



flowPACK E1 SiC

1200 V / 32 mΩ

Topology features

- 3ph Inverter
- Low and high side Kelvin Emitter for improved switching performance
- SiC MOSFET
- Open Emitter configuration
- Temperature sensor

Component features

- High Blocking Voltage with low drain source on state resistance
- High speed SiC-MOSFET technology
- Resistant to Latch-up

Housing features

- Base isolation: Al₂O₃
- 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

- Charging Stations
- Elevator Drives
- Embedded Drives
- Servo Drives

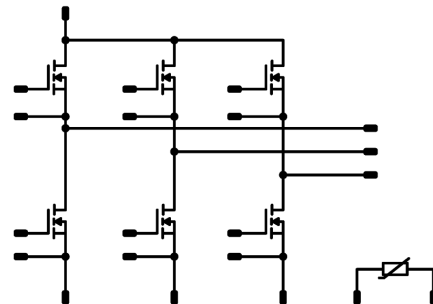
Types

- 10-EZ126PB032ME-LS18F08T

flow E1 12 mm housing



Schematic





Vincotech

10-EZ126PB032ME-LS18F08T
datasheet

Maximum Ratings

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

Parameter	Symbol	Conditions	Value	Unit
Inverter Switch				
Drain-source voltage	V_{DS}		1200	V
Drain current (DC current)	I_D	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	39	A
Peak drain current	I_{DM}	t_p limited by T_{jmax}	120	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	74	W
Gate-source voltage	V_{GS}		-4 / 15	V
		dynamic	-8 / 19	
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* $t_p = 2\text{ s}$	6000	V
Isolation voltage	V_{isol}	AC Voltage $t_p = 1\text{ min}$	2500	V
Creepage distance			>12,7	mm
Clearance			8,74	mm
Comparative Tracking Index	CTI		≥ 600	

*100 % tested in production



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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		

Inverter Switch

Static

Drain-source on-state resistance	$r_{DS(on)}$		15		40	25 125 150	22,4	34,2 42,1 46,4	41,6 ⁽¹⁾	mΩ
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$			0,0115	25	1,8	2,5	3,6	V
Gate to Source Leakage Current	I_{GSS}		15	0		25		10	250	nA
Zero Gate Voltage Drain Current	I_{DSS}		0	1200		25		1	19	μA
Internal gate resistance	r_g							1,7		Ω
Gate charge	Q_g		-4/15	800	40	25		118		nC
Short-circuit input capacitance	C_{iss}	$f = 100$ kHz	0	1000	0	25		3357		pF
Short-circuit output capacitance	C_{oss}							129		
Reverse transfer capacitance	C_{rss}							8		
Diode forward voltage	V_{SD}		0		20	25		4,6		V

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						1,28		K/W
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Vincotech

10-EZ126PB032ME-LS18F08T
datasheet

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		
Dynamic										
Turn-on delay time	$t_{d(on)}$					25 125 150		25,88 23,53 23,25		ns
Rise time	t_r	$R_{gon} = 8 \Omega$ $R_{goff} = 8 \Omega$				25 125 150		9,13 8,45 8,27		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		61,73 68,82 70,31		ns
Fall time	t_f					25 125 150		16,81 17,44 18,37		ns
Turn-on energy (per pulse)	E_{on}	$Q_{rFWD}=0,223 \mu C$ $Q_{rFWD}=0,49 \mu C$ $Q_{rFWD}=0,609 \mu C$	-4/15	600	30	25 125 150		0,32 0,362 0,388		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,131 0,131 0,132		mWs
Peak recovery current	I_{RRM}					25 125 150		29,71 41,88 47,97		A
Reverse recovery time	t_{rr}					25 125 150		12,9 18,87 19,88		ns
Recovered charge	Q_r	$di/dt=3997 A/\mu s$ $di/dt=4663 A/\mu s$ $di/dt=4786 A/\mu s$				25 125 150		0,223 0,49 0,609		μC
Reverse recovered energy	E_{rec}					25 125 150		0,052 0,159 0,211		mWs
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$					25 125 150		6325,32 4793,08 6259,29		A/ μs



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Characteristic Values

Parameter	Symbol	Conditions					Values			Unit
		V_{GS} [V]	V_{GE} [V]	V_{DS} [V]	V_{CE} [V]	T_j [°C]	Min	Typ	Max	

Thermistor

Static

Rated resistance	R					25		5		kΩ
Deviation of R100	$A_{R/R}$	$R_{100} = 499 \Omega$				100	3,2		3,3	%
Power dissipation	P					25		130		mW
Power dissipation constant	d					25		1,3		mW/K
B-value	$B_{(25/50)}$	Tol. $\pm 1 \%$						3380		K
Vincotech Thermistor Reference									V	

⁽¹⁾ Value at chip level

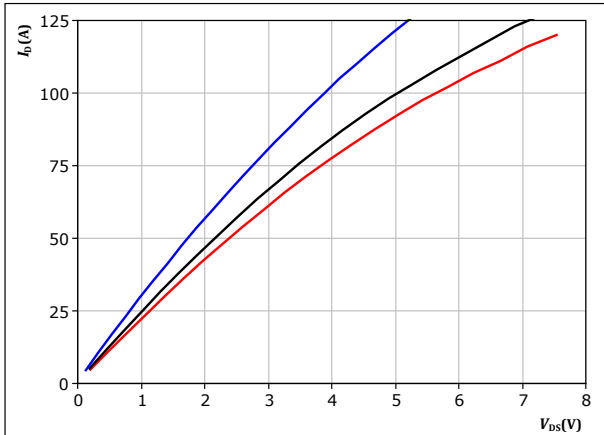
⁽²⁾ Only valid with pre-applied Vincotech thermal interface material.



