A0-VP122PA600RA-L759F80T
datasheet

VINcoDUAL E3 **1200 V / 600 A**

Topology features

- Temperature sensor
- Half Bridge

Component features

- Easy paralleling
- Low collector emitter saturation voltage
- Low turn-off losses

Housing features

- Base isolation: IMB
- SoLid Cover Technology
- Standard mid-power industry package
- Driver pins are avaliable in press-fit and solder pin
- M6 High Power Screw Contact
- Reliable cold welding connection to PCB
- Press-fit terminals

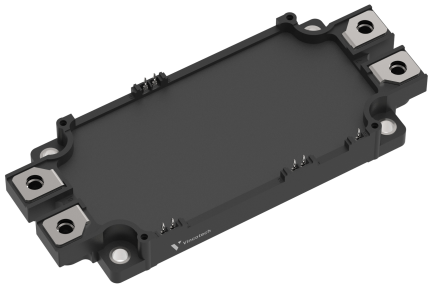
Target applications

- Industrial Drives

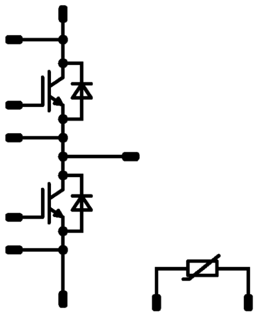
Types

- A0-VP122PA600RA-L759F80T

VINco E3s 17 mm housing



Schematic



Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions		Value	Unit
Half-Bridge Switch					
Collector-emitter voltage	V_{CES}			1200	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$	T_s = 80 °C	568	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}		1800	A
Turn off safe operating area		T_j = 150°C, V_{CE} = 1200 V		1800	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	956	W
Gate-emitter voltage	V_{GES}			±30	V
Short circuit ratings	t_{SC}	V_{GE} = 15 V, V_{CC} = 800 V	T_j = 150 °C	8	µs
Maximum junction temperature	T_{jmax}			175	°C
Half-Bridge Diode					
Peak repetitive reverse voltage	V_{RRM}			1200	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s = 80 °C	466	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}		1800	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	747	W
Maximum junction temperature	T_{jmax}			175	°C
Module Properties					
Thermal Properties					
Storage temperature	T_{stg}			-40…+125	°C
Operation temperature under switching condition	T_{jop}			-40…+(T_{jmax} - 25)	°C
Isolation Properties					
Isolation voltage	V_{isol}	DC Test Voltage*	t_p = 2 s	6000	V
Creepage distance				16,2	mm
Clearance				18,1	mm
Comparative Tracking Index	CTI			≥ 200	

*100 % tested in production

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	
Half-Bridge Switch										
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$			5	0,0708	25	5,5	6,3	7,1	V
Collector-emitter saturation voltage	V_{CEsat}		15		600	25 125 150		1,33 1,58 1,65	1,95(1)	V
Collector-emitter cut-off current	I_{CES}		0	1200		25			30	µA
Gate-emitter leakage current	I_{GES}		30	0		25			1500	nA
Internal gate resistance	r_g							None		Ω
Input capacitance	C_{ies}	f = 1 Mhz	0	30		25		99594		pF
Output capacitance	C_{oes}							2259		pF
Reverse transfer capacitance	C_{res}							834		pF
Gate charge	Q_g		0/15	600	600	25		3615		nC
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,1		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 5,82 Ω R_{goff} = 5,82 Ω	-5/15	600	600	25 125 150		648,19 628,71 621,05		ns
Rise time	t_r					25 125 150		169,8 206,11 215,76		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		1269,08 1304,77 1314,99		ns
Fall time	t_f					25 125 150		89,43 111,54 113,23		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=33,86 µC Q_{rFWD}=67,52 µC Q_{rFWD}=79,88 µC				25 125 150		100,03 136,88 149,09		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		69,1 85,22 90,99		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	
Half-Bridge Diode										
Static										
Forward voltage	V_F				600	25 125 150		1,53 1,71 1,72	2,1[1]	V
Reverse leakage current	I_R	V_r = 1200 V				25			30	µA
Thermal										
Thermal resistance junction to sink[2]	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,13		K/W
Dynamic										
Peak recovery current	I_{RM}	d*i*/d*t*=3404 A/µs d*i*/d*t*=2784 A/µs d*i*/d*t*=2390 A/µs	-5/15	600	600	25 125 150		196,86 221,74 234,23		A
Reverse recovery time	t_{rr}					25 125 150		438,57 708,8 776,91		ns
Recovered charge	Q_r					25 125 150		33,86 67,52 79,88		µC
Reverse recovered energy	E_{rec}					25 125 150		8,63 19,05 22,82		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		1382,38 538,28 485,71		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	
Thermistor										
Static										
Rated resistance	R					25		5		kΩ
Deviation of R100	$\Delta_{R/R}$	R_{100} = 493 Ω				100	-5		5	%
Power dissipation	P							245		mW
Power dissipation constant	d					25		1,4		mW/K
B-value	$B_{(25/50)}$	Tol. ±2 %						3375		K
B-value	$B_{(25/100)}$	Tol. ±2 %						3437		K
Vincotech Thermistor Reference									K	

