10-EZ126PB040MS01-LS18F73T
datasheet

***flow*PACK E1 SiC** **1200 V / 40 mΩ**

Topology features

- 3ph Inverter
- Low and high side Kelvin Emitter for improved switching performance
- 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: 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

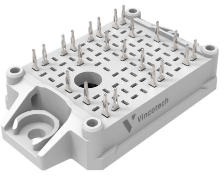
Target applications

- Charging Stations
- Industrial Drives
- Servo Drives

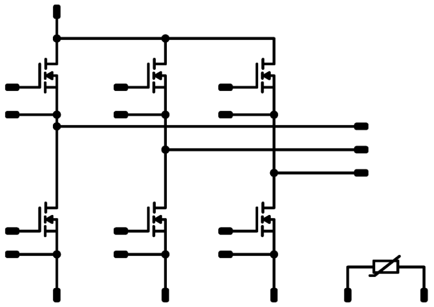
Types

- 10-EZ126PB040MS01-LS18F73T

flow E1 12 mm housing



Schematic



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 (DC current)	I_D	$T_j = T_{jmax}$	T_s = 80 °C	45	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 °C	81	W
Gate-source voltage	V_{GSS}			0 / 22	V
		dynamic		-5 / 22	
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				>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	$r_{DS(on)}$		18		30	25 125 150		37,9 36,8 39,2	55,2[1]	mΩ
Gate-source threshold voltage	$V_{GS(th)}$				0,003	25	3,6	4,6	5,6	V
Gate to Source Leakage Current	I_{GSS}		22	0		25			200	nA
Zero Gate Voltage Drain Current	I_{DSS}		0	1200		25			100	µA
Internal gate resistance	r_g							3		Ω
Gate charge	Q_g		0/18		30	25		185		nC
Short-circuit input capacitance	C_{iss}		0	10	0	25		4000		pF
Short-circuit output capacitance	C_{oss}							1300		
Reverse transfer capacitance	C_{rss}							110		
Thermal										
Thermal resistance junction to sink[2]	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						1,17		K/W

Characteristic Values

Parameter	Symbol	Conditions	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	Unit
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 4 Ω R_{goff} = 4 Ω	0/18	600	32	25 125 150		19,08 16,7 16,58		ns
Rise time	t_r					25 125 150		9,24 7,8 7,31		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		46,37 54,06 56,76		ns
Fall time	t_f					25 125 150		15,72 21,09 19,9		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=0,236 μC Q_{rFWD}=0,485 μC Q_{rFWD}=0,607 μC				25 125 150		0,373 0,353 0,367		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,113 0,11 0,112		mWs
Peak recovery current	I_{RRM}	di/dt=3931 A/μs di/dt=5128 A/μs di/dt=5348 A/μs				25 125 150		29,49 43,86 50,24		A
Reverse recovery time	t_{rr}					25 125 150		13,53 18,03 18,9		ns
Recovered charge	Q_r					25 125 150		0,236 0,485 0,607		μC
Reverse recovered energy	E_{rec}					25 125 150		0,045 0,153 0,206		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		6355,59 4916,19 6488,35		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} = 499 Ω				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. ±1 %						3380		K
Vincotech Thermistor Reference									V	

(1) Value at chip level

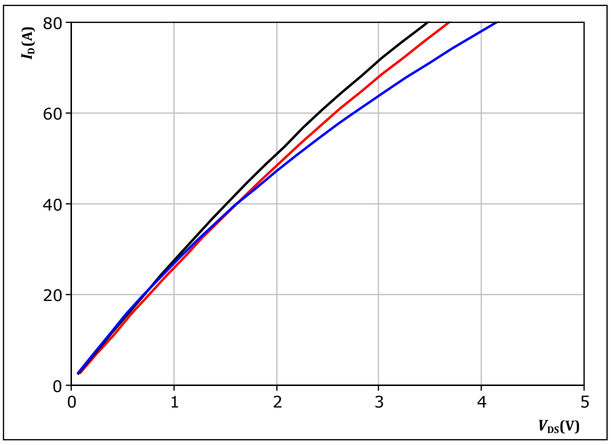
(2) Only valid with pre-applied Vincotech thermal interface material.

