Vincotech

10-EY07LBB011ME-PQ84J18T
datasheet

flowNPFC E2 SiC **650 V / 11 mΩ**

Topology features

- Integrated DC capacitor
- Integrated Shunt Gate Resistor
- Kelvin Emitter for improved switching performance
- Low inductive commutation loop
- Neutral Boost PFC
- SiC MOSFET
- 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

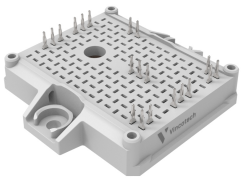
Target applications

- Charging Stations

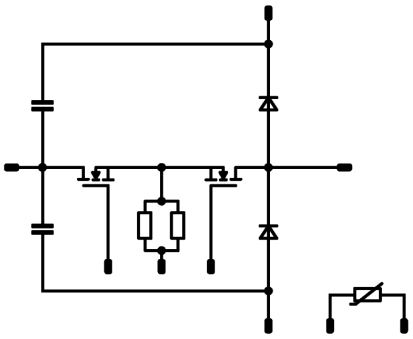
Types

- 10-EY07LBB011ME-PQ84J18T

flow E2 12 mm housing



Schematic



Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
Boost Switch				
Drain-source voltage	V_{DSS}		650	V
Drain current (DC current)	I_D	T_j = T_{jmax} T_s = 80 °C	101	A
Peak drain current	I_{DM}	t_p limited by T_{jmax}	528	A
Total power dissipation	P_{tot}	T_j = T_{jmax} T_s = 80 °C	173	W
Gate-source voltage	V_{GSS}	static	-4 / 15	V
		dynamic	-8 / 19	V
Maximum Junction Temperature	T_{jmax}		175	°C
Boost Diode				
Peak repetitive reverse voltage	V_{RRM}		1200	V
Forward current (DC current)	I_F	T_j = T_{jmax} T_s = 80 °C	104	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	356	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, t_p = 10 ms T_j = 110 °C	516	A
Total power dissipation	P_{tot}	T_j = T_{jmax} T_s = 80 °C	198	W
Maximum junction temperature	T_{jmax}		175	°C
Resistor (Sense)				
DC current	I	terminal temperature Tk = 90 C°	1264	mA
Power dissipation	P_{tot}	T_j = T_{jmax} T_s = 80 °C	0,4	W
Operation Temperature	T_{op}		-55 ... 155	°C
Capacitor (DC)				
Maximum DC voltage	V_{MAX}		630	V
Operation Temperature	T_{op}		-55 ... 125	°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			12,28	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	
Boost Switch										
Static										
Drain-source on-state resistance	$r_{DS(on)}$		15		70,4	25 125 150		12,3 14,8 16,1	15(1)	mΩ
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$			0,01936	25	1,8	2,6	3,6	V
Gate to Source Leakage Current	I_{GSS}		15	0		25		40	400	nA
Zero Gate Voltage Drain Current	I_{DSS}		0	650		25		4	128	µA
Internal gate resistance	r_g							0,75		Ω
Gate charge	Q_g		-4/15	400	70,4	25		252		nC
Short-circuit input capacitance	C_{iss}	f = 1 Mhz	0	600	0	25		6400		pF
Short-circuit output capacitance	C_{oss}							400		
Reverse transfer capacitance	C_{rss}							32		
Diode forward voltage	V_{SD}		0		35,2	25		4,8		V
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 5,2 W/mK (PTM)						0,55		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 8 Ω R_{goff} = 8 Ω	-4/15	350	100	25 125 150		40,92 36,91 36,52		ns
Rise time	t_r					25 125 150		28,57 25,09 24,27		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		111,53 120,28 122,64		ns
Fall time	t_f					25 125 150		19,34 20,27 20,58		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=0,511 µC Q_{rFWD}=0,564 µC Q_{rFWD}=0,562 µC				25 125 150		1,05 0,918 0,898		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,773 0,81 0,826		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	
Boost Diode										
Static										
Forward voltage	V_F				80	25 125 150		1,37 1,56 1,63	2[1]	V
Reverse leakage current	I_R	V_r = 1200 V				25		20	2000	µA
Thermal										
Thermal resistance junction to sink[2]	$R_{th(j-s)}$	λ_{paste} = 5,2 W/mK (PTM)						0,48		K/W
Dynamic										
Peak recovery current	I_{RM}	di/dt=3478 A/µs di/dt=3743 A/µs di/dt=3791 A/µs	-4/15	350	100	25 125 150		37,72 41,47 41,84		A
Reverse recovery time	t_{rr}					25 125 150		22,75 22,66 22,63		ns
Recovered charge	Q_r					25 125 150		0,511 0,564 0,562		µC
Reverse recovered energy	E_{rec}					25 125 150		0,086 0,107 0,107		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		4797,31 5720,49 5590,63		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	
Resistor (Sense)										
Static										
Resistance	R							0,25		Ω
Tolerance							-1		1	%
Temperature coeficient	tc							200		ppm/K
Capacitor (DC)										
Static										
Capacitance	C	DC bias voltage = 0 V				25		100		nF
Tolerance							-10		10	%
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

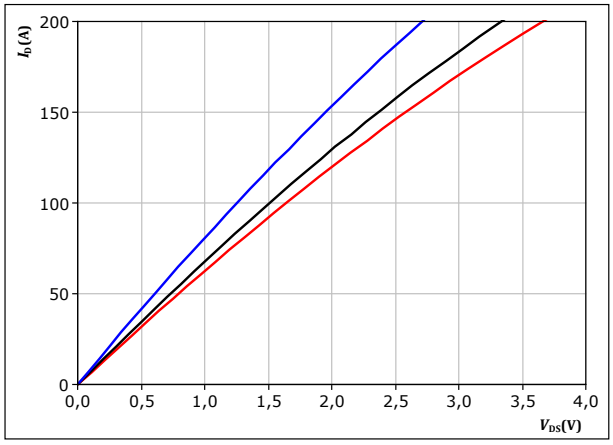
(2) Only valid with pre-applied Vincotech thermal interface material.

