Vincotech

10-EZ166BA050MS03-PS10G28T
datasheet

flowCON E1 | **1600 V / 50 A**

Topology features

- Temperature sensor
- Brake Chopper
- Three-phase Rectifier
- SiC

Component features

- High inrush current capability

Housing features

- Base isolation: Al_2O_3
- Convex shaped substrate for superior thermal contact
- Compact housing
- CTI600 housing material
- Thermo-mechanical push-and-pull force relief
- Press-fit pin
- Reliable cold welding connection

Target applications

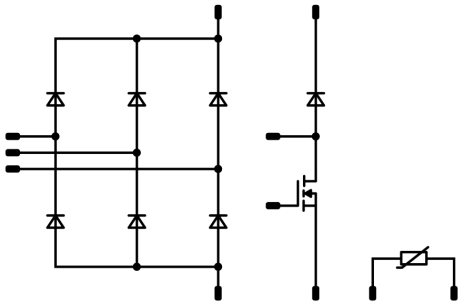
- Embedded Drives
- HVAC
- Industrial Drives

Types

- 10-EZ166BA050MS03-PS10G28T

flow E1 12 mm housing

Schematic



Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
Brake Switch				
Drain-source voltage	V_{DSS}		1200	V
Drain current (DC current)	I_D	$T_j = T_{jmax}$ T_s = 80 °C	42	A
Peak drain current	I_{DM}	t_p limited by T_{jmax}	160	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ T_s = 80 °C	85	W
Gate-source voltage	V_{GSS}	static	-5 / 18	V
		dynamic	-10 / 22	V
Maximum Junction Temperature	T_{jmax}		175	°C
Brake Diode				
Peak repetitive reverse voltage	V_{RRM}		1700	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$ T_s = 80 °C	29	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, t_p = 8,3 ms T_j = 25 °C	95	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ T_s = 80 °C	88	W
Maximum junction temperature	T_{jmax}		175	°C
Rectifier Diode				
Peak repetitive reverse voltage	V_{RRM}		1600	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$ T_s = 80 °C	106	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, t_p = 10 ms T_j = 150 °C	600	A
Surge current capability	I^2t		1800	A^2s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ T_s = 80 °C	129	W
Maximum junction temperature	T_{jmax}		175	°C

Maximum Ratings

T_j = 25 °C, unless otherwise specified

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 Test Voltage* t_p = 2 s	6000	V
Creepage distance			>12,7	mm
Clearance			9,21	mm
Comparative Tracking Index	CTI		≥ 600	

*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	
Brake Switch										
Static										
Drain-source on-state resistance	$r_{DS(on)}$		18		40	25 125 150		33,2 41,4 45,7	45(1)	mΩ
Gate-source threshold voltage	$V_{GS(th)}$				0,004	25	1,7	2,25	2,75	V
Gate to Source Leakage Current	I_{GSS}		22	0		25			100	nA
Zero Gate Voltage Drain Current	I_{DSS}		0	1200		25			10	µA
Internal gate resistance	r_g							2		Ω
Gate charge	Q_g		-5/18	800	40	25		108		nC
Short-circuit input capacitance	C_{iss}	f = 500 kHz	0	800	0	25		2600		pF
Short-circuit output capacitance	C_{oss}							135		
Reverse transfer capacitance	C_{rss}							6		
Diode forward voltage	V_{SD}		0		40	25		4,1		V
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 5,2 W/mK (PTM)						1,12		K/W
Brake Diode										
Static										
Forward voltage	V_F				25	25 125 150		1,59 2,27 2,53	1,95(1)	V
Reverse leakage current	I_R	V_r = 1700 V				25		2,5	150	µA
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 5,2 W/mK (PTM)						1,08		K/W

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	
Rectifier Diode										
Static										
Forward voltage	V_F				50	25 125 150		1,06 0,991 0,977	1,5[1]	V
Reverse leakage current	I_R	V_r = 1600 V				25 150			50 1500	µA
Thermal										
Thermal resistance junction to sink[2]	$R_{th(j-s)}$	λ_{paste} = 5,2 W/mK (PTM)						0,74		K/W
Thermistor										
Static										
Rated resistance	R					25		22		kΩ
Deviation of R100	$\Delta_{R/R}$	R_{100} = 1484 Ω				100	-5		5	%
Power dissipation	P					25		130		mW
Power dissipation constant	d					25		1,5		mW/K
B-value	$B_{(25/50)}$	Tol. ±1 %						3962		K
B-value	$B_{(25/100)}$	Tol. ±1 %						4000		K
Vincotech Thermistor Reference									I	