Inverter Switch Characteristics

figure 1. **MOSFET**

Typical output characteristics

I_D = f(V_{DS})

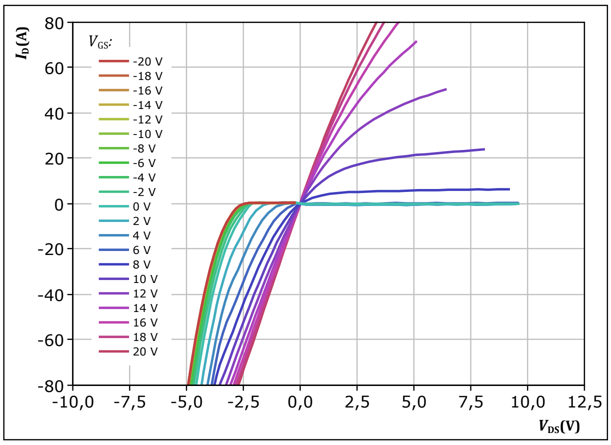


t_p =	250	µs		25 °C
V_{GS} =	18	V	T_j:	125 °C
				150 °C

figure 2. **MOSFET**

Typical output characteristics

I_D = f(V_{DS})



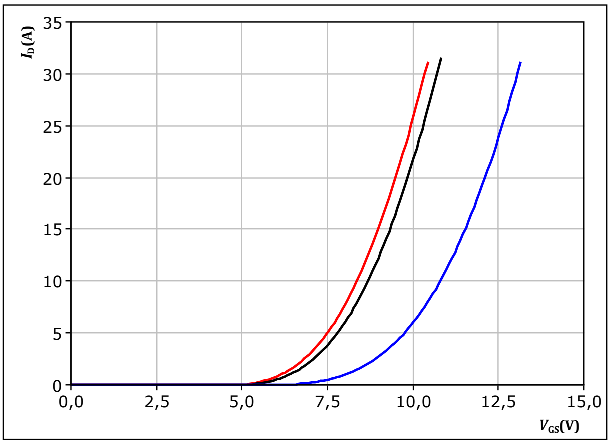
t_p =	250	µs
T_j =	150	°C

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

figure 3. **MOSFET**

Typical transfer characteristics

I_D = f(V_{GS})

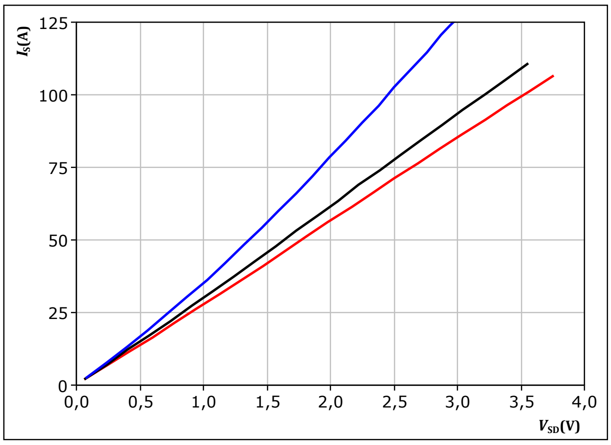


t_p =	250	µs		25 °C
V_{DS} =	10	V	T_j:	125 °C
				150 °C

figure 4. **MOSFET**

Typical reverse drain current characteristics

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



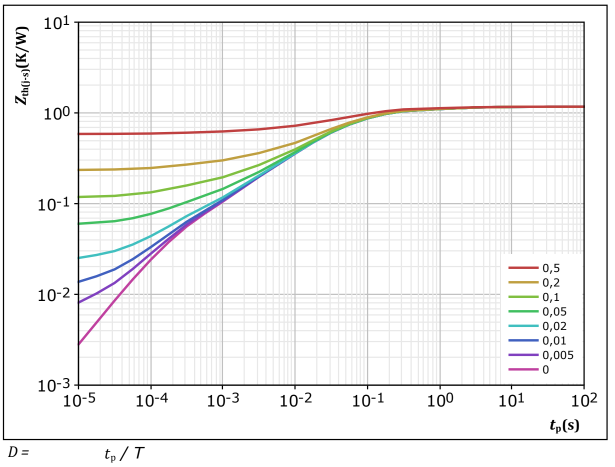
t_p =	250	µs		25 °C
V_{GS} =	18	V	T_j:	125 °C
				150 °C

Inverter 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	
$R_{th(j-s)}$ =	1,171	K/W