Boost Switch Characteristics

figure 1. **MOSFET**

Typical output characteristics

$I_D = f(V_{DS})$

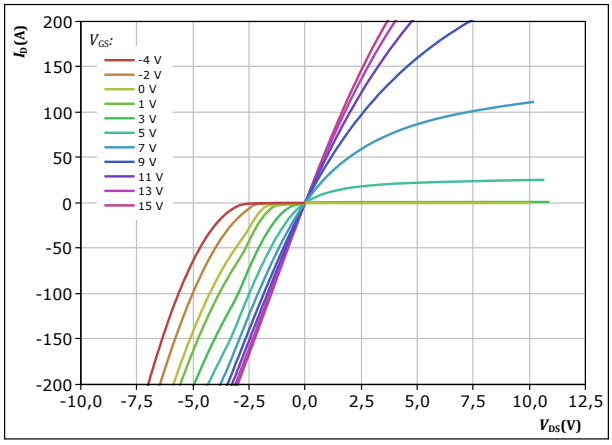


t_p =	250	µs		
V_{GS} =	15	V	T_j:	25 °C
				125 °C
				150 °C

figure 2. **MOSFET**

Typical output characteristics

$I_D = f(V_{DS})$



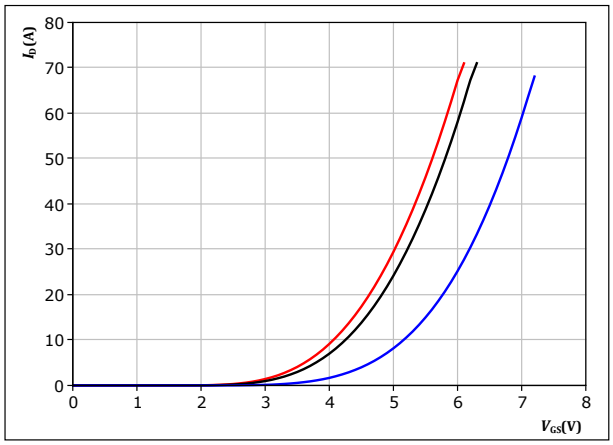
t_p =	250	µs
T_j =	150	°C

V_{GS} from -4 V to 15 V in steps of 2 V

figure 3. **MOSFET**

Typical transfer characteristics

$I_D = f(V_{GS})$

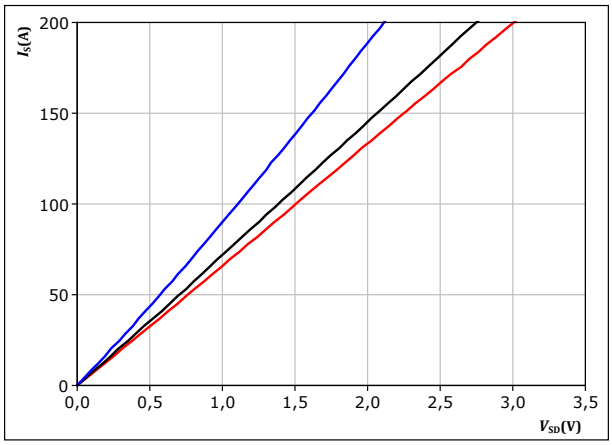


t_p =	250	µs		
V_{DS} =	10	V	T_j:	25 °C
				125 °C
				150 °C

figure 4. **MOSFET**

Typical reverse drain current characteristics

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



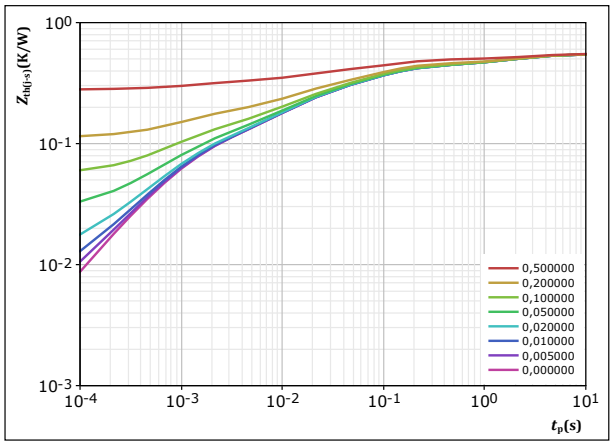
t_p =	250	µs		
V_{GS} =	15	V	T_j:	25 °C
				125 °C
				150 °C