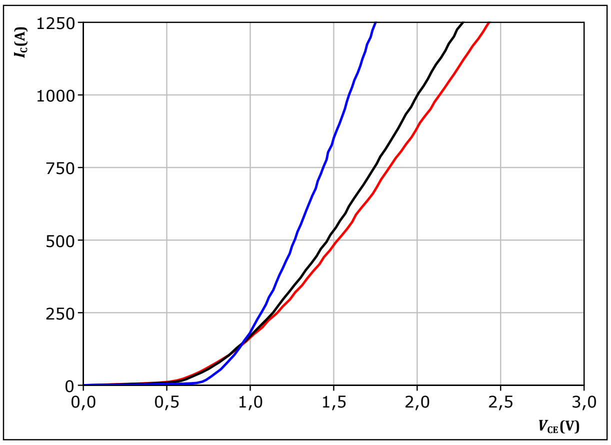
(1) Value at chip level
(2) Only valid with pre-applied Vincotech thermal interface material.

Half-Bridge Switch Characteristics

figure 1. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$

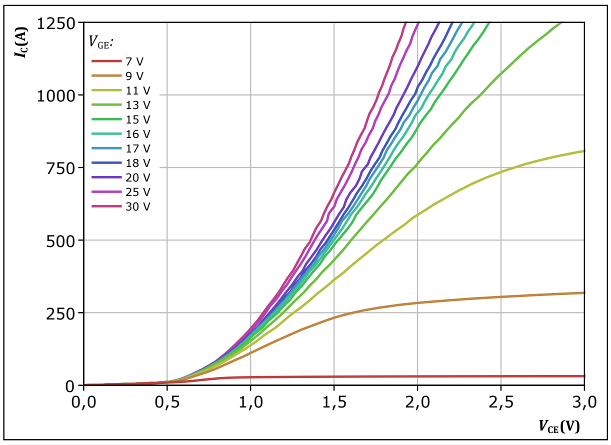


t_p = 250 µs
V_{GE} = 15 V
T_j: 25 °C, 125 °C, 150 °C

figure 2. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$

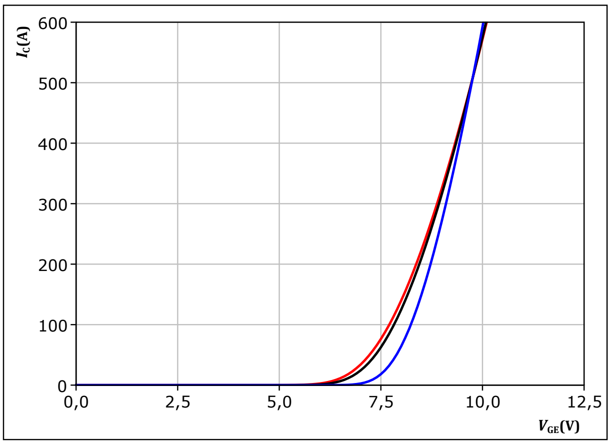


t_p = 250 µs
T_j = 150 °C
V_{GE} from 7 V to 30 V in steps of 2 V

figure 3. **IGBT**

Typical transfer characteristics

$I_C = f(V_{GE})$

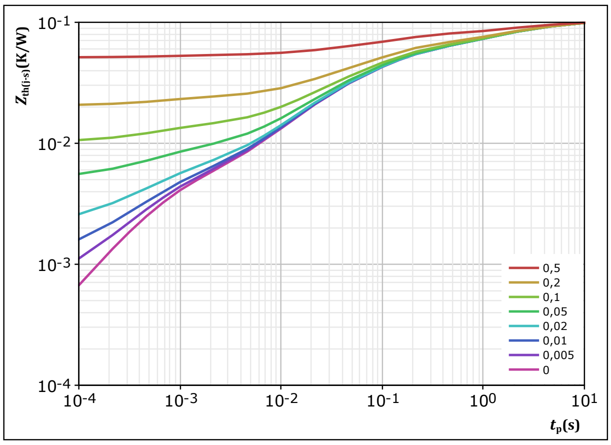


t_p = 250 µs
V_{CE} = 30 V
T_j: 25 °C, 125 °C, 150 °C

figure 4. **IGBT**

Transient thermal impedance as a function of pulse width

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



D = t_p / T
$R_{th(j-s)}$ = 0,099 K/W

IGBT thermal model values

