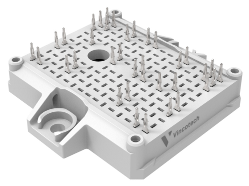
10-EY122PA008ME-LU38F08T
datasheet

***flow*Dual E2 SiC** **1200 V / 8 mΩ**

Features

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

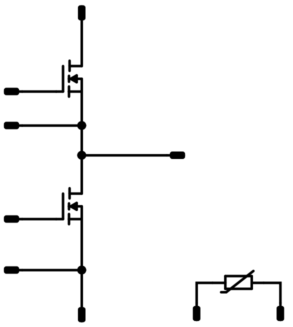
flow E2 12 mm housing



Target applications

- Charging Stations
- Energy Storage Systems
- Power Supply
- Solar Inverters
- Welding & Cutting

Schematic



Types

- 10-EY122PA008ME-LU38F08T

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions		Value	Unit
Half-Bridge Switch					
Drain-source voltage	V_{DSS}			1200	V
Drain current (DC current)	I_D	$T_j = T_{jmax}$	T_s = 80 °C	148	A
Peak drain current	I_{DM}	t_p limited by T_{jmax}		480	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	260	W
Gate-source voltage	V_{GSS}			-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 s	6000	V
Isolation voltage	V_{isol}	AC Voltage	t_p = 1 min	2500	V
Creepage distance				>12,7	mm
Clearance				9,34	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	
Half-Bridge Switch										
Static										
Drain-source on-state resistance	$r_{DS(on)}$		15		160	25 125 150	5,6	9 11 12	10,4[1]	mΩ
Gate-source threshold voltage	$V_{GS(th)}$		0		0,046	25	1,8	2,5	3,6	V
Gate to Source Leakage Current	I_{GSS}		15	0		25		40	1000	nA
Zero Gate Voltage Drain Current	I_{DSS}		0	1200		25		4	76	μA
Internal gate resistance	r_g							0,425		Ω
Gate charge	Q_g		-4/15	800	160	25		472		nC
Short-circuit input capacitance	C_{iss}	f = 100 kHz	0	1000	0	25		13428		pF
Short-circuit output capacitance	C_{oss}							516		
Reverse transfer capacitance	C_{rss}							32		
Diode forward voltage	V_{SD}		0		80	25		4,6		V
Thermal										
Thermal resistance junction to sink [2]	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,37		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} = 8 Ω R_{goff} = 8 Ω	-4/15	600	160	25 125 150		74,24 65,6 64,64		ns
Rise time	t_r					25 125 150		40 34,56 33,92		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		162,24 179,52 184,64		ns
Fall time	t_f					25 125 150		16,92 17,26 17,77		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=0,828 µC Q_{rFWD}=2,16 µC Q_{rFWD}=2,64 µC				25 125 150		5,64 5,67 5,78		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		3,06 2,99 3		mWs
Peak recovery current	I_{RRM}	d*i*/d*t*=4859 A/µs d*i*/d*t*=5582 A/µs d*i*/d*t*=5668 A/µs				25 125 150		48,54 82,05 94,28		A
Reverse recovery time	t_{rr}					25 125 150		22,84 45,41 45,5		ns
Recovered charge	Q_r					25 125 150		0,828 2,16 2,64		µC
Reverse recovered energy	E_{rec}					25 125 150		0,188 0,536 0,679		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		5861 4376 4597		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 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	

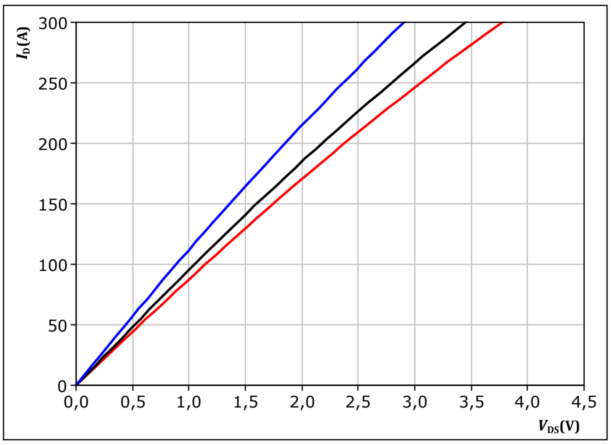
(1) Value at chip level
(2) Only valid with pre-applied Vincotech thermal interface material.