Inverter Switch Characteristics

figure 1. MOSFET

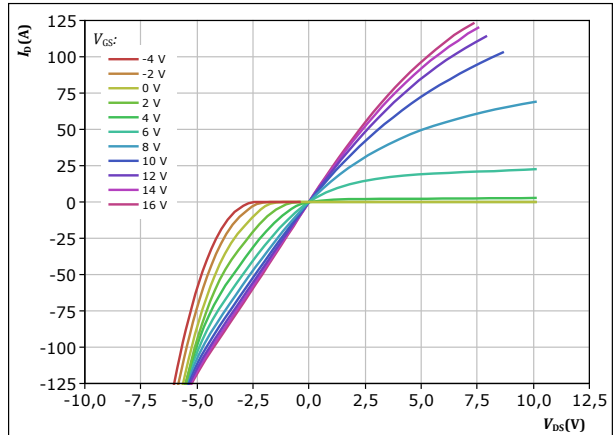
Typical output characteristics
 $I_D = f(V_{DS})$



$t_p = 250 \mu s$
 $V_{GS} = 14 V$
 $T_j:$ 25 °C (blue), 125 °C (black), 150 °C (red)

figure 2. MOSFET

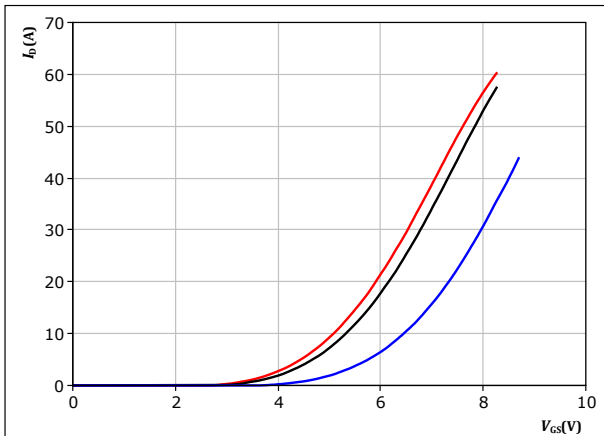
Typical output characteristics
 $I_D = f(V_{DS})$



$t_p = 250 \mu s$
 $T_j = 150 \text{ } ^\circ\text{C}$
 V_{GS} from -4 V to 16 V in steps of 2 V

figure 3. MOSFET

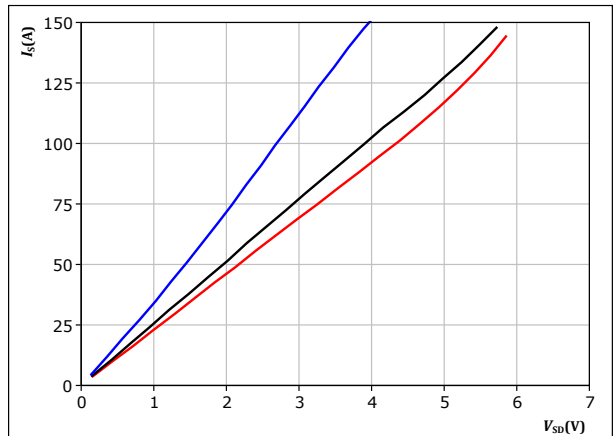
Typical transfer characteristics
 $I_D = f(V_{GS})$



$t_p = 250 \mu s$
 $V_{DS} = 10 V$
 $T_j:$ 25 °C (blue), 125 °C (black), 150 °C (red)

figure 4. MOSFET

Typical reverse drain current characteristics
 $I_{SD} = f(V_{SD})$



$t_p = 250 \mu s$
 $V_{GS} = 14 V$
 $T_j:$ 25 °C (blue), 125 °C (black), 150 °C (red)

