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# 10-EY122PA007MS-LU38F78T

datasheet

flowDUAL E2 SiC

1200 V / 7 mΩ

## Topology features

- Temperature sensor
- Half Bridge

## 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<sub>2</sub>O<sub>3</sub>
- 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

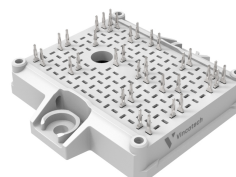
## Target applications

- Charging Stations
- General
- Power Supply
- UPS
- Welding & Cutting

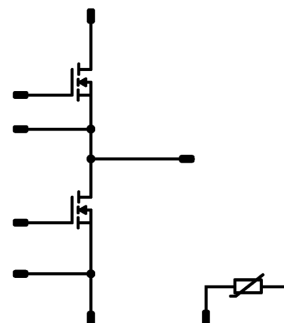
## Types

- 10-EY122PA007MS-LU38F78T

## flow E2 12 mm housing



## Schematic





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## Maximum Ratings

$T_j = 25\text{ °C}$ , unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
<b>Inverter Switch</b>				
Drain-source voltage	$V_{DS}$		1200	V
Drain current (DC current)	$I_D$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	157	A
Peak drain current	$I_{DM}$	$t_p$ limited by $T_{jmax}$	640	A
Total power dissipation	$P_{tot}$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	276	W
Gate-source voltage	$V_{GS}$	static	-5 / 18	V
		dynamic	-10 / 22	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* $t_p = 2\text{ s}$	6000	V
Creepage distance			>12,7	mm
Clearance			9,34	mm
Comparative Tracking Index	CTI		≥ 600	

\*100 % tested in production



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## 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		160	25 125 150		7,68 9,78 10,8	11,2 <sup>(1)</sup>	mΩ
Gate-source threshold voltage	$V_{GS(th)}$				0,016	25	1,7	2,25	2,75	V
Gate to Source Leakage Current	$I_{GSS}$		22	0		25			400	nA
Zero Gate Voltage Drain Current	$I_{DSS}$		0	1200		25			40	μA
Internal gate resistance	$r_g$							0,5		Ω
Gate charge	$Q_g$		-5/18	800	160	25		432		nC
Short-circuit input capacitance	$C_{iss}$	$f = 500$ kHz	0	800	0	25		10400		pF
Short-circuit output capacitance	$C_{oss}$							540		
Reverse transfer capacitance	$C_{rss}$							24		
Diode forward voltage	$V_{SD}$		0		160	25		4,1		V

#### Thermal

Thermal resistance junction to sink <sup>(2)</sup>	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ W/mK (PTM)						0,34		K/W
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## 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	$t_{d(on)}$	$R_{gon} = 1\ \Omega$ $R_{goff} = 1\ \Omega$	-5/18	600	160	25		23,22		ns	
						125		21,85			
						150		21,58			
Rise time	$t_r$					25		9,77			ns
						125		8,92			
						150		8,8			
Turn-off delay time	$t_{d(off)}$					25		38,13			ns
						125		42,59			
						150		43,65			
Fall time	$t_f$					25		7,88			ns
						125		8,19			
						150		8,61			
Turn-on energy (per pulse)	$E_{on}$	$Q_{rFWD}=1,26\ \mu C$ $Q_{rFWD}=2,88\ \mu C$ $Q_{rFWD}=3,32\ \mu C$	25		0,916			mWs			
			125		1,06						
			150		1,07						
Turn-off energy (per pulse)	$E_{off}$		25		0,389			mWs			
			125		0,421						
			150		0,43						
Peak recovery current	$I_{RRM}$	$di/dt=19581\ A/\mu s$ $di/dt=23245\ A/\mu s$ $di/dt=23527\ A/\mu s$	25		150,09			A			
			125		252,73						
			150		276,54						
Reverse recovery time	$t_{rr}$		25		13,88			ns			
			125		18,37						
			150		19,59						
Recovered charge	$Q_r$		25		1,26			$\mu C$			
			125		2,88						
			150		3,32						
Reverse recovered energy	$E_{rec}$		25		0,602			mWs			
			125		1,48						
			150		1,71						
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$	25		35381			A/ $\mu s$				
		125		69987,68							
		150		80229,87							



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## 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		k $\Omega$
Deviation of R100	$\Delta_{R/R}$	$R_{100} = 493 \Omega$				100	-5		5	%
Power dissipation	$P$							245		mW
Power dissipation constant	$d$					25		1,4		mW/K
B-value	$B_{(25/50)}$	Tol. $\pm 2 \%$						3375		K
B-value	$B_{(25/100)}$	Tol. $\pm 2 \%$						3437		K
Vincotech Thermistor Reference									K	

<sup>(1)</sup> Value at chip level

<sup>(2)</sup> Only valid with pre-applied Vincotech thermal interface material.



