Vincotech

10-EZ126PB075ME-LS17F08T
datasheet

***flow*PACK E1 SiC** **1200 V / 75 mΩ**

Features

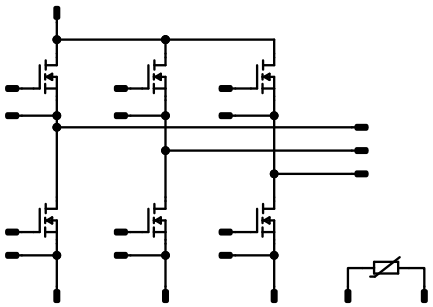
- C3M™ SiC MOSFET technology
- Standard industrial housing
- Low inductive design
- Optimized Rth(j-s) with Phase Change Material
- Built-in NTC

flow E1 12 mm housing

Target applications

- Elevator Drives
- Industrial Drives
- Servo Drives
- UPS

Schematic



Types

- 10-EZ126PB075ME-LS17F08T

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
Inverter Switch				
Drain-source voltage	V_{DSS}		1200	V
Drain current	I_D	T_j = T_{jmax} T_s = 80 °C	21	A
Peak drain current	I_{DM}	t_p limited by T_{jmax}	80	A
Total power dissipation	P_{tot}	T_j = T_{jmax} T_s = 80 °C	57	W
Gate-source voltage	V_{GSS}		-4 / 15	V
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
Isolation voltage	V_{isol}	AC Voltage t_p = 1 min	2500	V
Creepage distance			min. 12,7	mm
Clearance			8,74	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	
Inverter Switch										
Static										
Drain-source on-state resistance	$r_{DS(on)}$		15		20	25 125 150		76 105 116	90	mΩ
Gate-source threshold voltage	$V_{GS(th)}$		0		0,005	25	1,7	2,5	4	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	100	µA
Internal gate resistance	r_g							10,5		Ω
Gate charge	Q_g		-4/15	800	20	25		54		nC
Short-circuit input capacitance	C_{iss}	f = 1 Mhz	0	1000	0	25		1350		pF
Short-circuit output capacitance	C_{oss}							58		
Reverse transfer capacitance	C_{rss}							3		
Diode forward voltage	V_{SD}		0		10	25		4,5		V
Thermal										
Thermal resistance junction to sink*	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						1,67		K/W
Dynamic Switch										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 4 Ω R_{goff} = 4 Ω	0/15	600	30	25 125 150		14,08 12,48 12,32		ns
Rise time	t_r					25 125 150		8 7,68 8,16		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		45,12 52,16 53,92		ns
Fall time	t_f					25 125 150		7,52 7,5 7,35		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=0,142 µC Q_{rFWD}=0,307 µC Q_{rFWD}=0,394 µC				25 125 150		0,228 0,26 0,294		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,147 0,157 0,161		mWs

*Only valid with pre-applied Vincotech thermal interface material.

Characteristic Values

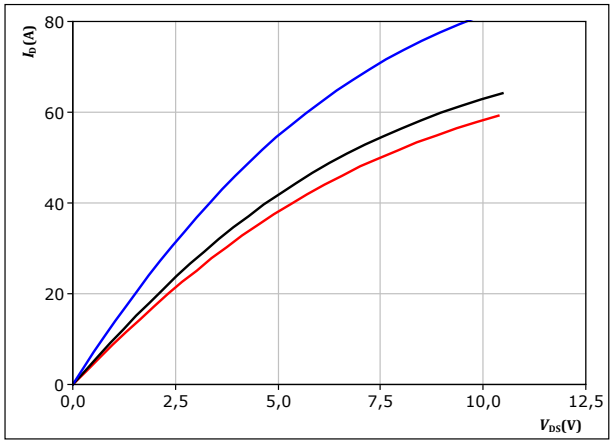
Parameter	Symbol	Conditions					Values			Unit
			V_{GE} [V] V_{GS} [V]	V_{CE} [V] V_{DS} [V] V_F [V]	I_C [A] I_D [A] I_F [A]	T_j [°C]	Min	Typ	Max	
Inverter Switch										
Dynamic Diode										
Peak recovery current	I_{RRM}	di/dt=4752 A/µs di/dt=5121 A/µs di/dt=5299 A/µs	0/15	600	30	25 125 150		23,58 30,35 36,48		A
Reverse recovery time	t_{rr}					25 125 150		10,78 16,16 17,54		ns
Recovered charge	Q_r					25 125 150		0,142 0,307 0,394		µC
Reverse recovered energy	E_{rec}					25 125 150		0,046 0,122 0,161		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		4733 6414 9935		A/µs
Thermistor										
Rated resistance	R					25		5		kΩ
Deviation of R_{100}	$\Delta_{R/R}$	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	