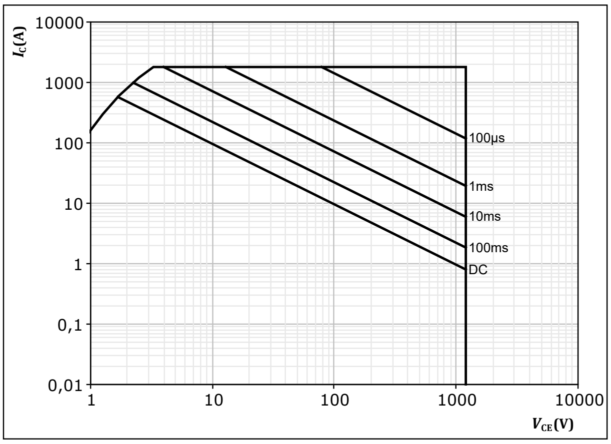
R (K/W)	τ (s)
2,22E-02	5,62E+00
2,72E-02	1,09E+00
3,46E-02	1,03E-01
1,50E-02	1,91E-02
3,67E-03	6,09E-04

Half-Bridge Switch Characteristics

figure 5. **IGBT**

Safe operating area

I_C = f(V_{CE})



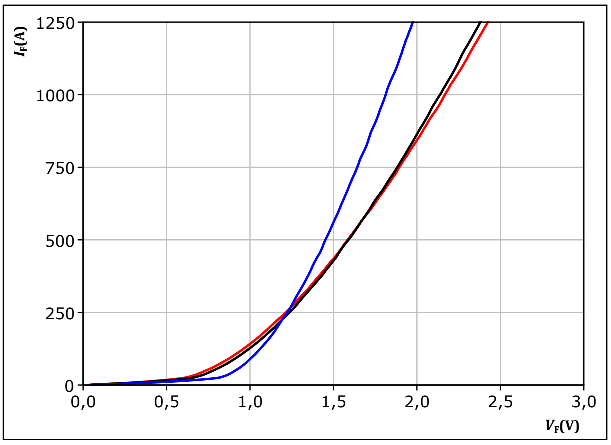
D = single pulse
T_s = 80 °C
V_{GE} = 15 V
T_j = T_{jmax}

Half-Bridge Diode Characteristics

figure 6. **FWD**

Typical forward characteristics

I_F = f(V_F)



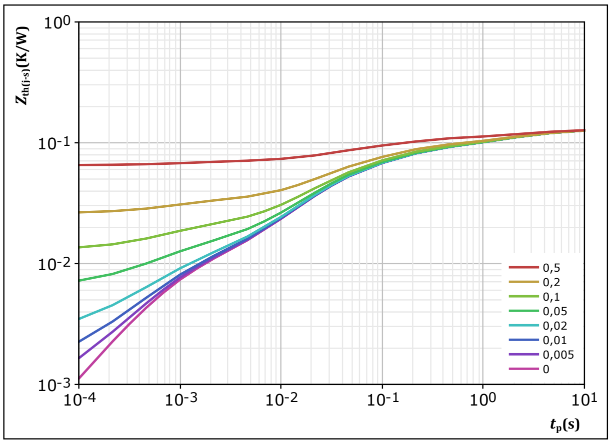
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 7. **FWD**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 0,127 K/W

FWD thermal model values

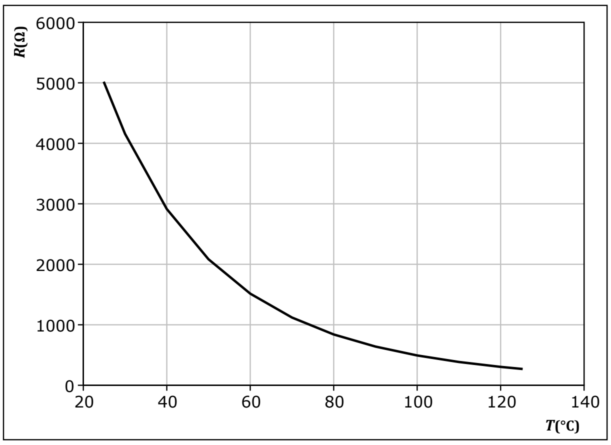
R (K/W)	τ (s)
1,84E-02	6,38E+00
2,80E-02	1,35E+00
4,01E-02	1,22E-01
3,64E-02	2,34E-02
7,49E-03	7,55E-04

Thermistor Characteristics

figure 8.	Thermistor

Typical NTC characteristic as function of temperature

R_T = f(T)