(1) Value at chip level

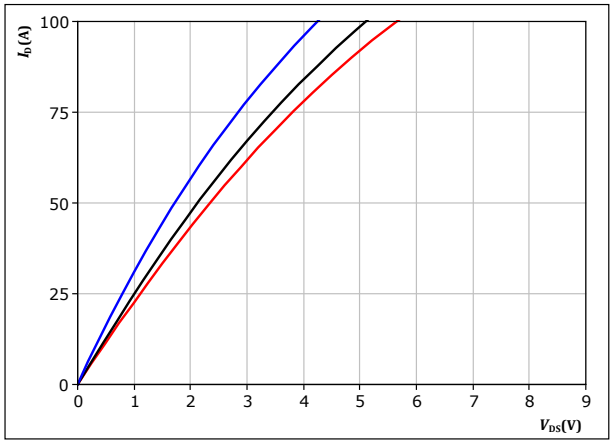
(2) Only valid with pre-applied Vincotech thermal interface material.

Brake Switch Characteristics

figure 1. **MOSFET**

Typical output characteristics

$I_D = f(V_{DS})$

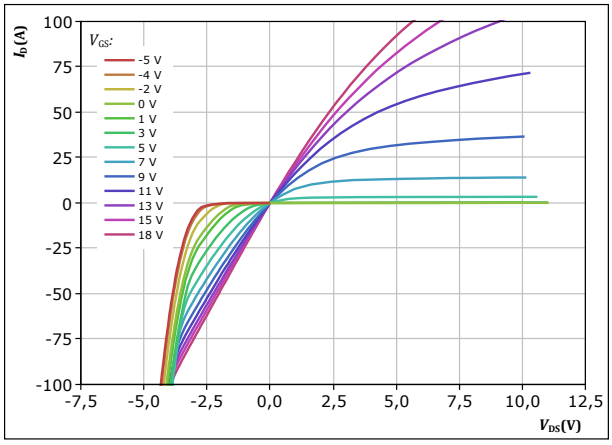


t_p =	250	µs		
V_{GS} =	18	V	T_j:	25 °C
				125 °C
				150 °C

figure 2. **MOSFET**

Typical output characteristics

$I_D = f(V_{DS})$



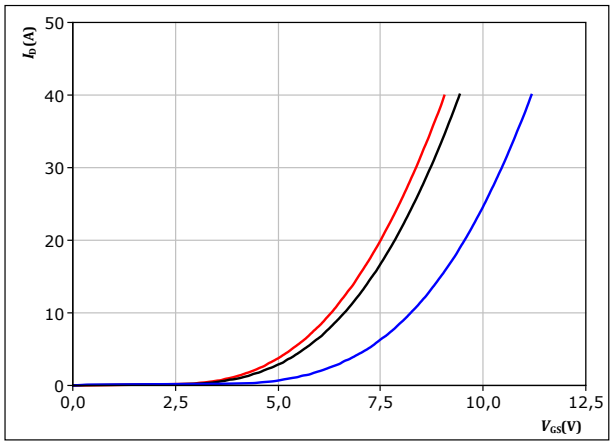
t_p =	250	µs
T_j =	150	°C

V_{GS} from -5 V to 18 V in steps of 1 V

figure 3. **MOSFET**

Typical transfer characteristics

$I_D = f(V_{GS})$

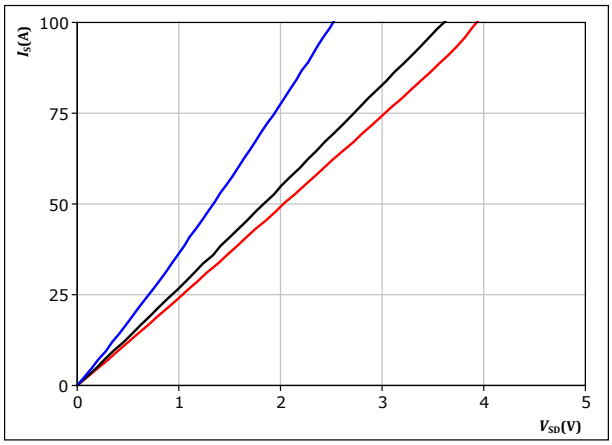


t_p =	250	µs		
V_{DS} =	10	V	T_j:	25 °C
				125 °C
				150 °C

figure 4. **MOSFET**

Typical reverse drain current characteristics

$I_{SD} = f(V_{SD})$



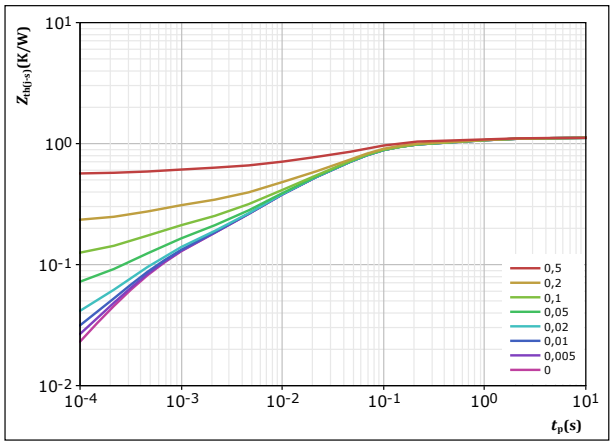
t_p =	250	µs		
