Vincotech

10-EY122PA005MS-LU39F78T
datasheet

flowDUAL E2 SiC **1200 V / 5 mΩ**

Topology features

- Gate Resistor
- Half Bridge
- Temperature sensor

Component features

- Fast intrinsic diode with low reverse recovery
- High blocking voltage with low on-resistance
- High speed switching with low capacitance

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

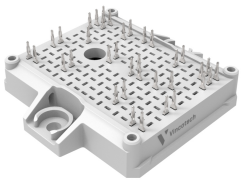
Target applications

- Charging Stations
- Energy Storage Systems
- General
- Industrial Drives
- Power Supply
- Servo Drives
- Solar Inverters
- UPS

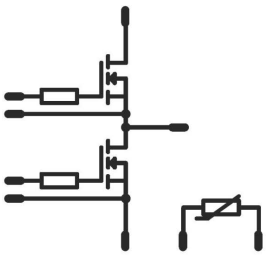
Types

- 10-EY122PA005MS-LU39F78T

flow E2 12 mm housing



Schematic



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	213	A
Peak drain current	I_{DM}	t_p limited by T_{jmax}	960	A
Total power dissipation	P_{tot}	T_j = T_{jmax} T_s = 80 °C	341	W
Gate-source voltage	V_{GSS}	static	-5 / 18	V
		dynamic	-10 / 22	V
Maximum Junction Temperature	T_{jmax}		175	°C
Resistor (Gate)				
DC current	I	terminal temperature Tk = 90 C°	2121	mA
Power dissipation	P_{tot}	T_j = T_{jmax} T_s = 80 °C	1,5	W
Operation Temperature	T_{op}		-55 ... 155	°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			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	$r_{DS(on)}$		18		240	25 125 150		5,12 6,52 7,2	7,5[1]	mΩ
Gate-source threshold voltage	$V_{GS(th)}$				0,024	25	1,7	2,25	2,75	V
Gate to Source Leakage Current	I_{GSS}		22	0		25			600	nA
Zero Gate Voltage Drain Current	I_{DSS}		0	1200		25			60	µA
Internal gate resistance	r_g							0,333		Ω
Gate charge	Q_g		-5/18	800	240	25		648		nC
Short-circuit input capacitance	C_{iss}	f = 500 kHz	0	800	0	25		15600		pF
Short-circuit output capacitance	C_{oss}							810		
Reverse transfer capacitance	C_{rss}							36		
Diode forward voltage	V_{SD}		0		240	25		4,1		V
Thermal										
Thermal resistance junction to sink[2]	$R_{th(j-s)}$	λ_{pastc} = 3,4 W/mK (PSX)						0,28		K/W

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	$t_{d(on)}$	R_{gon} = 4 Ω R_{goff} = 4 Ω	-5/18	600	240	25 125 150		76,2 60,67 58,29		ns
Rise time	t_r					25 125 150		42,27 33,8 32,47		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		120,82 140,36 144,47		ns
Fall time	t_f					25 125 150		14,41 15,09 16,32		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=1,04 µC Q_{rFWD}=3,27 µC Q_{rFWD}=3,78 µC				25 125 150		6,67 6,51 6,62		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		2,23 2,36 2,52		mWs
Peak recovery current	I_{RRM}	di/dt=7628 A/µs di/dt=8008 A/µs di/dt=8077 A/µs				25 125 150		73,63 136,22 149,29		A
Reverse recovery time	t_{rr}					25 125 150		24,14 38,88 40,14		ns
Recovered charge	Q_r					25 125 150		1,04 3,27 3,78		µC
Reverse recovered energy	E_{rec}					25 125 150		0,118 0,628 0,76		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		7000,24 8340,56 9138,1		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 (Gate)										
Static										
Resistance	R							0,333		Ω
Tolerance							-1		1	%
Temperature coeficient	tc							100		ppm/K
Thermistor										
Static										
Rated resistance	R					25		5		kΩ
Deviation of R100	$\Delta_{R/R}$	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

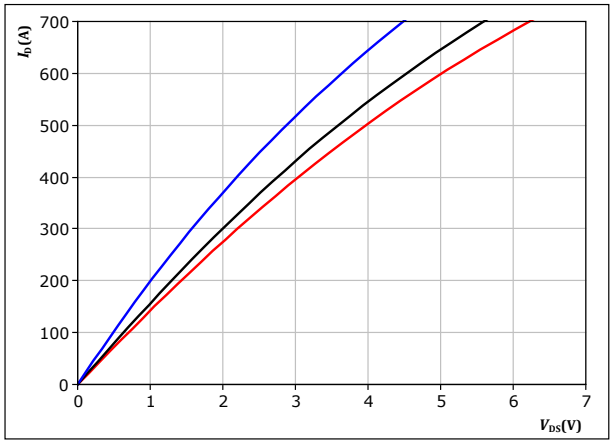
(2) Only valid with pre-applied Vincotech thermal interface material.