Boost 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

$R_{th(j-s)} =$ 0,55 K/W

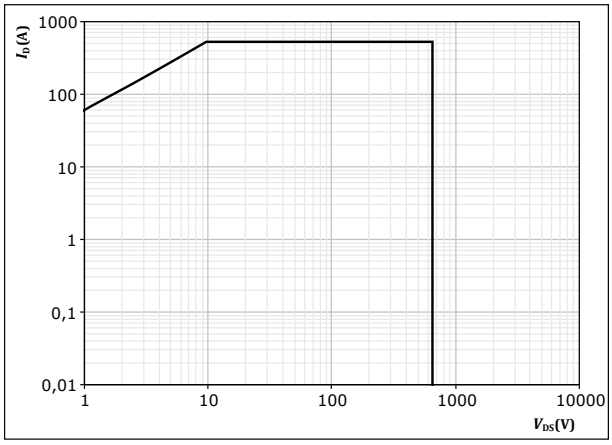
MOSFET thermal model values

R (K/W)	τ (s)
1,40E-02	3,60E+01
1,19E-01	2,04E+00
2,07E-01	8,44E-02
1,42E-01	1,20E-02
7,55E-02	9,81E-04

figure 6. **MOSFET**

Safe operating area

$I_D = f(V_{DS})$



$D =$ single pulse

$T_s =$ 80 °C

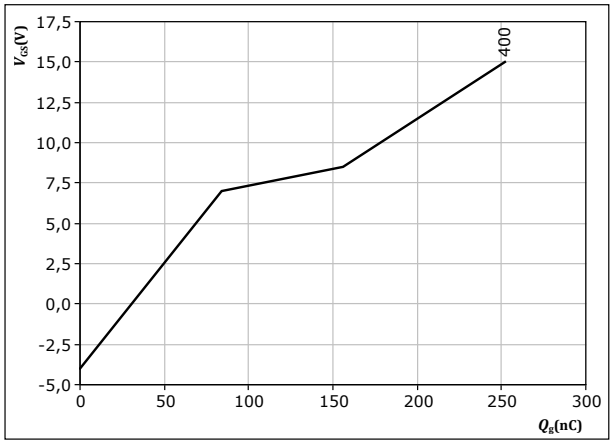
$V_{GS} =$ 15 V

$T_j =$ T_{jmax}

figure 7. **MOSFET**

Gate voltage vs gate charge

$V_{GS} = f(Q_g)$



$I_D =$ 70.4 A

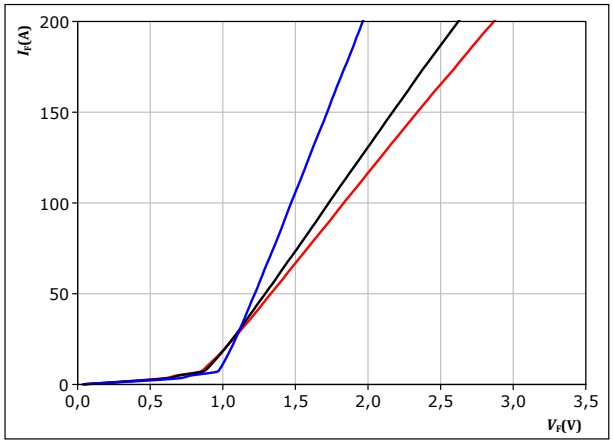
$T_j =$ 25 °C

Boost Diode Characteristics

figure 8. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



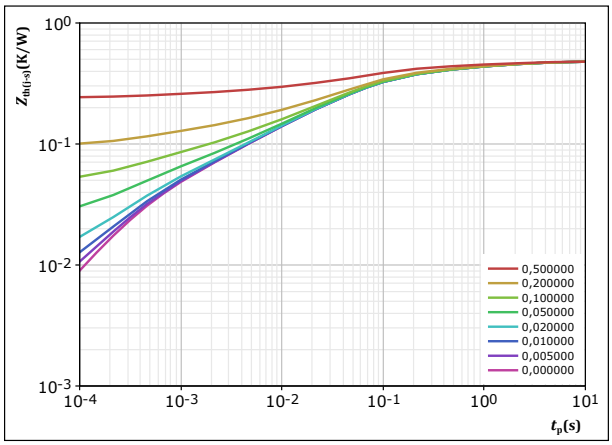
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 9. **FWD**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 0,479 K/W

FWD thermal model values

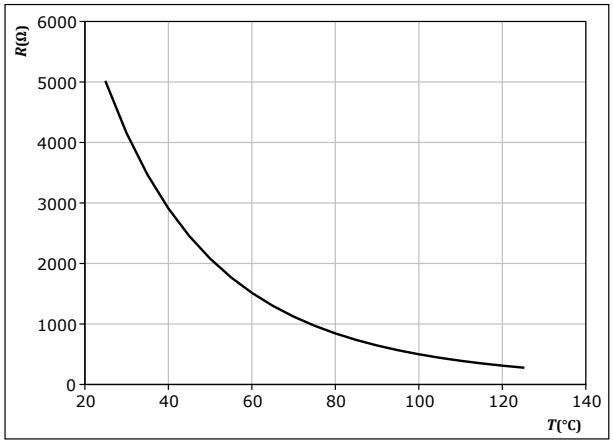
R (K/W)	τ (s)
1,56E-02	6,99E+00
6,13E-02	1,41E+00
8,53E-02	2,40E-01
1,94E-01	5,21E-02
6,74E-02	9,46E-03
3,15E-02	1,97E-03
2,71E-02	3,78E-04