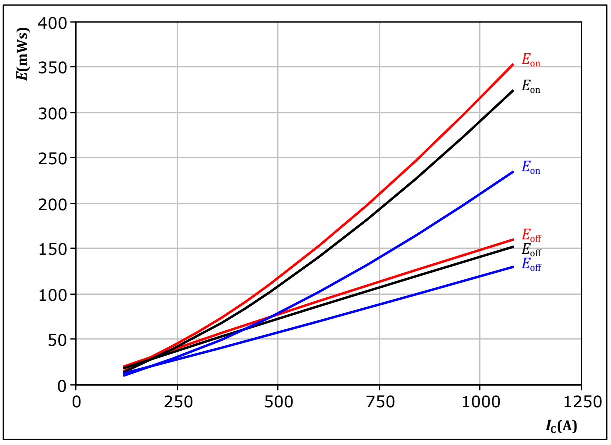


Half-Bridge Switching Characteristics

figure 9. **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} = -5/15 V

R_{gon} = 5,82 Ω

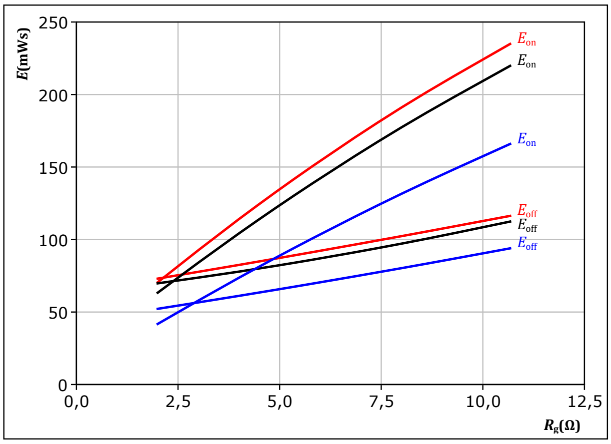
R_{goff} = 5,82 Ω

T_j: 25 °C, 125 °C, 150 °C

figure 10. **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} = -5/15 V

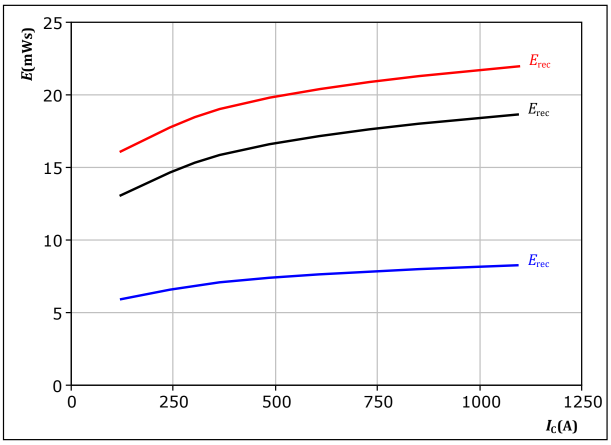
I_C = 600 A

T_j: 25 °C, 125 °C, 150 °C

figure 11. **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} = -5/15 V

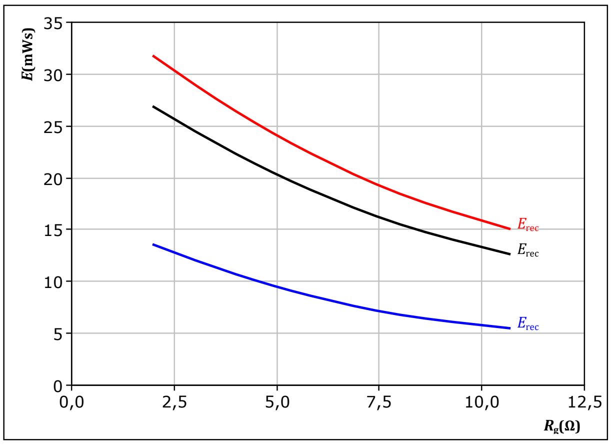
R_{gon} = 5,82 Ω

T_j: 25 °C, 125 °C, 150 °C

figure 12. **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} = -5/15 V

I_C = 600 A

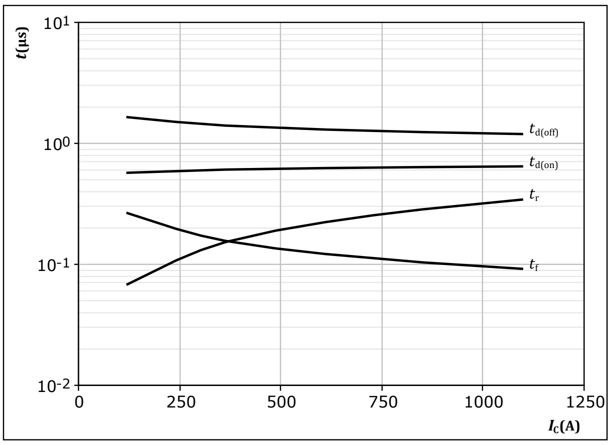
T_j: 25 °C, 125 °C, 150 °C

Half-Bridge Switching Characteristics

figure 13. **IGBT**

Typical switching times as a function of collector current

$t = f(I_C)$



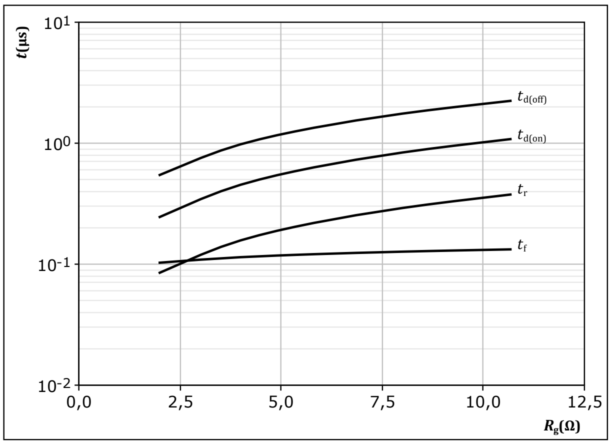
With an inductive load at

T_j =	150	°C
V_{CE} =	600	V
V_{GE} =	-5/15	V
R_{gon} =	5,82	Ω