Inverter Switch Characteristics

figure 1. **MOSFET**

Typical output characteristics

$I_D = f(V_{DS})$

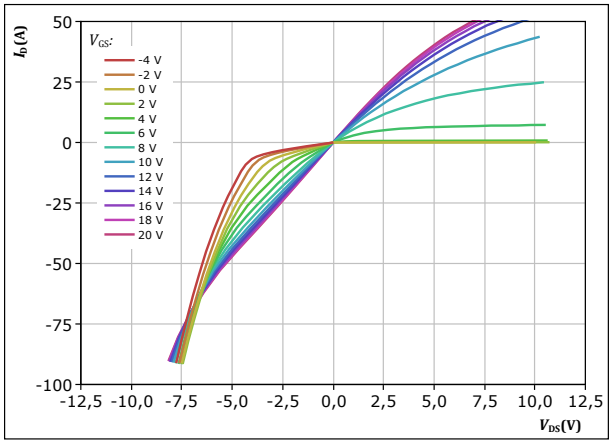


t_p =	250	µs		
V_{GS} =	16	V	T_j:	25 °C
				125 °C
				150 °C

figure 2. **MOSFET**

Typical output characteristics

$I_D = f(V_{DS})$



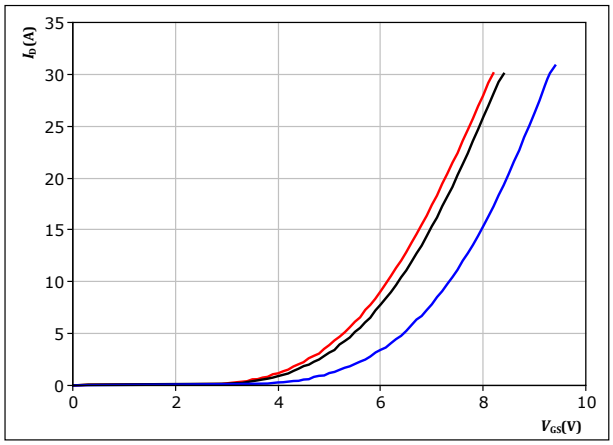
t_p =	250	µs
T_j =	150	°C

V_{GS} from -4 V to 20 V in steps of 2 V

figure 3. **MOSFET**

Typical transfer characteristics

$I_D = f(V_{GS})$

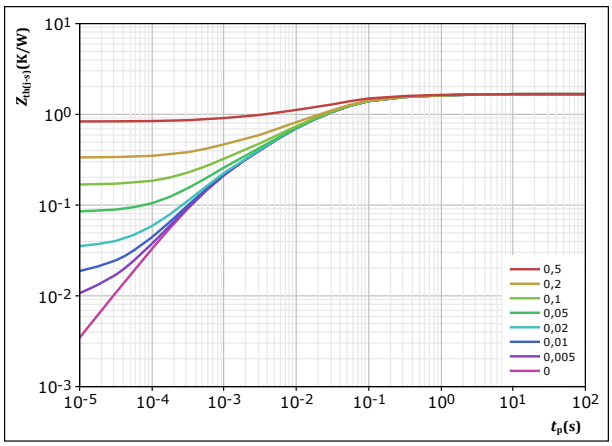


t_p =	250	µs		
V_{DS} =	10	V	T_j:	25 °C
				125 °C
				150 °C

figure 4. **MOSFET**

Transient thermal impedance as a function of pulse width

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



D =	t_p / T	
$R_{th(j-s)}$ =	1,67	K/W

MOSFET thermal model values

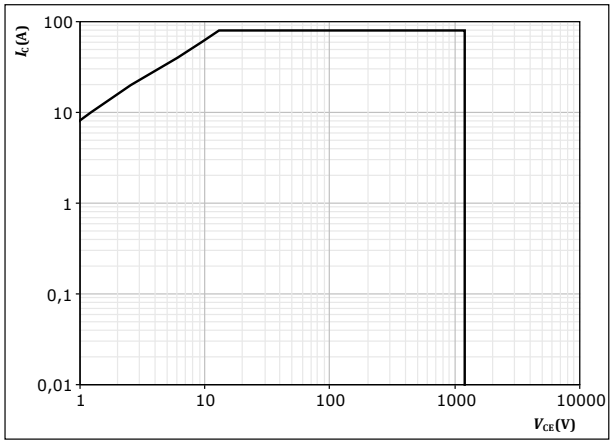
R (K/W)	τ (s)
8,03E-02	2,10E+00
2,75E-01	1,82E-01
7,88E-01	3,22E-02
3,82E-01	4,89E-03
1,44E-01	5,88E-04