V_{GS} =	18	V	T_j:	25 °C
				125 °C
				150 °C

Brake Switch Characteristics

figure 5. **MOSFET**

Transient thermal impedance as a function of pulse width

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



D =	t_p / T	
$R_{th(j-s)}$ =	1,117	K/W

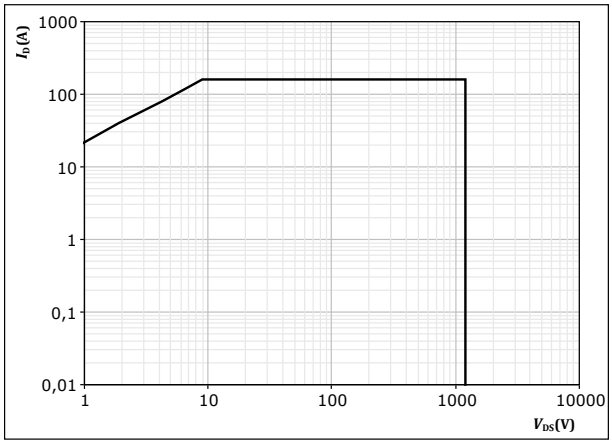
MOSFET thermal model values

R (K/W)	τ (s)
2,40E-02	6,63E+00
1,44E-01	6,82E-01
6,46E-01	5,06E-02
2,09E-01	6,56E-03
9,87E-02	4,77E-04

figure 6. **MOSFET**

Safe operating area

$I_D = f(V_{DS})$



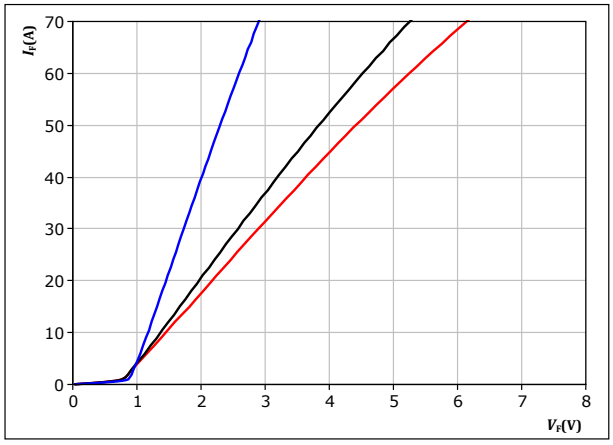
D =	single pulse	
T_s =	80	°C
V_{GS} =	18	V
T_j =	T_{jmax}	

Brake Diode Characteristics

figure 7. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



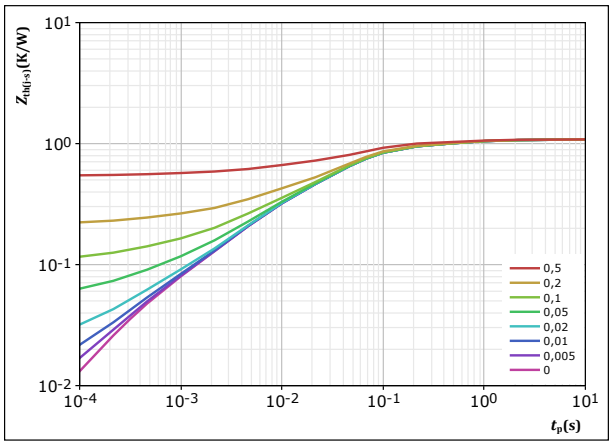
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 8. **FWD**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 1,083 K/W