R_{goff} =	5,82	Ω

figure 14. **IGBT**

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

$t = f(R_g)$



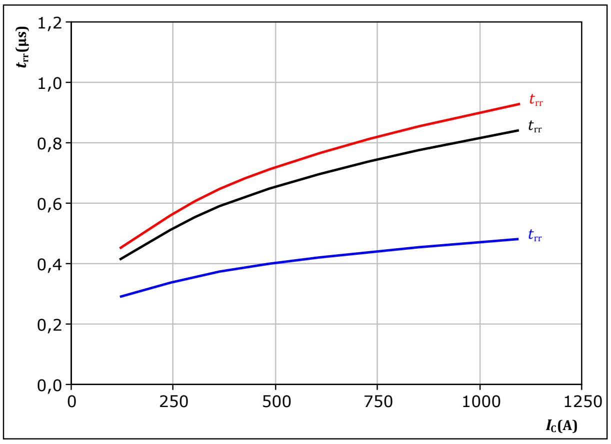
With an inductive load at

T_j =	150	°C
V_{CE} =	600	V
V_{GE} =	-5/15	V
I_C =	600	A

figure 15. **FWD**

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_C)$



With an inductive load at

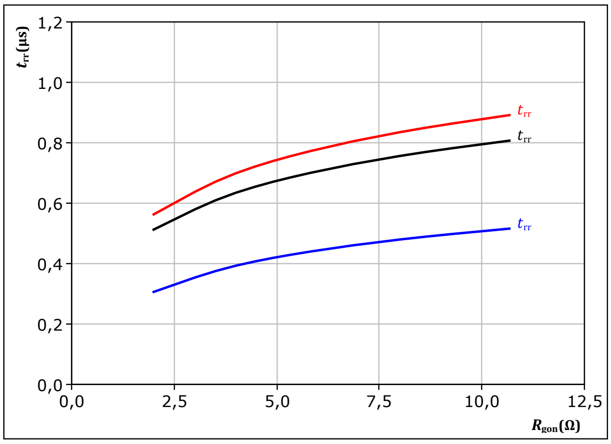
V_{CE} =	600	V
V_{GE} =	-5/15	V
R_{gon} =	5,82	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 16. **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} =	-5/15	V
I_C =	600	A

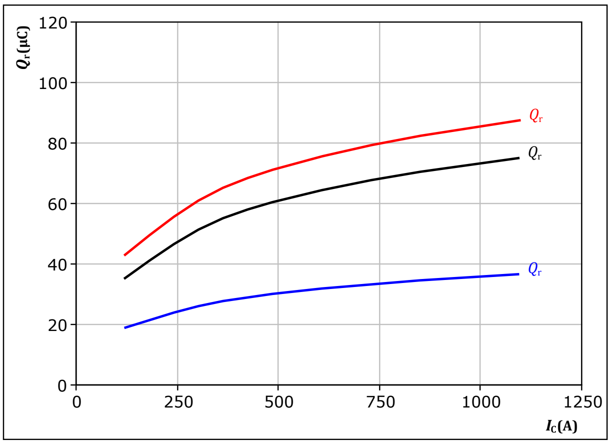
T_j: 25 °C, 125 °C, 150 °C

Half-Bridge Switching Characteristics

figure 17. **FWD**

Typical recovered charge as a function of collector current

Q_r = f(I_C)



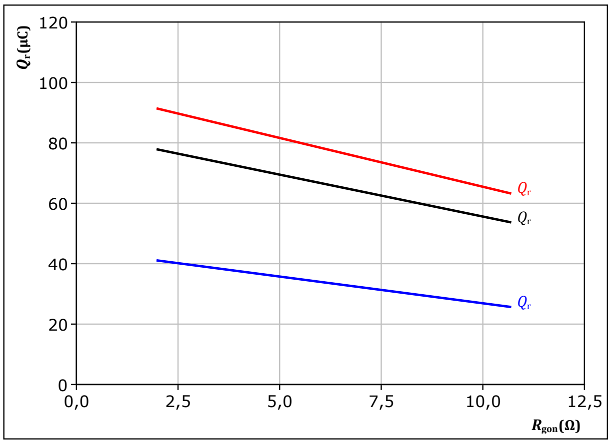
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	-5/15	V		125 °C
R_{gon} =	5,82	Ω		150 °C

figure 18. **FWD**

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

Q_r = f(R_{gon})