Half-Bridge Switch Characteristics

figure 1. **MOSFET**

Typical output characteristics

I_D = f(V_{DS})

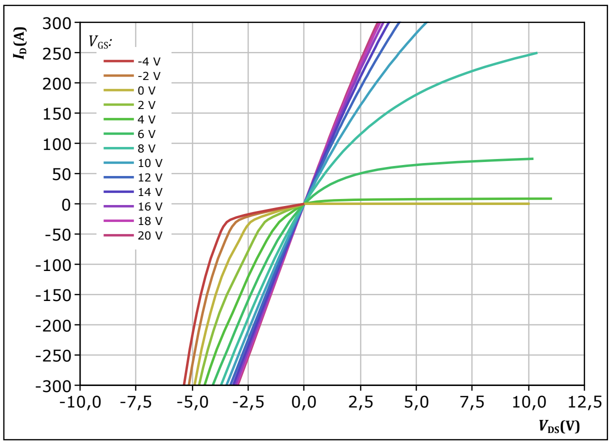


t_p =	250	μs		25 °C
V_{GS} =	14	V	T_j:	125 °C
				150 °C

figure 2. **MOSFET**

Typical output characteristics

I_D = f(V_{DS})



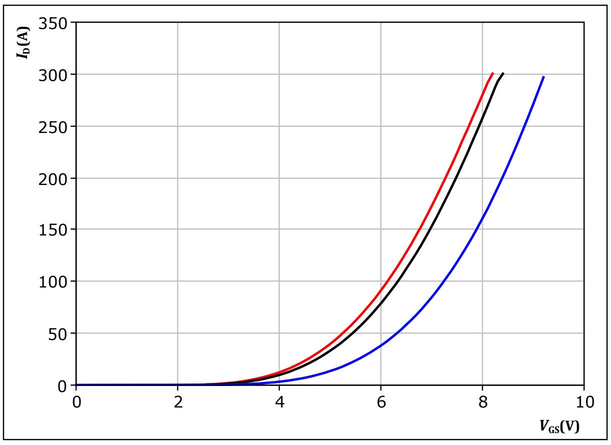
t_p =	250	μs
T_j =	150	°C

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

figure 3. **MOSFET**

Typical transfer characteristics

I_D = f(V_{GS})

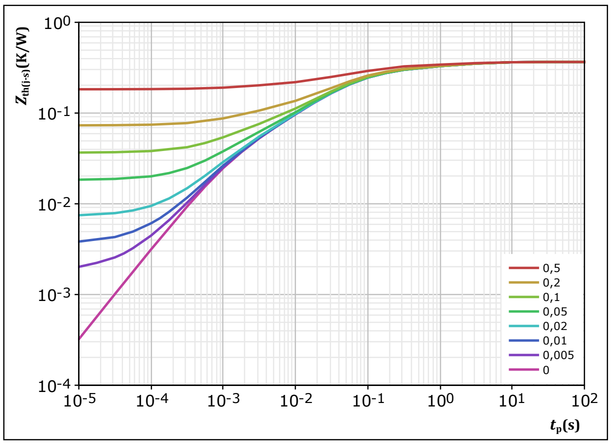


t_p =	250	μs		25 °C
V_{DS} =	10	V	T_j:	125 °C
				150 °C

figure 4. **MOSFET**

Transient thermal impedance as a function of pulse width

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



D =	t_p / T	
$R_{th(j-s)}$ =	0,366	K/W

MOSFET thermal model values

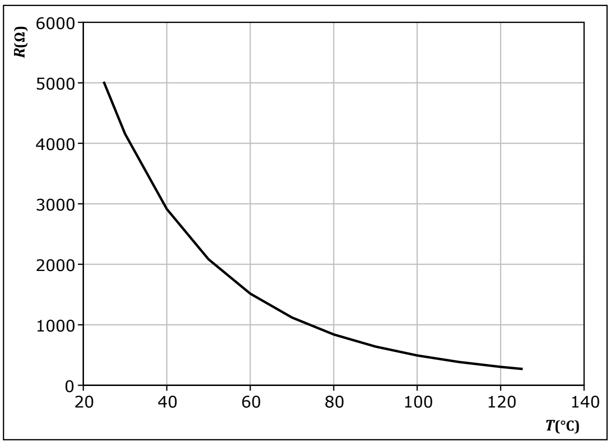
R (K/W)	τ (s)
3,20E-02	3,90E+00
5,74E-02	6,37E-01
1,72E-01	6,78E-02
7,47E-02	1,17E-02
2,94E-02	1,26E-03

Thermistor Characteristics

figure 5. **Thermistor**

Typical NTC characteristic as function of temperature

R_T = f(T)

