Vincotech

V23990-P829-F08x-PM
datasheet

flow PACK 1 3rd gen — 1200 V / 50 A

Features

- Compact *flow* 1 housing
- Trench Fieldstop IGBT4 technology
- Compact and low inductance design
- AlN substrate for improved performance
- Built-in NTC

flow 1 12mm housing

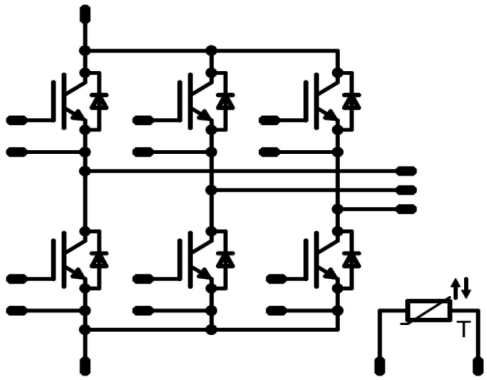
solder pins

Press-fit pins

Target applications

- Motor Drive
- Power generation
- UPS

Schematic



Types

- V23990-P829-F08-PM
- V23990-P829-F08Y-PM

Maximum Ratings

T_j = 25 °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 °C	71	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	216	W
Gate-emitter voltage	V_{GES}		±20	V
Short circuit ratings	t_{SC} V_{CC}	$T_j \leq$ 150°C V_{GE} = 15V	10 800	µs V
Maximum Junction Temperature	T_{jmax}		175	°C

Parameter	Symbol	Conditions	Value	Unit
Inverter Diode				
Peak Repetitive Reverse Voltage	V_{RRM}		1200	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$ $T_s = 80°C$	65	A
Repetitive peak forward current	I_{FRM}		100	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80°C$	146	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. 12,5	mm
Clearance		solder pins / Press-fit pins	7,81 / 7,9	mm
Comparative Tracking Index	CTI		> 200	

Characteristic Values

Inverter Switch

Parameter	Symbol	Conditions					Value			Unit
			V_{GE} [V]	V_{CE} [V]	I_C [A]	T_j[°C]	Min	Typ	Max	
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}$			0,0017	25 125	5,3	5,8	6,3	V
Collector-emitter saturation voltage	V_{CEsat}		15		50	25 125 150	1,58	1,88 2,30	2,07	V
Collector-emitter cut-off current	I_{CES}		0	1200		25 125			1	µA
Gate-emitter leakage current	I_{GES}		20	0		25 125			120	nA
Internal gate resistance	r_g							4		Ω
Input capacitance	C_{ies}	f=1MHz	0	25		25		2800		pF
Reverse transfer capacitance	C_{res}							100		
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	phase-change material λ=3,4W/mK						0,44		K/W
IGBT Switching										
Turn-on delay time	$t_{d(on)}$	R_{goff} = 8 Ω R_{gon} = 8 Ω	±15	600	50	25 150		96 101		ns
Rise time	t_r					25 150		17 24		
Turn-off delay time	$t_{d(off)}$					25 150		214 281		
Fall time	t_f					25 150		87 122		
Turn-on energy (per pulse)	E_{on}	Q_{rFWD} = 4,8 µC Q_{rFWD} = 9,7 µC				25 150		2,701 4,211		mWs
Turn-off energy (per pulse)	E_{off}					25 150		2,744 4,531		

Inverter Diode

Parameter	Symbol	Conditions					Value			Unit
				V_r [V]	I_F [A]	T_j [°C]	Min	Typ	Max	
Static										
Forward voltage	V_F				50	25 125 150		1,73 1,70 1,68	2,05	V
Reverse leakage current	I_r			1200		25 150			10	µA
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	phase-change material λ = 3,4 W/mK						0,65		K/W
FWD Switching										
Peak recovery current	I_{RRM}	di/dt = 3866 A/µs di/dt = 2820 A/µs	±15	600	50	25 150		81 85		A
Reverse recovery time	t_{rr}					25 150		139 316		ns
Recovered charge	Q_r					25 150		4,797 9,708		µC
Reverse recovered energy	E_{rec}					25 150		1,790 3,972		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 150		4803 1209		A/µs

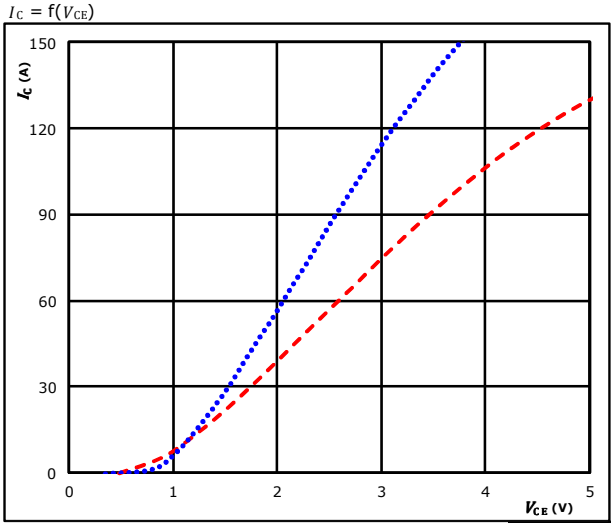
Thermistor

Parameter	Symbol	Conditions					Value			Unit
			V_{GE} [V]	V_{CE} [V]	I_C [A]	T_j [°C]	Min	Typ	Max	
Rated resistance	R					25		4,7		kΩ
Deviation of R100	$\Delta_{R/R}$	R100=401 Ω				100	-12,4		12,4	%
Power dissipation	P					25		210		mW
Power dissipation constant						25		3,5		mW/K
B-value	$B_{(25/50)}$					25		3590		K
B-value	$B_{(25/100)}$					25		3650		K
Vincotech NTC Reference									D	