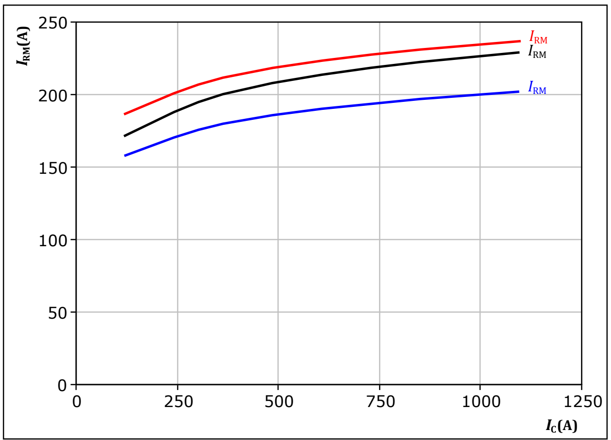
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	-5/15	V		125 °C
I_C =	600	A		150 °C

figure 19. **FWD**

Typical peak reverse recovery current as a function of collector current

I_{RM} = f(I_C)



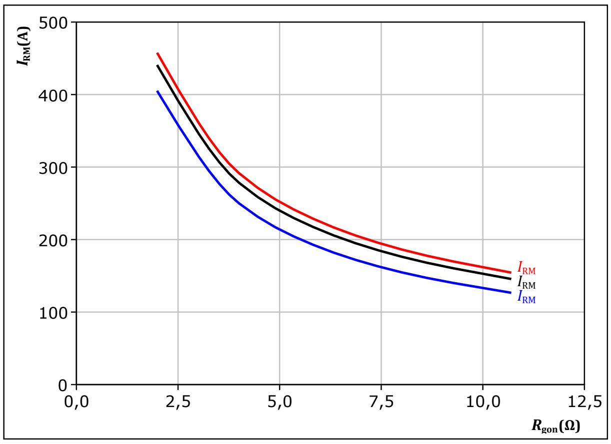
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	-5/15	V		125 °C
R_{gon} =	5,82	Ω		150 °C

figure 20. **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

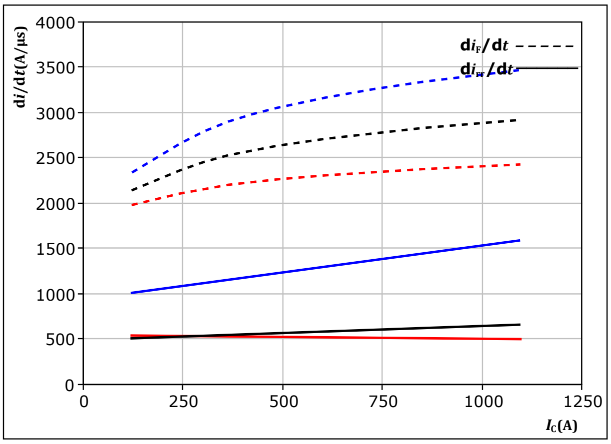
V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	-5/15	V		125 °C
I_C =	600	A		150 °C

Half-Bridge Switching Characteristics

figure 21. **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)



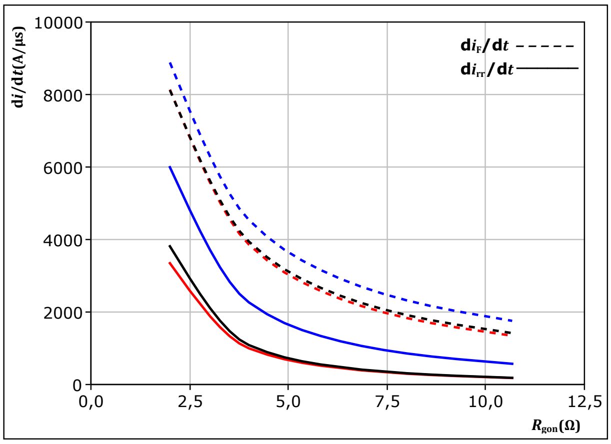
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	-5/15	V		125 °C
R_{gon} =	5,82	Ω		150 °C

figure 22. **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})



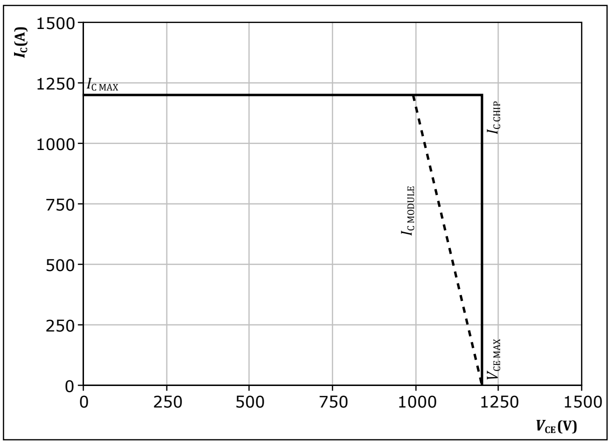
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	-5/15	V		125 °C
I_C =	600	A		150 °C

figure 23. **IGBT**

Reverse bias safe operating area

I_C = f(V_{CE})



