15		15	25 125 150	1,78	1,89 2,28	2,42	V
Collector-emitter cut-off current	I_{CES}		0	1200		25 125			2	µA
Gate-emitter leakage current	I_{GES}		20	0		25 125			120	nA
Internal gate resistance	r_g							none		Ω
Input capacitance	C_{ies}	f=1 MHz	0	25		25		875		pF
Reverse transfer capacitance	C_{res}							45		
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	Phase-Change Material λ=3,4W/mK						1,35		K/W
IGBT Switching										
Turn-on delay time	$t_{d(on)}$	R_{goff} = 32 Ω R_{gon} = 32 Ω	±15	600	15	25 125 150		84 85 86		ns
Rise time	t_r					25 125 150		24 25 26		
Turn-off delay time	$t_{d(off)}$					25 125 150		174 221 230		
Fall time	t_f					25 125 150		42 63 69		
Turn-on energy (per pulse)	E_{on}	Q_{rFWD} = 1,1 µC Q_{rFWD} = 2,1 µC Q_{rFWD} = 2,6 µC				25 125 150		0,894 1,283 1,444		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,512 0,815 0,890		

Parameter	Symbol	Conditions					Value			Unit
H-Bridge Diode				V_r [V]	I_F [A]	T_j [°C]	Min	Typ	Max	
Static										
Forward voltage	V_F				15	25 125 150		2,37 2,47	2,71	V
Reverse leakage current	I_r			1200		25 150			60 1800	µA
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	Phase-Change Material λ=3,4W/mK						2,46		K/W
FWD Switching										
Peak recovery current	I_{RRM}	di/dt = 615 A/µs di/dt = 691 A/µs di/dt = 576 A/µs	±15	600	15	25 125 150		12 15 16		A
Reverse recovery time	t_{rr}					25 125 150		250 429 466		ns
Recovered charge	Q_r					25 125 150		1,122 2,063 2,610		µC
Reverse recovered energy	E_{rec}					25 125 150		0,439 0,830 1,075		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		133 101 94		A/µs

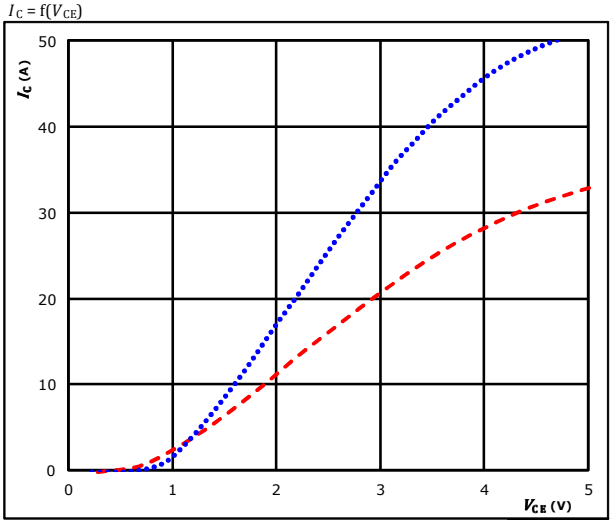
Thermistor

Parameter	Symbol	Conditions					Value			Unit
			V_{GE} [V]	V_{CE} [V]	I_C [A]	T_j [°C]	Min	Typ	Max	
Rated resistance	R					25		21,5		kΩ
Deviation of R100	$\Delta_{R/R}$	R100=1486 Ω				100	-4,5		+4,5	%
Power dissipation	P					25		210		mW
Power dissipation constant						25		3,5		mW/K
B-value	$B_{(25/50)}$					25		3884		K
B-value	$B_{(25/100)}$					25		3964		K
Vincotech NTC Reference									F	