Inverter Switch Characteristics

Typical output characteristics **IGBT**

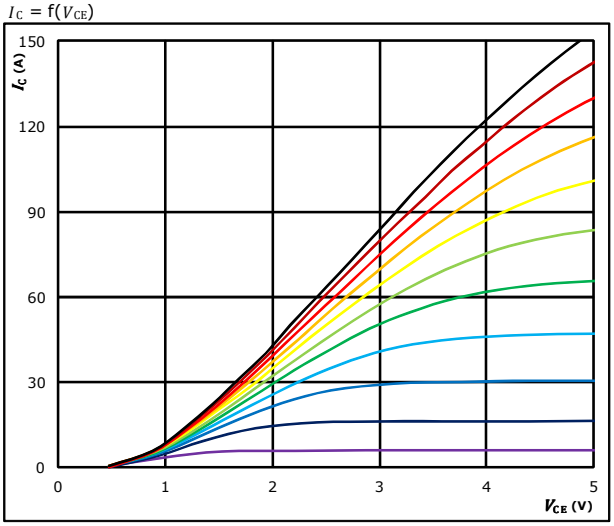
$I_C = f(V_{CE})$



t_p =	250	µs		25 °C
V_{GE} =	15	V	T_j:	150 °C

Typical output characteristics **IGBT**

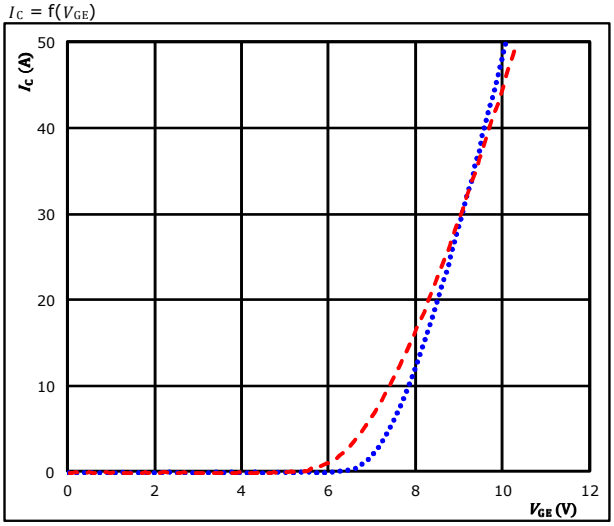
$I_C = f(V_{CE})$



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**

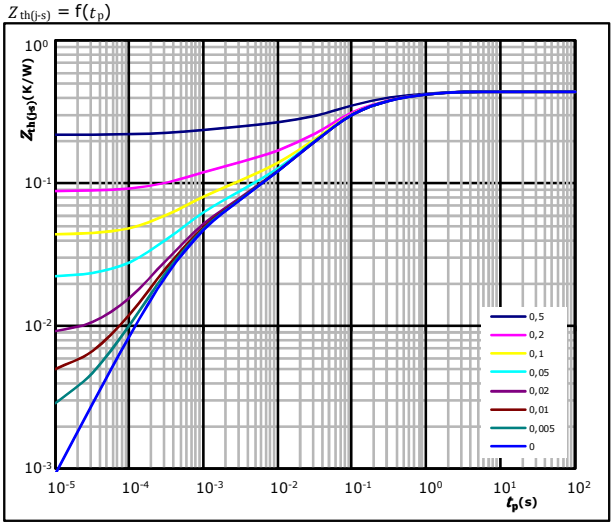
$I_C = f(V_{GE})$



t_p =	100	µs		25 °C
V_{CE} =	10	V	T_j:	150 °C

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

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



D =	t_p / T	
$R_{th(j-s)}$ =	0,44	K/W

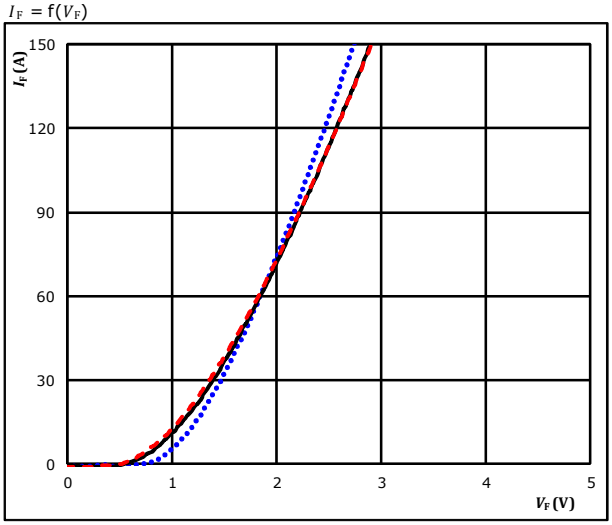
IGBT thermal model values

R (K/W)	τ (s)
9,12E-02	6,01E-01
1,84E-01	8,26E-02
9,04E-02	2,81E-02
4,02E-02	2,85E-03
3,41E-02	4,57E-04

Inverter Diode Characteristics

Typical forward characteristics **FWD**

$I_F = f(V_F)$

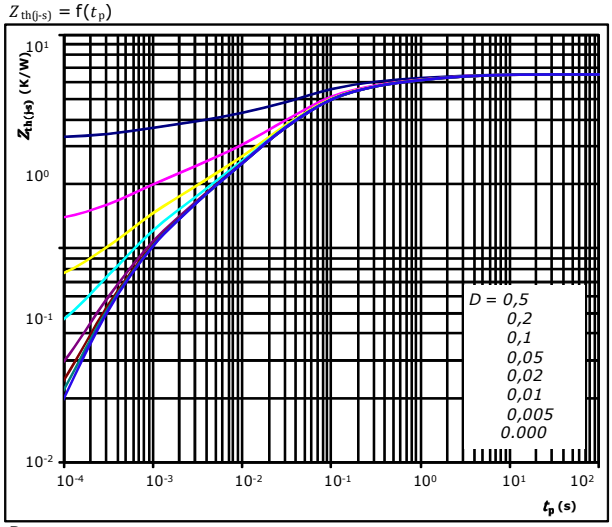


t_p = 250 µs

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

$R_{th(j-s)}$ = 0,65 K/W

FWD thermal model values