Half-Bridge Switch Characteristics

figure 1. **MOSFET**

Typical output characteristics

$I_D = f(V_{DS})$

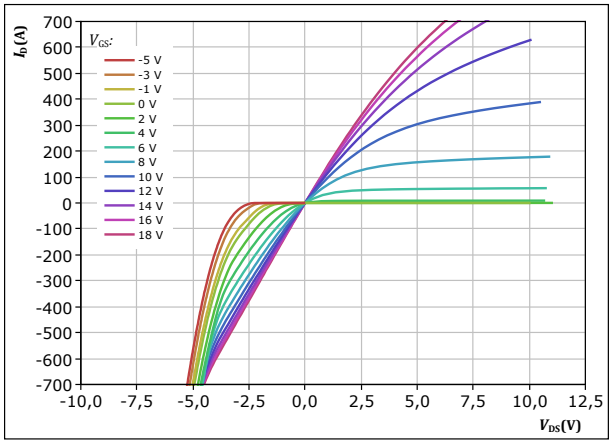


t_p =	250	µs	T_j:	25 °C
V_{GS} =	18	V		125 °C
				150 °C

figure 2. **MOSFET**

Typical output characteristics

$I_D = f(V_{DS})$



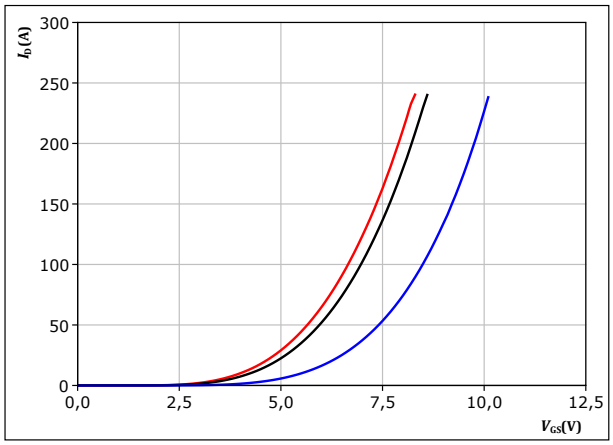
t_p =	250	µs
T_j =	150	°C

V_{GS} from -5 V to 18 V in steps of 2 V

figure 3. **MOSFET**

Typical transfer characteristics

$I_D = f(V_{GS})$

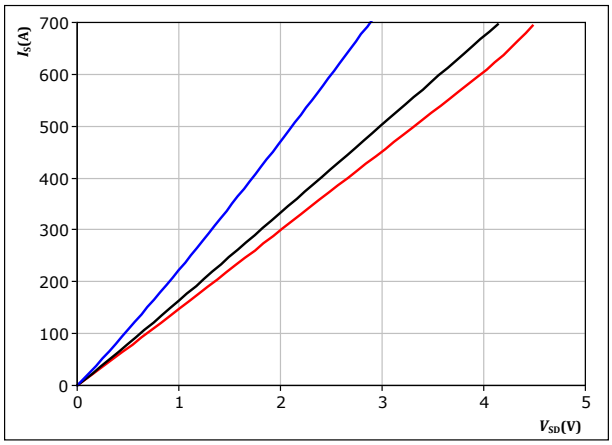


t_p =	250	µs	T_j:	25 °C
V_{DS} =	23	V		125 °C
				150 °C

figure 4. **MOSFET**

Typical reverse drain current characteristics

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



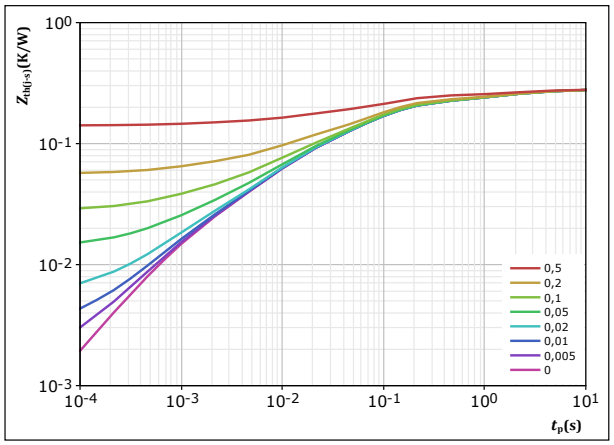
t_p =	250	µs	T_j:	25 °C
V_{GS} =	18	V		125 °C
				150 °C

Half-Bridge 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	
$R_{th(j-s)}$ =	0,278	K/W