At	T_j =	150	°C
	R_{gon} =	5,82	Ω
	R_{goff} =	5,82	Ω

Half-Bridge Switching Definitions

figure 24. **IGBT**

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

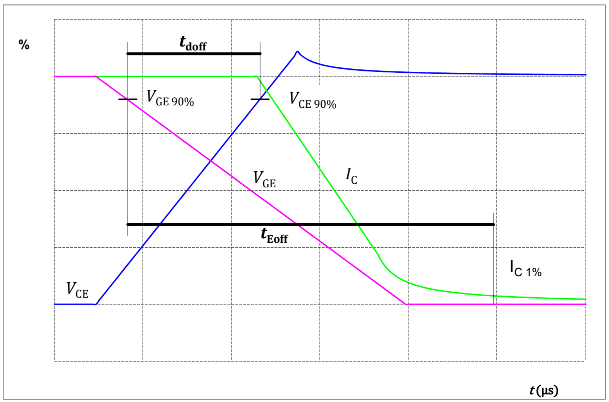


figure 25. **IGBT**

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

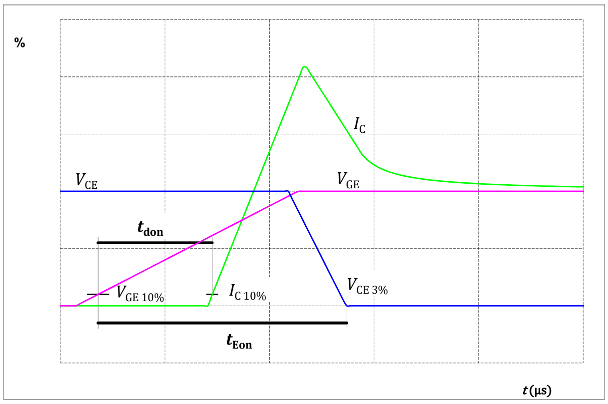


figure 26. **IGBT**

Turn-off Switching Waveforms & definition of t_f

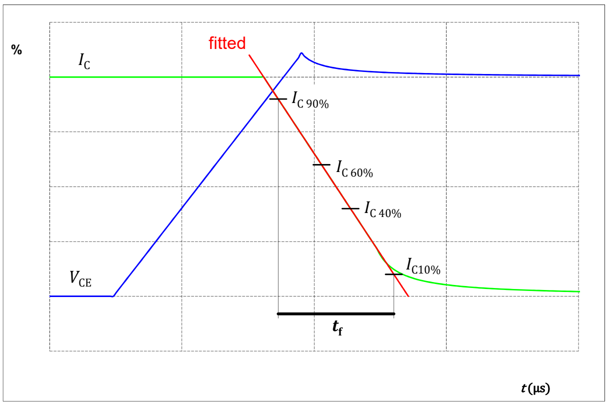
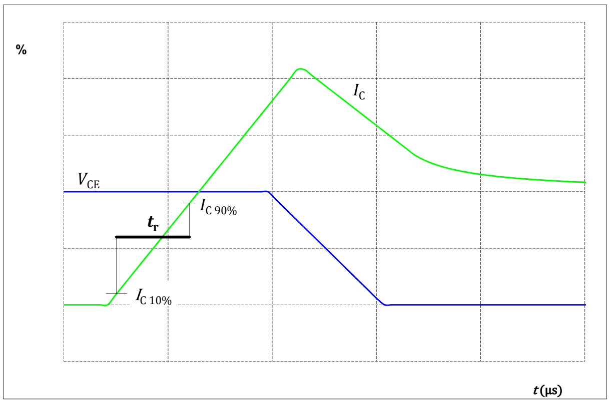