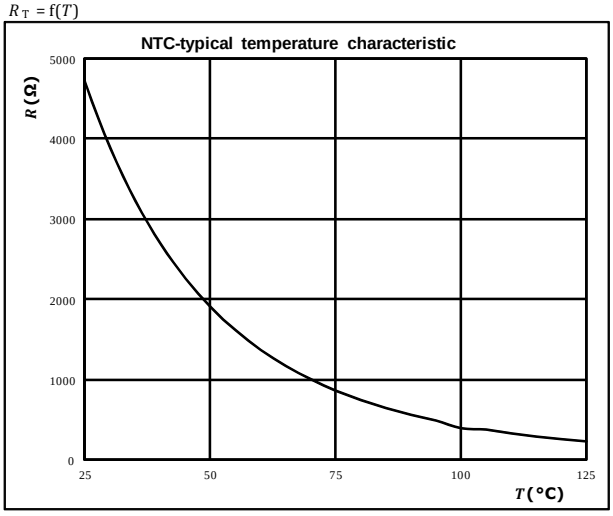
R (K/W)	τ (s)
2,1630E-02	5,6310E+00
7,4790E-02	7,7120E-01
1,3890E-01	1,1610E-01
2,2410E-01	3,1460E-02
7,3190E-02	6,5550E-03
5,9880E-02	1,5650E-03
5,8730E-02	3,6760E-04

Thermistor

Thermistor typical temperature characteristic

Typical NTC characteristic
as a function of temperature

$R_T = f(T)$

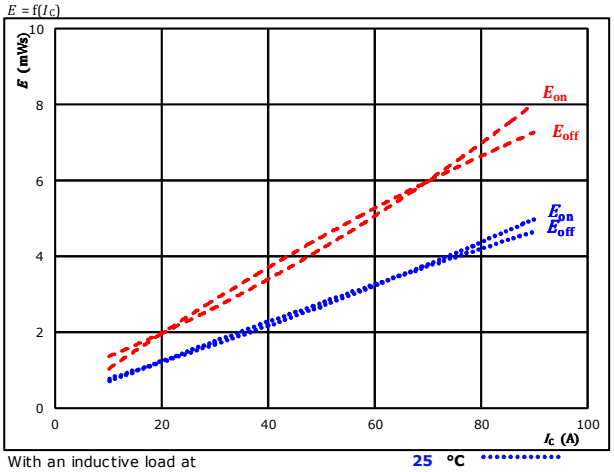


Inverter Switching Characteristics

Figure 1. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



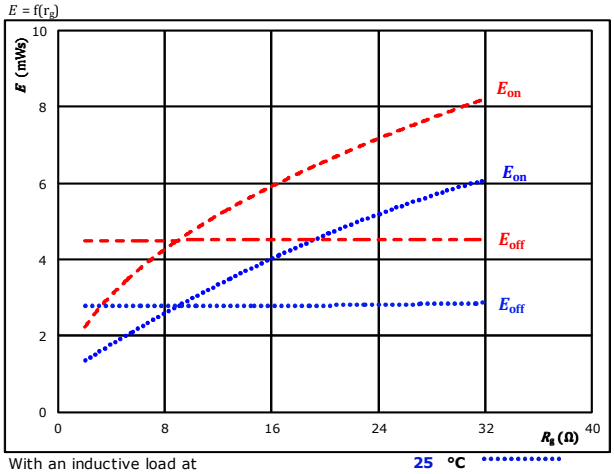
With an inductive load at — T_j: 25 °C, 150 °C

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

Figure 2. **IGBT**

Typical switching energy losses as a function of gate resistor

$E = f(r_g)$



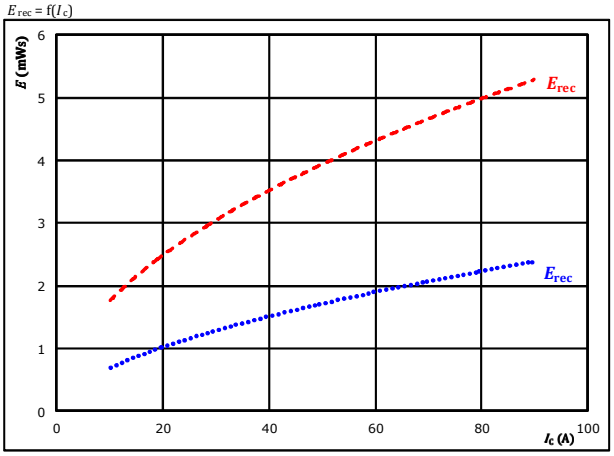
With an inductive load at — T_j: 25 °C, 150 °C

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

Figure 3. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



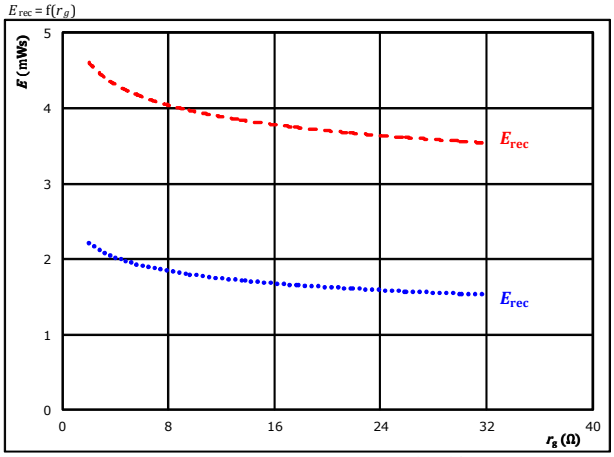
With an inductive load at — T_j: 25 °C, 150 °C