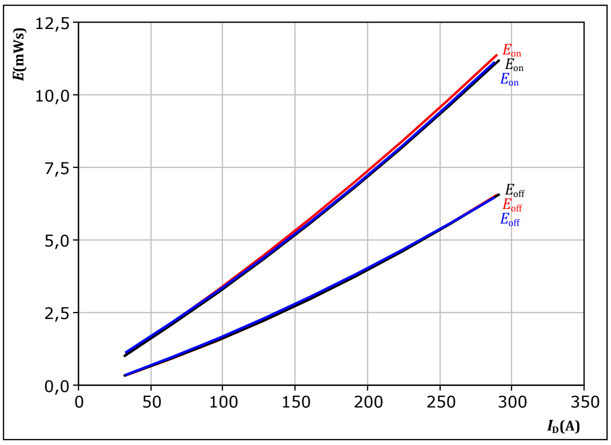


Half-Bridge Switching Characteristics

figure 6. **MOSFET**

Typical switching energy losses as a function of drain current

$E = f(I_D)$



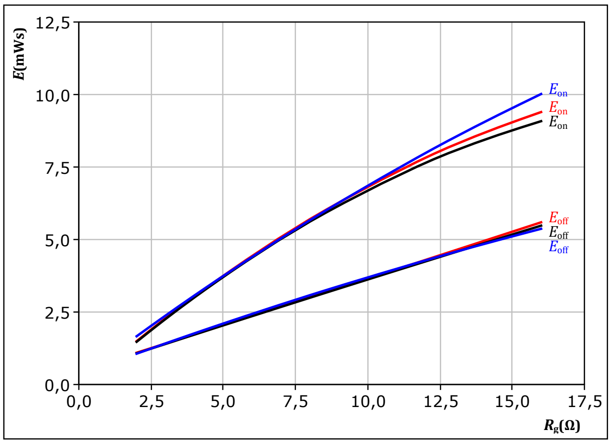
With an inductive load at

V_{DS} =	600	V	T_j:	25 °C
V_{GS} =	-4/15	V		125 °C
R_{gon} =	8	Ω		150 °C
R_{goff} =	8	Ω		

figure 7. **MOSFET**

Typical switching energy losses as a function of gate resistor

$E = f(R_g)$



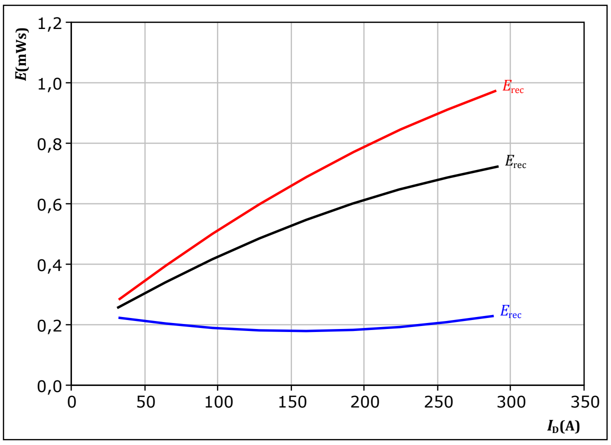
With an inductive load at

V_{DS} =	600	V	T_j:	25 °C
V_{GS} =	-4/15	V		125 °C
I_D =	160	A		150 °C

figure 8. **MOSFET**

Typical reverse recovered energy loss as a function of drain current

$E_{rec} = f(I_D)$



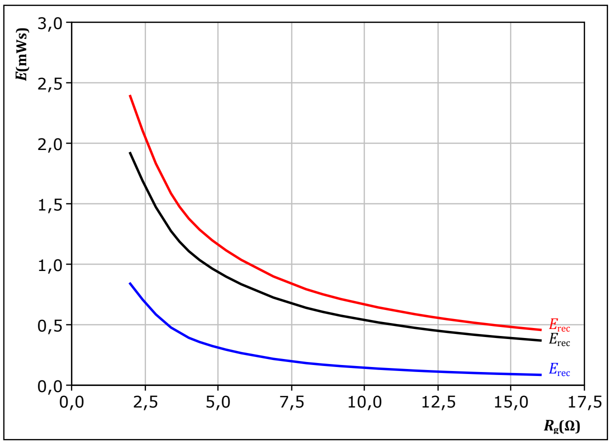
With an inductive load at

V_{DS} =	600	V	T_j:	25 °C
V_{GS} =	-4/15	V		125 °C
R_{gon} =	8	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

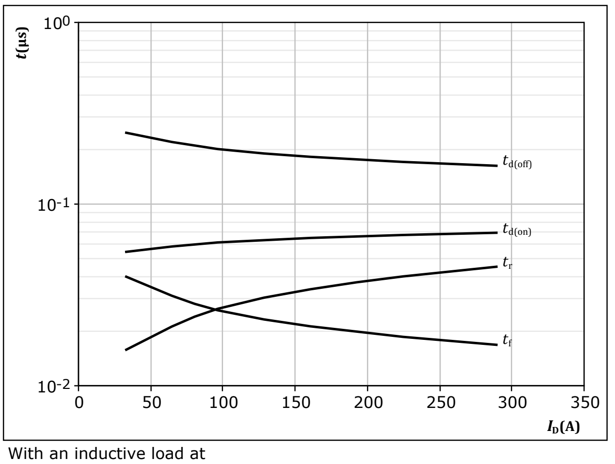
V_{DS} =	600	V	T_j:	25 °C
V_{GS} =	-4/15	V		125 °C
I_D =	160	A		150 °C