H-Bridge Switch Characteristics

Typical output characteristics **IGBT**

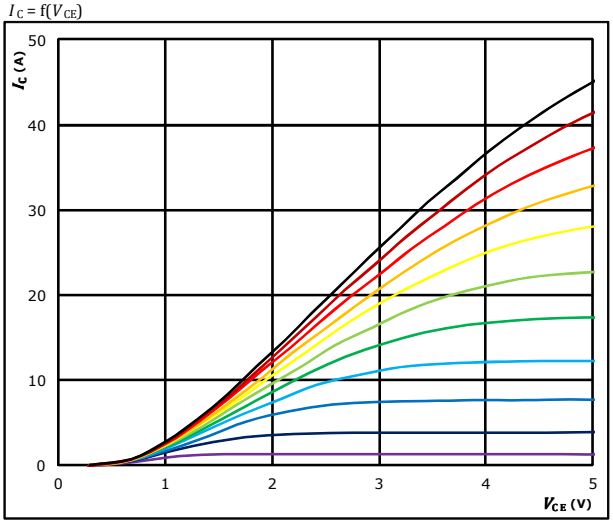
$I_C = f(V_{CE})$



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

Typical output characteristics **IGBT**

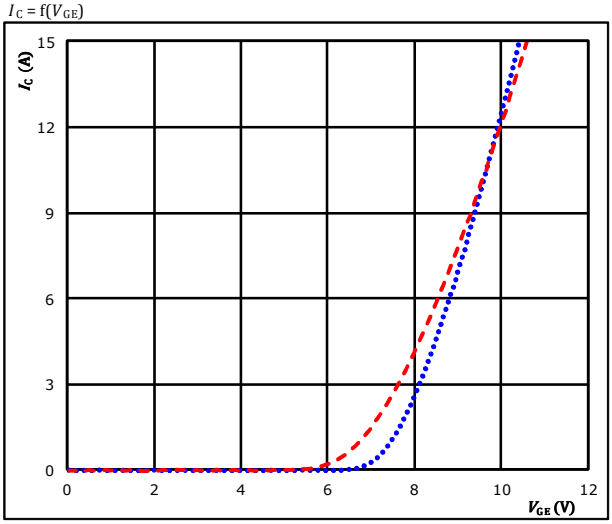
$I_C = f(V_{CE})$



t_p =	250	µs
T_j =	150	°C
V_{GE} from	7 V to 17 V in steps of 1 V	

Typical transfer characteristics **IGBT**

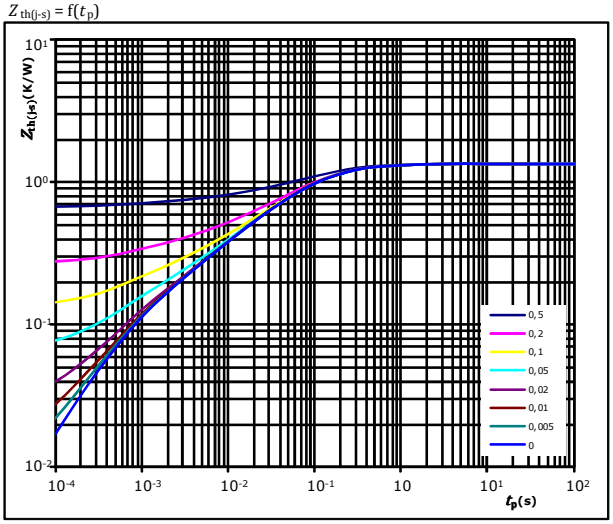
$I_C = f(V_{GE})$



t_p =	100	µs	**25 °C**
V_{CE} =	10	V	**125 °C**
			150 °C

Transient Thermal Impedance as function of Pulse duration **IGBT**

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



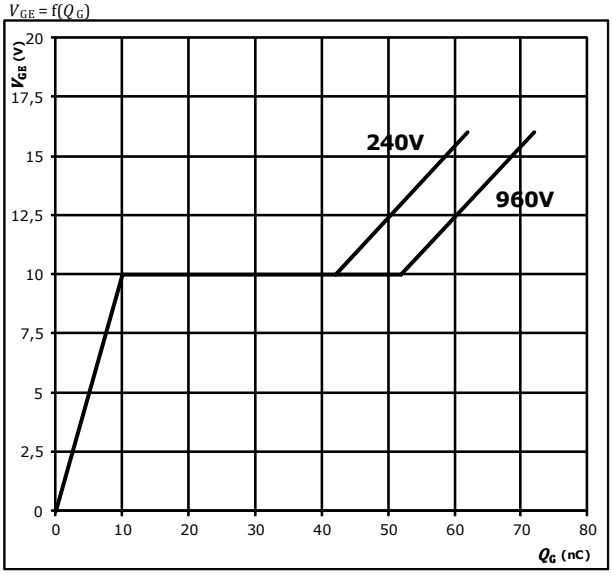
D =	t_p / T	
$R_{th(j-s)}$ =	1,35	K/W

IGBT thermal model values

R_{th} (K/W)	τ (s)
1,62E-01	5,85E-01
6,34E-01	9,42E-02
2,82E-01	2,85E-02
1,64E-01	6,73E-03
8,75E-02	9,43E-04
1,75E-02	3,79E-04