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

Figure 4. **FWD**

Typical reverse recovered energy loss as a function of gate resistor

$E_{rec} = f(r_g)$



With an inductive load at — T_j: 25 °C, 150 °C

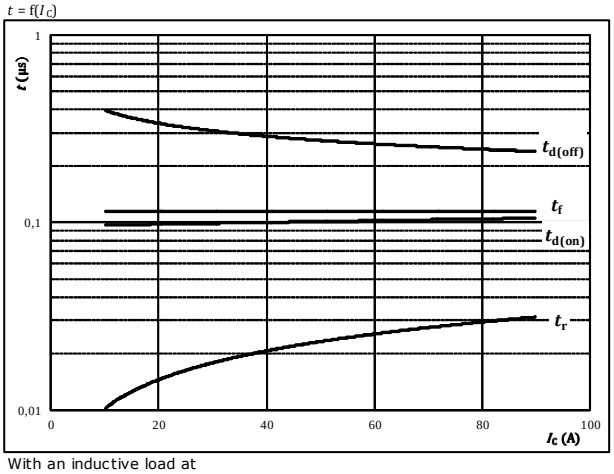
V_{CE} =	600	V
V_{GE} =	±15	V
I_C =	50	A

Inverter Switching Characteristics

Figure 5. **IGBT**

Typical switching times as a function of collector current

$t = f(I_C)$



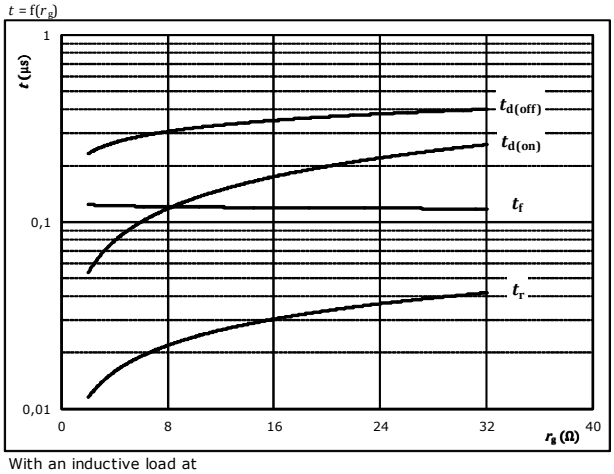
With an inductive load at

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

Figure 6. **IGBT**

Typical switching times as a function of gate resistor

$t = f(r_g)$



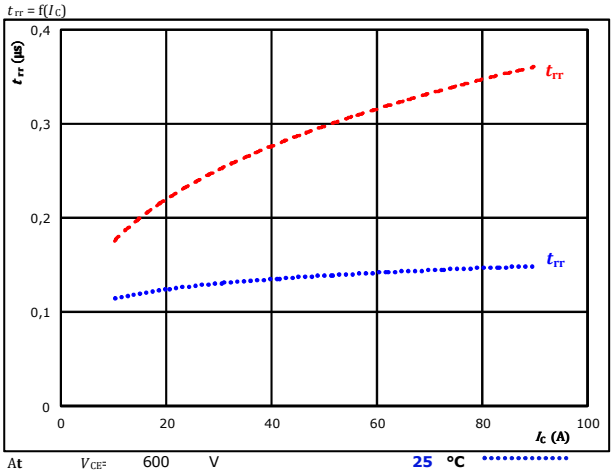
With an inductive load at

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

Figure 7. **FWD**

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_C)$

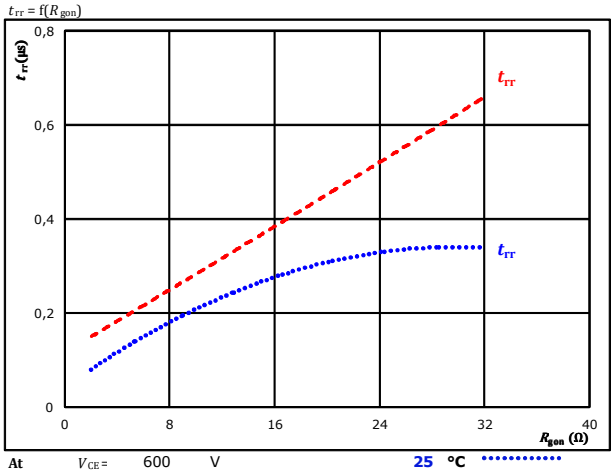


At	V_{CE}=	600	V	T_j:	25 °C
	V_{GE} =	±15	V		150 °C
	R_{gon} =	8	Ω		

Figure 8. **FWD**

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

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



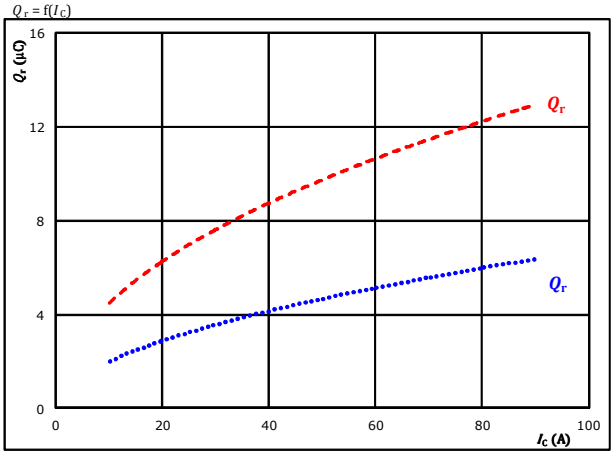
At	V_{CE} =	600	V	T_j:	25 °C
	V_{GE} =	±15	V		150 °C
	I_C =	50	A		