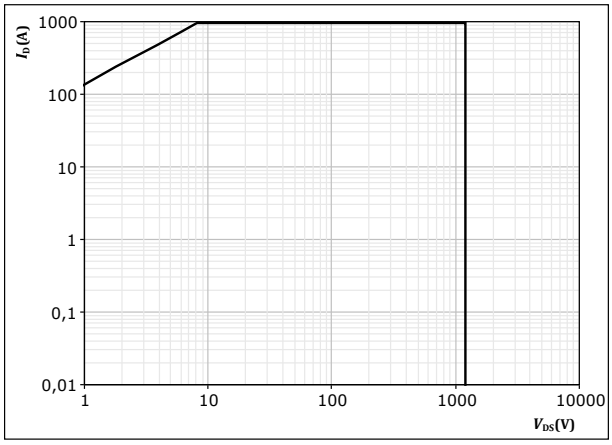
MOSFET thermal model values

R (K/W)	τ (s)
1,96E-02	7,04E+00
5,34E-02	1,27E+00
1,44E-01	8,54E-02
5,31E-02	9,87E-03
1,21E-02	9,36E-04

figure 6. **MOSFET**

Safe operating area

$I_D = f(V_{DS})$



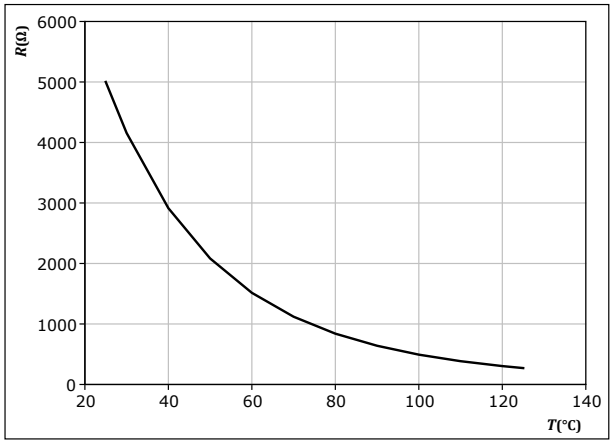
D =	single pulse	
T_s =	80	°C
V_{GS} =	18	V
T_j =	T_{jmax}	

Thermistor Characteristics

figure 7. **Thermistor**

Typical NTC characteristic as function of temperature

$R_T = f(T)$

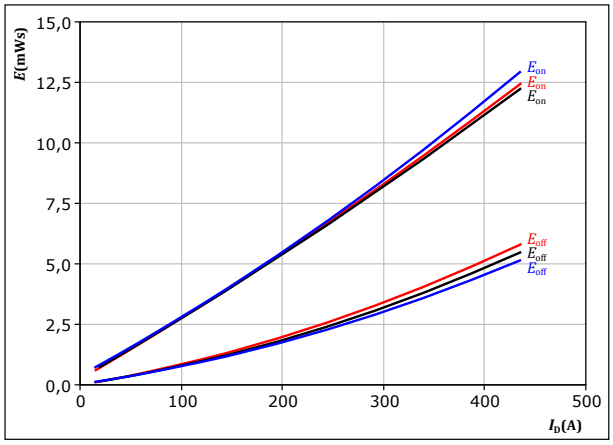


Half-Bridge Switching Characteristics

figure 8. **MOSFET**

Typical switching energy losses as a function of drain current

$E = f(I_D)$



With an inductive load at

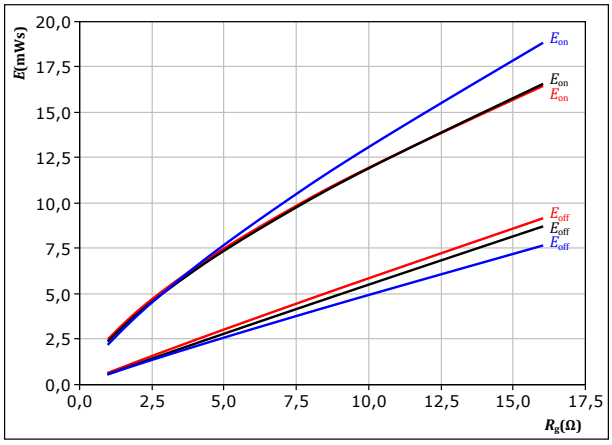
V_{DS} =	600	V
V_{GS} =	-5/18	V
R_{gon} =	4	Ω
R_{goff} =	4	Ω