Gate voltage vs Gate charge **IGBT**

$V_{GE} = f(Q_G)$



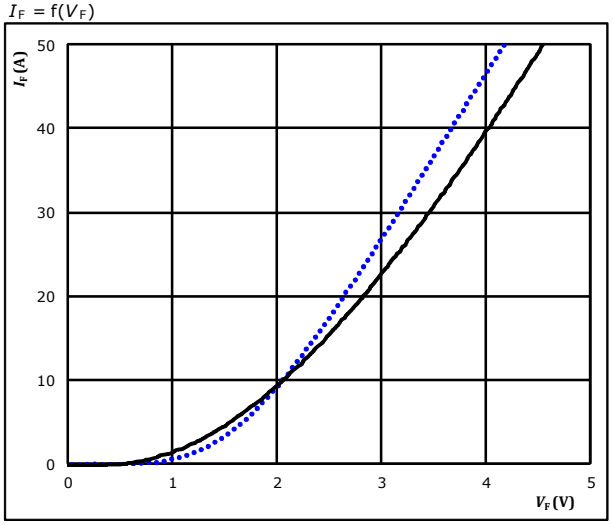
At

I_C= 15 A

H-Bridge Diode Characteristics

Typical forward characteristics **FWD**

$I_F = f(V_F)$

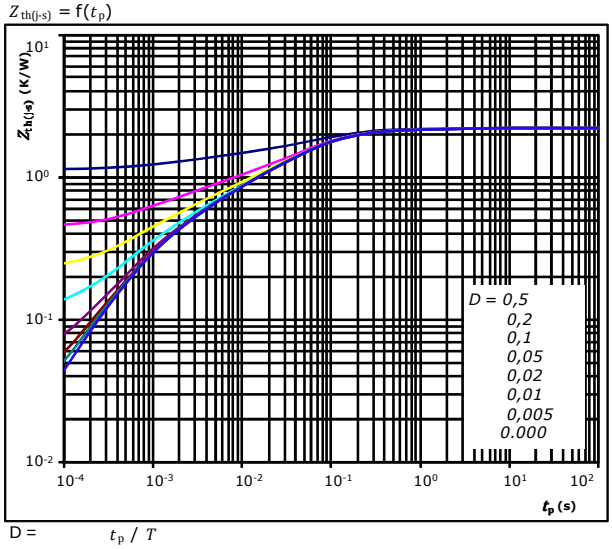


t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

Transient thermal impedance as a function of pulse width **FWD**

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



D = t_p / T

$R_{th(j-s)}$ = 2,24 K/W

FWD thermal model values

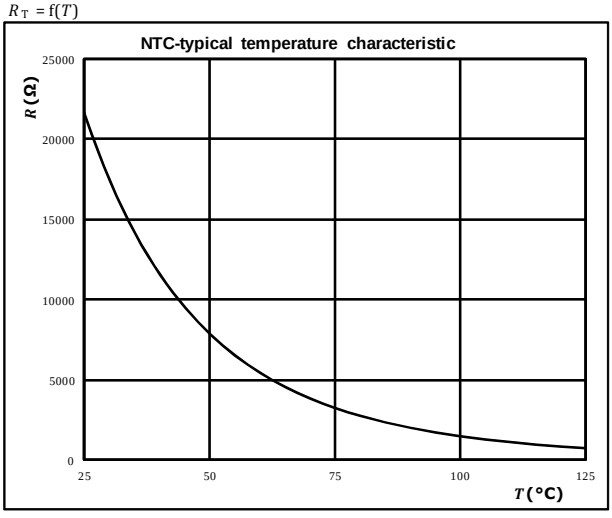
R (K/W)	τ (s)
7,47E-02	2,62E+00
1,66E-01	3,82E-01
9,90E-01	7,20E-02
4,45E-01	1,82E-02
3,36E-01	3,41E-03
2,26E-01	6,98E-04

Thermistor

Thermistor typical temperature characteristic

Typical NTC characteristic as a function of temperature

$R_T = f(T)$

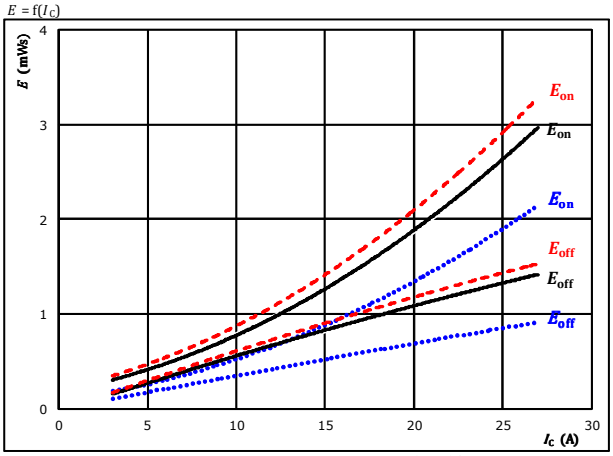


H-Bridge Switching Definition

Figure 1. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



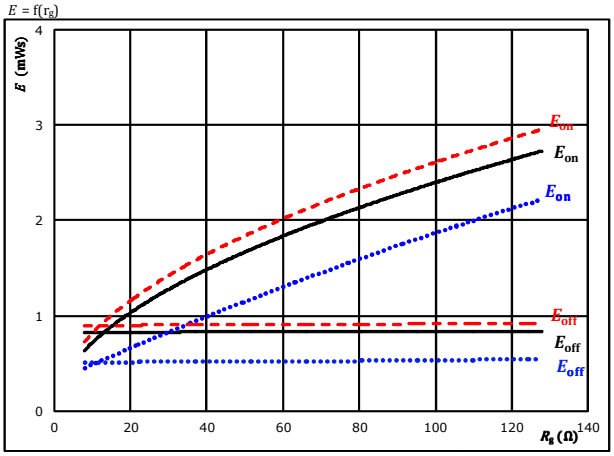
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	32	Ω		150 °C
R_{goff} =	32	Ω		

Figure 2. **IGBT**

Typical switching energy losses as a function of gate resistor

$E = f(r_g)$



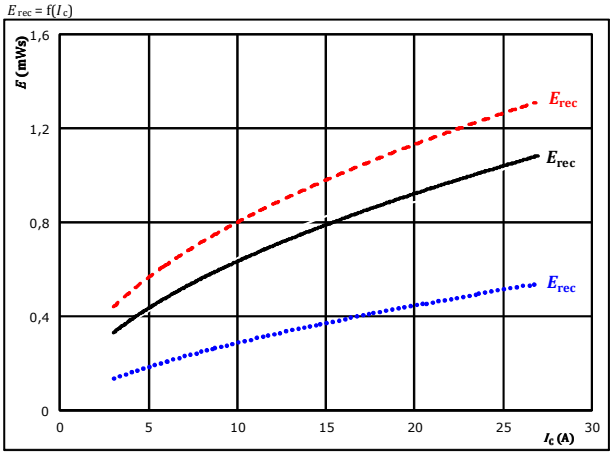
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	15	A		150 °C

Figure 3. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



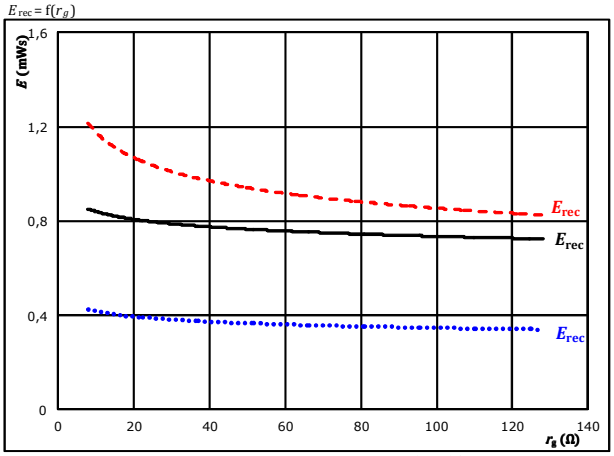
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	32	Ω		150 °C

Figure 4. **FWD**

Typical reverse recovered energy loss as a function of gate resistor

$E_{rec} = f(r_g)$



With an inductive load at

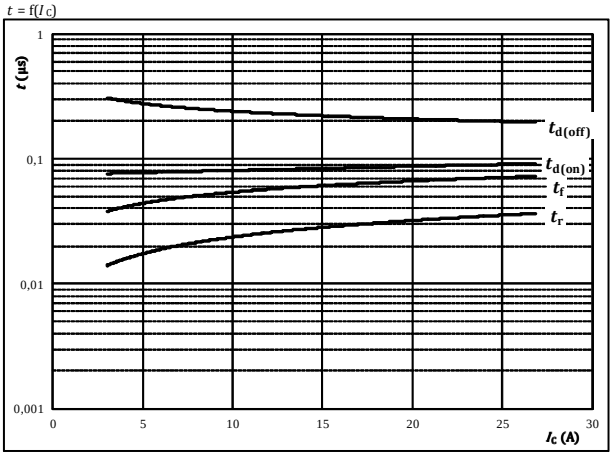
V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	15	A		150 °C