Thermistor Characteristics

figure 10. **Thermistor**

Typical NTC characteristic as function of temperature

$R_T = f(T)$

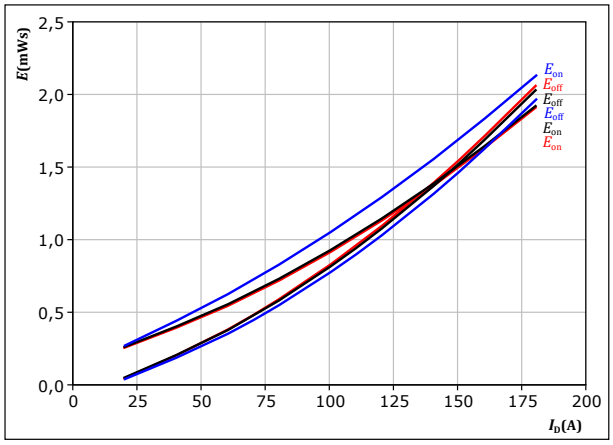


Boost Switching Characteristics

figure 11. **MOSFET**

Typical switching energy losses as a function of drain current

$E = f(I_D)$



With an inductive load at

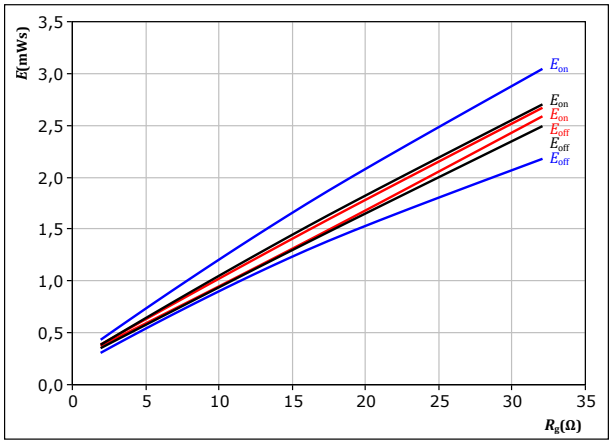
V_{DS} =	350	V
V_{GS} =	-4/15	V
R_{gon} =	8	Ω
R_{goff} =	8	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 12. **MOSFET**

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

$E = f(R_g)$



With an inductive load at

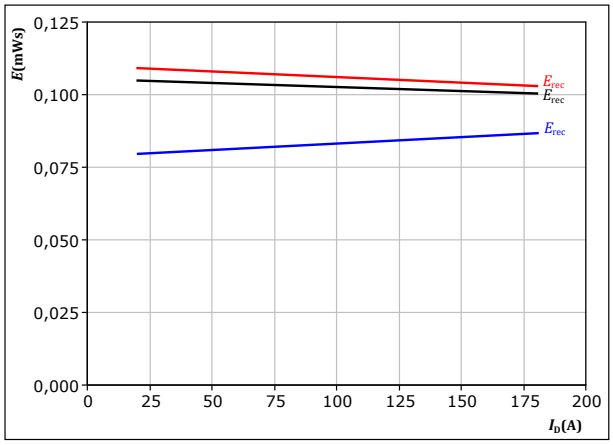
V_{DS} =	350	V
V_{GS} =	-4/15	V
I_D =	100	A

T_j: 25 °C, 125 °C, 150 °C

figure 13. **FWD**

Typical reverse recovered energy loss as a function of drain current

$E_{rec} = f(I_D)$



With an inductive load at

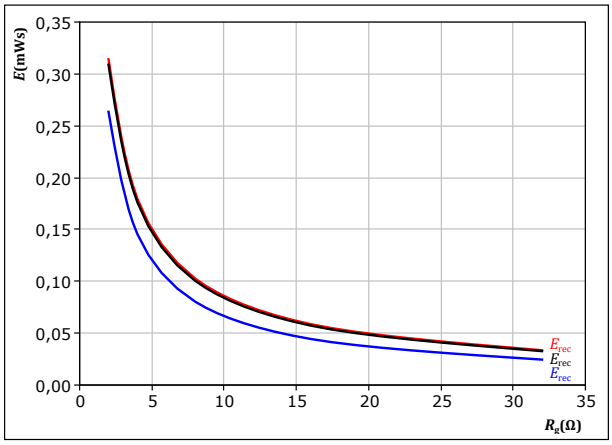
V_{DS} =	350	V
V_{GS} =	-4/15	V
R_{gon} =	8	Ω

T_j: 25 °C, 125 °C, 150 °C

figure 14. **FWD**

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} =	350	V
V_{GS} =	-4/15	V
I_D =	100	A