Half-Bridge Switching Characteristics

figure 10. **MOSFET**

Typical switching times as a function of drain current

$t = f(I_D)$



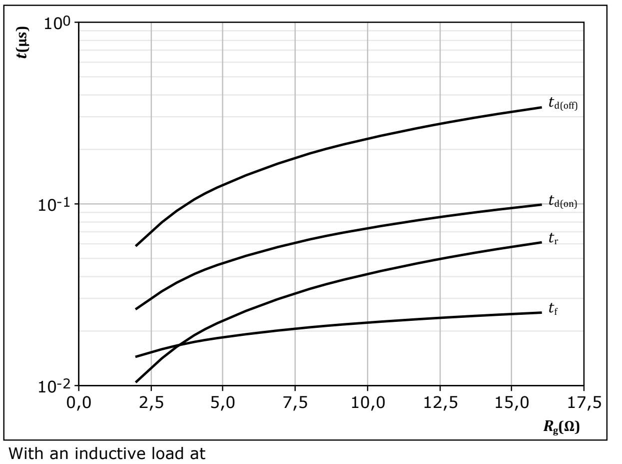
With an inductive load at

T_j =	150	°C
V_{DS} =	600	V
V_{GS} =	-4/15	V
R_{gon} =	8	Ω
R_{goff} =	8	Ω

figure 11. **MOSFET**

Typical switching times as a function of gate resistor

$t = f(R_g)$



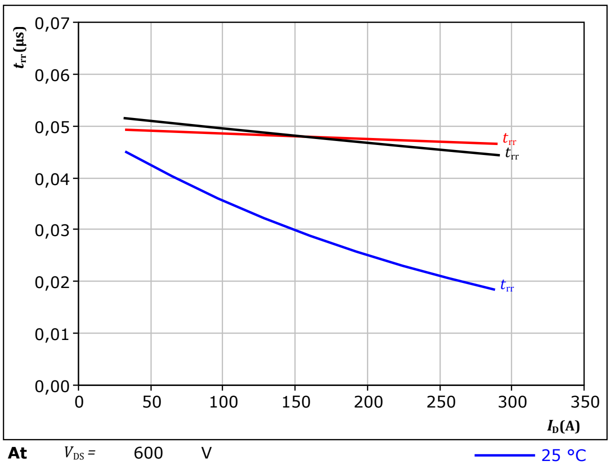
With an inductive load at

T_j =	150	°C
V_{DS} =	600	V
V_{GS} =	-4/15	V
I_D =	160	A

figure 12. **MOSFET**

Typical reverse recovery time as a function of drain current

$t_{rr} = f(I_D)$



At

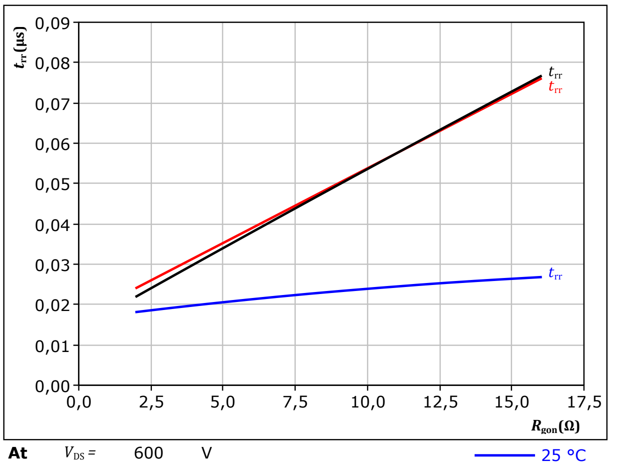
V_{DS} =	600	V	
V_{GS} =	-4/15	V	
R_{gon} =	8	Ω	

T_j: 25 °C, 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} =	-4/15	V
I_D =	160	A