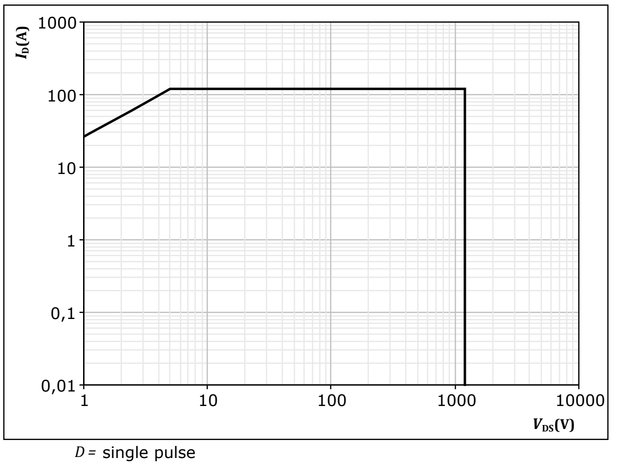
MOSFET thermal model values

R (K/W)	τ (s)
2,35E-02	7,28E+00
1,06E-01	1,23E+00
4,75E-01	1,01E-01
4,14E-01	2,05E-02
1,08E-01	2,42E-03
4,49E-02	2,08E-04

figure 6. **MOSFET**

Safe operating area

$I_D = f(V_{DS})$



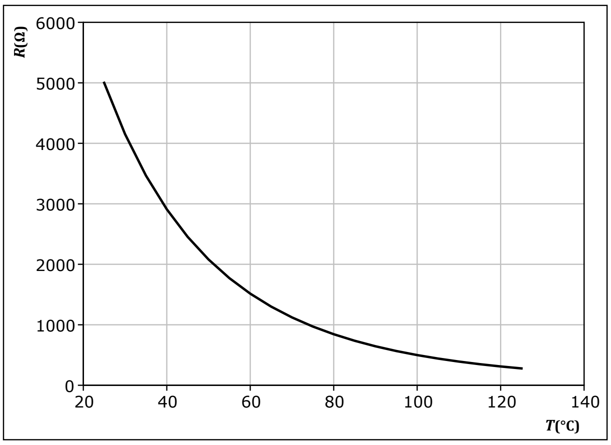
D =	single pulse	
T_s =	80	°C
V_{GS} =	18	V
T_j =	T_{jmax}	

Thermistor Characteristics

figure 7. **Thermistor**

Typical NTC characteristic as function of temperature

R_T = f(T)

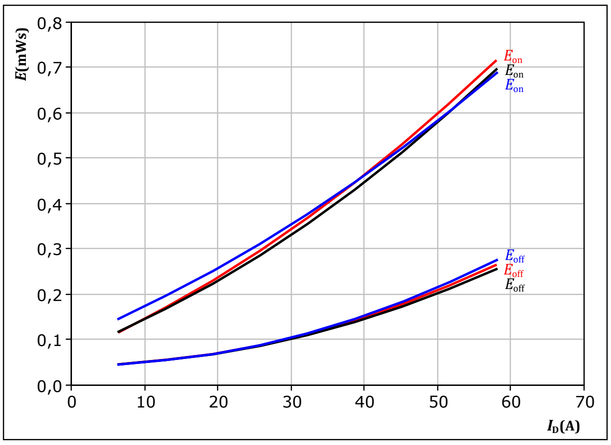


Inverter Switching Characteristics

figure 8. **MOSFET**

Typical switching energy losses as a function of drain current

E = f(I_D)



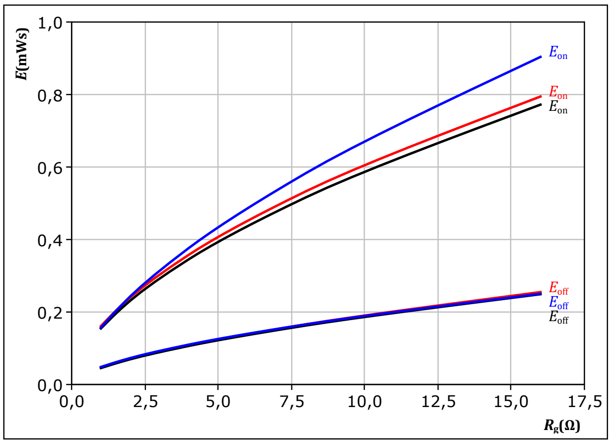
With an inductive load at

V_{DS} =	600	V	T_j:	25 °C
V_{GS} =	0/18	V		125 °C
R_{gon} =	4	Ω		150 °C
R_{goff} =	4	Ω		

figure 9. **MOSFET**

Typical switching energy losses as a function of MOSFET turn on gate resistor

E = f(R_g)