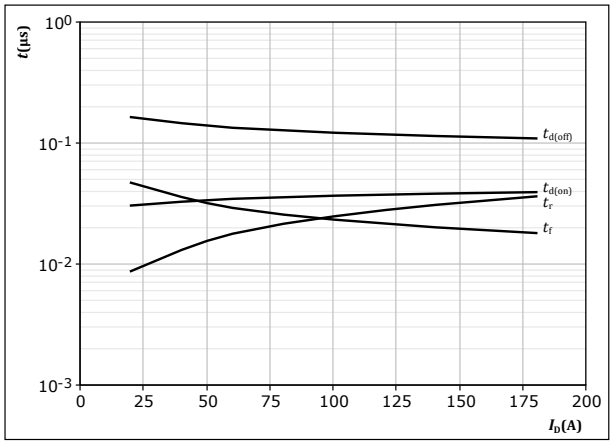
T_j: 25 °C, 125 °C, 150 °C

Boost Switching Characteristics

figure 15. **MOSFET**

Typical switching times as a function of drain current

$t = f(I_D)$



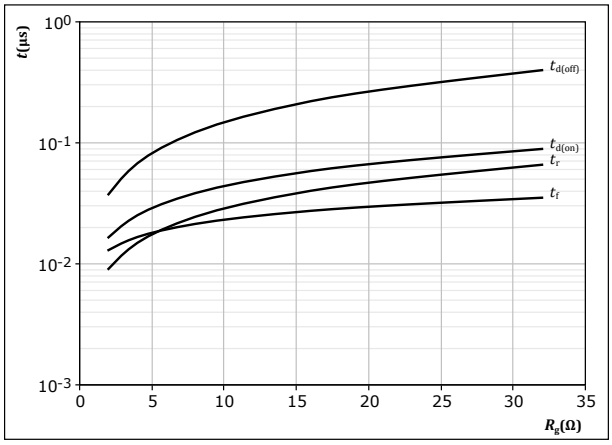
With an inductive load at

T_j =	150	°C
V_{DS} =	350	V
V_{GS} =	-4/15	V
R_{gon} =	8	Ω
R_{goff} =	8	Ω

figure 16. **MOSFET**

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

$t = f(R_g)$



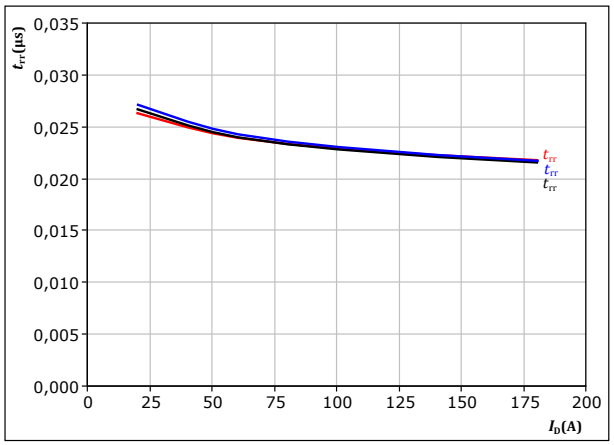
With an inductive load at

T_j =	150	°C
V_{DS} =	350	V
V_{GS} =	-4/15	V
I_D =	100	A

figure 17. **FWD**

Typical reverse recovery time as a function of drain current

$t_{rr} = f(I_D)$

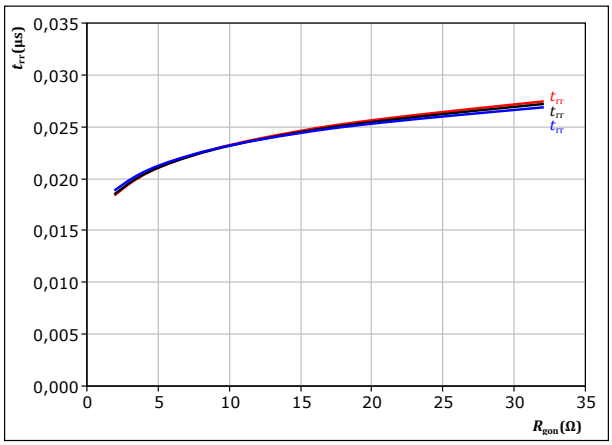


At	V_{DS} =	350	V	
	V_{GS} =	-4/15	V	T_j: 25 °C, 125 °C, 150 °C
	R_{gon} =	8	Ω	

figure 18. **FWD**

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

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



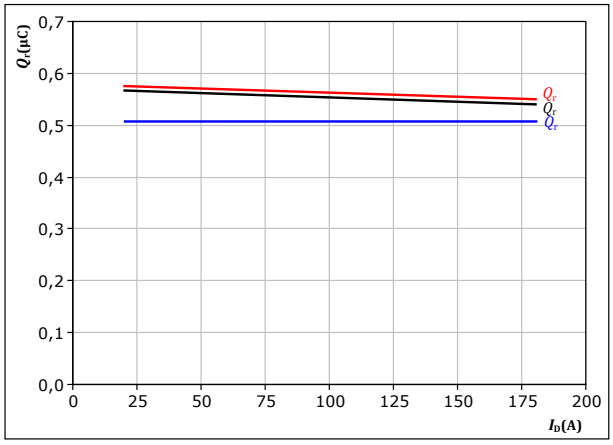
At	V_{DS} =	350	V	
	V_{GS} =	-4/15	V	T_j: 25 °C, 125 °C, 150 °C
	I_D =	100	A	

Boost Switching Characteristics

figure 19. **FWD**

Typical recovered charge as a function of drain current

$Q_r = f(I_D)$

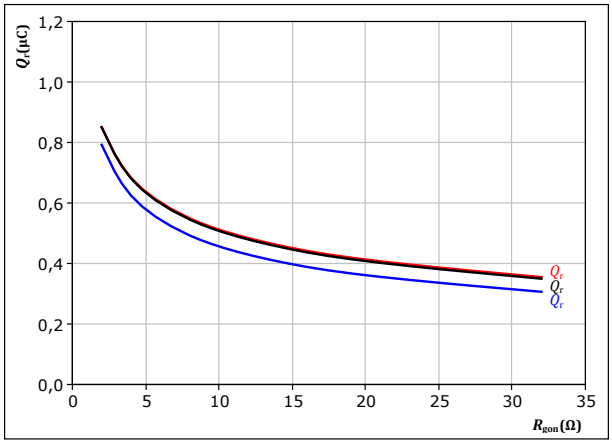


At				T_j:	
	V_{DS} =	350	V		25 °C
	V_{GS} =	-4/15	V		125 °C
	R_{gon} =	8	Ω		150 °C