H-Bridge Switching Definitions

Figure 5. **IGBT**

Typical switching times as a function of collector current

$t = f(I_C)$



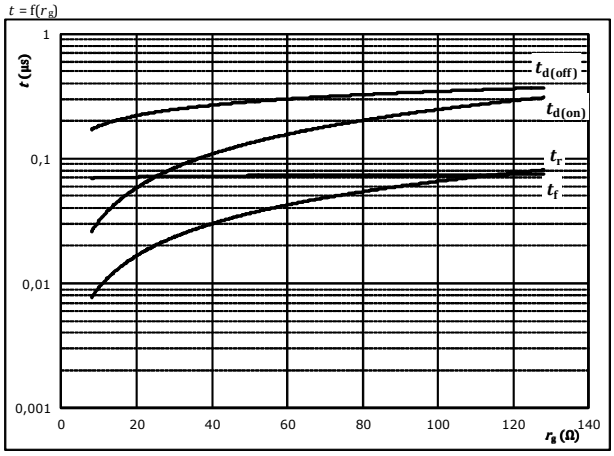
With an inductive load at

T_j =	150	°C
V_{CE} =	600	V
V_{GE} =	±15	V
R_{gon} =	32	Ω
R_{goff} =	32	Ω

Figure 6. **IGBT**

Typical switching times as a function of gate resistor

$t = f(r_g)$



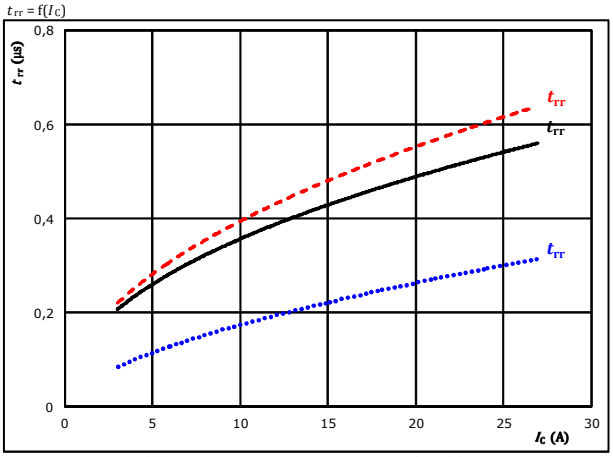
With an inductive load at

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

Figure 7. **FWD**

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_C)$

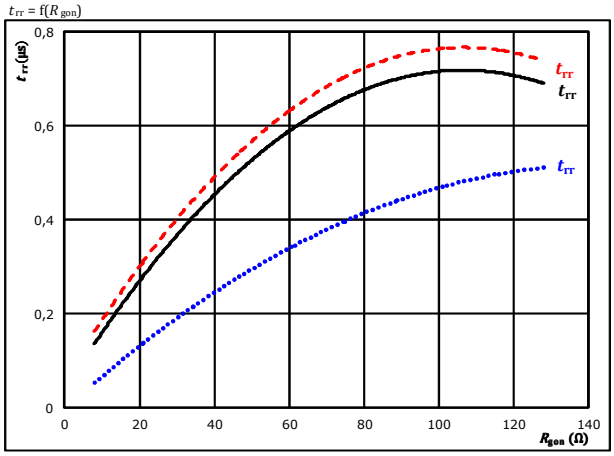


At					
V_{CE}:	600	V		25 °C	·····
V_{GE} =	±15	V	T_j:	125 °C	———
R_{gon} =	32	Ω		150 °C	– – –

Figure 8. **FWD**

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

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



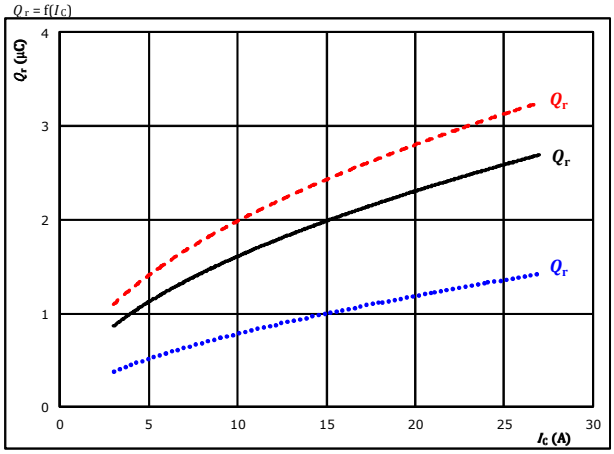
At					
V_{CE} =	600	V		25 °C	·····
V_{GE} =	±15	V	T_j:	125 °C	———
I_C =	15	A		150 °C	– – –

H-Bridge Switching Definition

Figure 9. FWD

Typical recovered charge as a function of collector current

$Q_r = f(I_C)$

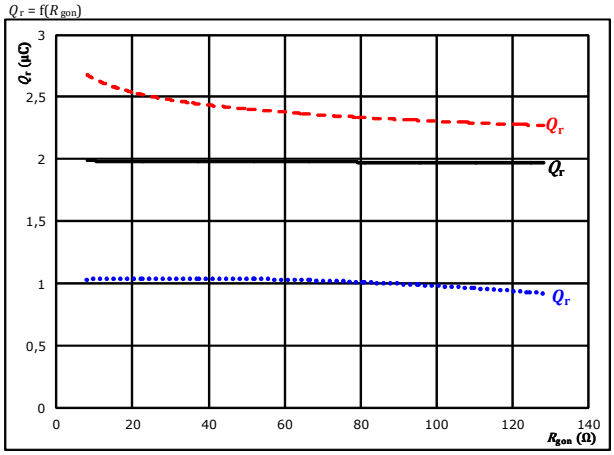


At					
	V_{CE} =	600	V		25 °C
	V_{GE} =	±15	V	T_j:	125 °C
	R_{gon} =	32	Ω		150 °C