T_j: 25 °C, 125 °C, 150 °C

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

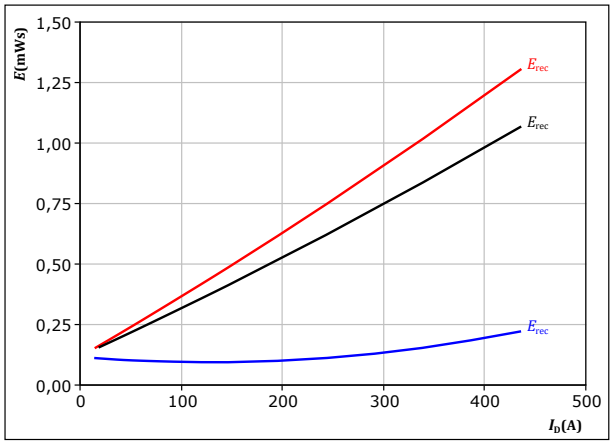
V_{DS} =	600	V
V_{GS} =	-5/18	V
I_D =	240	A

T_j: 25 °C, 125 °C, 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

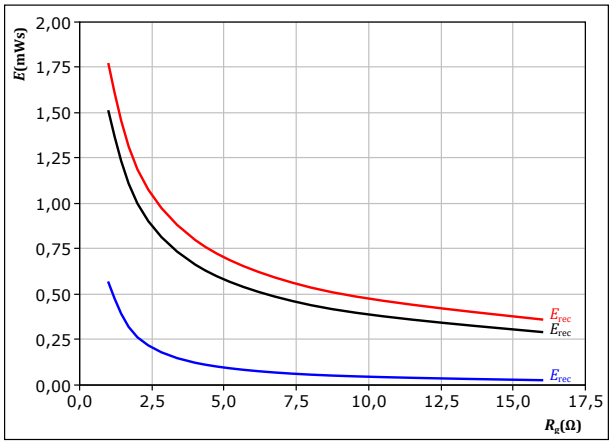
V_{DS} =	600	V
V_{GS} =	-5/18	V
R_{gon} =	4	Ω

T_j: 25 °C, 125 °C, 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
V_{GS} =	-5/18	V
I_D =	240	A