Inverter Switching Characteristics

Figure 9. FWD

Typical recovered charge as a function of collector current

$Q_r = f(I_C)$

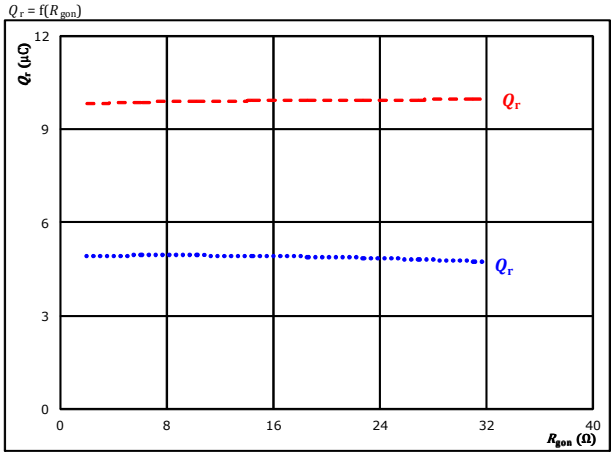


At						
	V_{CE} =	600	V		25 °C	
	V_{GE} =	±15	V	T_j:	150 °C	
	R_{gon} =	8	Ω			

Figure 10. FWD

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

$Q_r = f(R_{gon})$

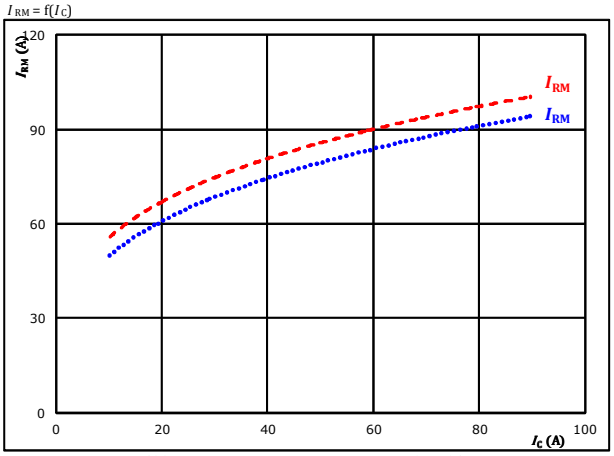


At						
	V_{CE}=	600	V		25 °C	
	V_{GE} =	±15	V	T_j:	150 °C	
	I_C=	50	A			

Figure 11. FWD

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

$I_{RM} = f(I_C)$

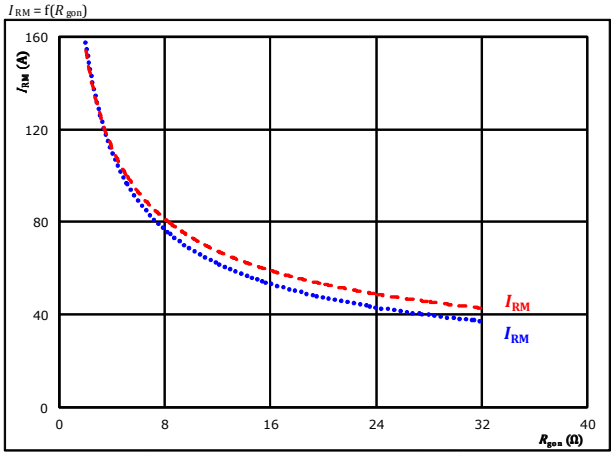


At						
	V_{CE} =	600	V		25 °C	
	V_{GE} =	±15	V	T_j:	150 °C	
	R_{gon} =	8	Ω			

Figure 12. FWD

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

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



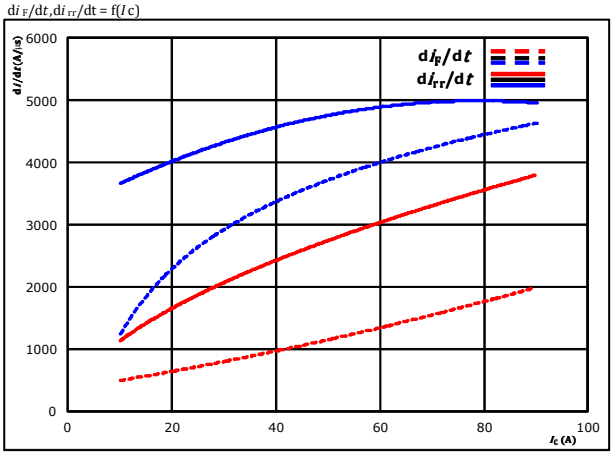
At						
	V_{CE} =	600	V		25 °C	
	V_{GE} =	±15	V	T_j:	150 °C	
	I_C =	50	A			