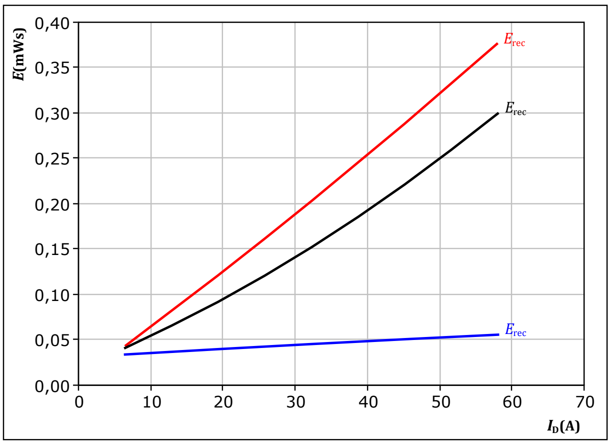
With an inductive load at

V_{DS} =	600	V	T_j:	25 °C
V_{GS} =	0/18	V		125 °C
I_D =	32	A		150 °C

figure 10. **MOSFET**

Typical reverse recovered energy loss as a function of drain current

E_{rec} = f(I_D)



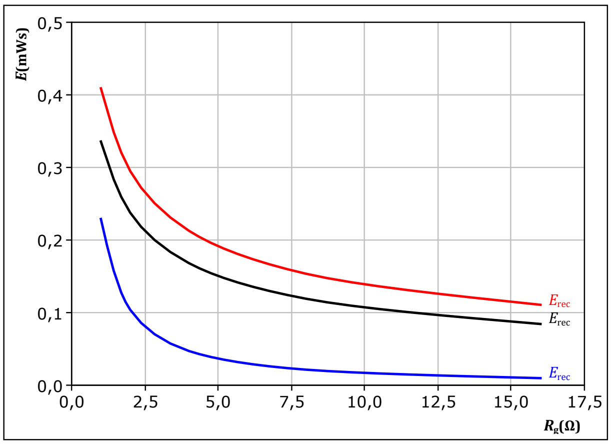
With an inductive load at

V_{DS} =	600	V	T_j:	25 °C
V_{GS} =	0/18	V		125 °C
R_{gon} =	4	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

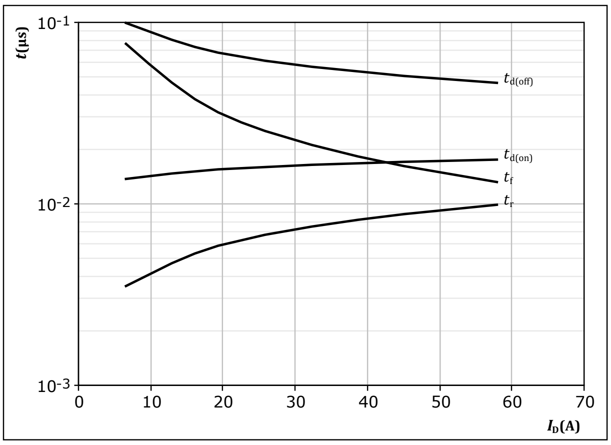
V_{DS} =	600	V	T_j:	25 °C
V_{GS} =	0/18	V		125 °C
I_D =	32	A		150 °C