figure 27. **IGBT**

Turn-on Switching Waveforms & definition of t_r



Half-Bridge Switching Definitions

figure 28. **FWD**

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

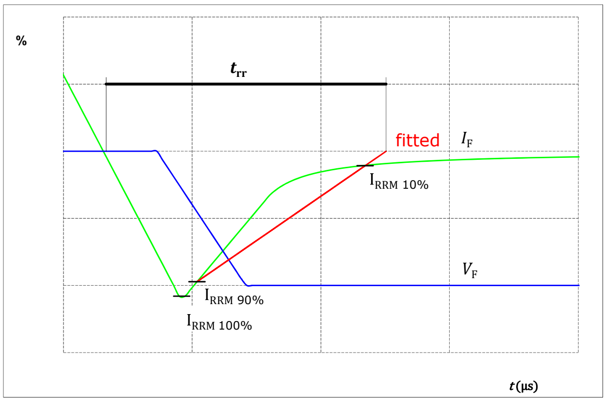
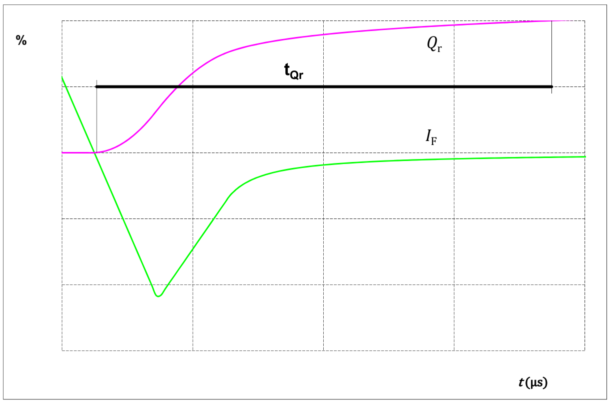


figure 29. **FWD**

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



Ordering Code

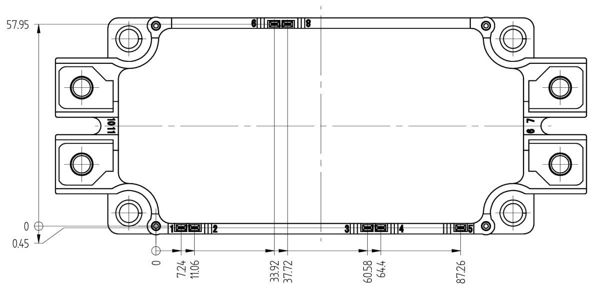
Version	Ordering Code
Without thermal paste	A0-VP122PA600RA-L759F80T
With thermal paste (5,2 W/mK, PTM6000HV)	A0-VP122PA600RA-L759F80T-/7/

Marking

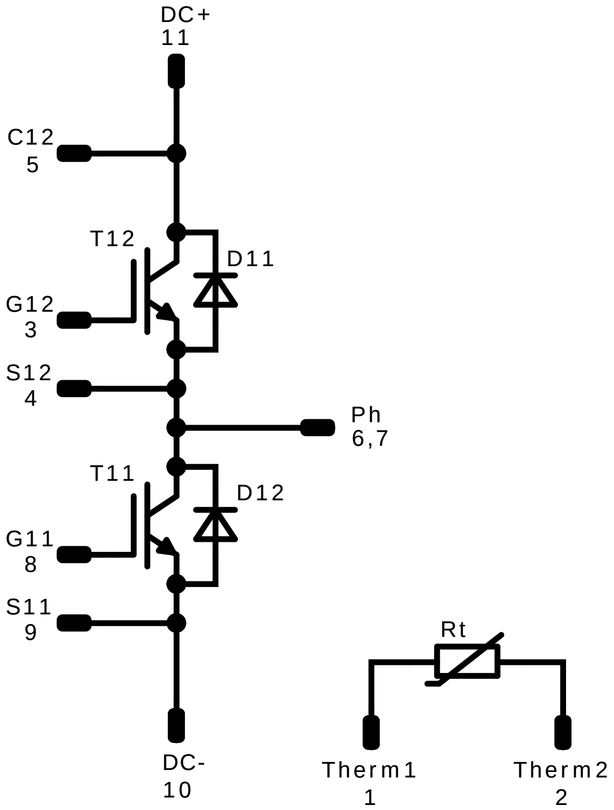
	Name		VIN	Date code	Lot	Serial
Text	NN-NNNNNNNNNNNNNN-TTTTTTTVV		VIN	WWYY	LLLLL	SSSS
Datamatrix	**Type&Ver**	**Lot number**	**Serial**	**Date code**		
	TTTTTTTVV	LLLLL	SSSS	WWYY		

Outline

Pin table [mm]			
Pin	X	Y	Function
1	7,24	-0,45	Therm1
2	11,06	-0,45	Therm2
3	60,58	-0,45	G12
4	64,4	-0,45	S12
5	87,26	-0,45	C12
6	-	-	Ph
7	-	-	Ph
8	37,72	57,95	G11
9	33,92	57,95	S11
10	-	-	DC-
11	-	-	DC+



Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T11, T12	IGBT	1200 V	600 A	Half-Bridge Switch	
D11, D12	FWD	1200 V	600 A	Half-Bridge Diode	
Rt	NTC			Thermistor	

Packaging instruction				
Standard packaging quantity (SPQ) 24	>SPQ	Standard	<SPQ	Sample

Handling instruction
Handling instructions for VINco E3s packages see vincotech.com website.

Package data
Package data for VINco E3s packages see vincotech.com website.

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

UL recognition and file number
Certification pending. For more information see vincotech.com website.

Document No.:	Date:	Modification:	Pages
A0-VP122PA600RA-L759F80T-D1-14	12 Jun. 2026	Initial Release	