Inverter Switching Characteristics

Figure 13. FWD

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

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

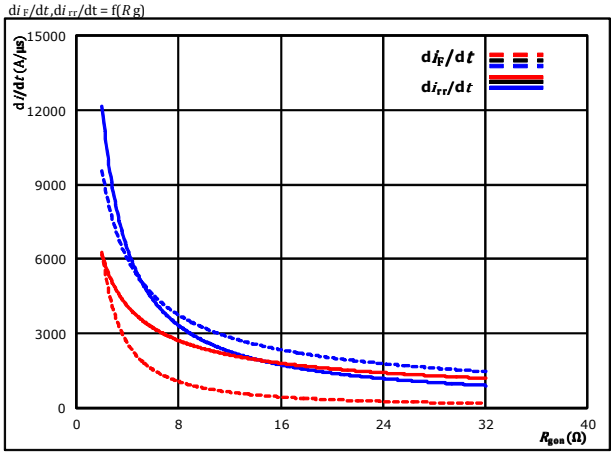


At					
V_{CE} =	600	V		25 °C	
V_{GE} =	±15	V	T_j:	150 °C	
R_{gon} =	8	Ω			

Figure 14. FWD

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

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

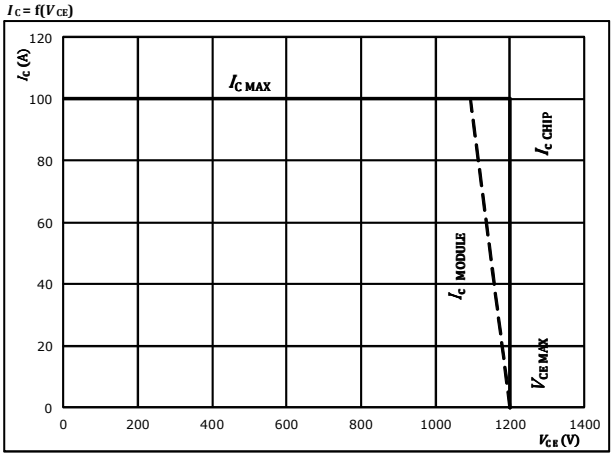


At					
V_{CE} =	600	V		25 °C	
V_{GE} =	±15	V	T_j:	150 °C	
I_C =	50	A			

Figure 15. IGBT

Reverse bias safe operating area

$I_C = f(V_{CE})$



At		
T_j =	175	°C
R_{gon} =	8	Ω
R_{goff} =	8	Ω

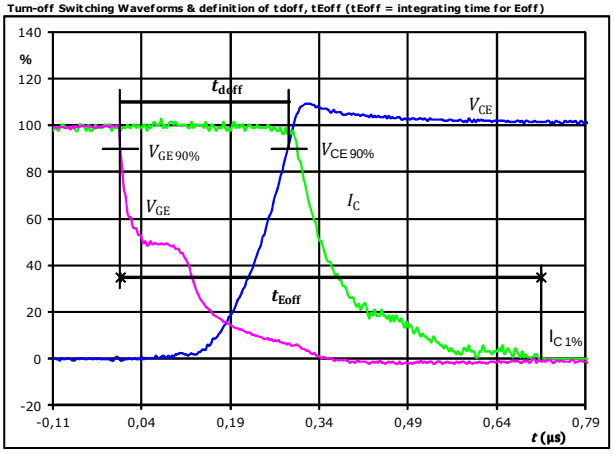
Inverter Switching Definitions

General conditions

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

Figure 1. IGBT

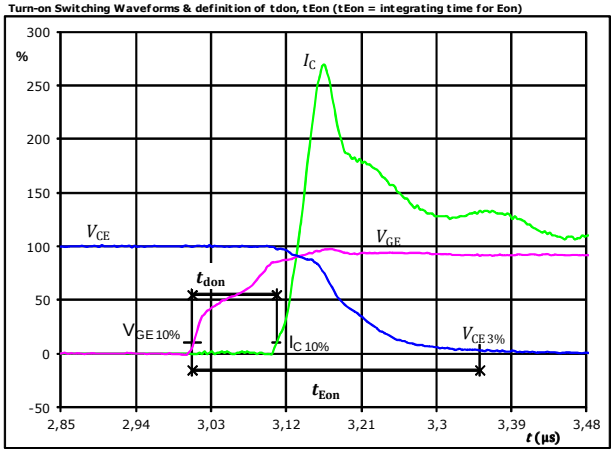
Turn-off Switching Waveforms & definition of tdoff, tEoff (tEoff = integrating time for Eoff)



$V_{GE}(0\%)$ =	-15	V
$V_{GE}(100\%)$ =	15	V
$V_C(100\%)$ =	600	V
$I_C(100\%)$ =	50	A
t_{doff} =	0,281	µs
t_{Eoff} =	0,710	µs

Figure 2. IGBT

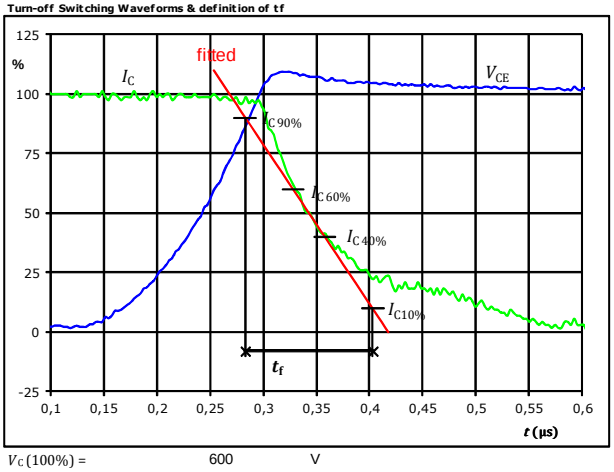
Turn-on Switching Waveforms & definition of tdon, tEon (tEon = integrating time for Eon)



$V_{GE}(0\%)$ =	-15	V
$V_{GE}(100\%)$ =	15	V
$V_C(100\%)$ =	600	V
$I_C(100\%)$ =	50	A
t_{don} =	0,101	µs
t_{Eon} =	0,345	µs

Figure 3. IGBT

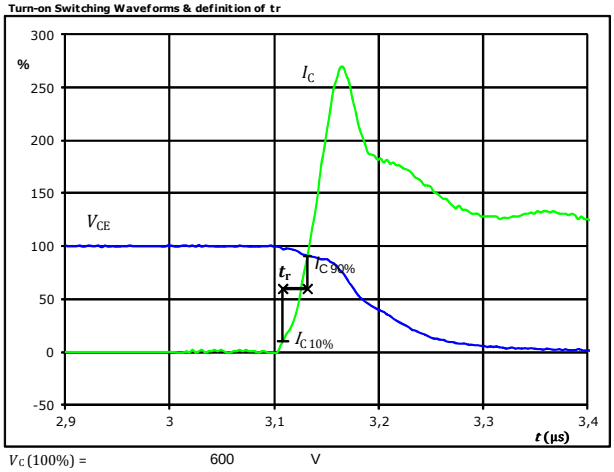
Turn-off Switching Waveforms & definition of tf