Inverter Switching Characteristics

figure 12. **MOSFET**

Typical switching times as a function of drain current

$t = f(I_D)$



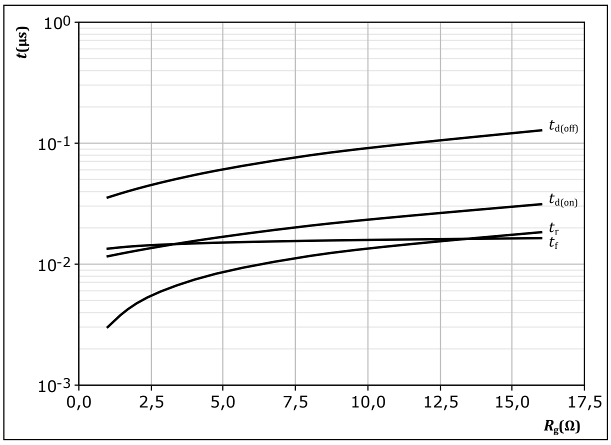
With an inductive load at

T_j =	150	°C
V_{DS} =	600	V
V_{GS} =	0/18	V
R_{gon} =	4	Ω
R_{goff} =	4	Ω

figure 13. **MOSFET**

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

$t = f(R_g)$



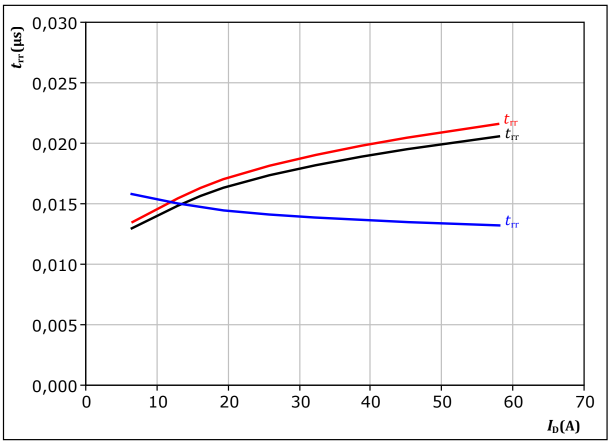
With an inductive load at

T_j =	150	°C
V_{DS} =	600	V
V_{GS} =	0/18	V
I_D =	32	A

figure 14. **MOSFET**

Typical reverse recovery time as a function of drain current

$t_{rr} = f(I_D)$



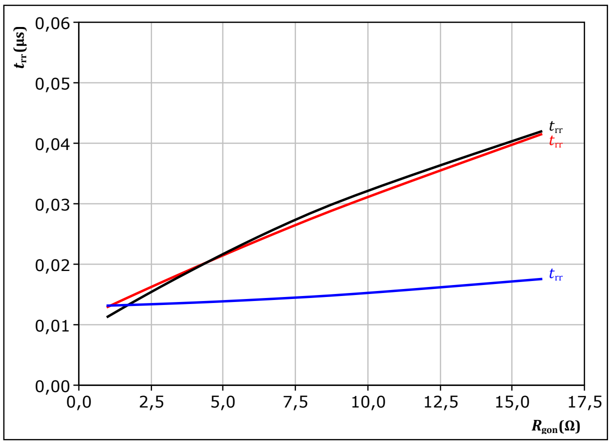
At			
	V_{DS} =	600	V
	V_{GS} =	0/18	V
	R_{gon} =	4	Ω

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	V
	V_{GS} =	0/18	V
	I_D =	32	A

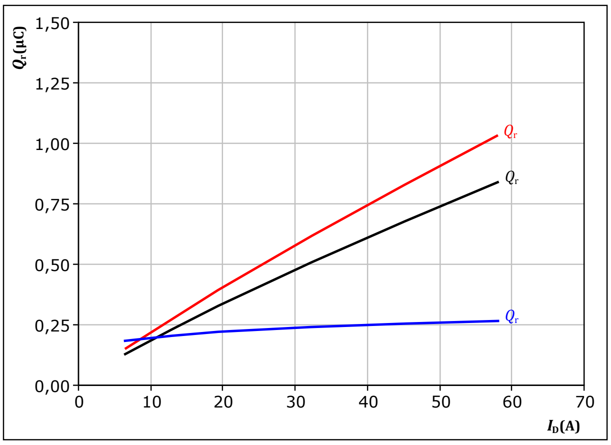
T_j: 25 °C, 125 °C, 150 °C

Inverter Switching Characteristics

figure 16. **MOSFET**

Typical recovered charge as a function of drain current

$Q_r = f(I_D)$

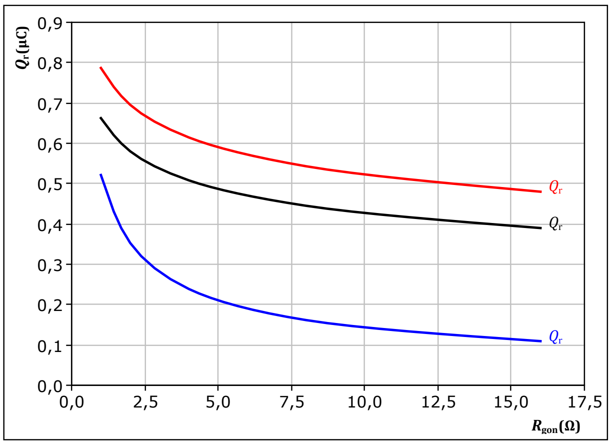


At					
	V_{DS} =	600	V		25 °C
	V_{GS} =	0/18	V	T_j:	125 °C
	R_{gon} =	4	Ω		150 °C