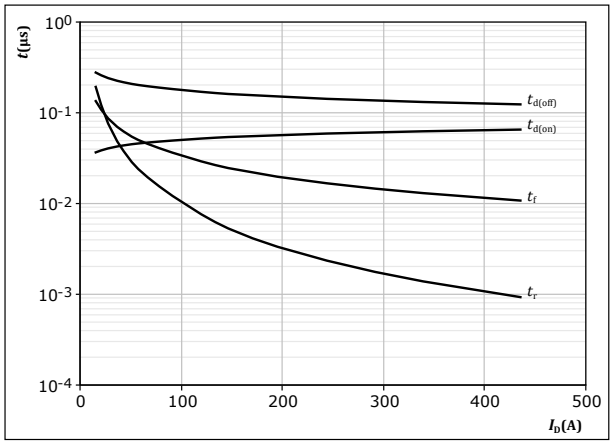
T_j: 25 °C, 125 °C, 150 °C

Half-Bridge Switching Characteristics

figure 12. **MOSFET**

Typical switching times as a function of drain current

$t = f(I_D)$



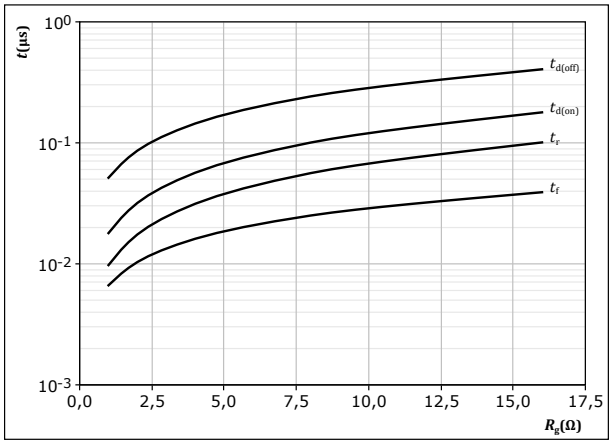
With an inductive load at

T_j =	150	°C
V_{DS} =	600	V
V_{GS} =	-5/18	V
R_{gon} =	4	Ω
R_{goff} =	4	Ω

figure 13. **MOSFET**

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

$t = f(R_g)$



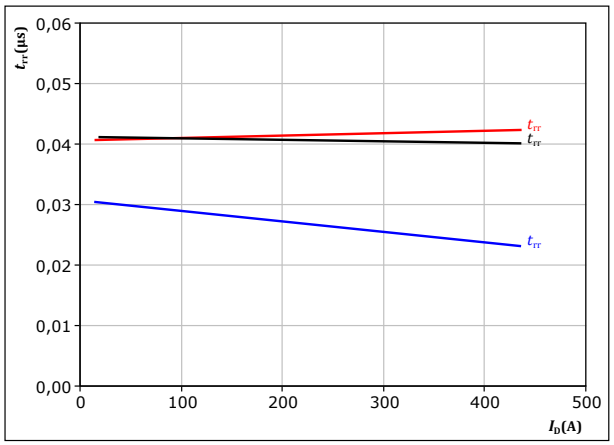
With an inductive load at

T_j =	150	°C
V_{DS} =	600	V
V_{GS} =	-5/18	V
I_D =	240	A

figure 14. **MOSFET**

Typical reverse recovery time as a function of drain current

$t_{rr} = f(I_D)$



At

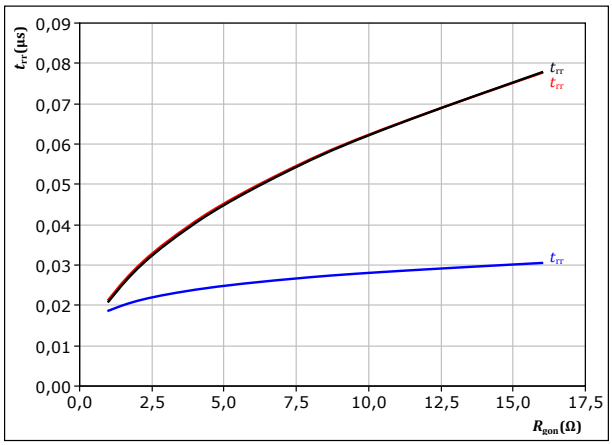
V_{DS} =	600	V
V_{GS} =	-5/18	V
R_{gon} =	4	Ω

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} =	-5/18	V
I_D =	240	A

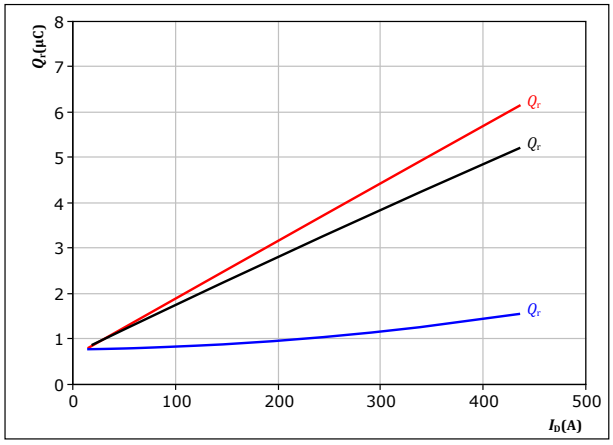
T_j: 25 °C, 125 °C, 150 °C

Half-Bridge Switching Characteristics

figure 16. **MOSFET**

Typical recovered charge as a function of drain current

$Q_r = f(I_D)$

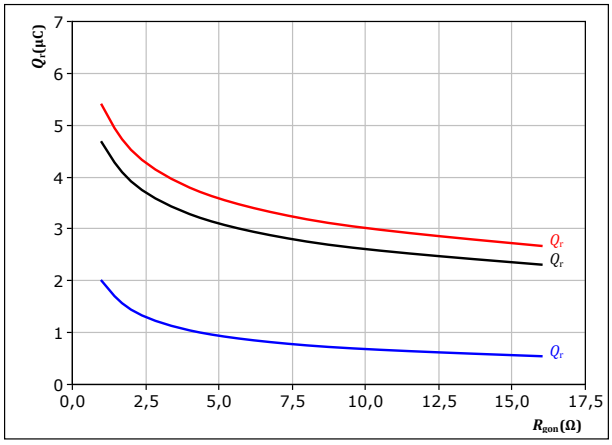


At					
	V_{DS} =	600	V		
	V_{GS} =	-5/18	V	T_j:	25 °C
	R_{gon} =	4	Ω		125 °C
					150 °C