$V_C(100\%)$ =	600	V
$I_C(100\%)$ =	50	A
t_f =	0,122	µs

Figure 4. IGBT

Turn-on Switching Waveforms & definition of tr

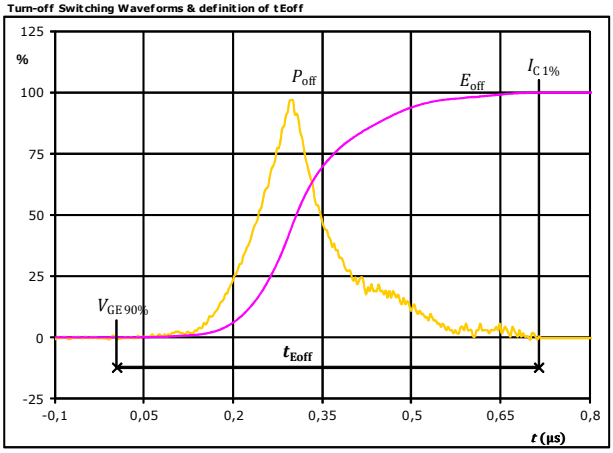


$V_C(100\%)$ =	600	V
$I_C(100\%)$ =	50	A
t_r =	0,024	µs

Inverter Switching Definitions

Figure 5. **IGBT**

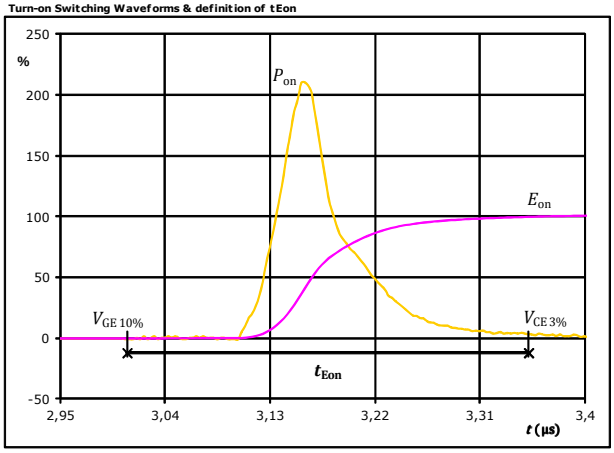
Turn-off Switching Waveforms & definition of tEoff



$P_{off}(100\%)$ =	30,10	kW
$E_{off}(100\%)$ =	4,53	mJ
t_{Eoff} =	0,71	µs

Figure 6. **IGBT**

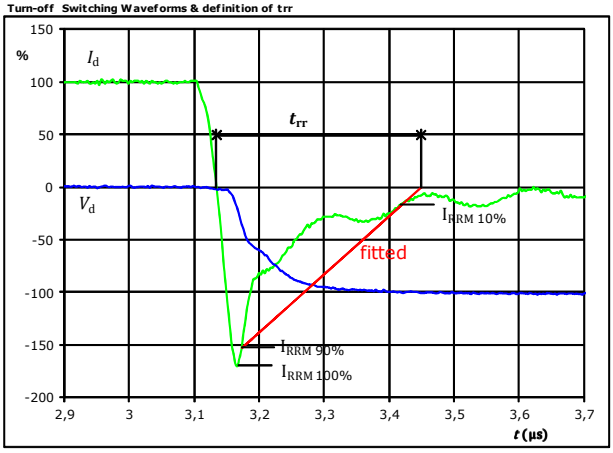
Turn-on Switching Waveforms & definition of tEon



$P_{on}(100\%)$ =	30,10	kW
$E_{on}(100\%)$ =	4,21	mJ
t_{Eon} =	0,345	µs

Figure 7. **FWD**

Turn-off Switching Waveforms & definition of trr

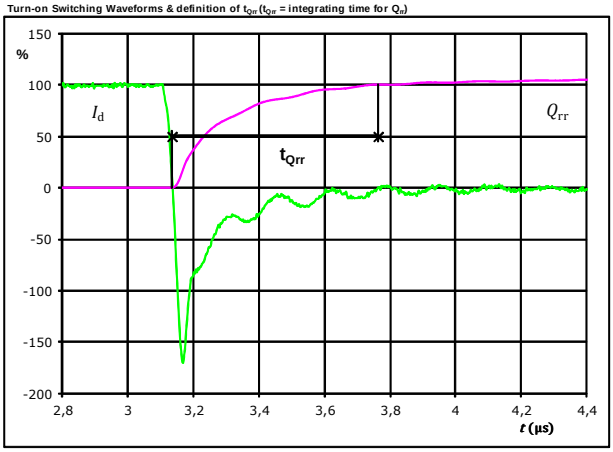


$V_d(100\%)$ =	600	V
$I_d(100\%)$ =	50	A
$I_{RRM}(100\%)$ =	-85	A
t_{rr} =	0,316	µs

Inverter Switching Definitions

Figure 8. **FWD**

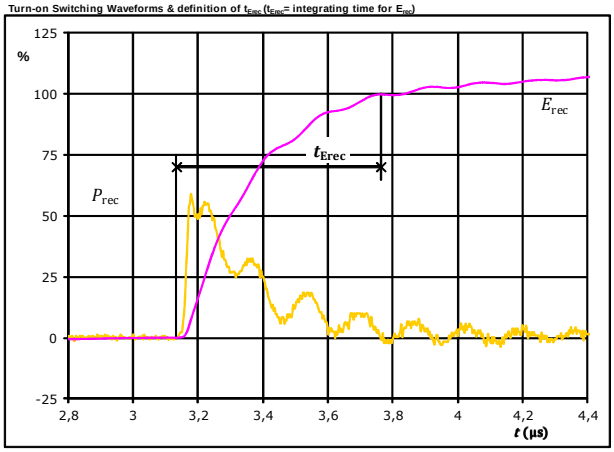
Turn-on Switching Waveforms & definition of t_{Qrr} (t_{Qrr} = integrating time for Q_{rr})