Figure 10. FWD

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

$Q_r = f(R_{gon})$

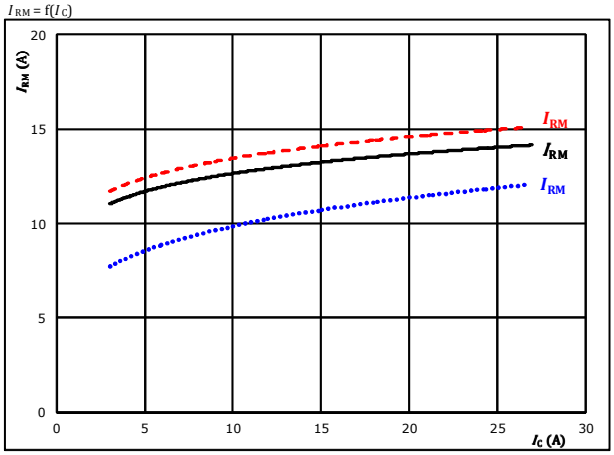


At					
	V_{CE}=	600	V		25 °C
	V_{GE} =	±15	V	T_j:	125 °C
	I_C=	15	A		150 °C

Figure 11. FWD

Typical peak reverse recovery current current as a function of collector current

$I_{RM} = f(I_C)$

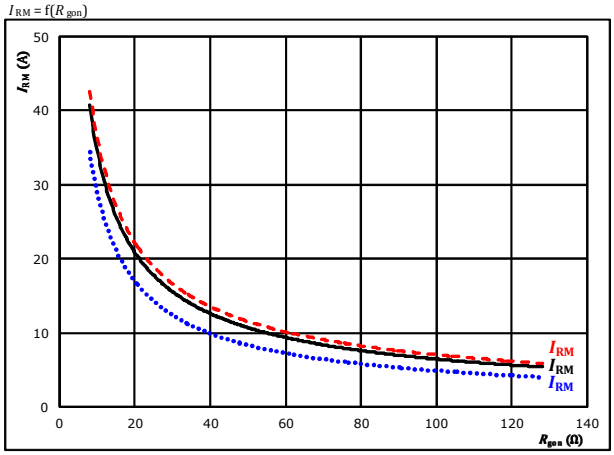


At					
	V_{CE} =	600	V		25 °C
	V_{GE} =	±15	V	T_j:	125 °C
	R_{gon} =	32	Ω		150 °C

Figure 12. FWD

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

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



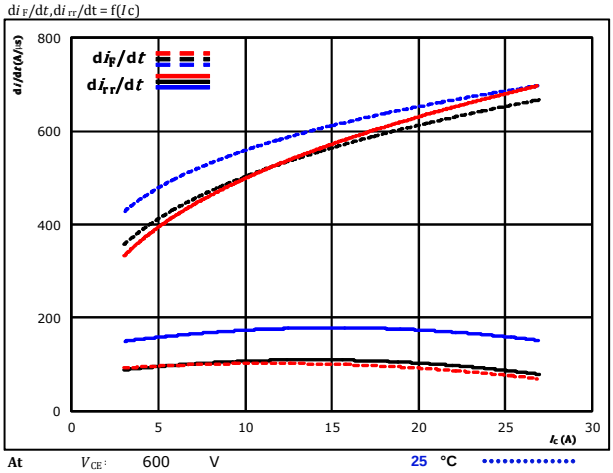
At					
	V_{CE} =	600	V		25 °C
	V_{GE} =	±15	V	T_j:	125 °C
	I_C =	15	A		150 °C

H-Bridge Switching Definition

Figure 13. **FWD**

Typical rate of fall of forward and reverse recovery current as a function of collector current

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

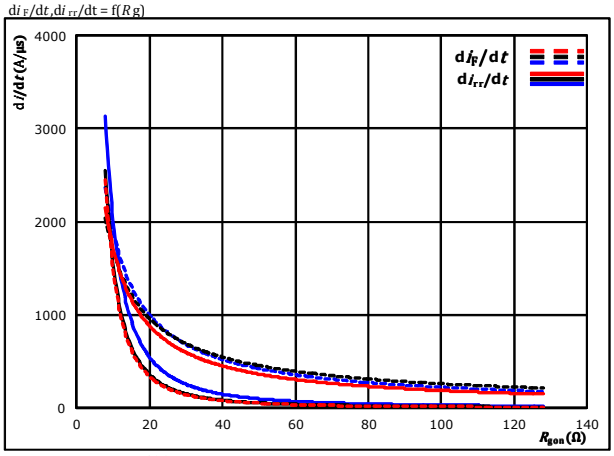


At					
V_{CE} =	600	V	T_j:	25 °C	
V_{GE} =	±15	V		125 °C	
R_{gon} =	32	Ω		150 °C	