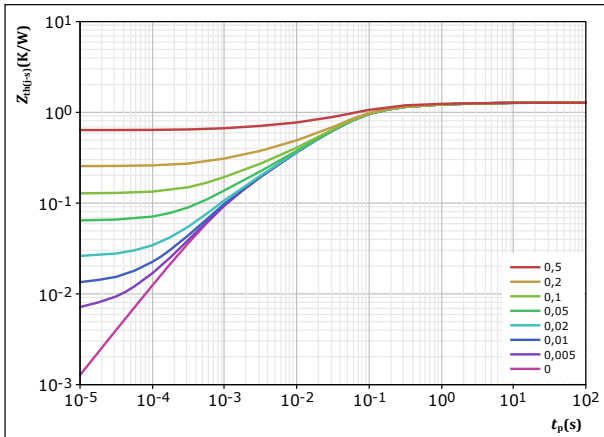


Inverter Switch Characteristics

figure 5. MOSFET

Transient thermal impedance as a function of pulse width

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



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

$$R_{th(j-c)} = 1,276 \text{ K/W}$$

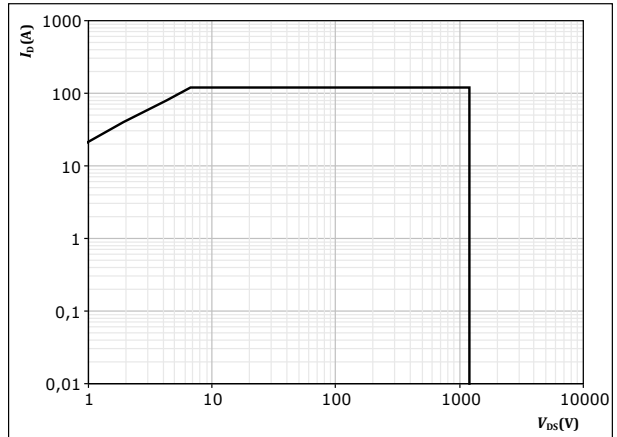
MOSFET thermal model values

R (K/W)	τ (s)
6,59E-02	2,75E+00
1,80E-01	3,21E-01
7,28E-01	5,55E-02
2,13E-01	8,37E-03
8,96E-02	1,01E-03

figure 6. MOSFET

Safe operating area

$$I_D = f(V_{DS})$$



D = single pulse

$$T_s = 80 \text{ } ^\circ\text{C}$$

$$V_{GS} = 14 \text{ V}$$

$$T_1 = T_{jmax}$$

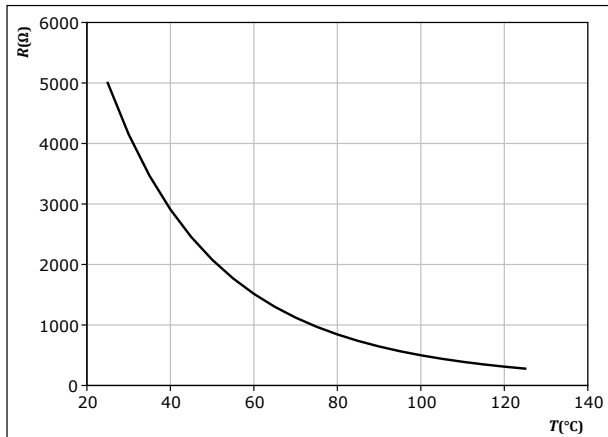


Thermistor Characteristics

figure 7. Thermistor

Typical NTC characteristic as function of temperature

$$R_T = f(T)$$

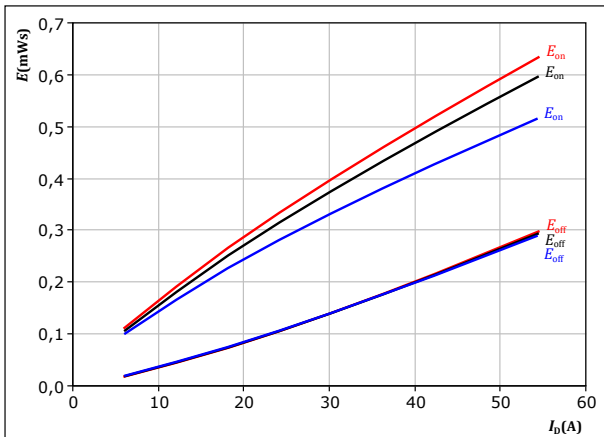




Inverter Switching Characteristics

figure 8. MOSFET

Typical switching energy losses as a function of drain current
 $E = f(I_D)$

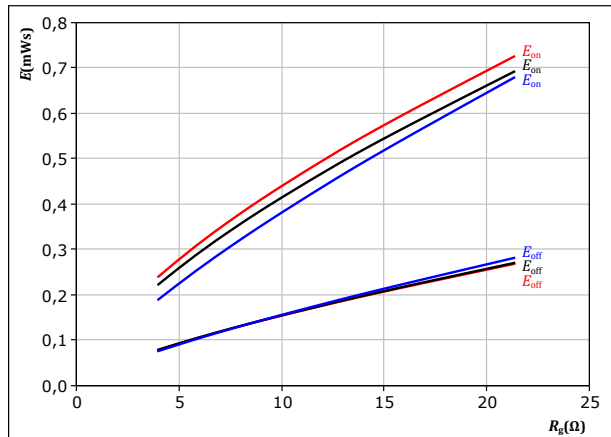


With an inductive load at

$V_{DS} =$	600	V	$T_j:$	25 °C
$V_{GS} =$	-4/15	V		125 °C
$R_{g(on)} =$	8	Ω		150 °C
$R_{g(off)} =$	8	Ω		

figure 9. MOSFET

Typical switching energy losses as a function of MOSFET turn on gate resistor
 $E = f(R_g)$

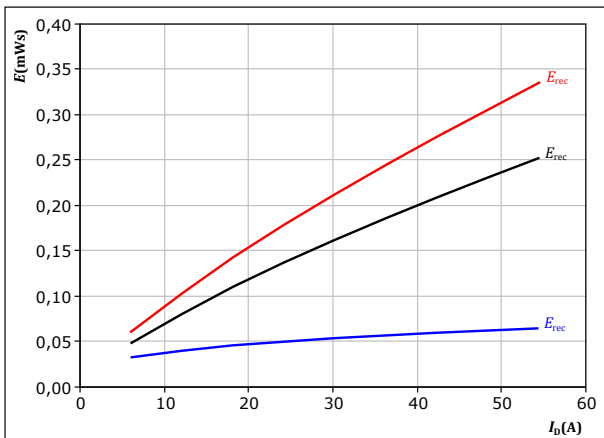


With an inductive load at

$V_{DS} =$	600	V	$T_j:$	25 °C
$V_{GS} =$	-4/15	V		125 °C
$I_D =$	30	A		150 °C

figure 10. MOSFET

Typical reverse recovered energy loss as a function of drain current
 $E_{rec} = f(I_D)$