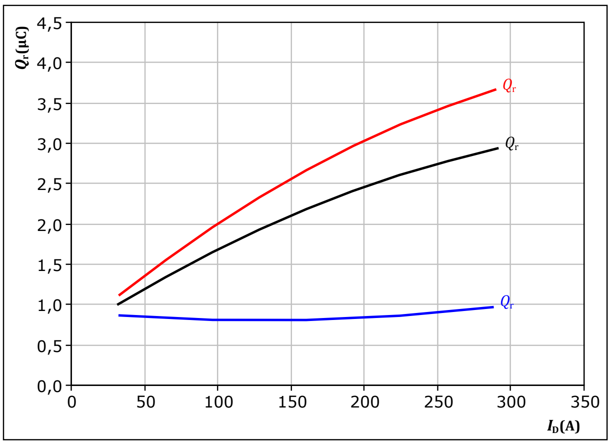
T_j: 25 °C, 125 °C, 150 °C

Half-Bridge Switching Characteristics

figure 14. **MOSFET**

Typical recovered charge as a function of drain current

Q_r = f(I_D)

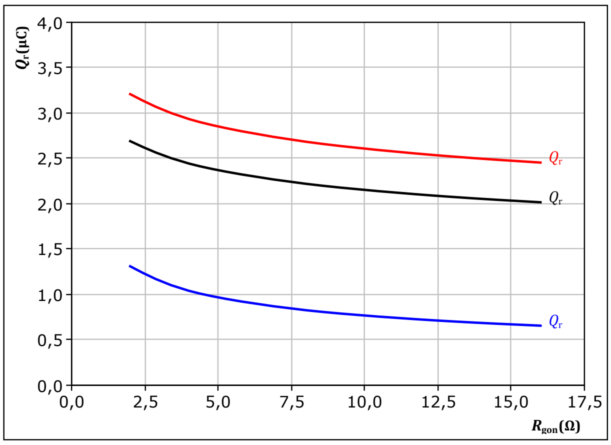


At				
V_{DS} =	600	V		25 °C
V_{GS} =	-4/15	V	T_j:	125 °C
R_{gon} =	8	Ω		150 °C

figure 15. **MOSFET**

Typical recovered charge as a function of turn on gate resistor

Q_r = f(R_{gon})

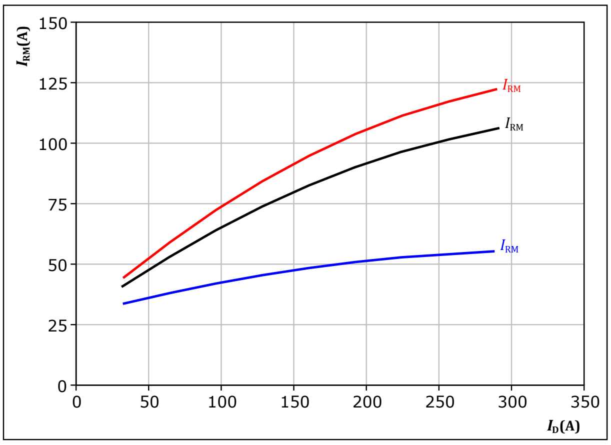


At				
V_{DS} =	600	V		25 °C
V_{GS} =	-4/15	V	T_j:	125 °C
I_D =	160	A		150 °C

figure 16. **MOSFET**

Typical peak reverse recovery current as a function of drain current

I_{RM} = f(I_D)

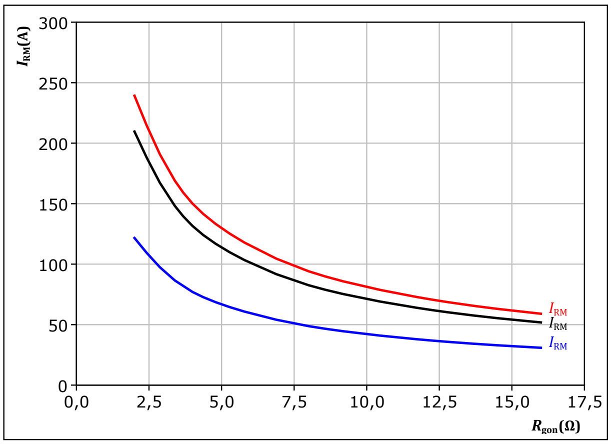


At				
V_{DS} =	600	V		25 °C
V_{GS} =	-4/15	V	T_j:	125 °C
R_{gon} =	8	Ω		150 °C

figure 17. **MOSFET**

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

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



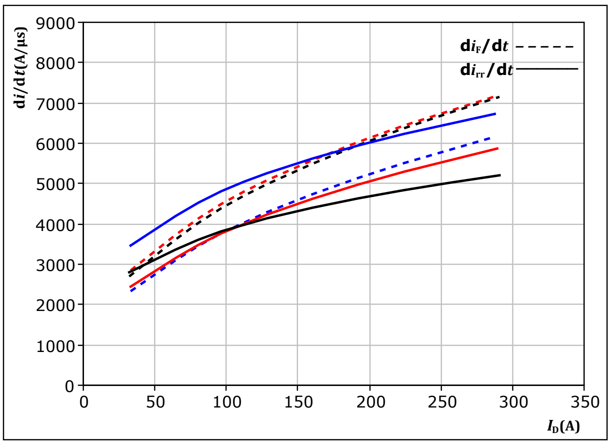
At				
V_{DS} =	600	V		25 °C
V_{GS} =	-4/15	V	T_j:	125 °C
I_D =	160	A		150 °C