Figure 14. **FWD**

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

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

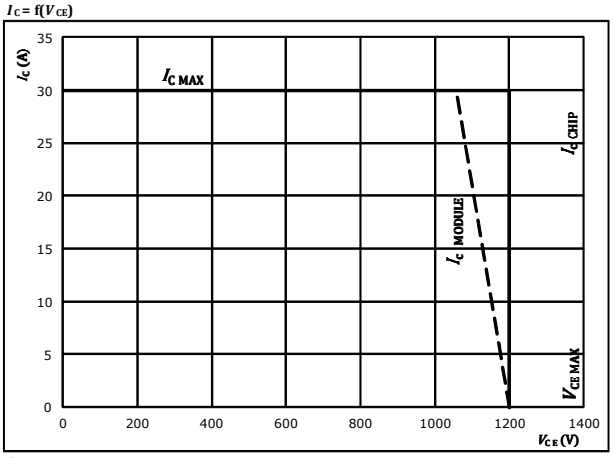


At			
V_{CE} =	600	V	
V_{GE} =	±15	V	
I_C =	15	A	

Figure 15. **IGBT**

Reverse bias safe operating area

$I_C = f(V_{CE})$



At

T_j =	175	°C
R_{gon} =	32	Ω
R_{goff} =	32	Ω

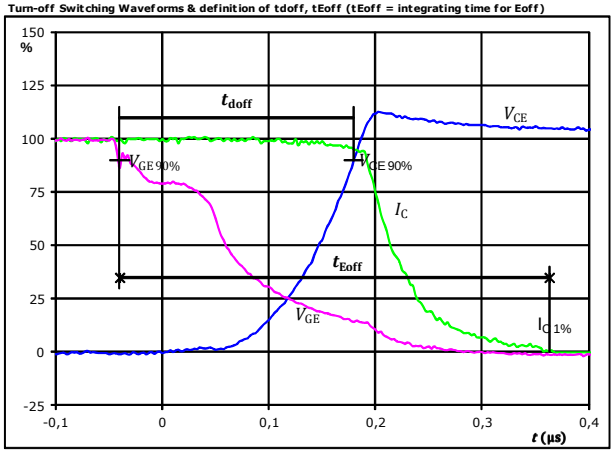
H-Bridge Switching Definition

General conditions

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

Figure 1. IGBT

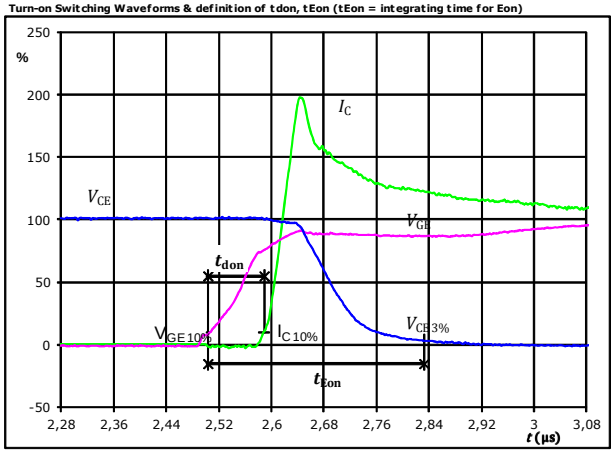
Turn-off Switching Waveforms & definition of tdoff, tEoff (tEoff = integrating time for Eoff)



$V_{GE}(0\%)$ =	-15	V
$V_{GE}(100\%)$ =	15	V
$V_C(100\%)$ =	600	V
$I_C(100\%)$ =	15	A
t_{doff} =	0,221	µs
t_{Eoff} =	0,403	µs

Figure 2. IGBT

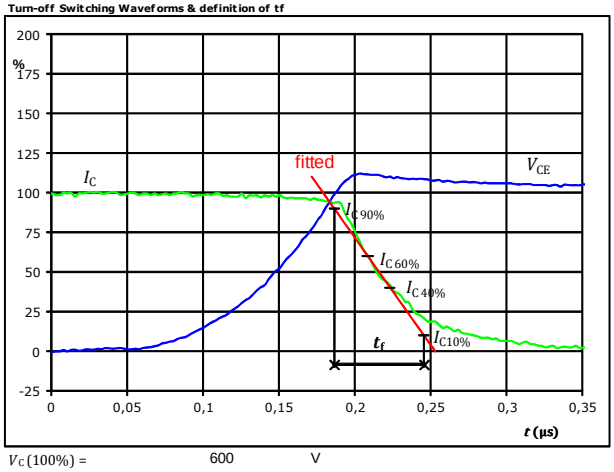
Turn-on Switching Waveforms & definition of tdon, tEon (tEon = integrating time for Eon)



$V_{GE}(0\%)$ =	-15	V
$V_{GE}(100\%)$ =	15	V
$V_C(100\%)$ =	600	V
$I_C(100\%)$ =	15	A
t_{don} =	0,085	µs
t_{Eon} =	0,329	µs

Figure 3. IGBT

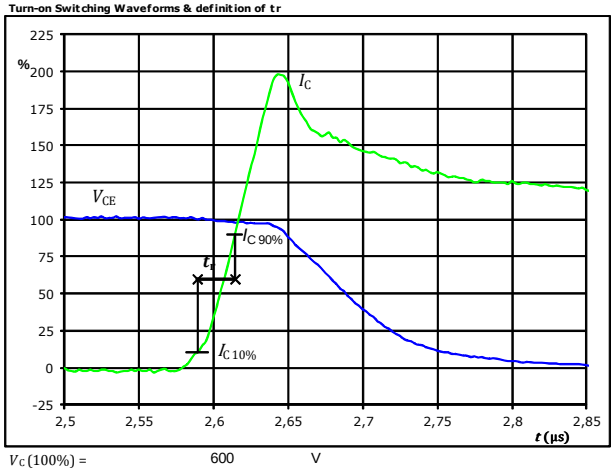
Turn-off Switching Waveforms & definition of tf