FWD thermal model values

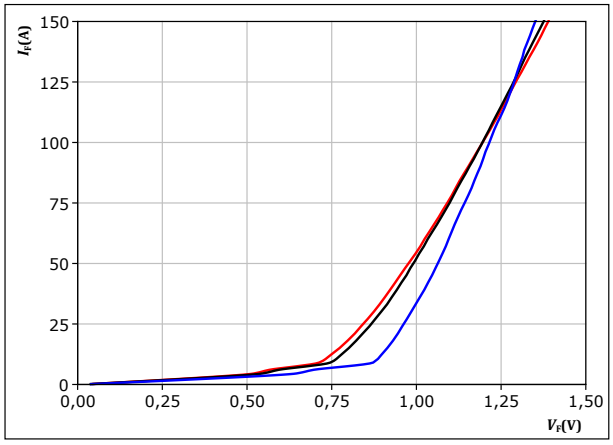
R (K/W)	τ (s)
2,41E-02	5,70E+00
1,75E-01	4,44E-01
6,75E-01	4,76E-02
1,76E-01	4,96E-03
3,61E-02	3,90E-04

Rectifier Diode Characteristics

figure 9. **Rectifier**

Typical forward characteristics

$I_F = f(V_F)$



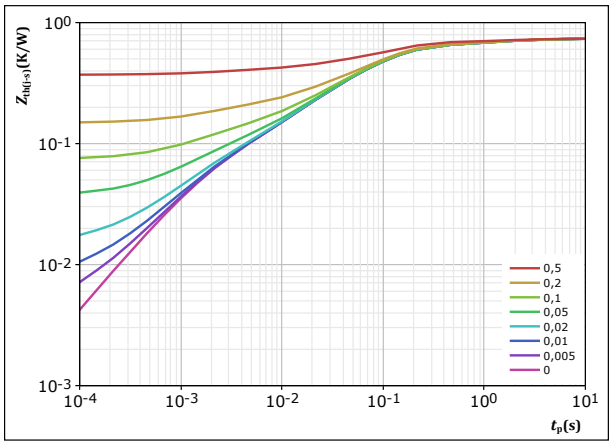
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 10. **Rectifier**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 0,736 K/W

Rectifier thermal model values

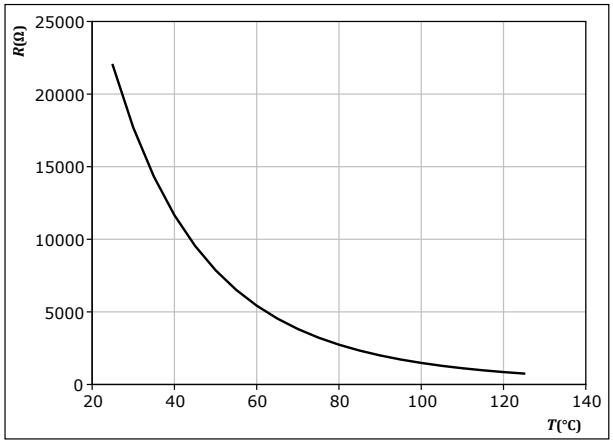
R (K/W)	τ (s)
2,25E-02	6,62E+00
9,23E-02	1,12E+00
4,58E-01	9,31E-02
1,13E-01	1,76E-02
5,39E-02	1,70E-03

Thermistor Characteristics

figure 11. **Thermistor**

Typical NTC characteristic as function of temperature

$R_T = f(T)$



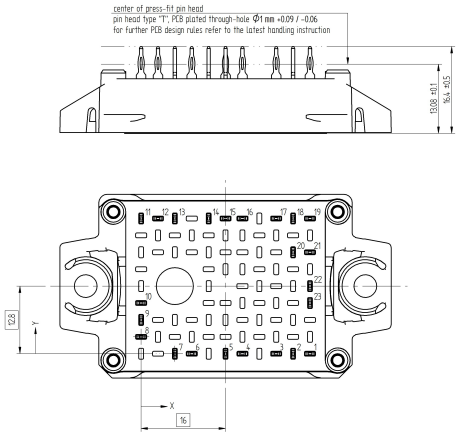
Ordering Code	
Version	**Ordering Code**
Without thermal paste	10-EZ166BA050MS03-PS10G28T
With thermal paste (5,2 W/mK, PTM6000HV)	10-EZ166BA050MS03-PS10G28T-/7/