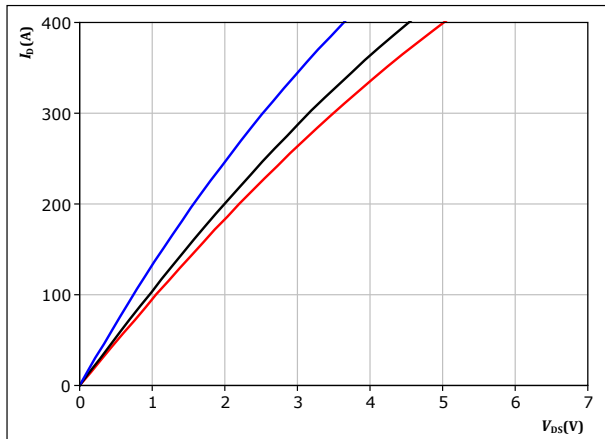
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## Inverter Switch Characteristics

figure 1. MOSFET

Typical output characteristics

$$I_D = f(V_{DS})$$



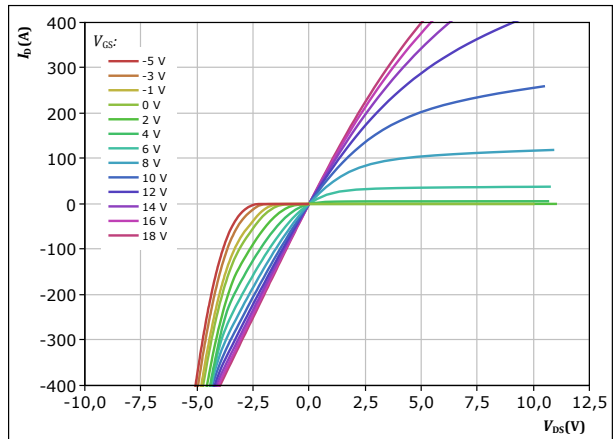
$t_p = 250 \mu s$   
 $V_{GS} = 18 V$

$T_j$ :  
— 25 °C  
— 125 °C  
— 150 °C

figure 2. MOSFET

Typical output characteristics

$$I_D = f(V_{DS})$$

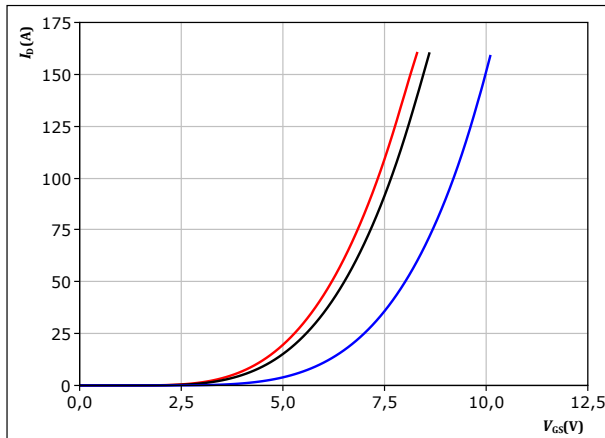


$t_p = 250 \mu s$   
 $T_j = 150 ^\circ C$   
 $V_{GS}$  from -5 V to 18 V in steps of 2 V

