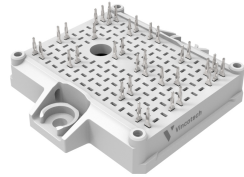
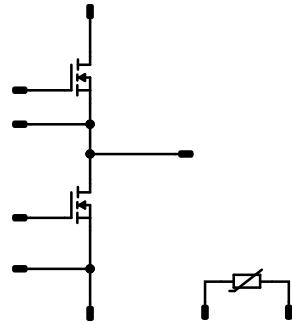




<b>flowDual E2 SiC</b>		<b>1200 V / 8 mΩ</b>	
<b>Features</b>		<b>flow E2 12 mm housing</b>	
<ul style="list-style-type: none"><li>• C3M™ SiC MOSFET technology</li><li>• Standard industrial housing</li><li>• Low inductive design</li><li>• Optimized Rth(j-s) with Phase Change Material</li><li>• Built-in NTC</li></ul>			
<b>Target applications</b>		<b>Schematic</b>	
<ul style="list-style-type: none"><li>• Charging Stations</li><li>• Energy Storage Systems</li><li>• Power Supply</li><li>• Solar Inverters</li><li>• Welding &amp; Cutting</li></ul>			
<b>Types</b>			
<ul style="list-style-type: none"><li>• 10-EY122PA008ME-LU38F08T</li></ul>			



Vincotech

**10-EY122PA008ME-LU38F08T**  
datasheet

## Maximum Ratings

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

Parameter	Symbol	Conditions	Value	Unit
<b>Half-Bridge Switch</b>				
Drain-source voltage	$V_{DS}$		1200	V
Drain current (DC current)	$I_D$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	148	A
Peak drain current	$I_{DM}$	$t_p$ limited by $T_{jmax}$	480	A
Total power dissipation	$P_{tot}$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	260	W
Gate-source voltage	$V_{GS}$		-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* $t_p = 2\text{ s}$	6000	V
Isolation voltage	$V_{isol}$	AC Voltage $t_p = 1\text{ min}$	2500	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		

### Half-Bridge Switch

#### Static

Drain-source on-state resistance	$r_{DS(on)}$		15		160	25 125 150	5,6	9 11 12	10,4 <sup>(1)</sup>	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 <sup>(2)</sup>	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						0,37		K/W
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Vincotech

10-EY122PA008ME-LU38F08T  
datasheet

### 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		
<b>Dynamic</b>										
Turn-on delay time	$t_{d(on)}$					25 125 150		74,24 65,6 64,64		ns
Rise time	$t_r$	$R_{gon} = 8 \Omega$ $R_{goff} = 8 \Omega$				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)	$E_{on}$	$Q_{rFWD}=0,828 \mu C$ $Q_{tFWD}=2,16 \mu C$ $Q_{rFWD}=2,64 \mu C$				25 125 150		5,64 5,67 5,78		mWs
Turn-off energy (per pulse)	$E_{off}$		-4/15	600	160	25 125 150		3,06 2,99 3		mWs
Peak recovery current	$I_{RRM}$					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	$Q_r$	$di/dt=4859 A/\mu s$ $di/dt=5582 A/\mu s$ $di/dt=5668 A/\mu s$				25 125 150		0,828 2,16 2,64		$\mu C$
Reverse recovered energy	$E_{rec}$					25 125 150		0,188 0,536 0,679		mWs
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$					25 125 150		5861 4376 4597		A/ $\mu s$



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### Characteristic Values

Parameter	Symbol	Conditions					Values			Unit
		$V_{GS}$ [V]	$V_{GE}$ [V]	$V_{DS}$ [V]	$V_{CE}$ [V]	$T_j$ [°C]	Min	Typ	Max	

### Thermistor

#### Static

Rated resistance	$R$					25		5		kΩ
Deviation of $R_{100}$	$A_{R/R}$	$R_{100} = 493 \Omega$				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.