Inverter Switch Characteristics

figure 5. **MOSFET**

Safe operating area

$I_C = f(V_{CE})$



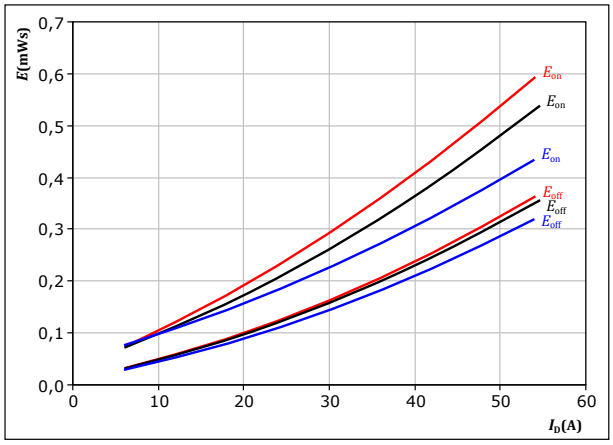
D =	single pulse	
T_s =	80	°C
V_{GE} =	16	V
T_j =	T_{jmax}	

Inverter Switching Characteristics

figure 6. **MOSFET**

Typical switching energy losses as a function of drain current

$E = f(I_D)$



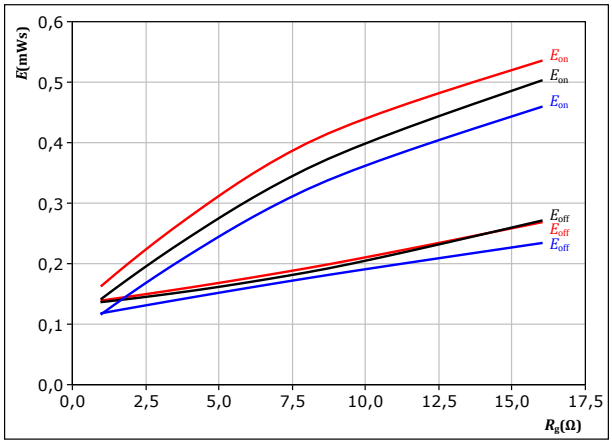
With an inductive load at

V_{DS} =	600	V	T_j: 25 °C
V_{GS} =	0/15	V	125 °C
R_{gon} =	4	Ω	150 °C
R_{goff} =	4	Ω	