figure 3. MOSFET

Typical transfer characteristics

$$I_D = f(V_{GS})$$



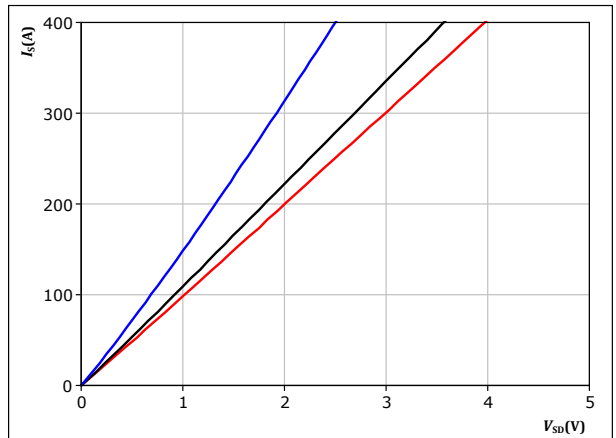
$t_p = 250 \mu s$   
 $V_{DS} = 23 V$

$T_j$ :  
— 25 °C  
— 125 °C  
— 150 °C

figure 4. MOSFET

Typical reverse drain current characteristics

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



$t_p = 250 \mu s$   
 $V_{GS} = 18 V$

$T_j$ :  
— 25 °C  
— 125 °C  
— 150 °C

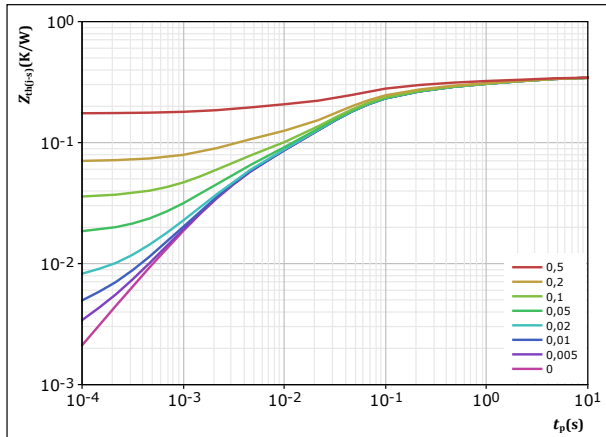


## Inverter Switch Characteristics

figure 5. MOSFET

Transient thermal impedance as a function of pulse width

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



$$D = t_p / T$$

$$R_{th(j-a)} = 0,344 \text{ K/W}$$

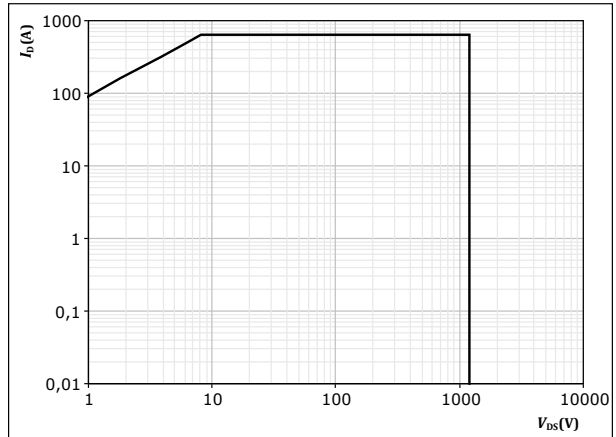
MOSFET thermal model values

$R$ (K/W)	$\tau$ (s)
1,73E-02	8,74E+00
4,84E-02	1,65E+00
6,92E-02	2,04E-01
1,70E-01	3,72E-02
4,36E-02	2,65E-03

figure 6. MOSFET

Safe operating area

$$I_D = f(V_{DS})$$



$D = \text{single pulse}$

$$T_s = 80 \text{ } ^\circ\text{C}$$

$$V_{GS} = 18 \text{ V}$$

$$T_j = T_{jmax}$$



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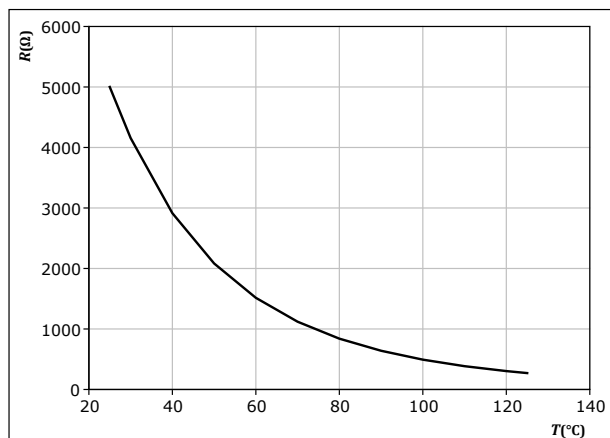
## Thermistor Characteristics

figure 7.

Thermistor

Typical NTC characteristic as function of temperature

$$R_T = f(T)$$







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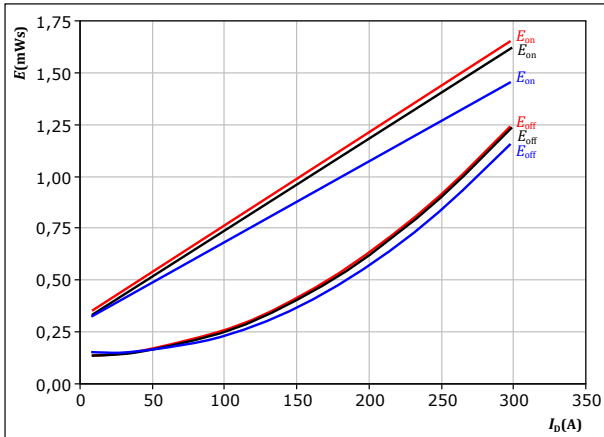
## Inverter Switching Characteristics

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  
 $V_{GS} = -5/18$  V  
 $R_{gon} = 1$   $\Omega$   
 $R_{goff} = 1$   $\Omega$

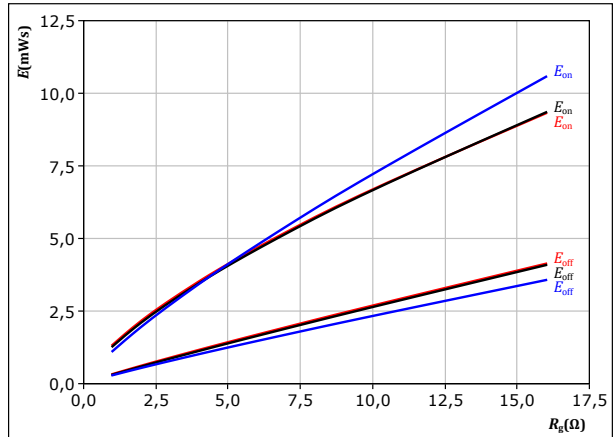
$T_j$ : 25 °C  
125 °C  
150 °C

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  
 $I_D = 160$  A

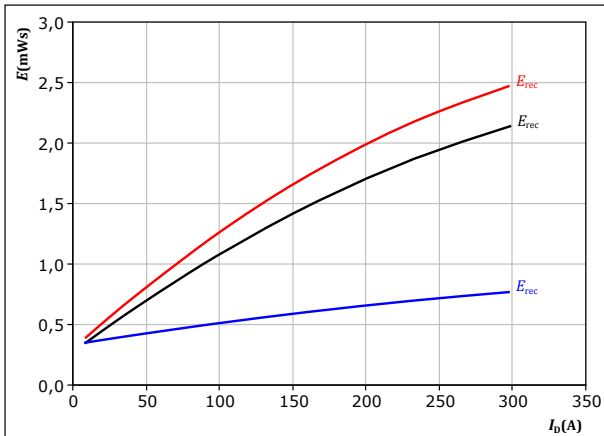
$T_j$ : 25 °C  
125 °C  
150 °C

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  
 $R_{gon} = 1$   $\Omega$