figure 17. **MOSFET**

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

$Q_r = f(R_{gon})$

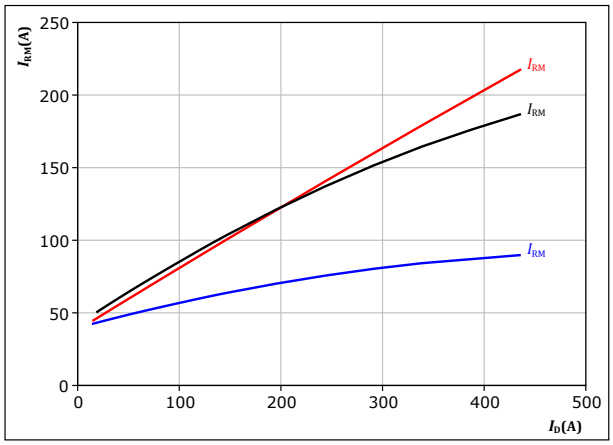


At					
	V_{DS} =	600	V		
	V_{GS} =	-5/18	V	T_j:	25 °C
	I_D =	240	A		125 °C
					150 °C

figure 18. **MOSFET**

Typical peak reverse recovery current as a function of drain current

$I_{RM} = f(I_D)$

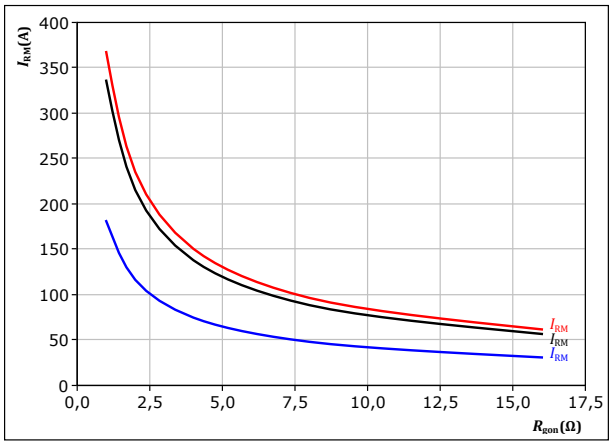


At					
	V_{DS} =	600	V		
	V_{GS} =	-5/18	V	T_j:	25 °C
	R_{gon} =	4	Ω		125 °C
					150 °C

figure 19. **MOSFET**

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

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



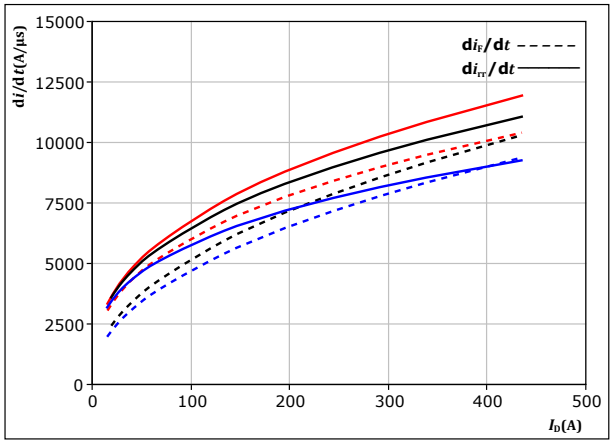
At					
	V_{DS} =	600	V		
	V_{GS} =	-5/18	V	T_j:	25 °C
	I_D =	240	A		125 °C
					150 °C

Half-Bridge 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)

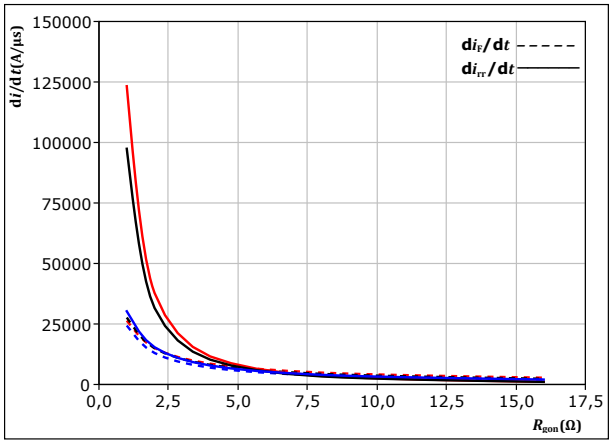


At	V_{DS} =	600	V		
	V_{GS} =	-5/18	V	T_j:	25 °C
	R_{gon} =	4	Ω		125 °C
					150 °C

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})