figure 17. **MOSFET**

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

$Q_r = f(R_{gon})$

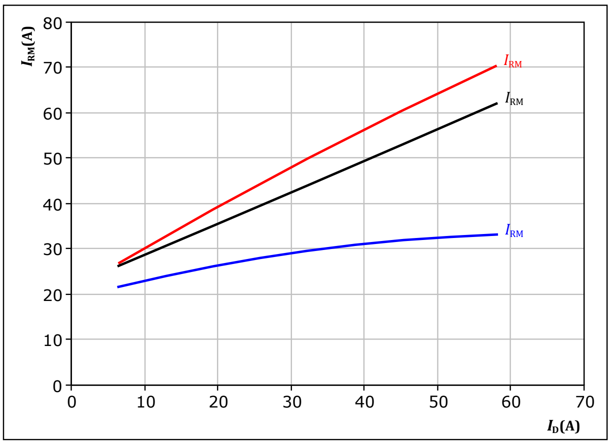


At					
	V_{DS} =	600	V		25 °C
	V_{GS} =	0/18	V	T_j:	125 °C
	I_D =	32	A		150 °C

figure 18. **MOSFET**

Typical peak reverse recovery current as a function of drain current

$I_{RM} = f(I_D)$

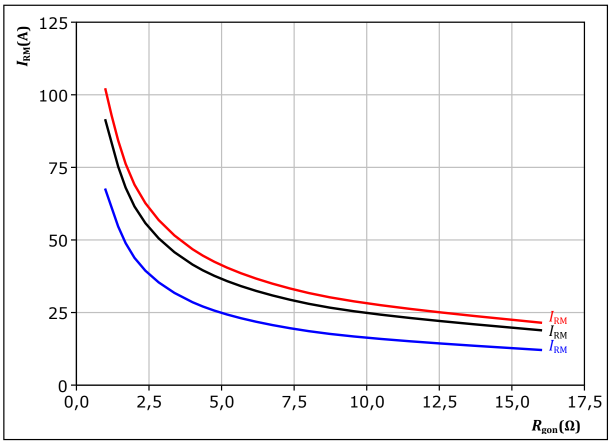


At					
	V_{DS} =	600	V		25 °C
	V_{GS} =	0/18	V	T_j:	125 °C
	R_{gon} =	4	Ω		150 °C

figure 19. **MOSFET**

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

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



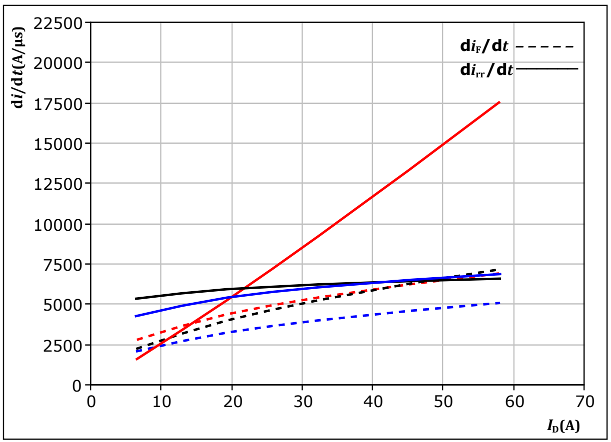
At					
	V_{DS} =	600	V		25 °C
	V_{GS} =	0/18	V	T_j:	125 °C
	I_D =	32	A		150 °C

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)

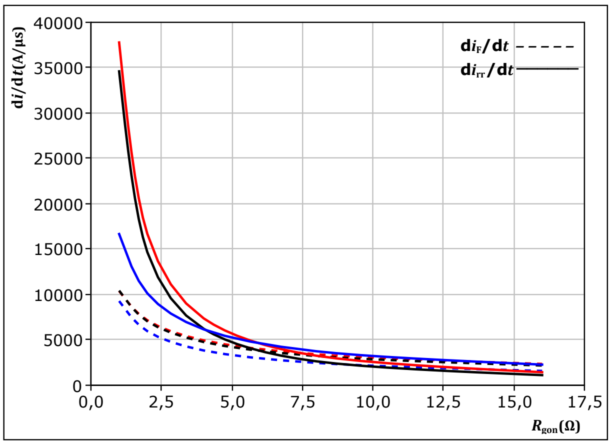


At				
V_{DS} =	600	V	T_j:	25 °C
V_{GS} =	0/18	V		125 °C
R_{gon} =	4	Ω		150 °C

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_{gon})