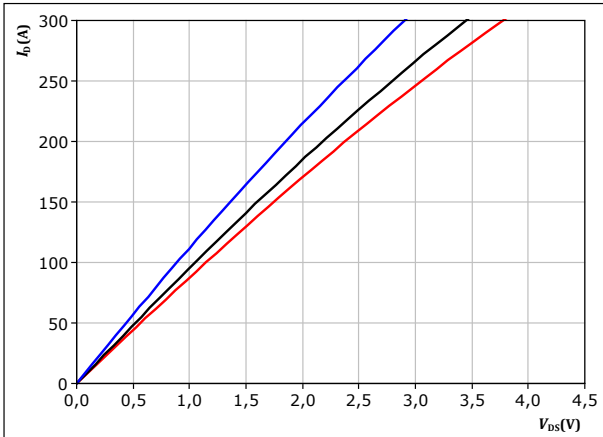


## Half-Bridge Switch Characteristics

**figure 1.** MOSFET

Typical output characteristics

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

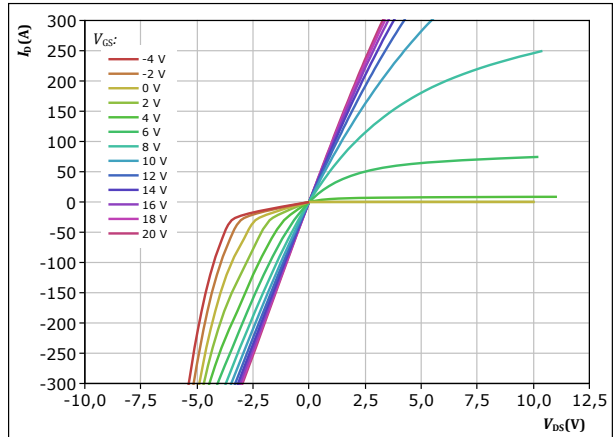


$t_p = 250 \mu s$   
 $V_{GS} = 14 V$   
 $T_j:$  25 °C (blue), 125 °C (black), 150 °C (red)

**figure 2.** MOSFET

Typical output characteristics

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

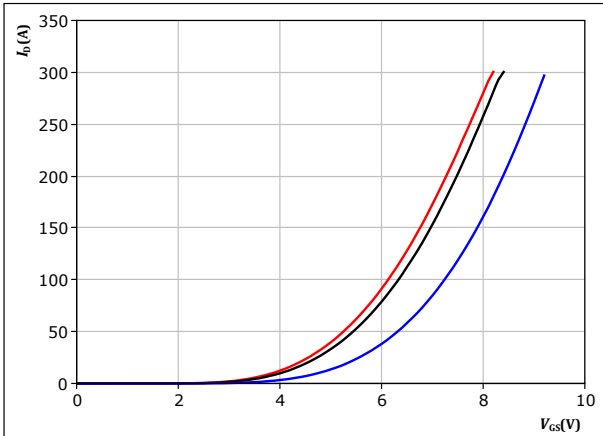


$t_p = 250 \mu s$   
 $T_j = 150 \text{ °C}$   
 $V_{GS}$  from -4 V to 20 V in steps of 2 V

**figure 3.** MOSFET

Typical transfer characteristics

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

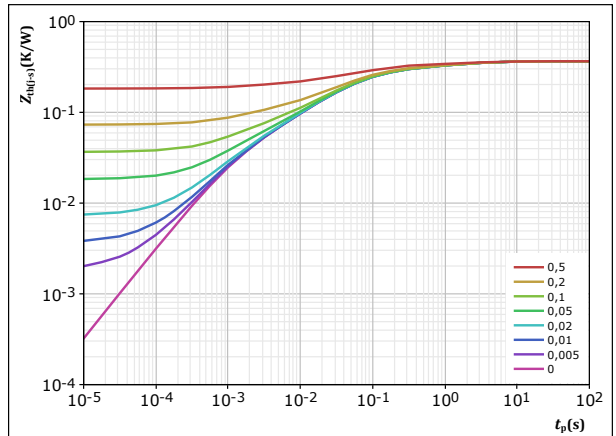


$t_p = 250 \mu s$   
 $V_{DS} = 10 V$   
 $T_j:$  25 °C (blue), 125 °C (black), 150 °C (red)