figure 20. **FWD**

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

$Q_r = f(R_{gon})$

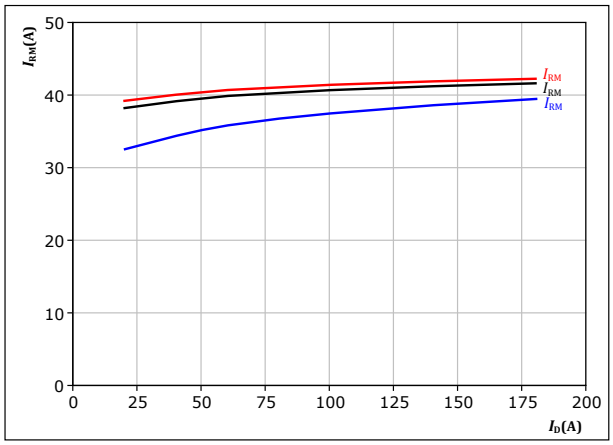


At				T_j:	
	V_{DS} =	350	V		25 °C
	V_{GS} =	-4/15	V		125 °C
	I_D =	100	A		150 °C

figure 21. **FWD**

Typical peak reverse recovery current as a function of drain current

$I_{RM} = f(I_D)$

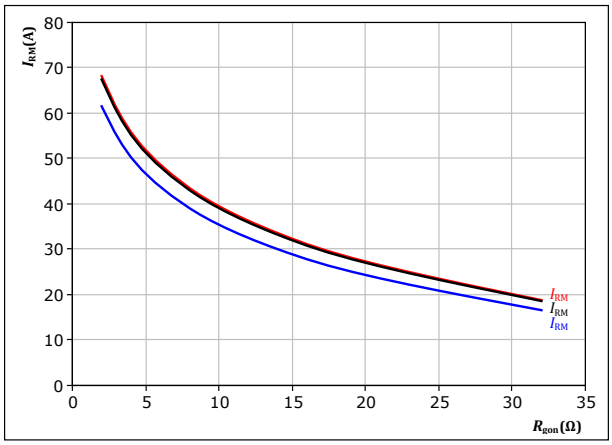


At				T_j:	
	V_{DS} =	350	V		25 °C
	V_{GS} =	-4/15	V		125 °C
	R_{gon} =	8	Ω		150 °C

figure 22. **FWD**

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

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



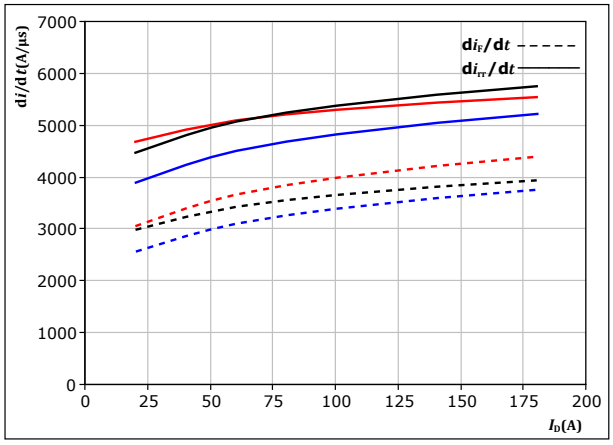
At				T_j:	
	V_{DS} =	350	V		25 °C
	V_{GS} =	-4/15	V		125 °C
	I_D =	100	A		150 °C

Boost Switching Characteristics

figure 23. **FWD**

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)

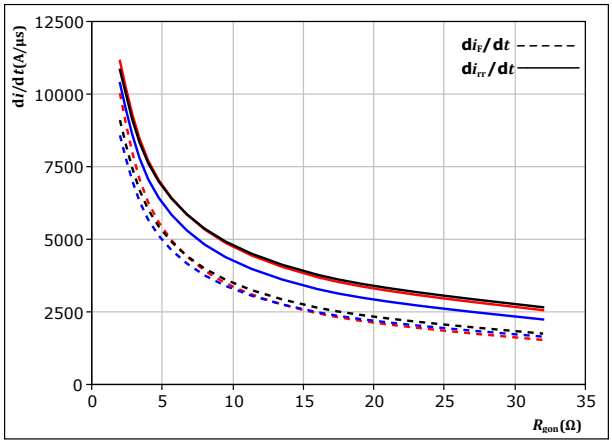


At					
	V_{DS} =	350	V		
	V_{GS} =	-4/15	V	T_j:	25 °C
	R_{gon} =	8	Ω		125 °C
					150 °C

figure 24. **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})

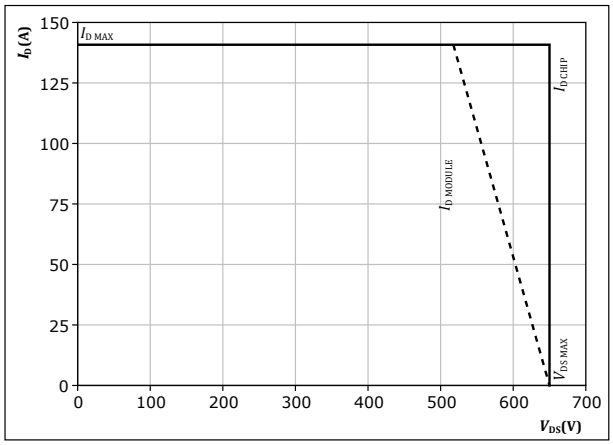


At					
	V_{DS} =	350	V		
	V_{GS} =	-4/15	V	T_j:	25 °C
	I_D =	100	A		125 °C
					150 °C

figure 25. **MOSFET**

Reverse bias safe operating area

I_D = f(V_{DS})