figure 7. **MOSFET**

Typical switching energy losses as a function of gate resistor

$E = f(R_g)$



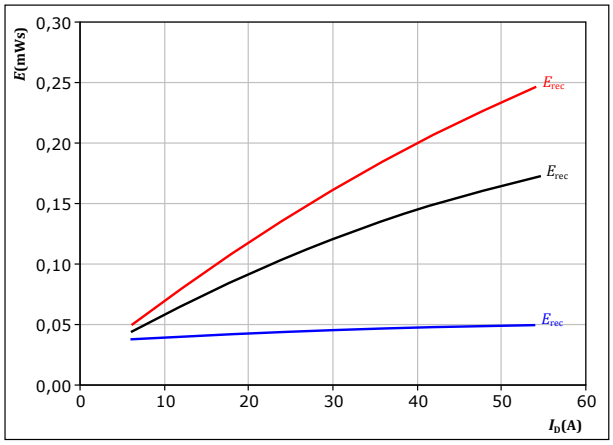
With an inductive load at

V_{DS} =	600	V	T_j: 25 °C
V_{GS} =	0/15	V	125 °C
I_D =	30	A	150 °C

figure 8. **MOSFET**

Typical reverse recovered energy loss as a function of drain current

$E_{rec} = f(I_D)$



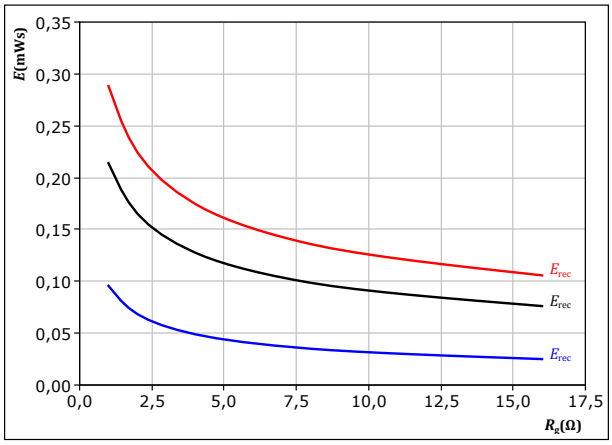
With an inductive load at

V_{DS} =	600	V	T_j: 25 °C
V_{GS} =	0/15	V	125 °C
R_{gon} =	4	Ω	150 °C

figure 9. **MOSFET**

Typical reverse recovered energy loss as a function of gate resistor

$E_{rec} = f(R_g)$



With an inductive load at

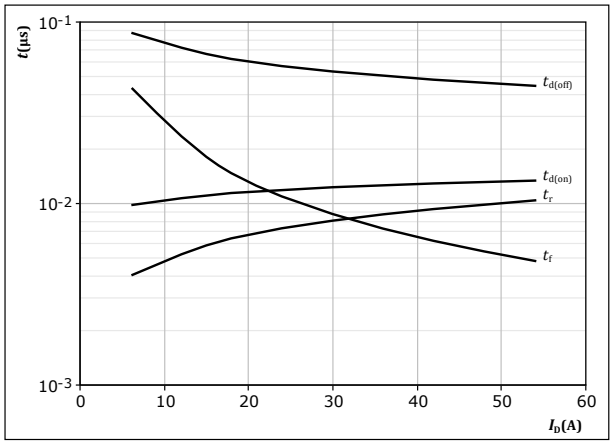
V_{DS} =	600	V	T_j: 25 °C
V_{GS} =	0/15	V	125 °C
I_D =	30	A	150 °C