**figure 4.** MOSFET

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$   
 $R_{th(j-s)} = 0,366 \text{ K/W}$   
MOSFET thermal model values

R (K/W)	$\tau$ (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

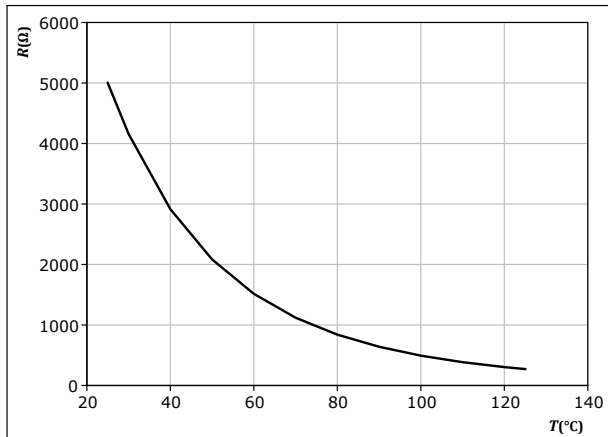


## Thermistor Characteristics

figure 5. Thermistor

Typical NTC characteristic as function of temperature

$$R_T = f(T)$$

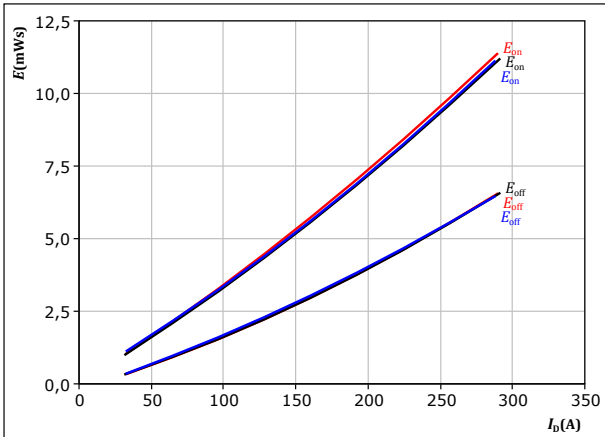




## Half-Bridge Switching Characteristics

figure 6. MOSFET

Typical switching energy losses as a function of drain current  
 $E = f(I_D)$

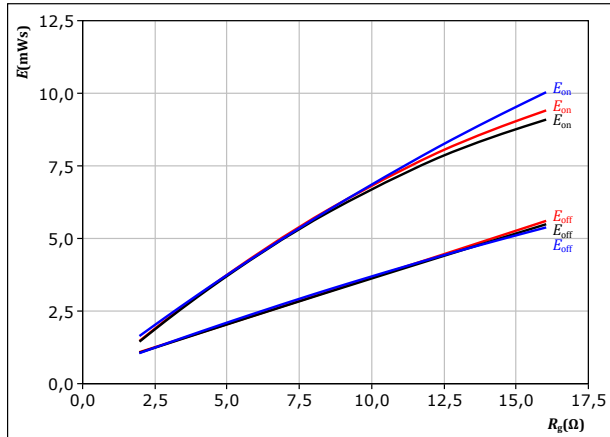


With an inductive load at

$V_{DS} =$	600	V	$T_j:$	—	25 °C
$V_{GS} =$	-4/15	V		—	125 °C
$R_{g(on)} =$	8	$\Omega$		—	150 °C
$R_{g(off)} =$	8	$\Omega$			