Marking

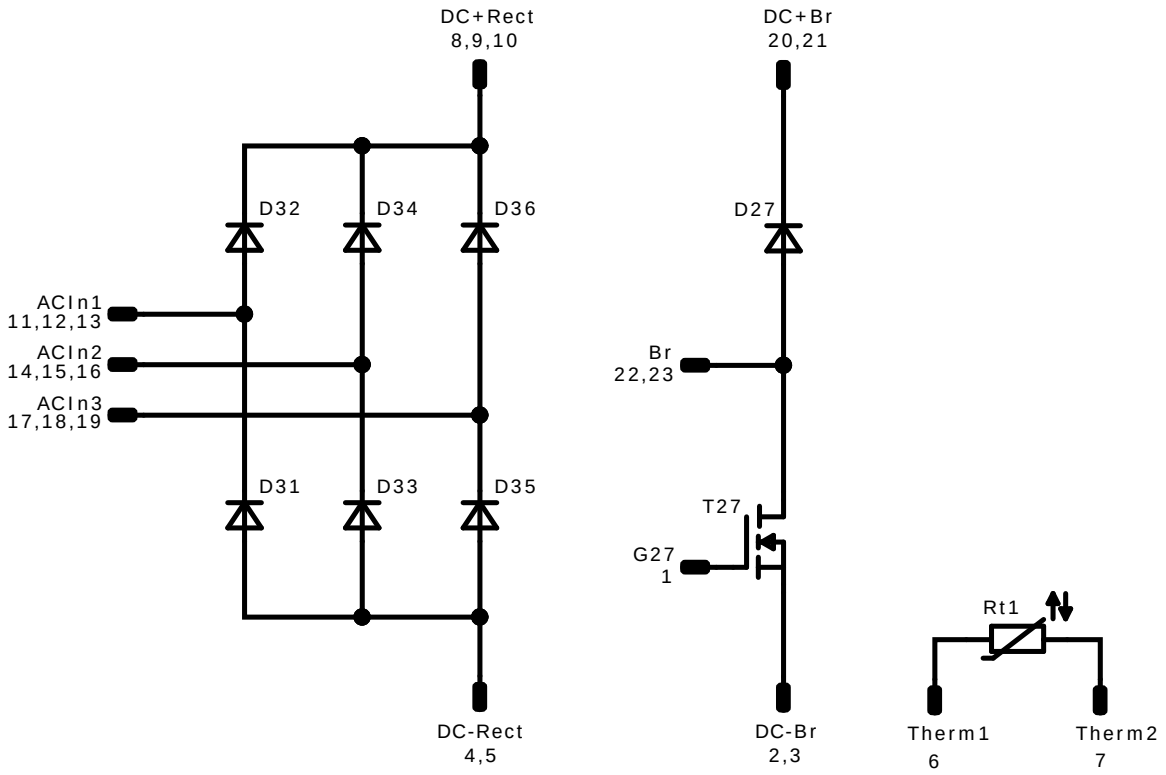
	Name		Date code	UL & VIN	Lot	Serial
Text	NN-NNNNNNNNNNNNNN-TTTTTTVV		WWYY	UL VIN	LLLLL	SSSS
Datamatrix	**Type&Ver**	**Lot number**	**Serial**	**Date code**		
	TTTTTTVV	LLLLL	SSSS	WWYY		

Outline

Pin table [mm]			
Pin	X	Y	Function
1	32	0	G27
2	28,8	0	DC-Br
3	25,6	0	DC-Br
4	19,2	0	DC-Rect
5	16	0	DC-Rect
6	9,6	0	Therm1
7	6,4	0	Therm2
8	0	3,2	DC+Rect
9	0	6,4	DC+Rect
10	0	9,6	DC+Rect
11	0	25,6	ACIn1
12	3,2	25,6	ACIn1
13	6,4	25,6	ACIn1
14	12,8	25,6	ACIn2
15	16	25,6	ACIn2
16	19,2	25,6	ACIn2
17	25,6	25,6	ACIn3
18	28,8	25,6	ACIn3
19	32	25,6	ACIn3
20	28,8	19,2	DC+Br
21	32	19,2	DC+Br
22	32	12,8	Br
23	32	9,6	Br



Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T27	MOSFET	1200 V	30 mΩ	Brake Switch	
D27	FWD	1700 V	25 A	Brake Diode	
D31, D32, D33, D34, D35, D36	Rectifier	1600 V	50 A	Rectifier Diode	
Rt	Thermistor			Thermistor	

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

Handling instruction
Handling instructions for *flow* E1 packages see vincotech.com website.

Package data
Package data for *flow* E1 packages see vincotech.com website.

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

UL recognition and file number
This device is UL 1557 recognized under E192116 up to a junction temperature under switching condition $T_{j,op}$=175°C and up to 3500VAC/1min isolation voltage. For more information see vincotech.com website.

Document No.:	Date:	Modification:	Pages
10-EZ166BA050MS03-PS10G28T-D1-14	7 Nov. 2025	Initial Release	