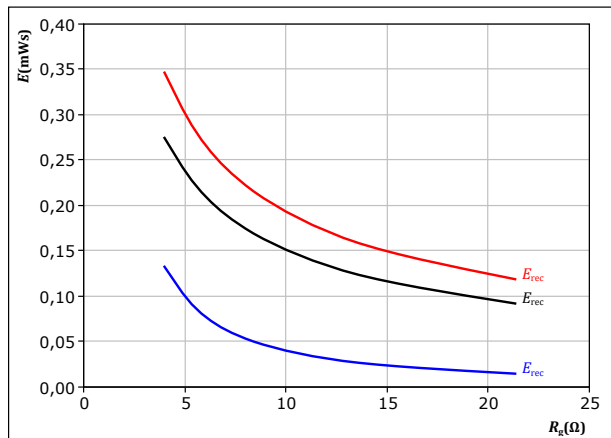


With an inductive load at

$V_{DS} =$	600	V	$T_j:$	25 °C
$V_{GS} =$	-4/15	V		125 °C
$R_{g(on)} =$	8	Ω		150 °C

figure 11. MOSFET

Typical reverse recovered energy loss as a function of MOSFET turn on gate resistor
 $E_{rec} = f(R_g)$



With an inductive load at

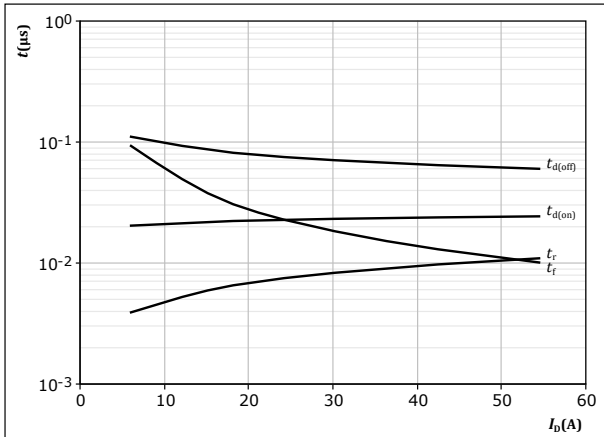
$V_{DS} =$	600	V	$T_j:$	25 °C
$V_{GS} =$	-4/15	V		125 °C
$I_D =$	30	A		150 °C



Inverter Switching Characteristics

figure 12. MOSFET

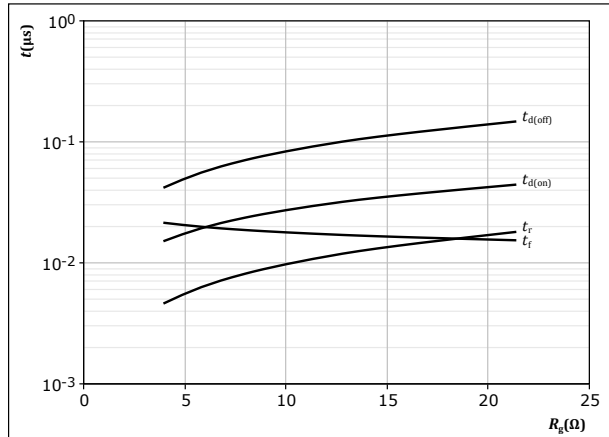
Typical switching times as a function of drain current
 $t = f(I_D)$



With an inductive load at
 $T_j = 150 \text{ }^\circ\text{C}$
 $V_{DS} = 600 \text{ V}$
 $V_{GS} = -4/15 \text{ V}$
 $R_{gon} = 8 \text{ } \Omega$
 $R_{goff} = 8 \text{ } \Omega$

figure 13. MOSFET

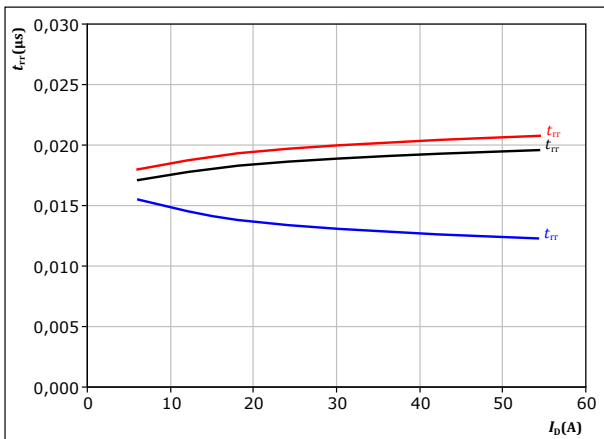
Typical switching times as a function of MOSFET turn on gate resistor
 $t = f(R_g)$



With an inductive load at
 $T_j = 150 \text{ }^\circ\text{C}$
 $V_{DS} = 600 \text{ V}$
 $V_{GS} = -4/15 \text{ V}$
 $I_D = 30 \text{ A}$

figure 14. MOSFET

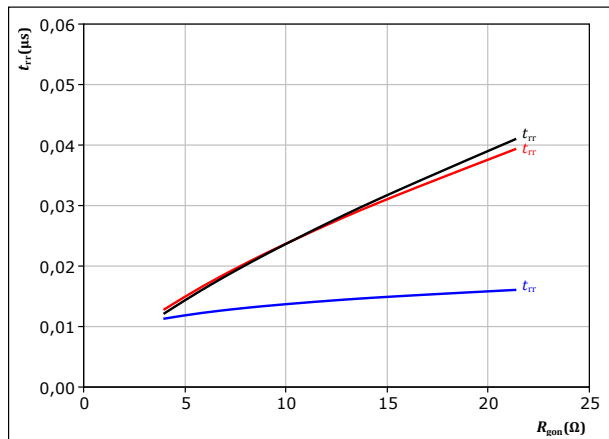
Typical reverse recovery time as a function of drain current
 $t_{rr} = f(I_D)$