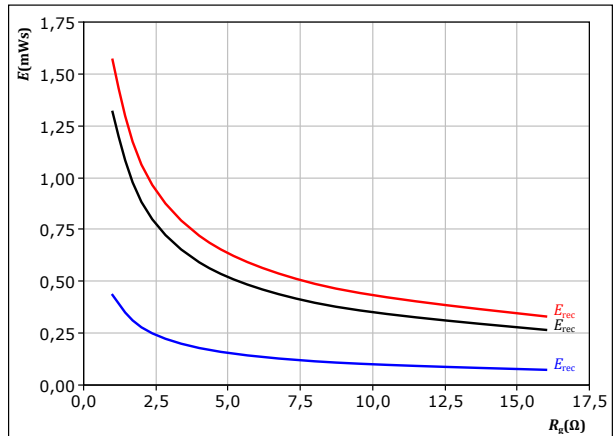
$T_j$ : 25 °C  
125 °C  
150 °C

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  
 $I_D = 160$  A

$T_j$ : 25 °C  
125 °C  
150 °C



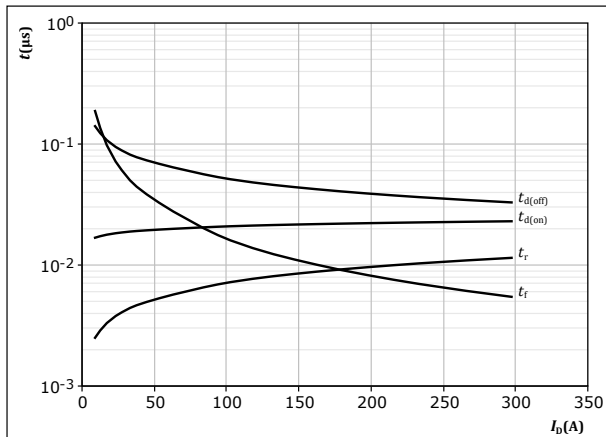
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## Inverter Switching Characteristics

figure 12. MOSFET

Typical switching times as a function of drain current  
 $t = f(I_D)$

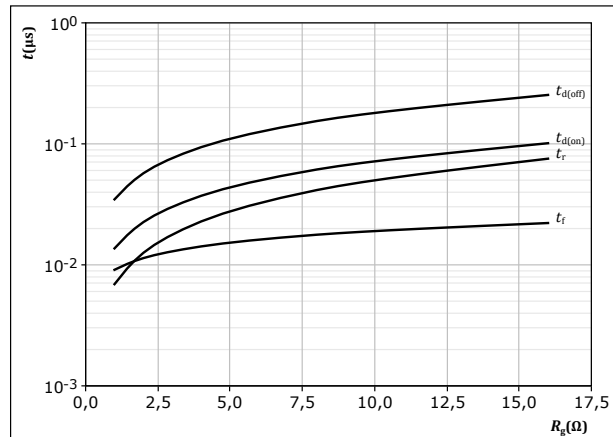


With an inductive load at

$T_j = 150$  °C  
 $V_{DS} = 600$  V  
 $V_{GS} = -5/18$  V  
 $R_{gon} = 1$  Ω  
 $R_{goff} = 1$  Ω

figure 13. MOSFET

Typical switching times as a function of MOSFET turn on gate resistor  
 $t = f(R_g)$

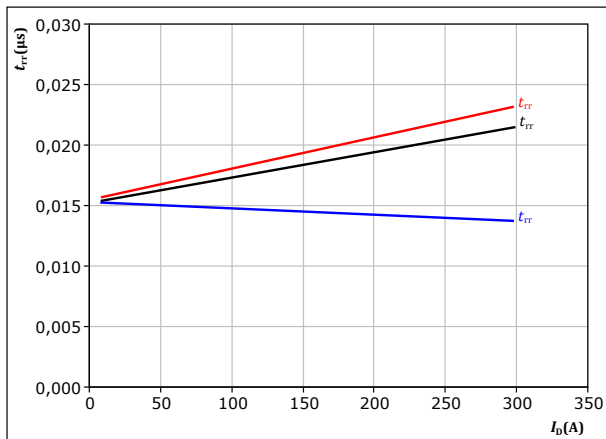


With an inductive load at

$T_j = 150$  °C  
 $V_{DS} = 600$  V  
 $V_{GS} = -5/18$  V  
 $I_D = 160$  A

figure 14. MOSFET

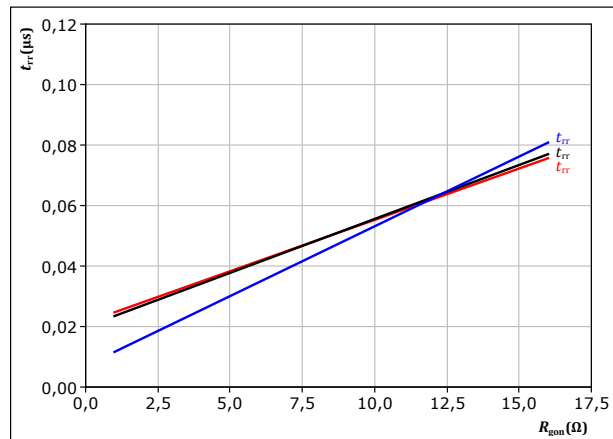
Typical reverse recovery time as a function of drain current  
 $t_{rr} = f(I_D)$