$V_C(100\%)$ =	600	V
$I_C(100\%)$ =	15	A
t_f =	0,063	µs

Figure 4. IGBT

Turn-on Switching Waveforms & definition of tr

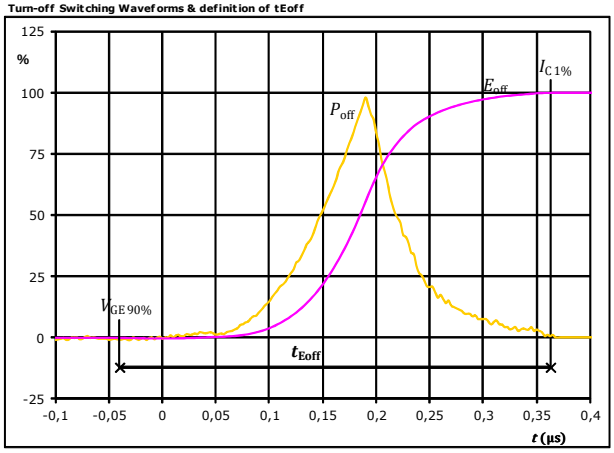


$V_C(100\%)$ =	600	V
$I_C(100\%)$ =	15	A
t_r =	0,025	µs

H-Bridge Switching Definition

Figure 5. **IGBT**

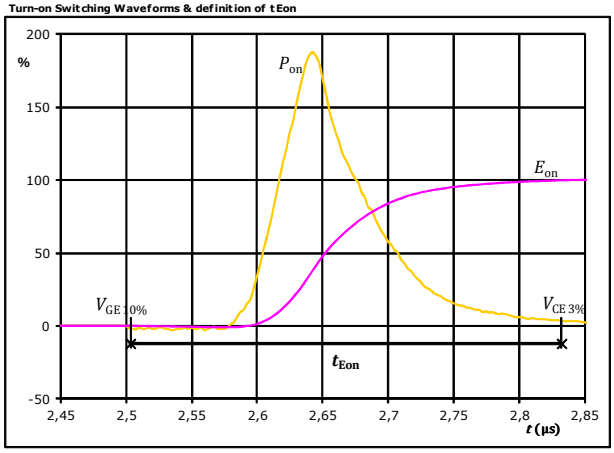
Turn-off Switching Waveforms & definition of tEoff



$P_{off}(100\%) =$	9,05	kW
$E_{off}(100\%) =$	0,82	mJ
$t_{Eoff} =$	0,40	µs

Figure 6. **IGBT**

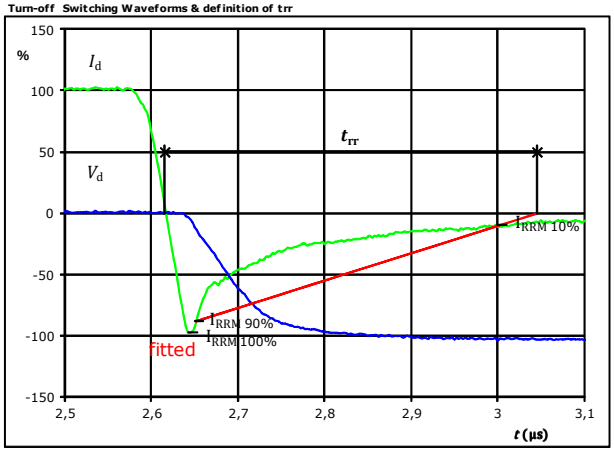
Turn-on Switching Waveforms & definition of tEon



$P_{on}(100\%) =$	9,05	kW
$E_{on}(100\%) =$	1,28	mJ
$t_{Eon} =$	0,33	µs

Figure 7. **FWD**

Turn-off Switching Waveforms & definition of trr

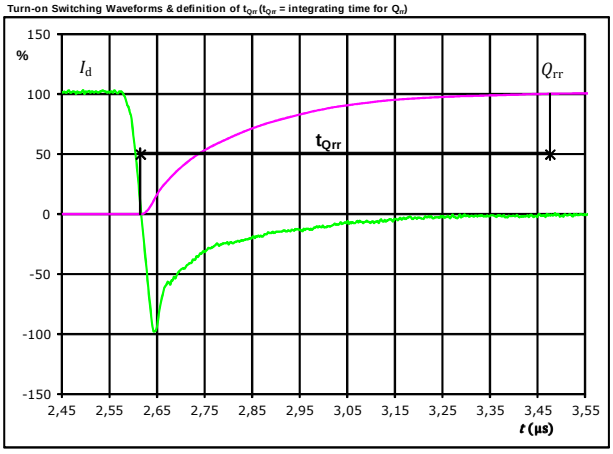


$V_d(100\%) =$	600	V
$I_d(100\%) =$	15	A
$I_{RRM}(100\%) =$	-15	A

H-Bridge Switching Definition

Figure 8. **FWD**

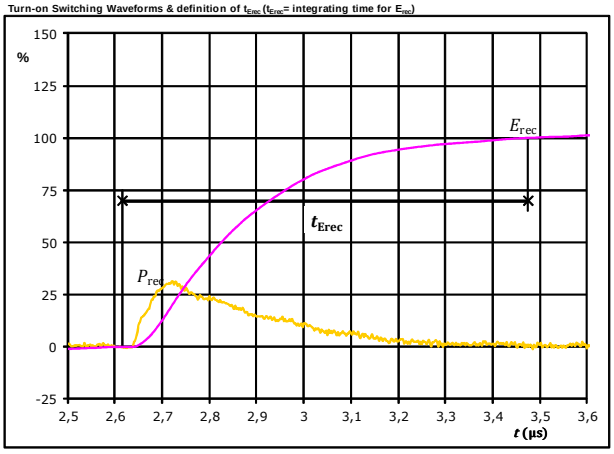
Turn-on Switching Waveforms & definition of t_{Qrr} (t_{Qrr} = integrating time for Q_{rr})



I_d (100%) =	15	A
Q_{rr} (100%) =	2,06	µC
t_{Qrr} =	0,86	µs

Figure 9. **FWD**

Turn-on Switching Waveforms & definition of t_{Erec} (t_{Erec}= integrating time for E_{rec})