At $V_{DS} = 600 \text{ V}$
 $V_{GS} = -4/15 \text{ V}$
 $R_{gon} = 8 \text{ } \Omega$
 $T_j:$ — 25 °C
 — 125 °C
 — 150 °C

figure 15. MOSFET

Typical reverse recovery time as a function of MOSFET turn on gate resistor
 $t_{rr} = f(R_{gon})$



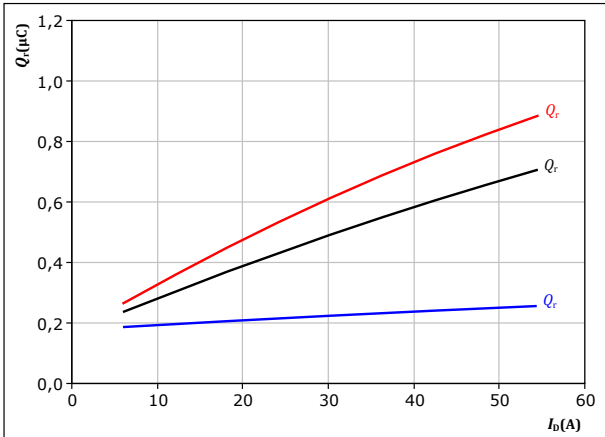
At $V_{DS} = 600 \text{ V}$
 $V_{GS} = -4/15 \text{ V}$
 $I_D = 30 \text{ A}$
 $T_j:$ — 25 °C
 — 125 °C
 — 150 °C



Inverter Switching Characteristics

figure 16. MOSFET

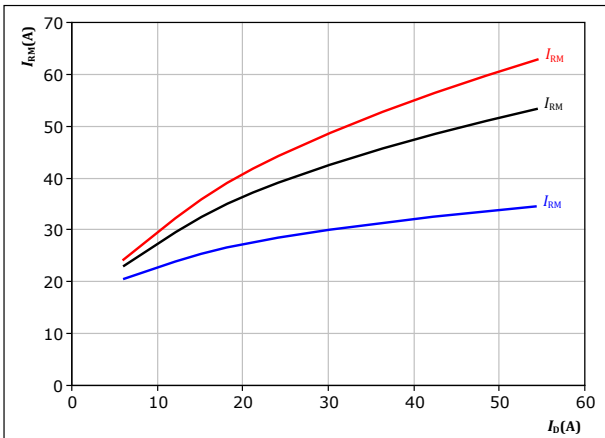
Typical recovered charge as a function of drain current
 $Q_r = f(I_D)$



At $V_{DS} = 600$ V
 $V_{GS} = -4/15$ V
 $R_{gon} = 8$ Ω
 T_j : 25 °C (blue), 125 °C (black), 150 °C (red)

figure 18. MOSFET

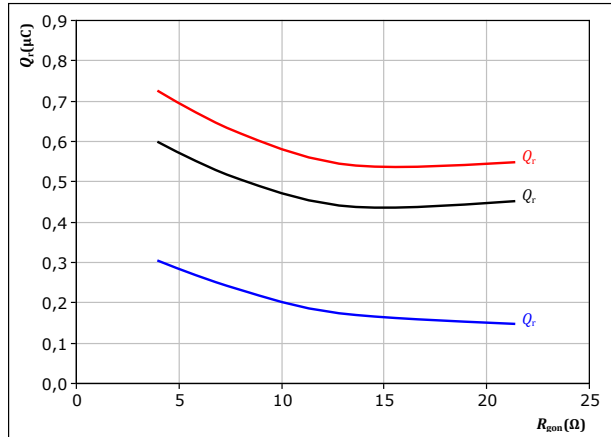
Typical peak reverse recovery current as a function of drain current
 $I_{RM} = f(I_D)$



At $V_{DS} = 600$ V
 $V_{GS} = -4/15$ V
 $R_{gon} = 8$ Ω
 T_j : 25 °C (blue), 125 °C (black), 150 °C (red)

figure 17. MOSFET

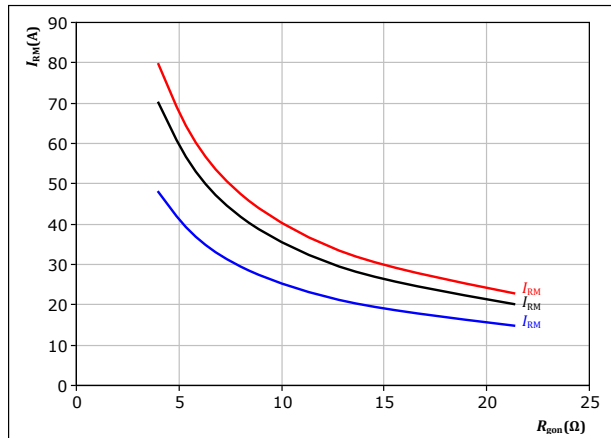
Typical recovered charge as a function of MOSFET turn on gate resistor
 $Q_r = f(R_{gon})$



At $V_{DS} = 600$ V
 $V_{GS} = -4/15$ V
 $I_D = 30$ A
 T_j : 25 °C (blue), 125 °C (black), 150 °C (red)

figure 19. MOSFET

Typical peak reverse recovery current as a function of MOSFET turn on gate resistor
 $I_{RM} = f(R_{gon})$