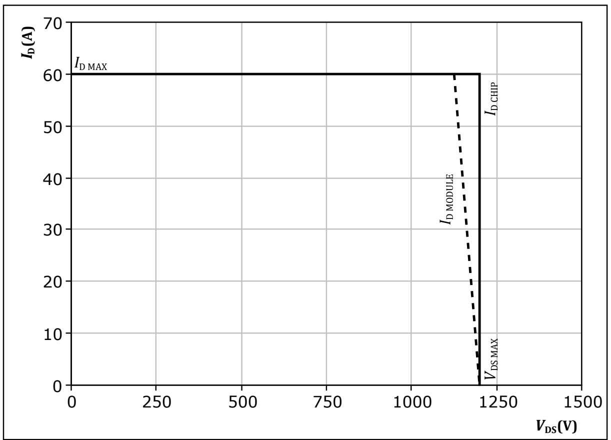


At				
V_{DS} =	600	V	T_j:	25 °C
V_{GS} =	0/18	V		125 °C
I_D =	32	A		150 °C

figure 22. **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 23. MOSFET

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

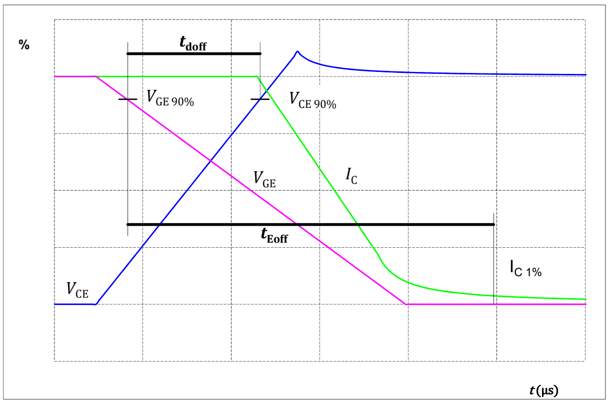


figure 24. MOSFET

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

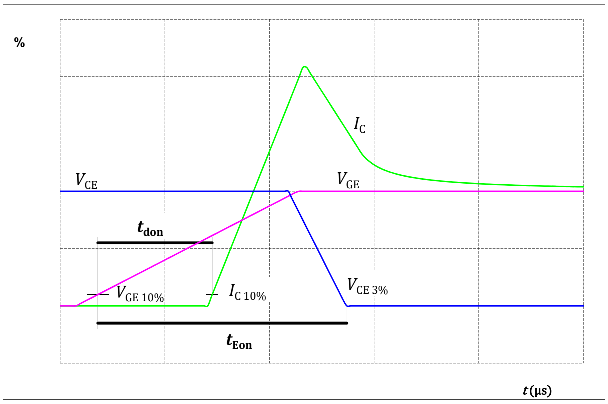


figure 25. MOSFET

Turn-off Switching Waveforms & definition of t_f

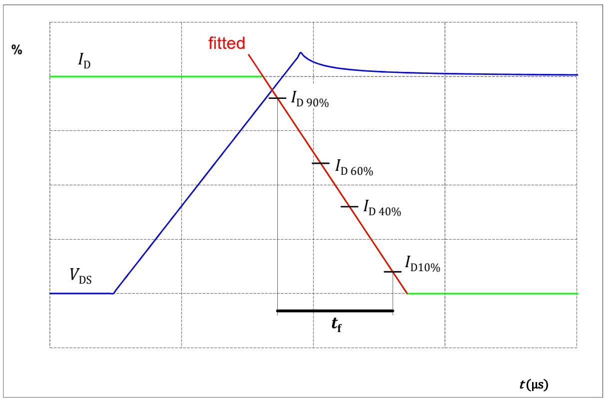
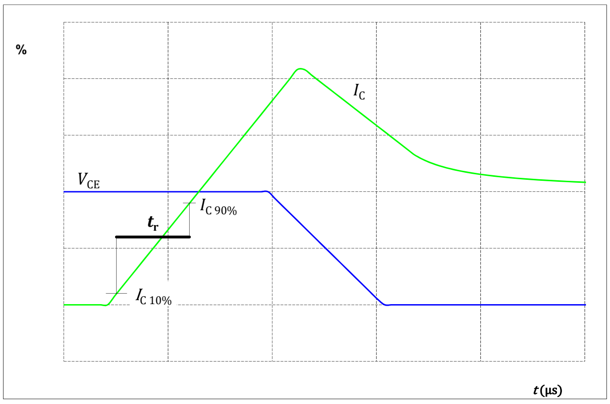