Inverter Switching Characteristics

figure 10. **MOSFET**

Typical switching times as a function of drain current

$t = f(I_D)$



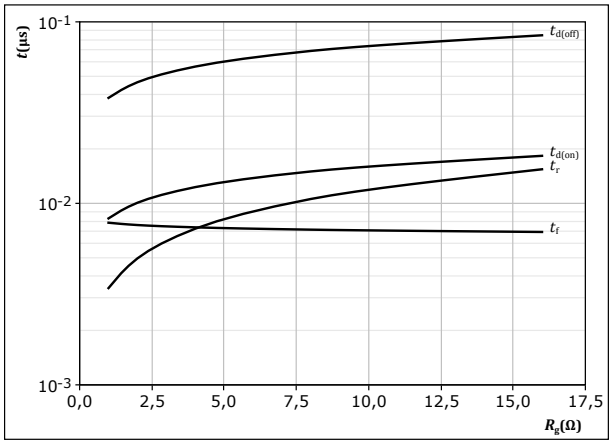
With an inductive load at

T_j =	150	°C
V_{DS} =	600	V
V_{GS} =	0/15	V
R_{gon} =	4	Ω
R_{goff} =	4	Ω

figure 11. **MOSFET**

Typical switching times as a function of gate resistor

$t = f(R_g)$



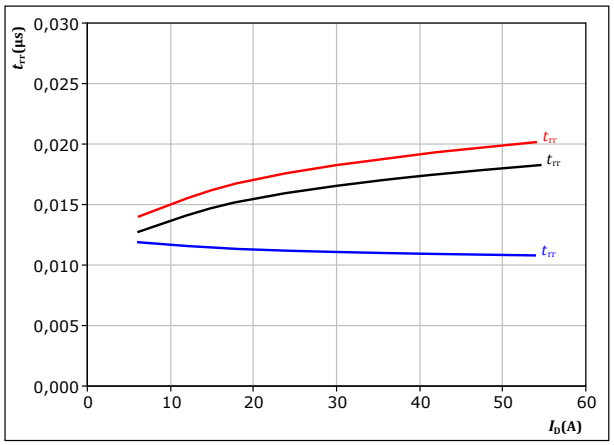
With an inductive load at

T_j =	150	°C
V_{DS} =	600	V
V_{GS} =	0/15	V
I_D =	30	A

figure 12. **MOSFET**

Typical reverse recovery time as a function of drain current

$t_{rr} = f(I_D)$

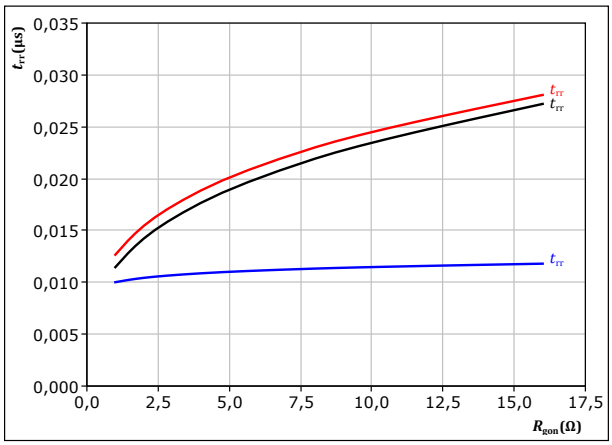


At	V_{DS} =	600	V	
	V_{GS} =	0/15	V	T_j: 25 °C
	R_{gon} =	4	Ω	125 °C
				150 °C

figure 13. **MOSFET**

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

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



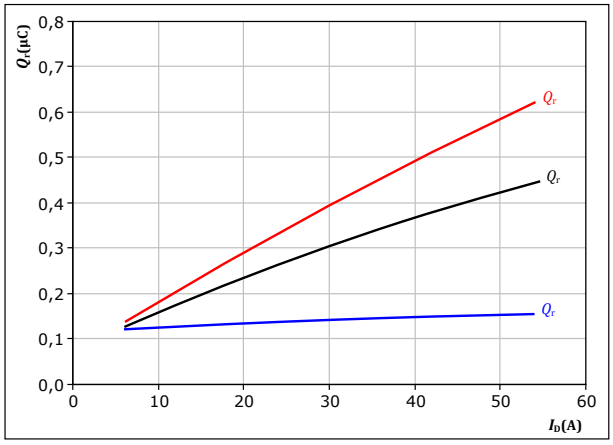
At	V_{DS} =	600	V	
	V_{GS} =	0/15	V	T_j: 25 °C
	I_D =	30	A	125 °C
				150 °C

Inverter Switching Characteristics

figure 14. **MOSFET**

Typical recovered charge as a function of drain current

$Q_r = f(I_D)$

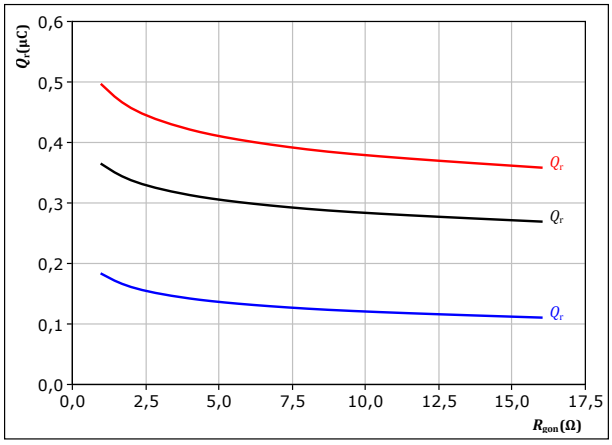


At					
	V_{DS} =	600	V		
	V_{GS} =	0/15	V	T_j:	25 °C
	R_{gon} =	4	Ω		125 °C
					150 °C