At  $V_{DS} = 600$  V  
 $V_{GS} = -5/18$  V  
 $R_{gon} = 1$  Ω  
 $T_j$ : 25 °C (blue), 125 °C (black), 150 °C (red)

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  
 $I_D = 160$  A  
 $T_j$ : 25 °C (blue), 125 °C (black), 150 °C (red)



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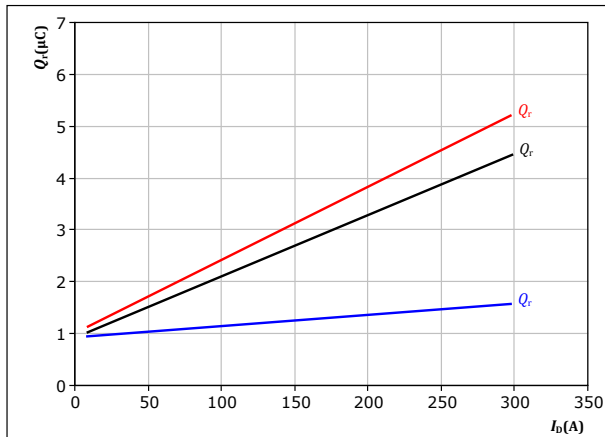
## Inverter Switching Characteristics

figure 16.

MOSFET

Typical recovered charge as a function of drain current

$$Q_r = f(I_D)$$



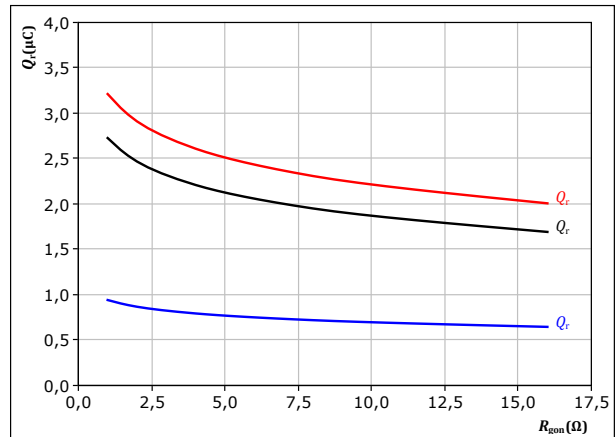
At  $V_{DS} = 600$  V  
 $V_{GS} = -5/18$  V  
 $R_{gon} = 1$   $\Omega$   
 $T_j$ : 25 °C  
125 °C  
150 °C

figure 17.

MOSFET

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

$$Q_r = f(R_{gon})$$



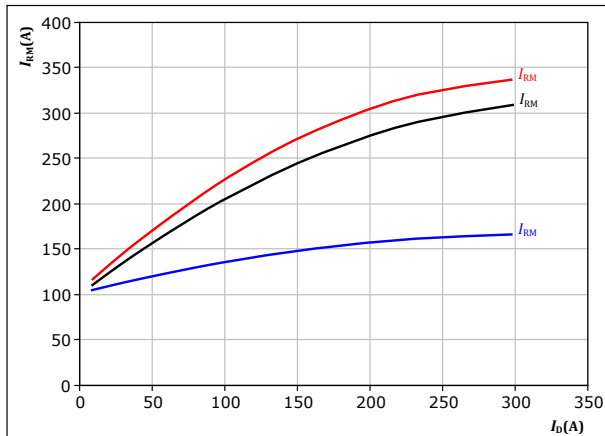
At  $V_{DS} = 600$  V  
 $V_{GS} = -5/18$  V  
 $I_D = 160$  A  
 $T_j$ : 25 °C  
125 °C  
150 °C

figure 18.

MOSFET

Typical peak reverse recovery current as a function of drain current

$$I_{RM} = f(I_D)$$



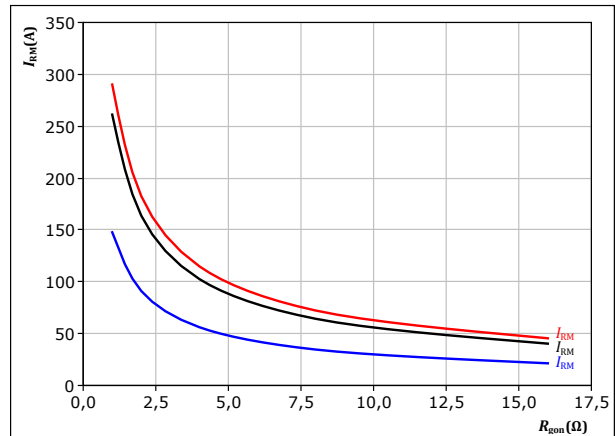
At  $V_{DS} = 600$  V  
 $V_{GS} = -5/18$  V  
 $R_{gon} = 1$   $\Omega$   
 $T_j$ : 25 °C  
125 °C  
150 °C