Half-Bridge 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} = -4/15 V

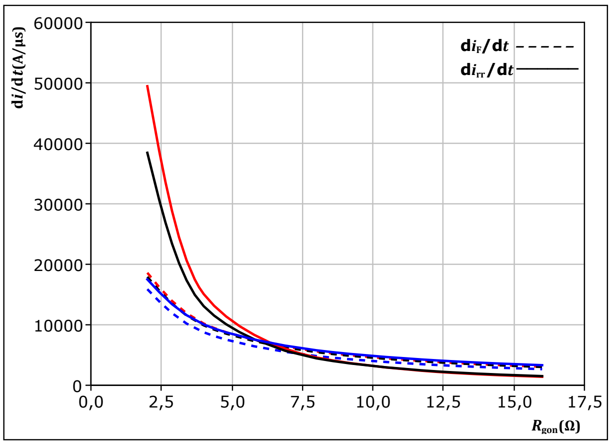
R_{gon} = 8 Ω

T_j: 25 °C, 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} = -4/15 V

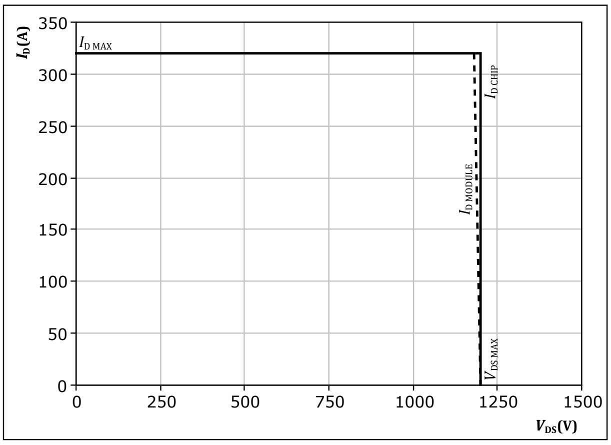
I_D = 160 A

T_j: 25 °C, 125 °C, 150 °C

figure 20. MOSFET

Reverse bias safe operating area

I_D = f(V_{DS})