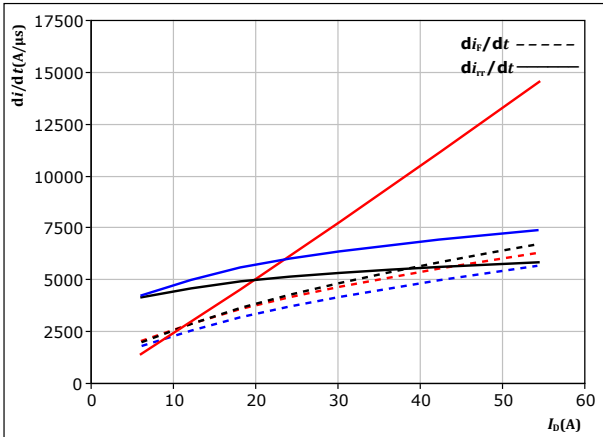
At $V_{DS} = 600$ V
 $V_{GS} = -4/15$ V
 $I_D = 30$ A
 T_j : 25 °C (blue), 125 °C (black), 150 °C (red)



Inverter Switching Characteristics

figure 20. MOSFET

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

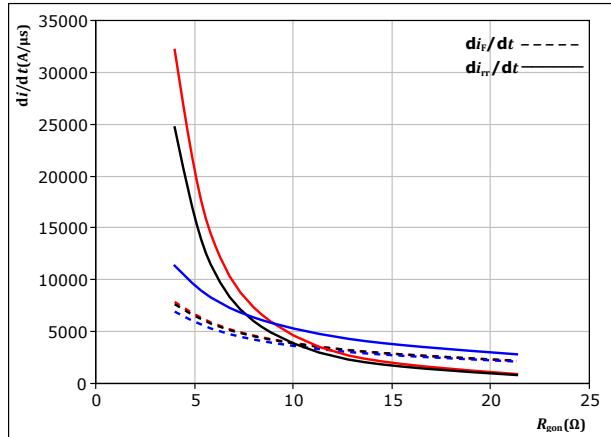


At $V_{DS} = 600$ V
 $V_{GS} = -4/15$ V
 $R_{g(on)} = 8$ Ω

T_j : 25 °C (blue)
 125 °C (black)
 150 °C (red)

figure 21. MOSFET

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

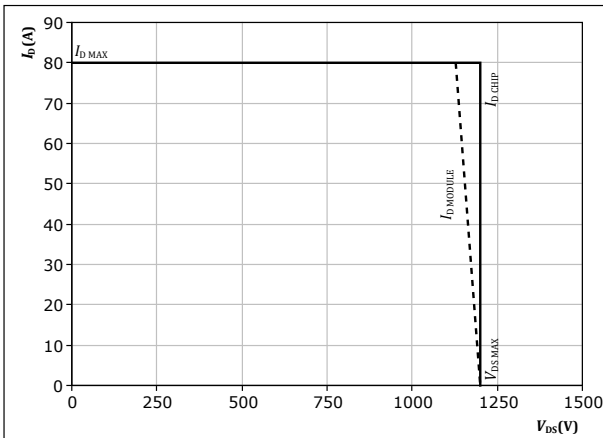


At $V_{DS} = 600$ V
 $V_{GS} = -4/15$ V
 $I_D = 30$ A

T_j : 25 °C (blue)
 125 °C (black)
 150 °C (red)