At			
	T_j =	150	°C
	R_{gon} =	8	Ω
	R_{goff} =	8	Ω

Boost Switching Definitions

figure 26. MOSFET

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

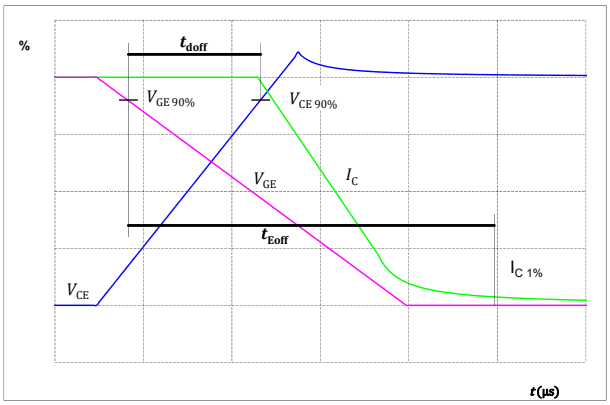


figure 27. MOSFET

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

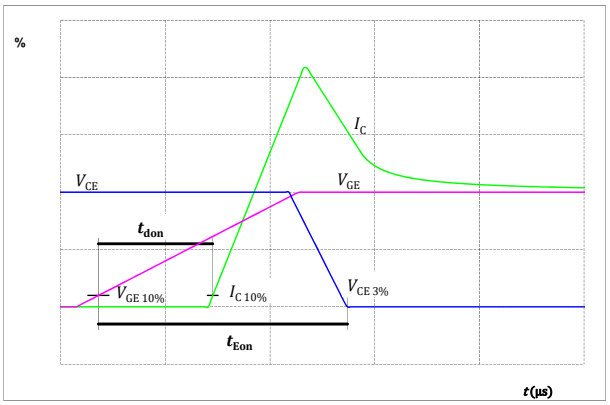


figure 28. MOSFET

Turn-off Switching Waveforms & definition of t_f

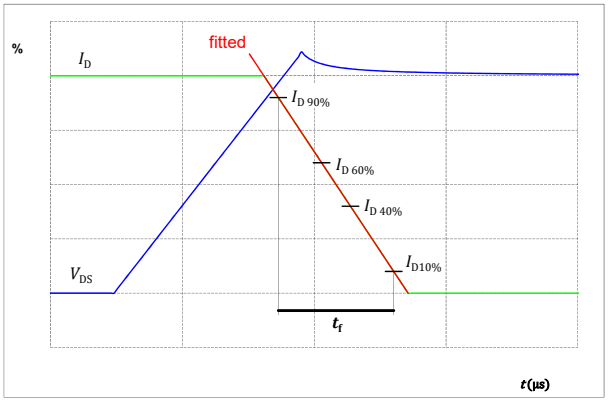
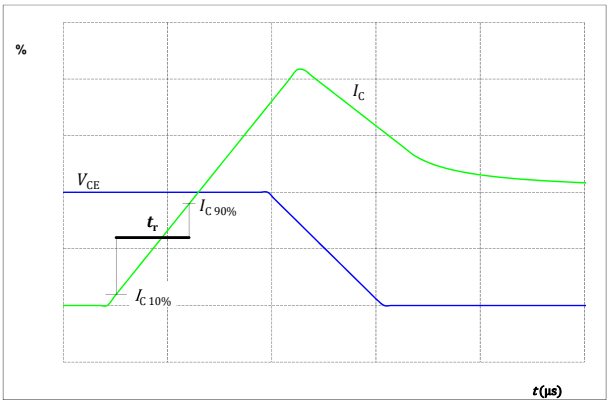


figure 29. MOSFET

Turn-on Switching Waveforms & definition of t_r



Boost Switching Definitions

figure 30. **FWD**

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

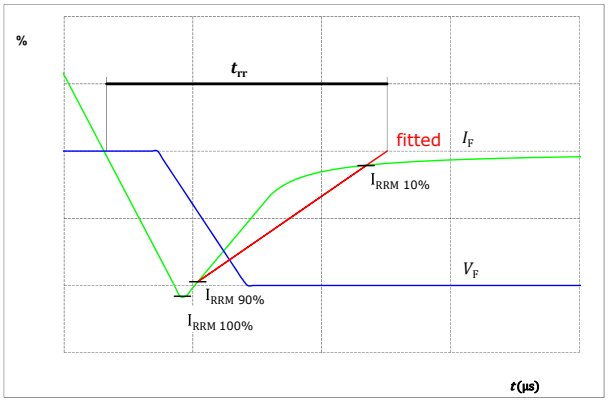


figure 31. **FWD**

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

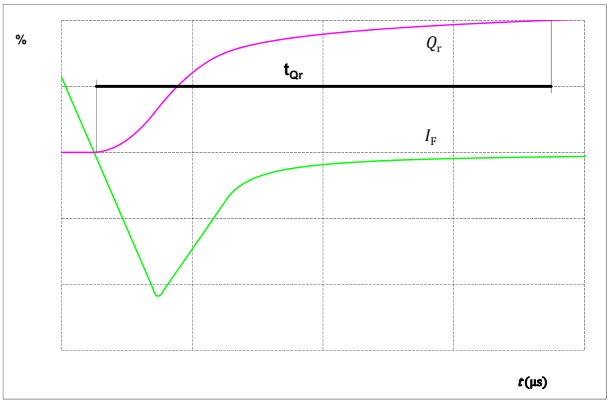
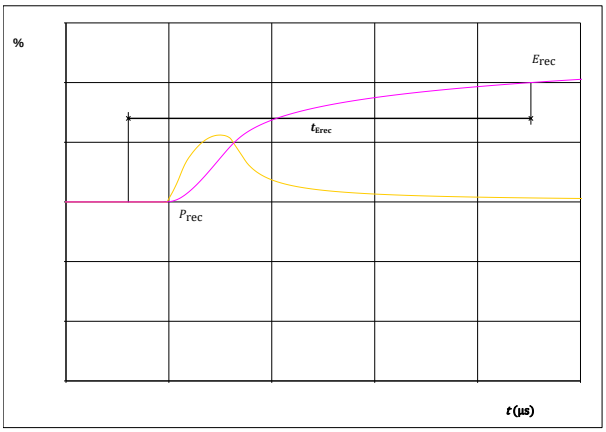