At T_j = 150 °C

R_{gon} = 8 Ω

R_{goff} = 8 Ω

Half-Bridge Switching Definitions

figure 21. **MOSFET**

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

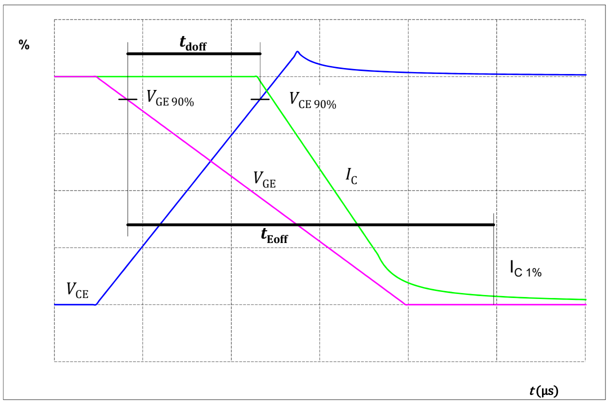


figure 22. **MOSFET**

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

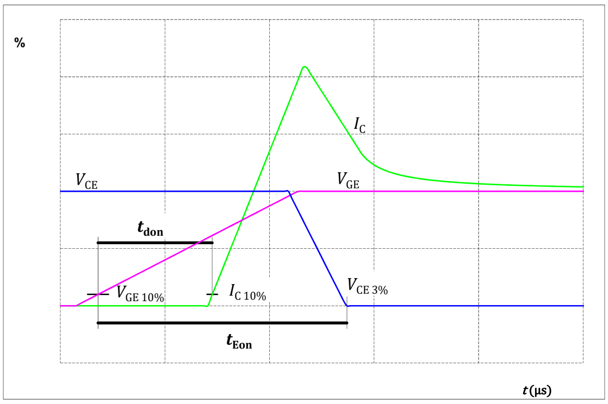


figure 23. **MOSFET**

Turn-off Switching Waveforms & definition of t_f

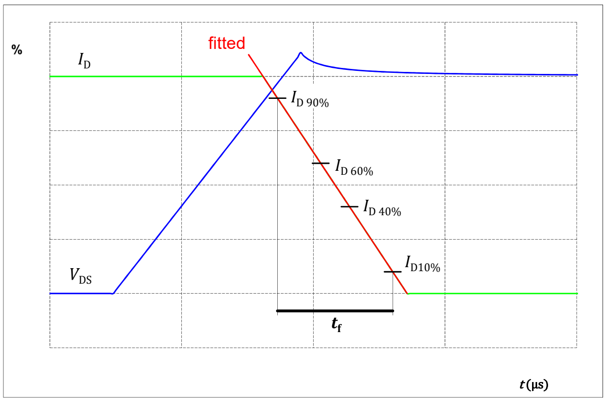
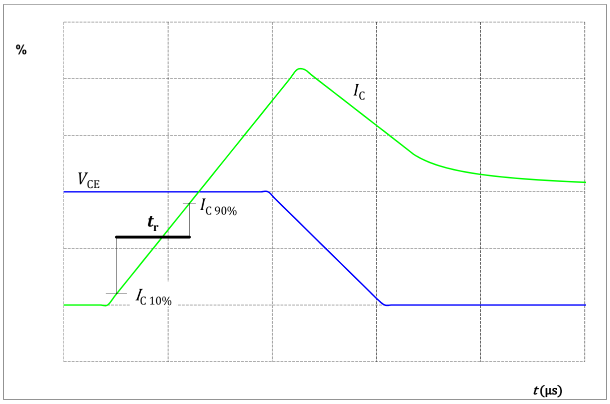


figure 24. **MOSFET**

Turn-on Switching Waveforms & definition of t_r



Half-Bridge Switching Definitions

figure 25. **FWD**

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

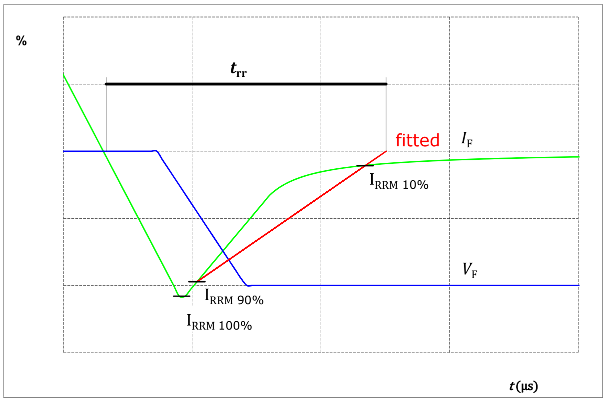


figure 26. **FWD**

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

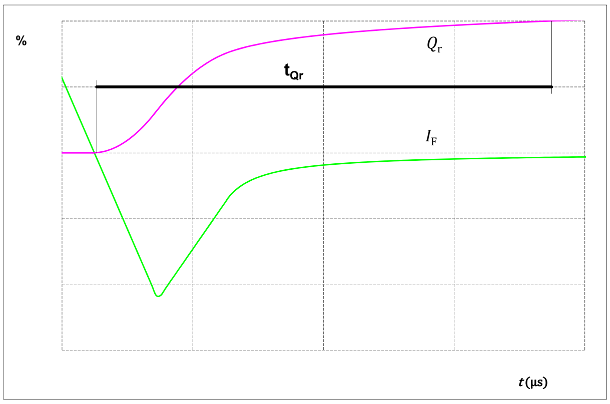
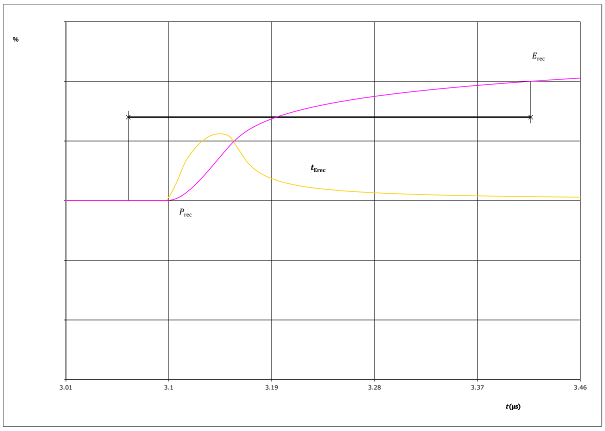


figure 27. **FWD**

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



Ordering Code

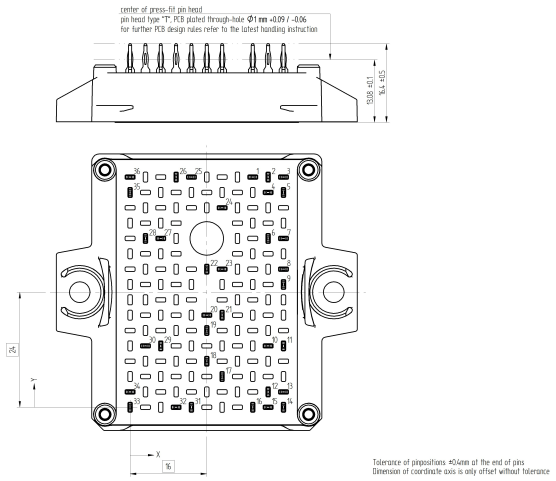
Version	Ordering Code
Without thermal paste	10-EY122PA008ME-LU38F08T
With thermal paste	10-EY122PA008ME-LU38F08T-/3/