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  
 $I_D = 160$  A  
 $T_j$ : 25 °C  
125 °C  
150 °C

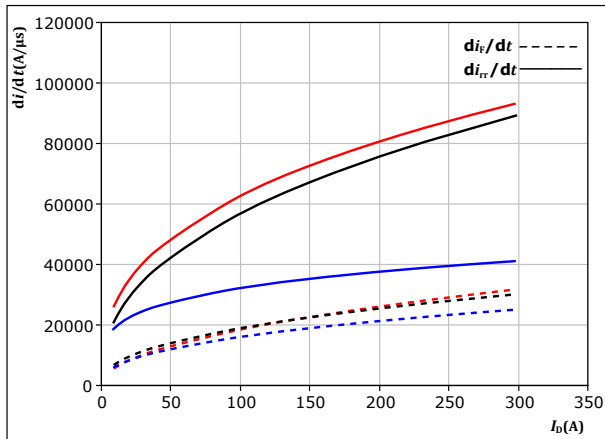


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## Inverter Switching Characteristics

figure 20. MOSFET

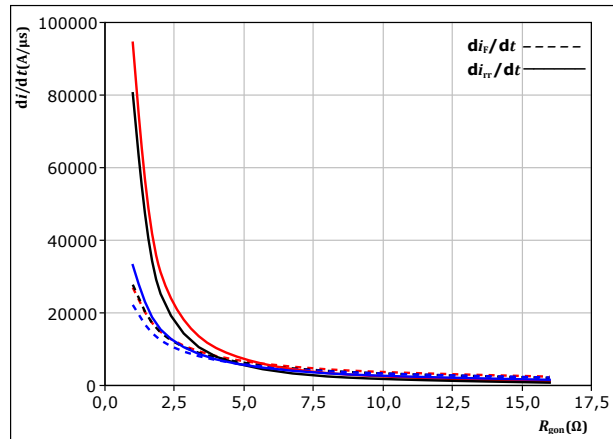
Typical rate of fall of forward and reverse recovery current as a function of drain current  
 $di_f/dt, di_{rr}/dt = f(I_D)$



At  $V_{DS} = 600$  V  
 $V_{GS} = -5/18$  V  
 $R_{gon} = 1$  Ω  
 $T_j = 25^\circ\text{C}$   
 $125^\circ\text{C}$   
 $150^\circ\text{C}$

figure 21. MOSFET

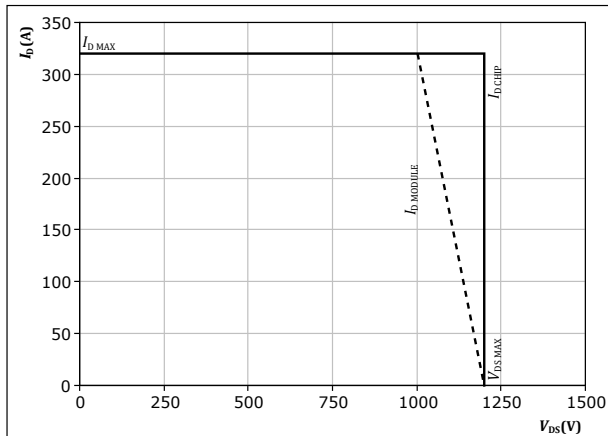
Typical rate of fall of forward and reverse recovery current as a function of turn on gate resistor  
 $di_f/dt, di_{rr}/dt = f(R_{gon})$



At  $V_{DS} = 600$  V  
 $V_{GS} = -5/18$  V  
 $I_D = 160$  A  
 $T_j = 25^\circ\text{C}$   
 $125^\circ\text{C}$   
 $150^\circ\text{C}$

figure 22. MOSFET

Reverse bias safe operating area  
 $I_D = f(V_{DS})$



At  $T_j = 150^\circ\text{C}$   
 $R_{gon} = 1$  Ω  
 $R_{goff} = 1$  Ω



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## Inverter Switching Definitions