figure 22. MOSFET

Reverse bias safe operating area
 $I_D = f(V_{DS})$



At $T_j = 150$ °C
 $R_{g(on)} = 8$ Ω
 $R_{g(off)} = 8$ Ω



Inverter Switching Definitions

figure 23. MOSFET

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

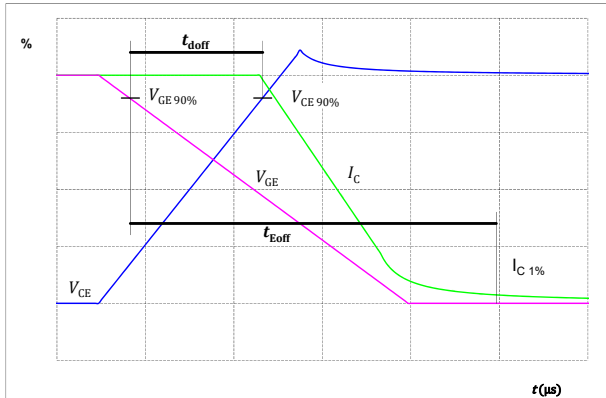


figure 24. MOSFET

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

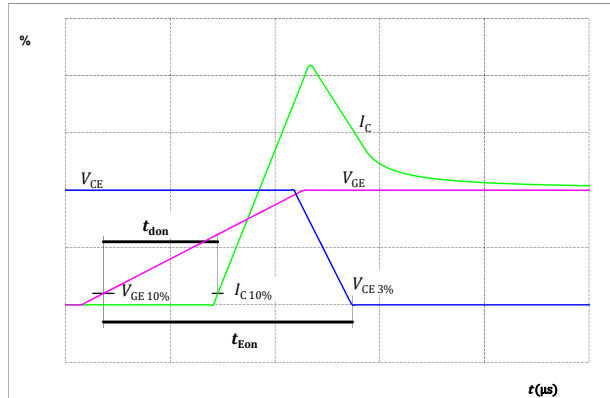


figure 25. MOSFET

Turn-off Switching Waveforms & definition of t_f

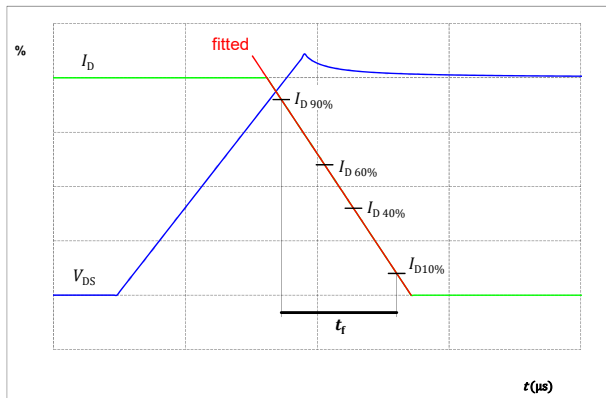
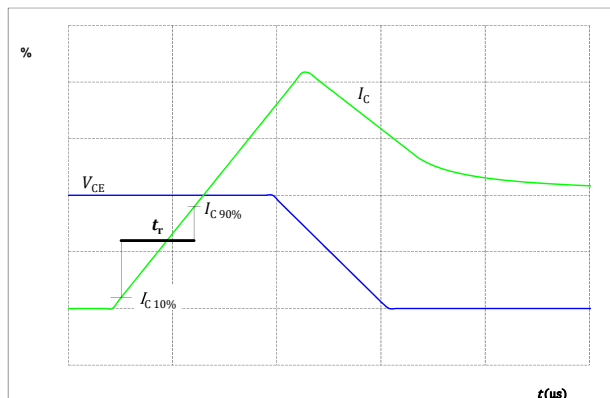


figure 26. MOSFET

Turn-on Switching Waveforms & definition of t_r





Inverter Switching Definitions

figure 27. FWD

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

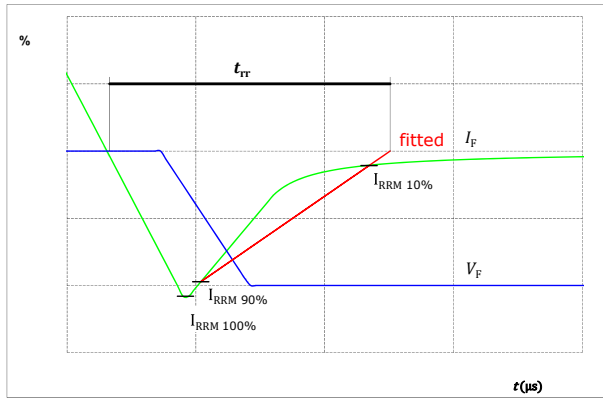


figure 28. FWD

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

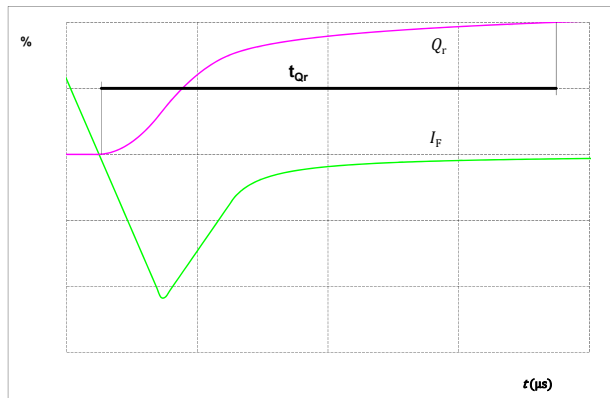
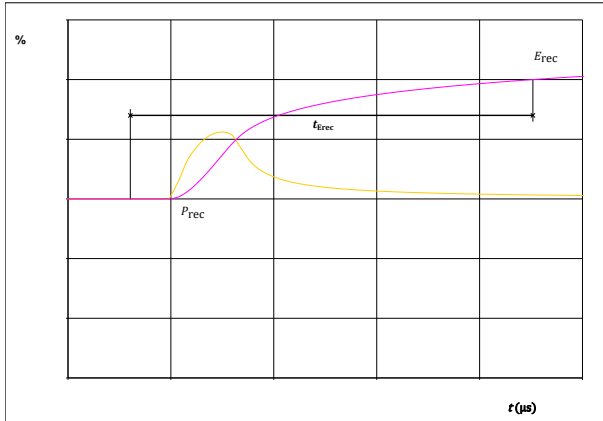


figure 29. FWD

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






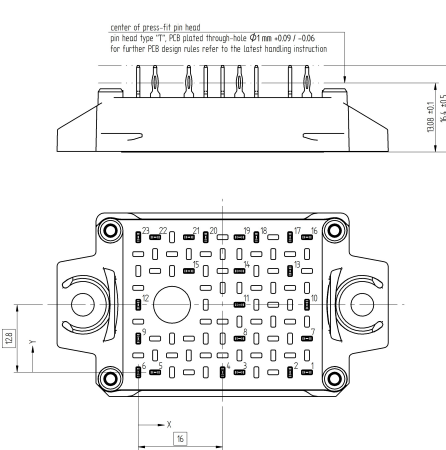
Vincotech

10-EZ126PB032ME-LS18F08T
datasheet

Ordering Code	
Version	Ordering Code
Without thermal paste	10-EZ126PB032ME-LS18F08T
With thermal paste (3,4 W/mK, PSX-P7)	10-EZ126PB032ME-LS18F08T-/3/