I_d (100%) =	50	A
Q_{rr} (100%) =	9,71	µC
t_{Qrr} =	0,63	µs

Figure 9. **FWD**

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



P_{rec} (100%) =	30,10	kW
E_{rec} (100%) =	3,97	mJ
t_{Erec} =	0,63	µs

Vincotech

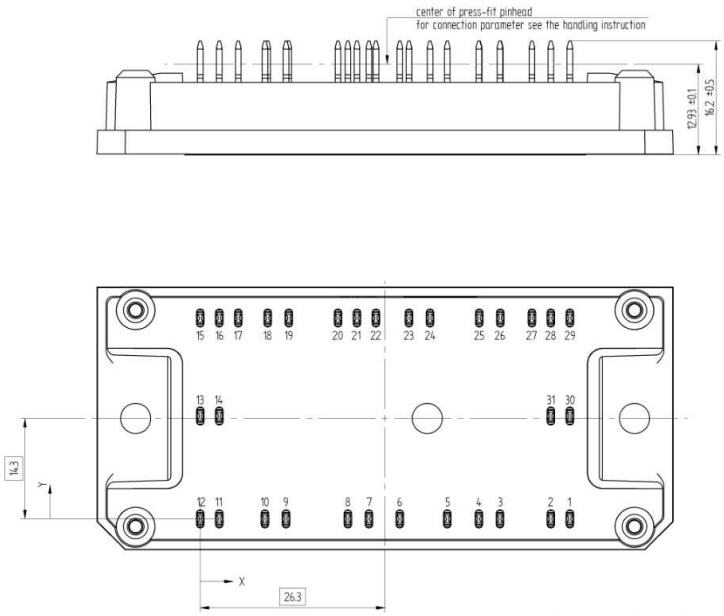
Ordering Code & Marking

Version	Ordering Code
Without thermal paste 12 mm housing solder pins	V23990-P829-F08-PM
With thermal paste 12 mm housing solder pins	V23990-P829-F08-/3/-PM
Without thermal paste 12 mm housing Press-fit pins	V23990-P829-F08Y-PM
With thermal paste 12 mm housing Press-fit pins	V23990-P829-F08Y-/3/-PM

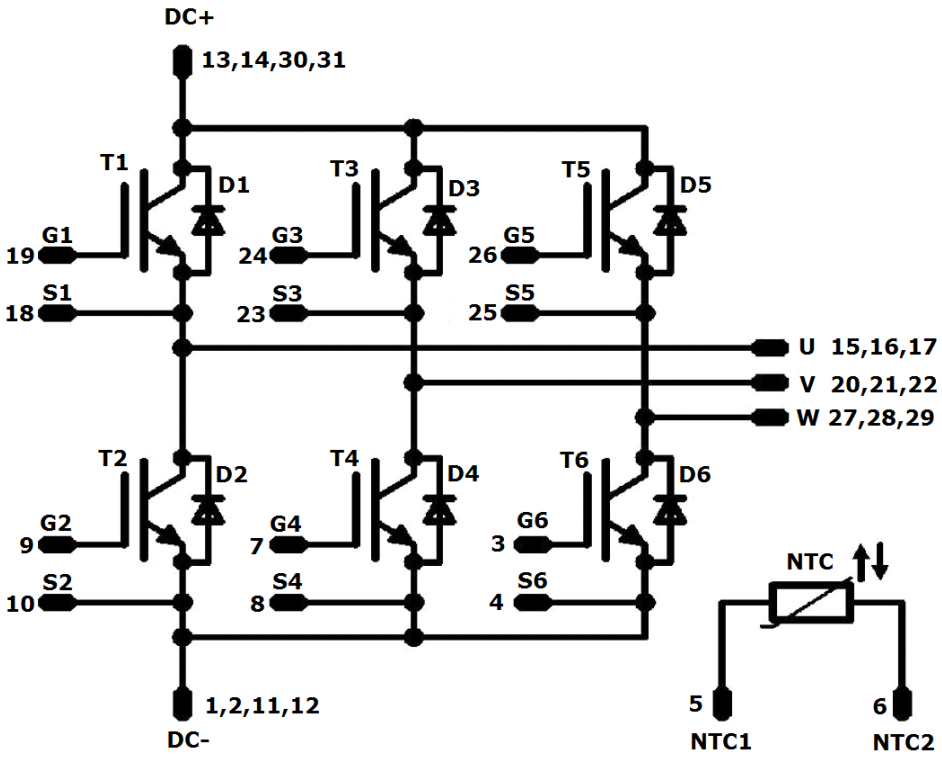
Text	**Vinco**	**Date code**	**Name&Ver**	**UL**	**Lot**	**Serial**
	Vinco	WWYY	TTTTTTTVV	UL	LLLLL	SSSS
Datamatrix	**Type&Ver**	**Lot number**	**Serial**	**Date code**		
	TTTTTTTVV	LLLLL	SSSS	WWYY		

Outline

Pin table [mm]				Pin table [mm]			
Pin	X	Y	Function	Pin	X	Y	Function
1	52,6	0	DC-	30	52,6	14,65	DC+
2	49,9	0	DC-	31	49,9	14,65	DC+
3	42,65	0	G6				
4	39,65	0	S6				
5	35,15	0	NTC1				
6	28,4	0	NTC2				
7	24	0	G4				
8	21	0	S4				
9	12,2	0	G2				
10	9,2	0	S2				
11	2,7	0	DC-				
12	0	0	DC-				
13	0	14,65	DC+				
14	2,7	14,65	DC+				
15	0	28,6	U				
16	2,7	28,6	U				
17	5,4	28,6	U				
18	9,6	28,6	S1				
19	12,6	28,6	G1				
20	19,6	28,6	V				
21	22,3	28,6	V				
22	25	28,6	V				
23	29,7	28,6	S3				
24	32,7	28,6	G3				
25	39,7	28,6	S5				
26	42,7	28,6	G5				
27	47,2	28,6	W				
28	49,9	28,6	W				
29	52,6	28,6	W				



Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T1,T2,T3,T4,T5,T6	IGBT	1200 V	50 A	Inverter Switch	
D1,D2,D3,D4,D5,D6	FWD	1200 V	50 A	Inverter Diode	
NTC	NTC	-	-	Thermistor	

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

Handling instruction
Handling instructions for *flow* 1 packages see vincotech.com website.

Package data
Package data for *flow* 1 packages see vincotech.com website.

Document No.:	Date:	Modification:	Pages
V23990-P829-F08x-D1-14	27 Nov. 2015		

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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