figure 23. MOSFET

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

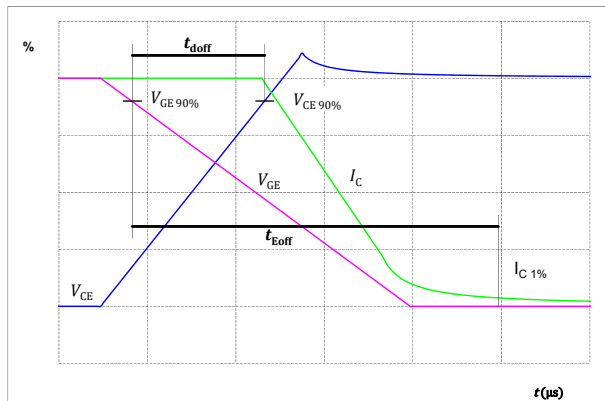


figure 24. MOSFET

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

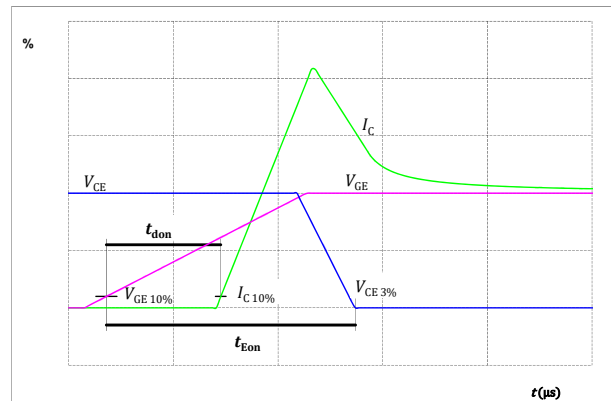


figure 25. MOSFET

Turn-off Switching Waveforms & definition of  $t_f$

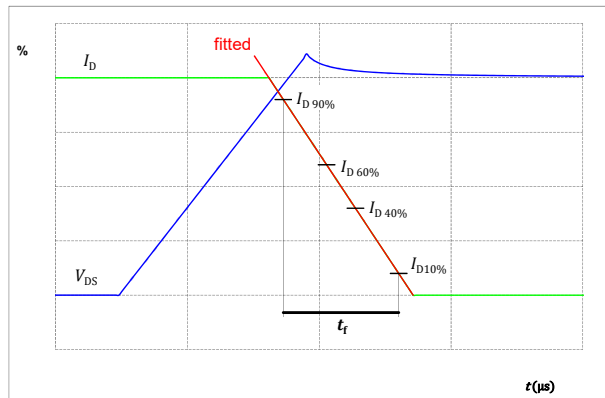
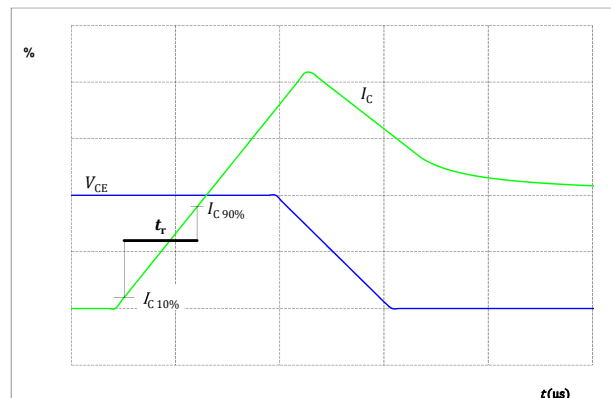


figure 26. MOSFET

Turn-on Switching Waveforms & definition of  $t_r$





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## Inverter Switching Definitions

figure 27. FWD

Turn-off Switching Waveforms & definition of  $t_{tr}$

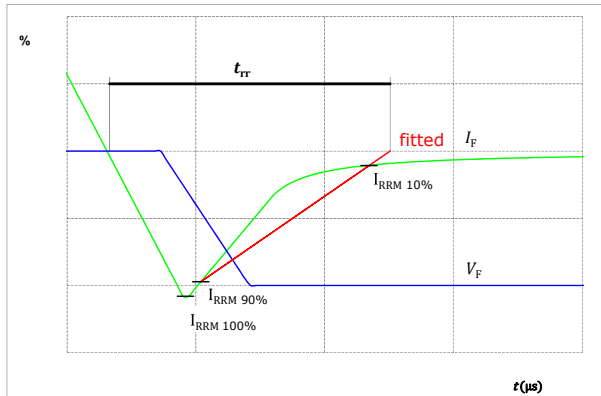


figure 28. FWD

Turn-on Switching Waveforms & definition of  $t_{Qr}$  ( $t_{Qr}$  = integrating time for  $Q_r$ )

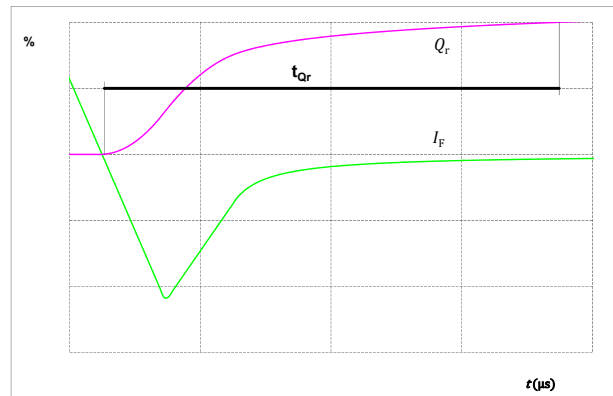
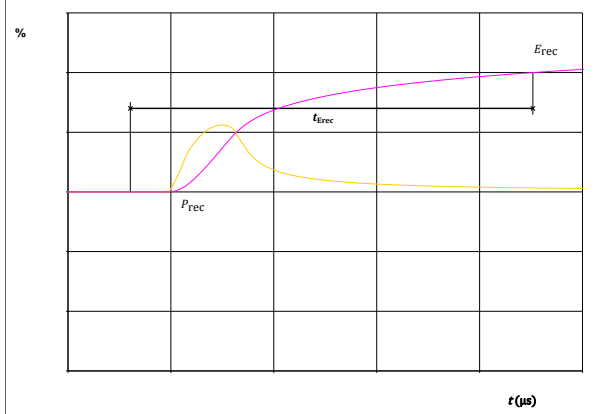