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

Outline				
Pin table [mm]				
Pin	X	Y	Function	
1	32	0	G15	
2	28,8	0	S15	
3	19,2	0	G13	
4	16	0	S13	
5	3,2	0	S11	
6	0	0	G11	
7	32	6,4	Ph3	
8	19,2	6,4	Ph2	
9	0	6,4	Ph1	
10	32	12,8	DC-3	
11	19,2	12,8	DC-2	
12	0	12,8	DC-1	
13	28,8	19,2	DC+	
14	19,2	19,2	DC+	
15	9,6	19,2	DC+	
16	32	25,6	Therm2	
17	28,8	25,6	Therm1	
18	22,4	25,6	G16	
19	19,2	25,6	S16	
20	12,8	25,6	G14	
21	9,6	25,6	S14	
22	3,2	25,6	G12	
23	0	25,6	S12	

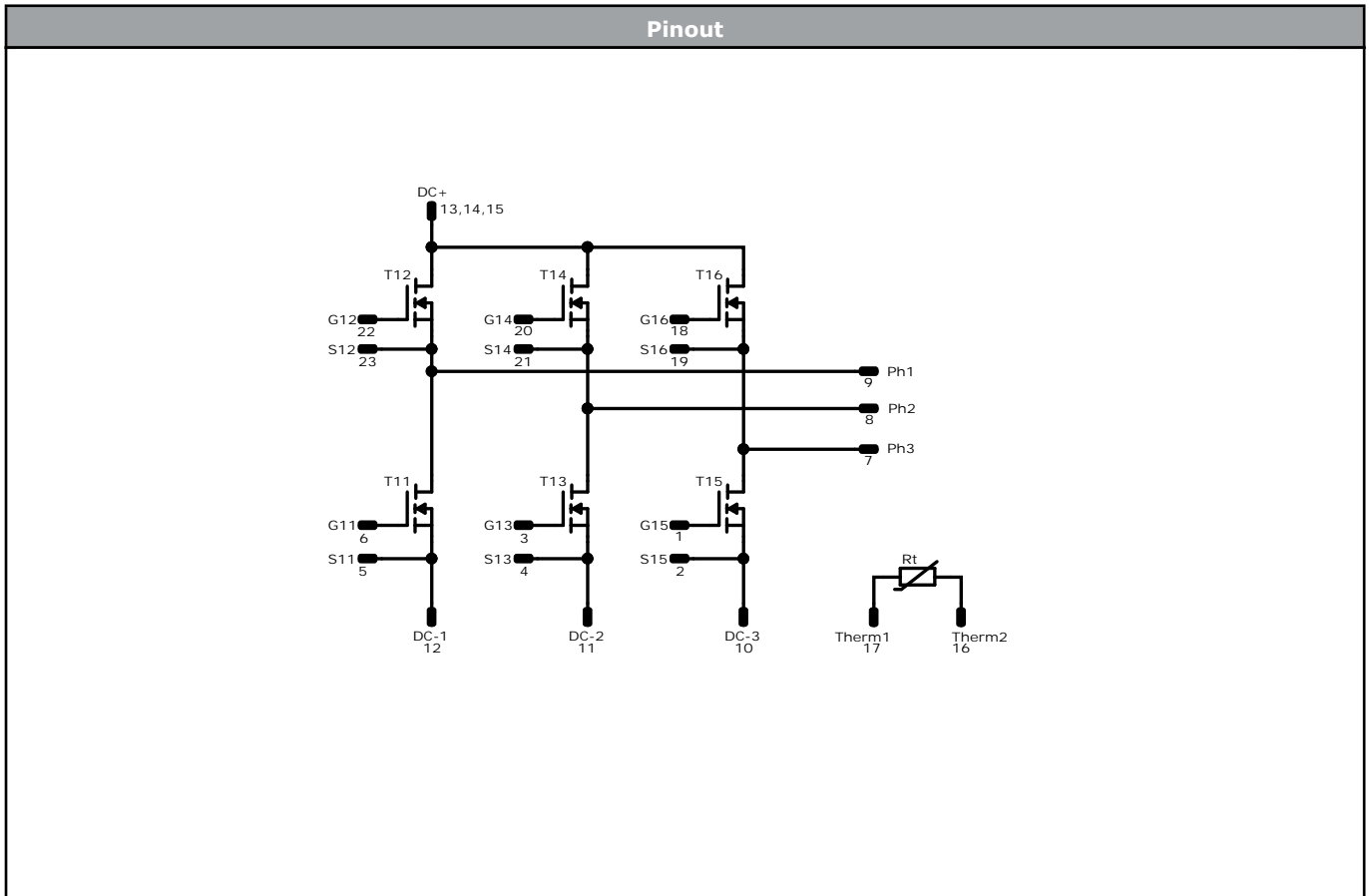


center of press-fit pin head
pin head type "T" PCB plated through-hole Ø1 mm +0.09 / -0.06
for further PCB design rules refer to the latest handling instruction

Dimension of coordinate axis is only critical without tolerance



Vincotech



Identification					
ID	Component	Voltage	Current	Function	Comment
T11, T12, T13, T14, T15, T16	MOSFET	1200 V	32 mΩ	Inverter Switch	
Rt	Thermistor			Thermistor	




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

Handling instruction
Handling instructions for <i>flow</i> E1 packages see vincotech.com website.

Package data
Package data for <i>flow</i> 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 certified according to UL 1557 standard, UL file number E192116. For more information see vincotech.com website. 

Document No.:	Date:	Modification:	Pages
10-EZ126PB032ME-LS18F08T-D1-14	12 Jan. 2024		

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Vincotech products are not authorised for use as critical components in life support devices or systems without the express written approval of Vincotech.

As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in labelling can be reasonably expected to result in significant injury to the user.
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.