figure 15. **MOSFET**

Typical recovered charge as a function of turn on gate resistor

$Q_r = f(R_{gon})$

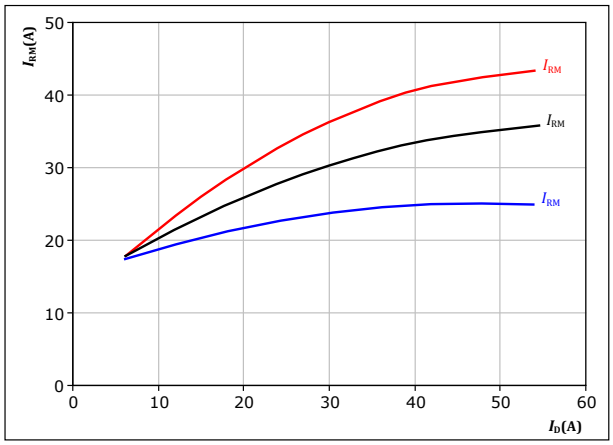


At					
	V_{DS} =	600	V		
	V_{GS} =	0/15	V	T_j:	25 °C
	I_D =	30	A		125 °C
					150 °C

figure 16. **MOSFET**

Typical peak reverse recovery current as a function of drain current

$I_{RM} = f(I_D)$

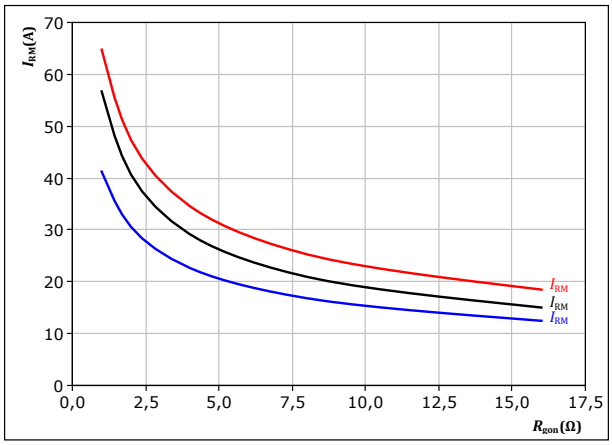


At					
	V_{DS} =	600	V		
	V_{GS} =	0/15	V	T_j:	25 °C
	R_{gon} =	4	Ω		125 °C
					150 °C

figure 17. **MOSFET**

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

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



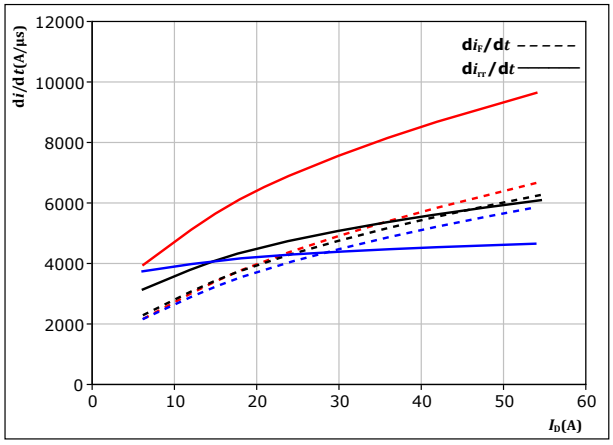
At					
	V_{DS} =	600	V		
	V_{GS} =	0/15	V	T_j:	25 °C
	I_D =	30	A		125 °C
					150 °C

Inverter Switching Characteristics

figure 18. **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)

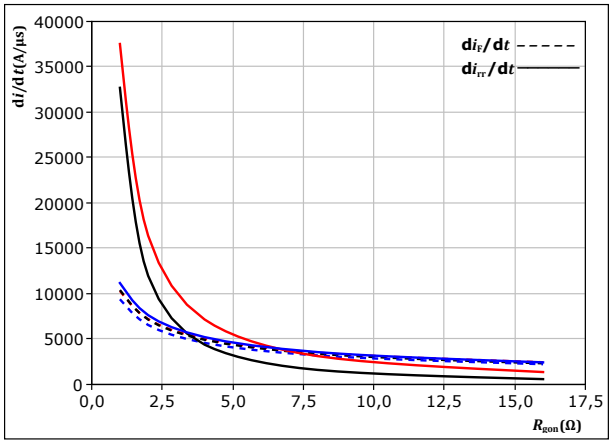


At	V_{DS} =	600	V		
	V_{GS} =	0/15	V	T_j:	25 °C
	R_{gon} =	4	Ω		125 °C
					150 °C

figure 19. **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_{gon})

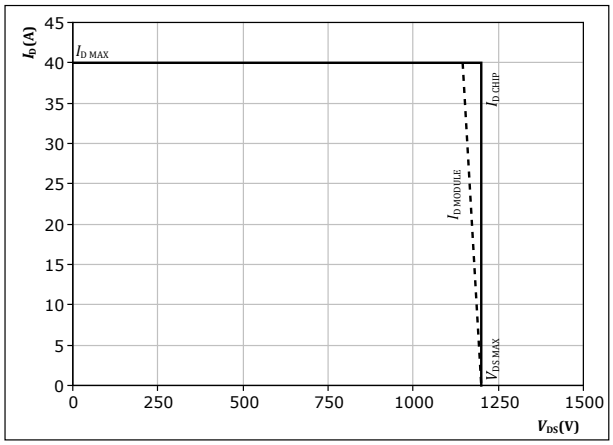


At	V_{DS} =	600	V		
	V_{GS} =	0/15	V	T_j:	25 °C
	I_D =	30	A		125 °C
					150 °C

figure 20. **MOSFET**

Reverse bias safe operating area

I_D = f(V_{DS})