Marking

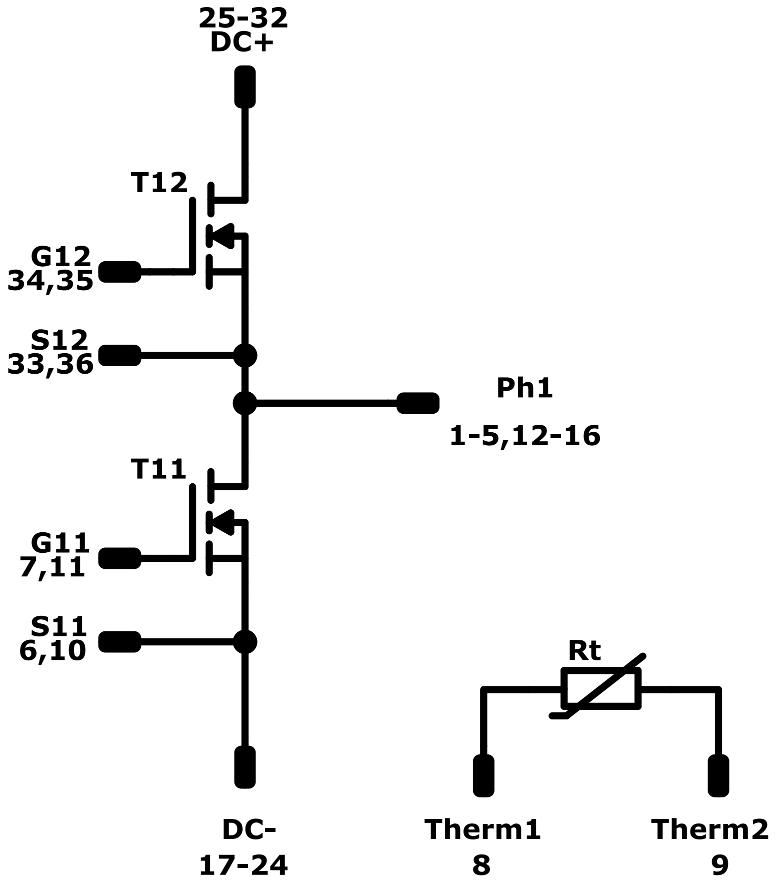
	**Text**	**Name**		**Date code**	**UL & VIN**	**Lot**	**Serial**
		NN-NNNNNNNNNNNNNN-TTTTTTVV		WWYY	UL VIN	LLLLL	SSSS
	Datamatrix	**Type&Ver**	**Lot number**	**Serial**	**Date code**		
		TTTTTTTVV	LLLLL	SSSS	WWYY		

Outline

Pin table [mm]			
Pin	X	Y	Function
1	25,6	48	Ph1
2	28,8	48	Ph1
3	32	48	Ph1
4	28,8	44,8	Ph1
5	32	44,8	Ph1
6	28,8	35,2	S11
7	32	35,2	G11
8	32	28,8	Therm1
9	32	25,6	Therm2
10	28,8	12,8	S11
11	32	12,8	G11
12	28,8	3,2	Ph1
13	32	3,2	Ph1
14	32	0	Ph1
15	28,8	0	Ph1
16	25,6	0	Ph1
17	19,2	6,4	DC-
18	16	9,6	DC-
19	16	16	DC-
20	16	19,2	DC-
21	19,2	19,2	DC-
22	16	28,8	DC-
23	19,2	28,8	DC-
24	19,2	41,6	DC-
25	12,8	48	DC+
26	9,6	48	DC+
27	6,4	35,2	DC+
28	3,2	35,2	DC+
29	6,4	12,8	DC+
30	3,2	12,8	DC+
31	12,8	0	DC+
32	9,6	0	DC+
33	0	0	S12
34	0	3,2	G12
35	0	44,8	G12
36	0	48	S12



Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T11, T12	MOSFET	1200 V	8 mΩ	Half-Bridge Switch	
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 certified according to UL 1557 standard, UL file number E192116. For more information see vincotech.com website.

Document No.:	Date:	Modification:	Pages
10-EY122PA008ME-LU38F08T-D1-14	22 Dec. 2020		