P_{rec} (100%) =	9,05	kW
E_{rec} (100%) =	0,83	mJ
t_{Erec} =	0,86	µs

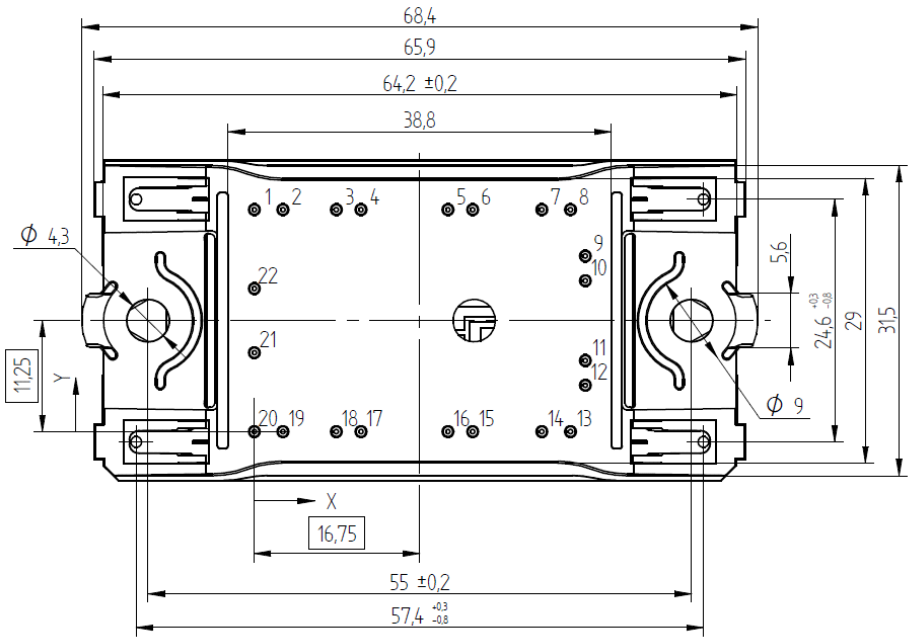
Ordering Code & Marking

Version	Ordering Code	in DataMatrix as	in packaging barcode as
without thermal paste 12mm housing	V23990-P627-F88	P627F88	P627F88
without thermal paste 17mm housing	V23990-P627-F89	P627F89	P627F89

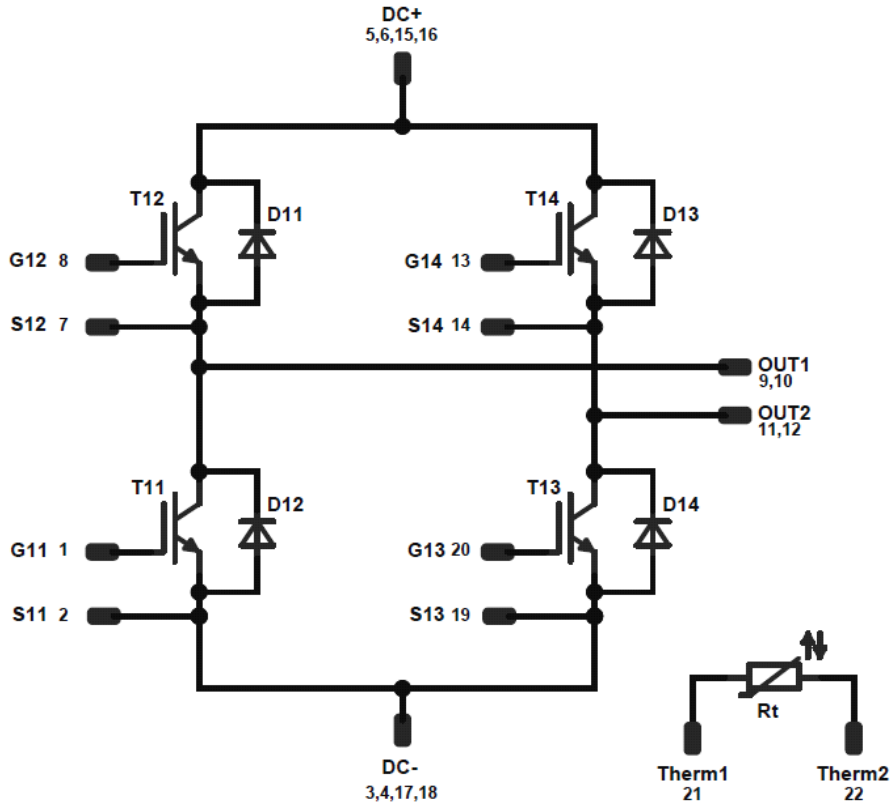
Text	**Vinco**	**Date code**	**Name&Ver**	**UL**	**Lot**	**Serial**
	Vinco	WWYY	NNNNNNNVV	UL	LLLLL	SSSS
Datamatrix	**Type&Ver**	**Lot number**	**Serial**	**Date code**		
	TTTTTTTVV	LLLLL	SSSS	WWYY		

Outline

Pin table [mm]			
Pin	X	Y	Function
1	0	22,5	G11
2	2,9	22,5	S11
3	8,3	22,5	DC-
4	10,8	22,5	DC-
5	19,6	22,5	DC+
6	22,1	22,5	DC+
7	29,1	22,5	S12
8	32	22,5	G12
9	33,5	17,8	OUT1
10	33,5	15,3	OUT1
11	33,5	7,2	OUT2
12	33,5	4,7	OUT2
13	32	0	G14
14	29,1	0	S14
15	22,1	0	DC+
16	19,6	0	DC+
17	10,8	0	DC-
18	8,3	0	DC-
19	2,9	0	S13
20	0	0	G13
21	0	8	Therm1
22	0	14,5	Therm2



Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T11-T14	IGBT	1200V	15A	H-Bridge Switch	
D11-D14	FWD	1200V	15A	H-Bridge Diode	
Rt	NTC	-	-	Thermistor	

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

Handling instruction
Handling instructions for *flow* 0 packages see vincotech.com website.

Document No.:	Date:	Modification:	Pages
V23990-P627-F8x-D2-14	22 Okt. 2015	Module properties correction	2

单击下面可查看定价，库存，交付和生命周期等信息

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