At	T_j =	150	°C
	R_{gon} =	4	Ω
	R_{goff} =	4	Ω

Inverter Switching Definitions

figure 21. MOSFET

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

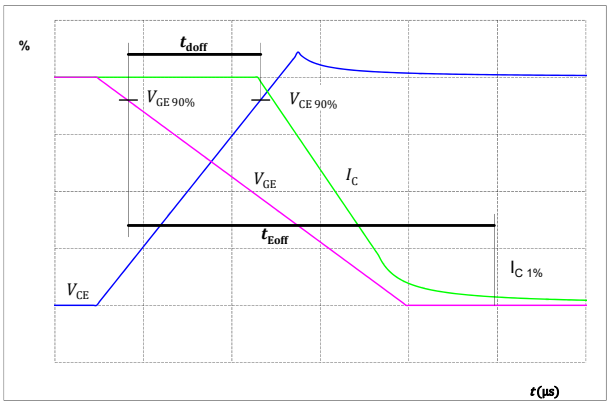


figure 22. MOSFET

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

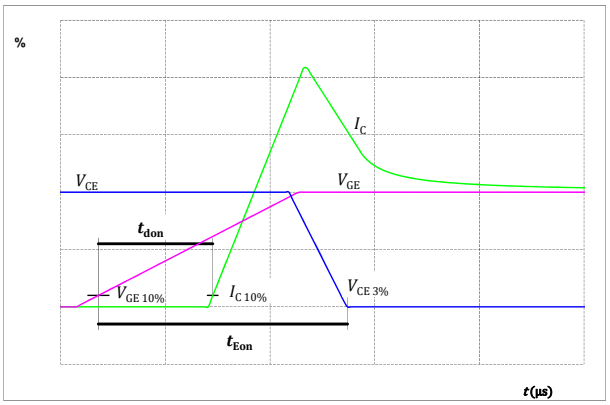


figure 23. MOSFET

Turn-off Switching Waveforms & definition of t_f

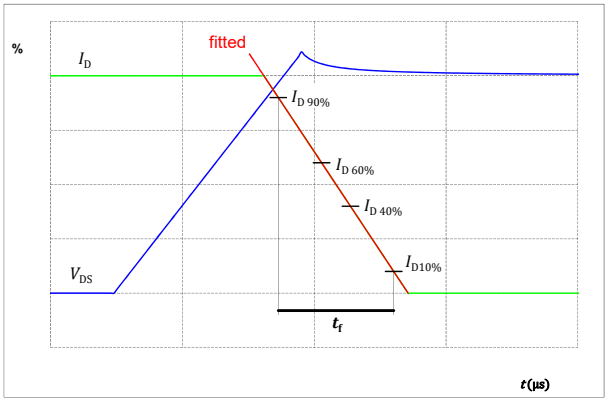
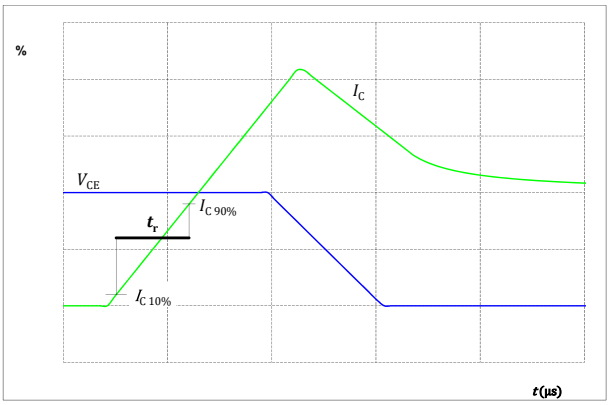