figure 26. MOSFET

Turn-on Switching Waveforms & definition of t_r



Inverter Switching Definitions

figure 27. **FWD**

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

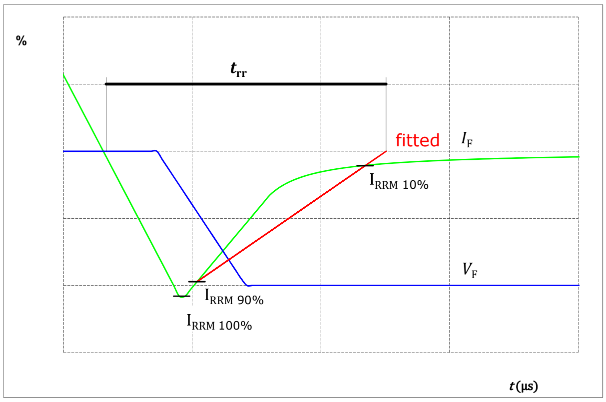


figure 28. **FWD**

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

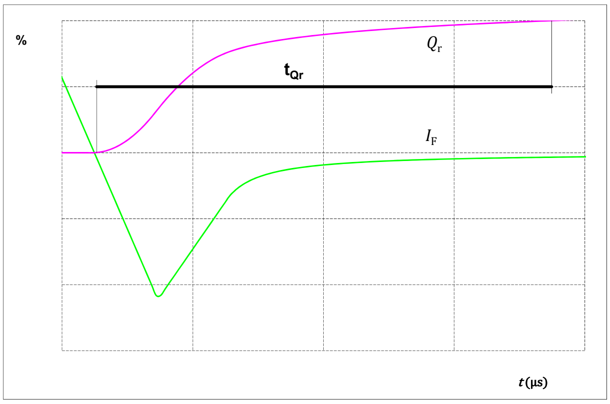
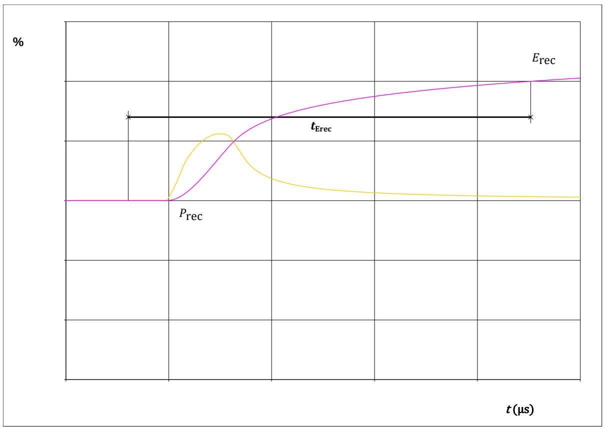


figure 29. **FWD**

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



10-EZ126PB040MS01-LS18F73T
datasheet

Ordering Code

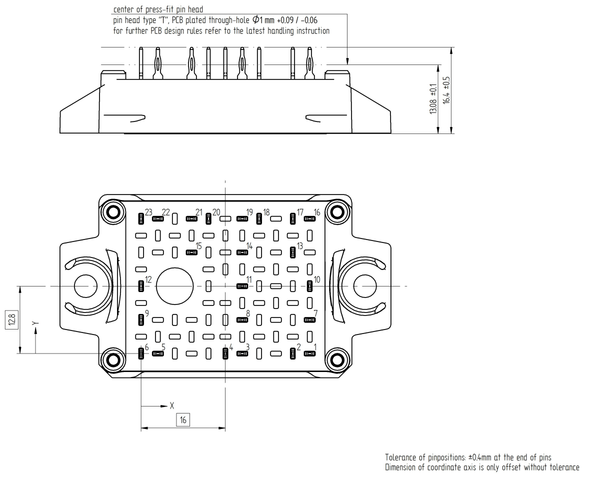
Version	Ordering Code
Without thermal paste	10-EZ126PB040MS01-LS18F73T
With thermal paste (5,2 W/mK, PTM6000HV)	10-EZ126PB040MS01-LS18F73T-/7/

Marking

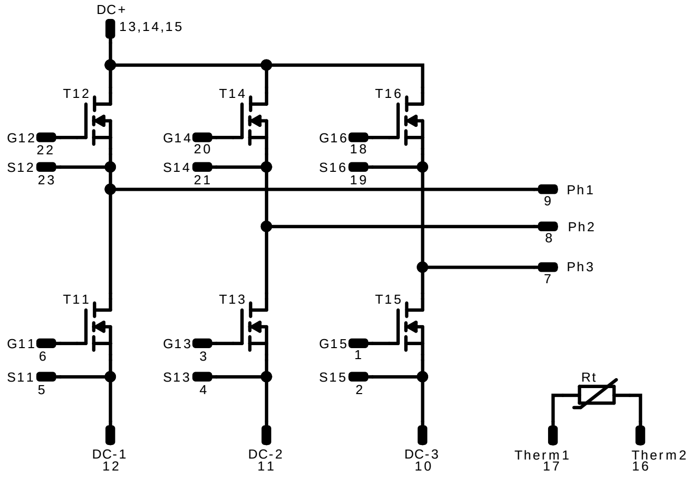
	Name		Date code	UL & VIN	Lot	Serial
Text	NN-NNNNNNNNNNNNNN-TTTTTTVV		WWYY	UL VIN	LLLLL	SSSS
	Type&Ver	Lot number	Serial	Date code		
Datamatrix	TTTTTTTVV	LLLLL	SSSS	WWYY		

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	40 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.

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.

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