figure 29. FWD

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





datasheet

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

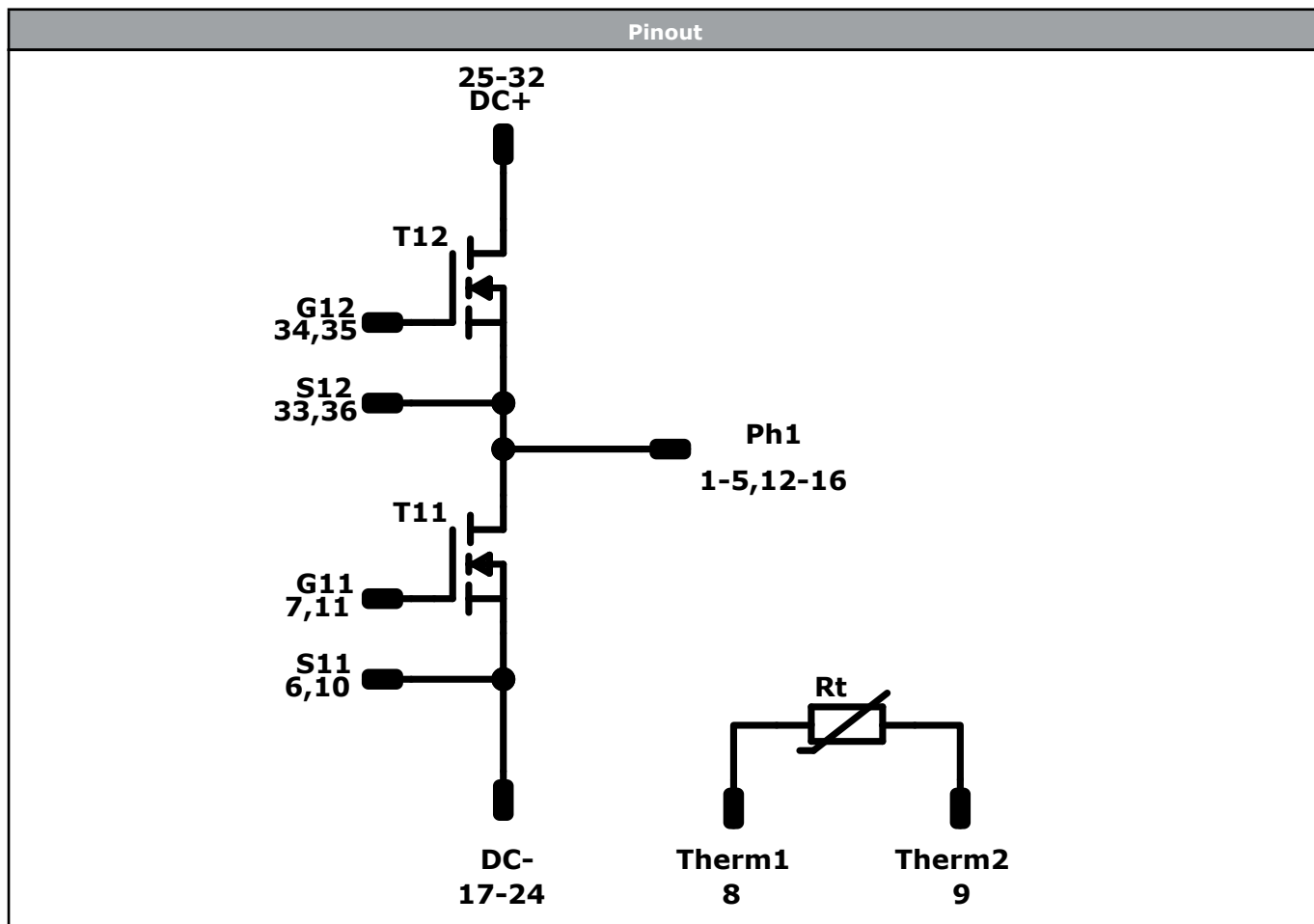
center of press-fit pin head  
pin head type "T" PCB plated through-hole  $\Phi 1\text{mm} \pm 0,09 / -0,06$   
for further PCB design rules refer to the latest loading instruction

Tolerance of prepositions ±0,1mm at the end of pins  
Dimension of coordinate axis is only offset without tolerance



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**10-EY122PA007MS-LU38F78T**  
datasheet



Identification					
ID	Component	Voltage	Current	Function	Comment
T11, T12	MOSFET	1200 V	7,5 mΩ	Inverter Switch	
Rt	Thermistor			Thermistor	





Vincotech

**10-EY122PA007MS-LU38F78T**  
datasheet

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

Handling instruction
Handling instructions for <i>flow</i> E2 packages see vincotech.com website.

Package data
Package data for <i>flow</i> 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 $T_{j,sp}=175^{\circ}\text{C}$ and up to 3500VAC/1min isolation voltage. For more information see vincotech.com website.



Document No.:	Date:	Modification:	Pages
10-EY122PA007MS-LU38F78T-D1-14	14 Apr. 2026	Initial Release	

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