figure 24. MOSFET

Turn-on Switching Waveforms & definition of t_r



Inverter Switching Definitions

figure 25. **FWD**

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

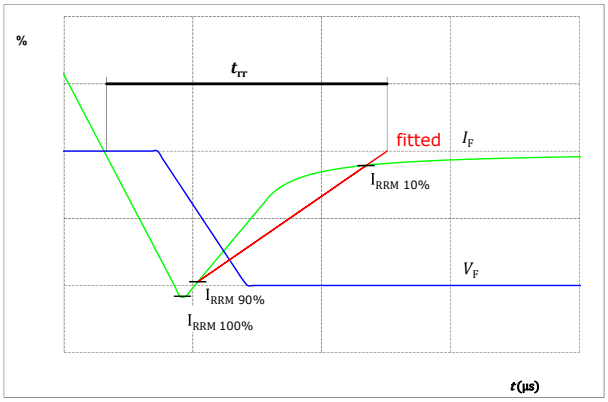


figure 26. **FWD**

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

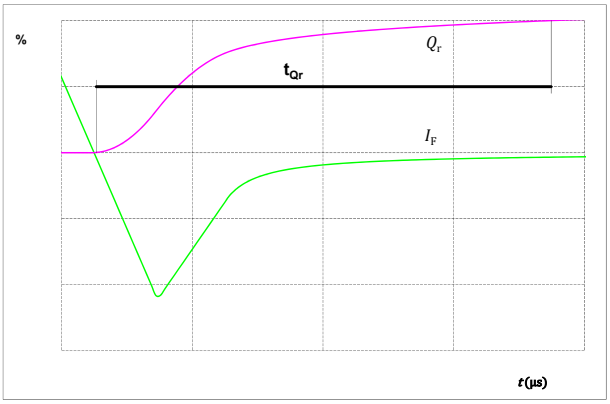
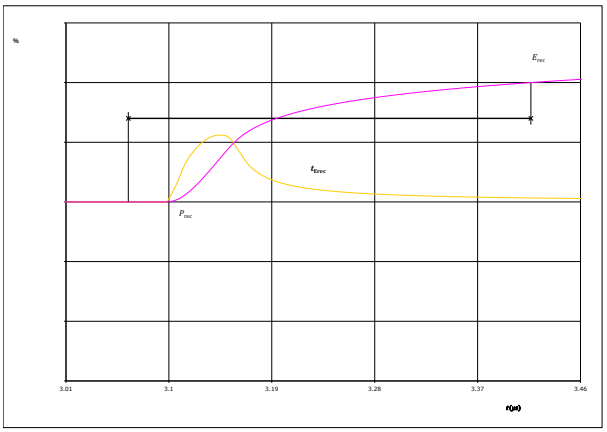


figure 27. **FWD**

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



Ordering Code

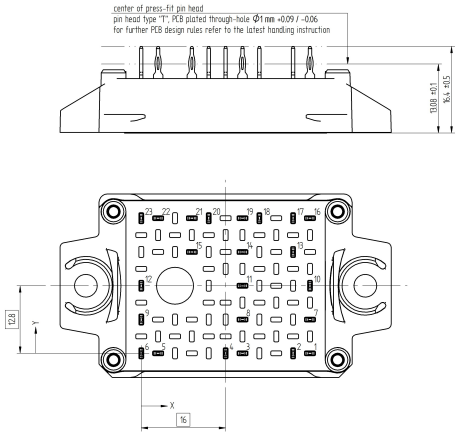
Version	Ordering Code
Without thermal paste	10-EZ126PB075ME-LS17F08T
With thermal paste	10-EZ126PB075ME-LS17F08T-/3/

Marking

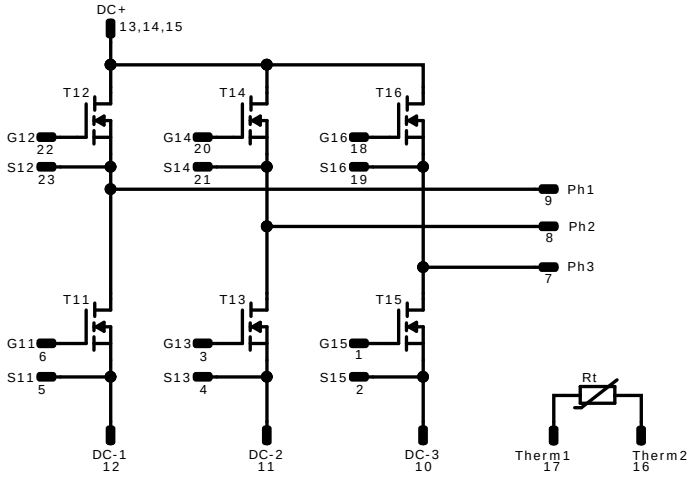
Text	**Name**		**Date code**	**UL & VIN**	**Lot**	**Serial**
	NN-NNNNNNNNNNNNNN-TTTTTTVV		WWYY	UL VIN	LLLLL	SSSS
Datamatrix	**Type&Ver**	**Lot number**	**Serial**	**Date code**		
	TTTTTTVV	LLLLL	SSSS	WWYY		

Outline

Pin table [mm]			
Pin	X	Y	Function
1	32	0	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



Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T11, T12, T13, T14, T15, T16	MOSFET	1200 V	75 mΩ	Inverter Switch	
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.

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-EZ126PB075ME-LS17F08T-D2-14	02 Jun. 2020	Change of Product Line	1

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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.