figure 32. **FWD**

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



Ordering Code

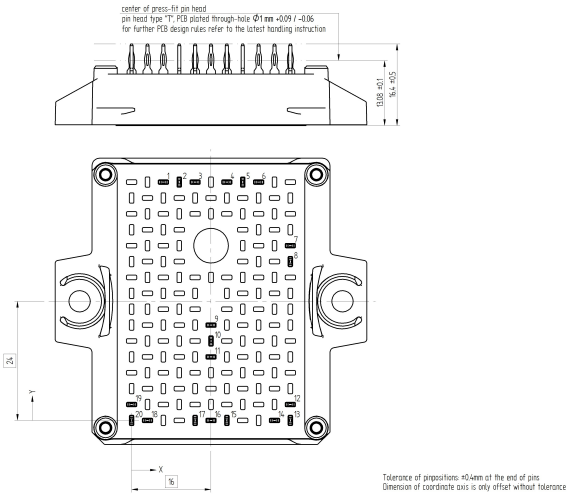
Version	Ordering Code
Without thermal paste	10-EY07LBB011ME-PQ84J18T
With thermal paste (5,2 W/mK, PTM6000HV)	10-EY07LBB011ME-PQ84J18T-/7/

Marking

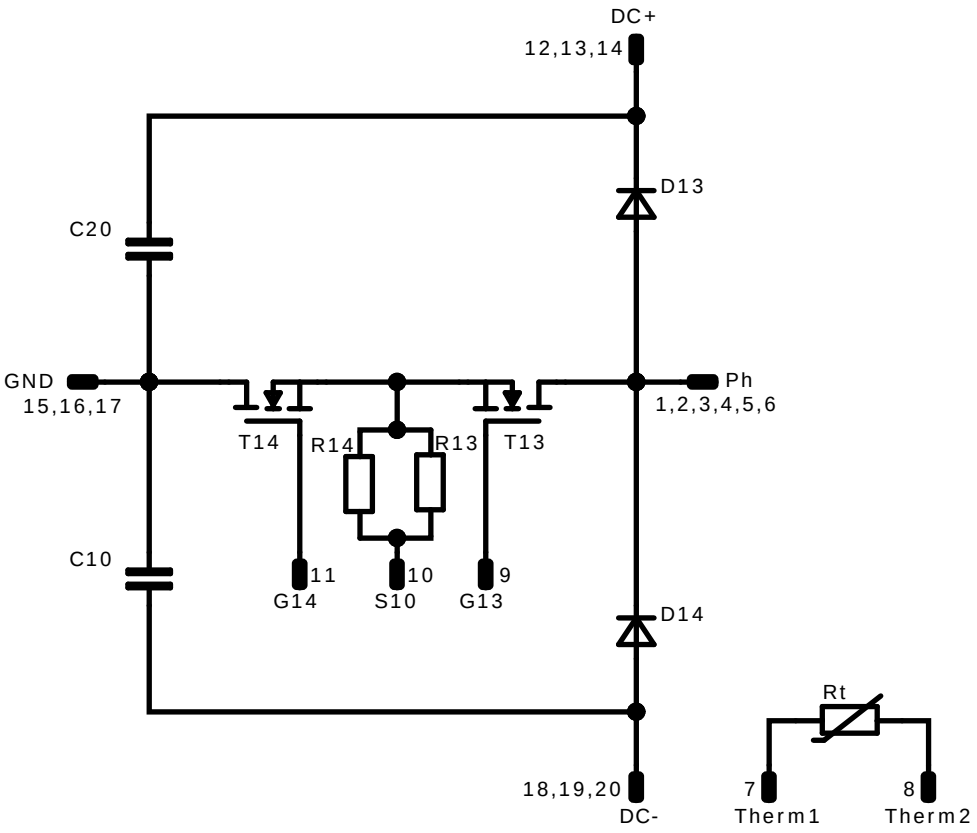
	Name		Date code	UL & VIN	Lot	Serial
Text	NN-NNNNNNNNNNNNN-TTTTTTVV		WWYY	UL VIN	LLLLL	SSSS
Datamatrix	**Type&Ver**	**Lot number**	**Serial**	**Date code**		
	TTTTTTVV	LLLLL	SSSS	WWYY		

Outline

Pin table [mm]			
Pin	X	Y	Function
1	6,4	48	Ph
2	9,6	48	Ph
3	12,8	48	Ph
4	19,2	48	Ph
5	22,4	48	Ph
6	25,6	48	Ph
7	32	35,2	Therm1
8	32	32	Therm2
9	16	19,2	G13
10	16	16	S10
11	16	12,8	G14
12	32	3,2	DC+
13	32	0	DC+
14	28,8	0	DC+
15	19,2	0	GND
16	16	0	GND
17	12,8	0	GND
18	3,2	0	DC-
19	0	3,2	DC-
20	0	0	DC-



Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
R13, R14	Resistor			Resistor (Sense)	
T13, T14	MOSFET	650 V	11,25 mΩ	Boost Switch	
D13, D14	FWD	1200 V	80 A	Boost Diode	
C10, C20	Capacitor	630 V		Capacitor (DC)	
Rt	Thermistor			Thermistor	

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

Handling instruction
Handling instructions for *flow* E2 packages see vincotech.com website.

Package data
Package data for *flow* E2 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-EY07LBB011ME-PQ84J18T-D1-14	13 Jun. 2025		