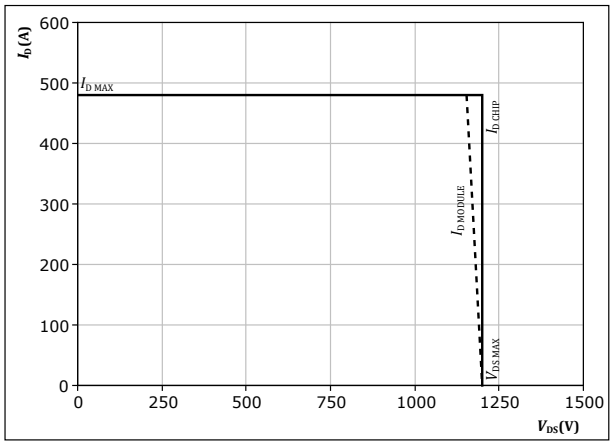


At	V_{DS} =	600	V		
	V_{GS} =	-5/18	V	T_j:	25 °C
	I_D =	240	A		125 °C
					150 °C

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

Half-Bridge Switching Definitions

figure 23. **MOSFET**

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

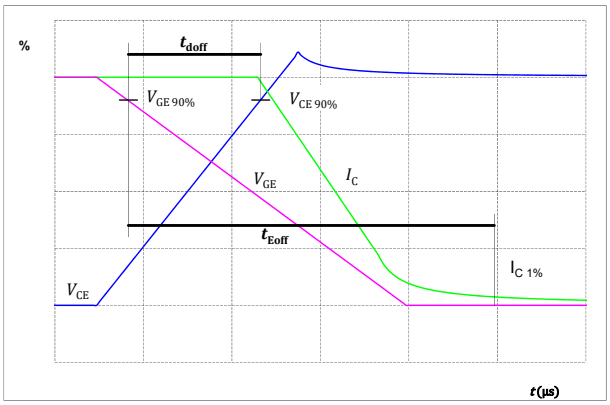


figure 24. **MOSFET**

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

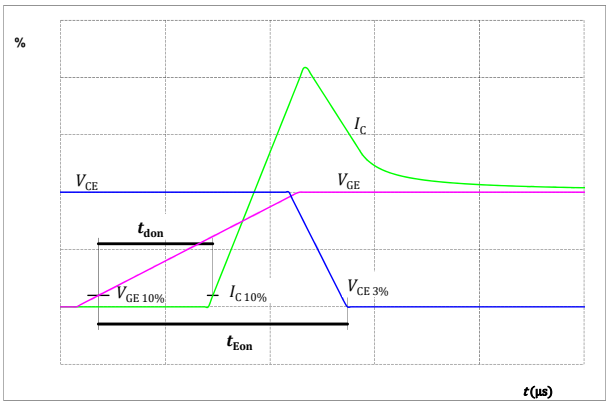


figure 25. **MOSFET**

Turn-off Switching Waveforms & definition of t_f

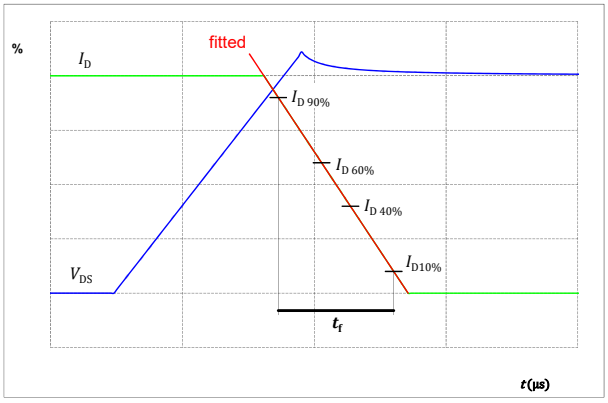
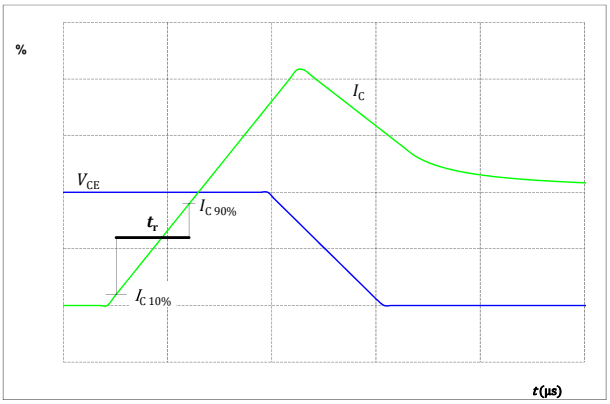


figure 26. **MOSFET**

Turn-on Switching Waveforms & definition of t_r



Half-Bridge Switching Definitions

figure 27. **FWD**

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

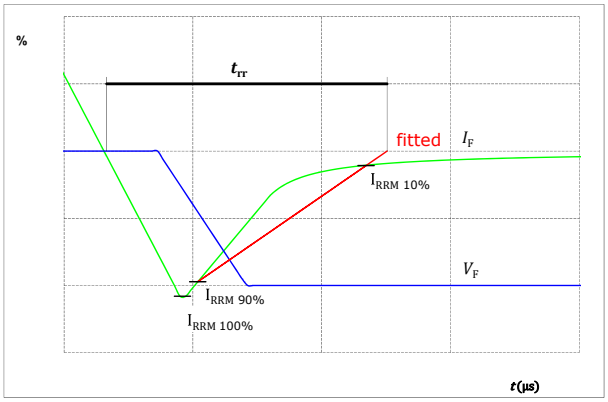


figure 28. **FWD**

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

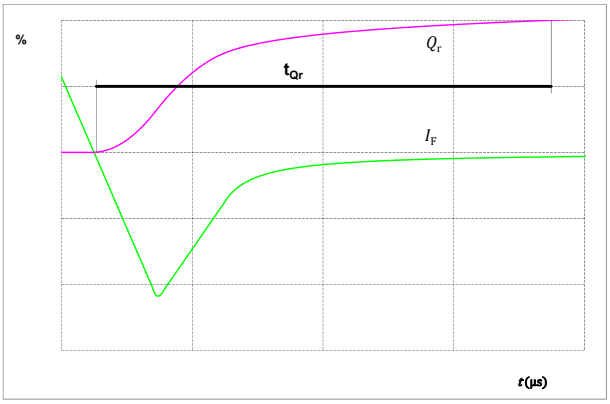
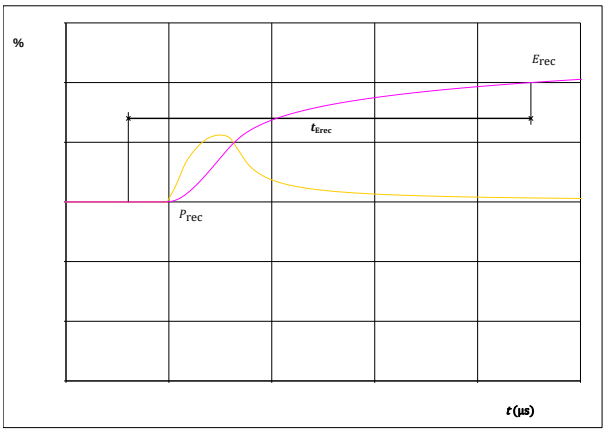


figure 29. **FWD**

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



Ordering Code

Version	Ordering Code
Without thermal paste	10-EY122PA005MS-LU39F78T
With thermal paste (5,2 W/mK, PTM6000HV)	10-EY122PA005MS-LU39F78T-/7/

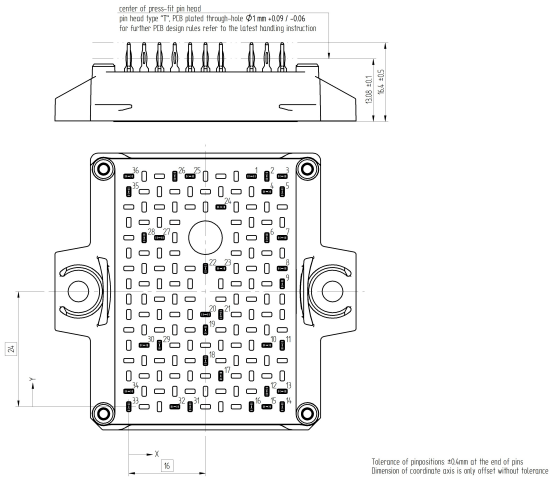
Marking

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

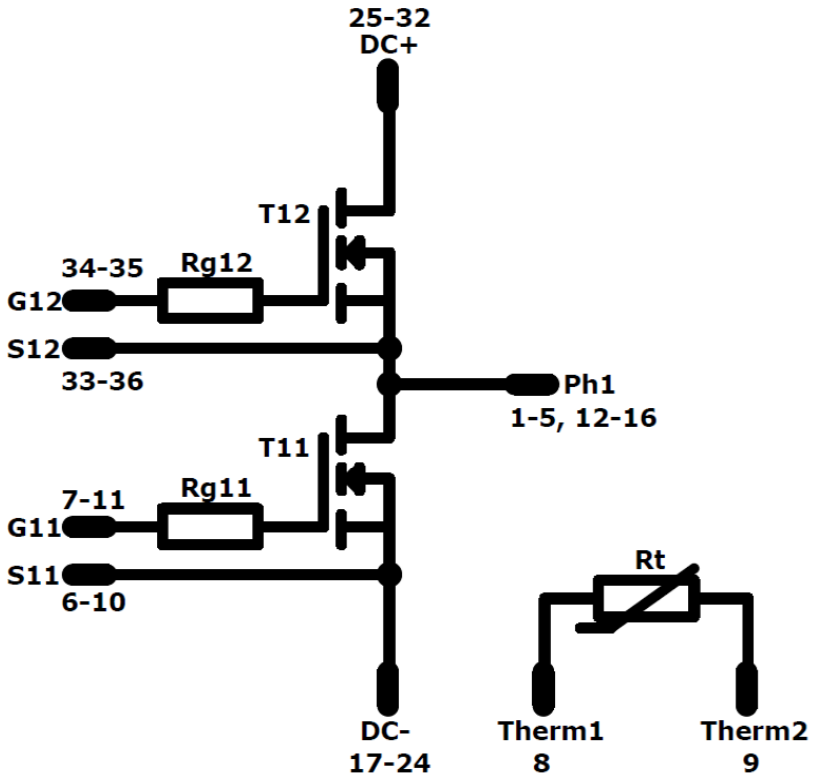
Outline

Pin table [mm]

Pin	X	Y	Function
1	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
Rg11, Rg12	Resistor			Resistor (Gate)	
T11, T12	MOSFET	1200 V	5 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 UL 1557 recognized under E192116 up to a junction temperature under switching condition $T_{j,op}$=175°C and up to 4000VAC/1min isolation voltage. For more information see vincotech.com website.

Document No.:	Date:	Modification:	Pages
10-EY122PA005MS-LU39F78T-D1-14	8 Sep. 2025	Initial Release	