figure 7. MOSFET

Typical switching energy losses as a function of gate resistor  
 $E = f(R_g)$

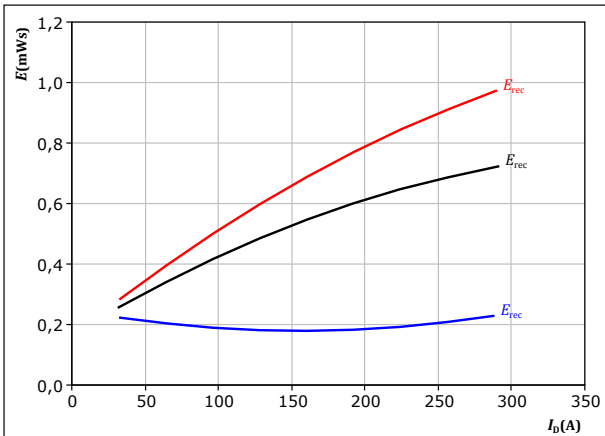


With an inductive load at

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

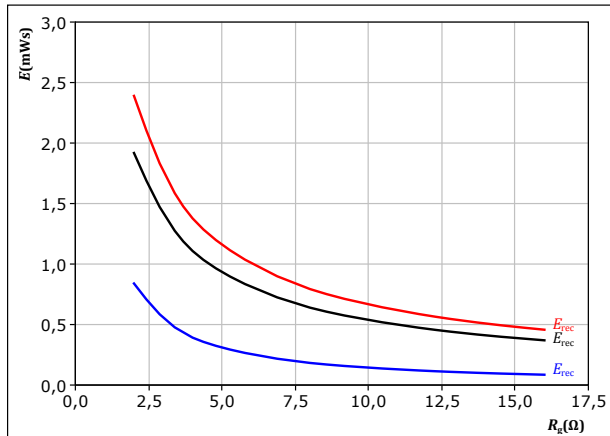


With an inductive load at

$V_{DS} =$	600	V	$T_j:$	—	25 °C
$V_{GS} =$	-4/15	V		—	125 °C
$R_{g(on)} =$	8	$\Omega$		—	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

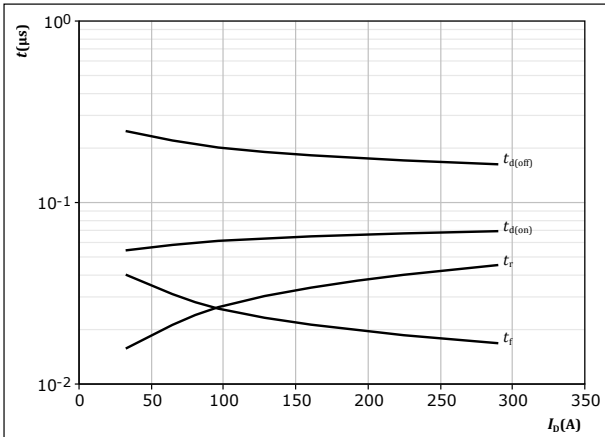




## Half-Bridge Switching Characteristics

**figure 10.** MOSFET

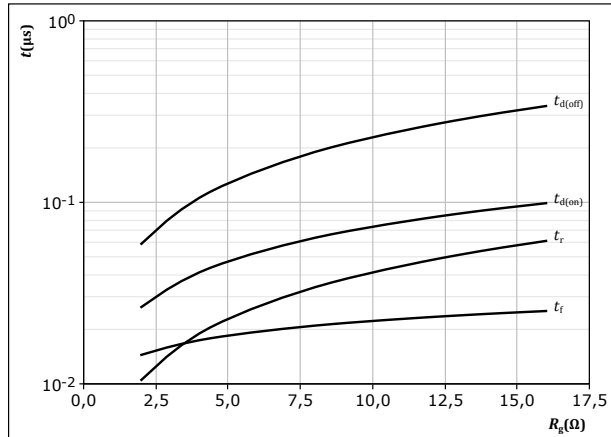
Typical switching times as a function of drain current  
 $t = f(I_D)$



With an inductive load at  
 $T_j = 150 \text{ }^\circ\text{C}$   
 $V_{DS} = 600 \text{ V}$   
 $V_{GS} = -4/15 \text{ V}$   
 $R_{gon} = 8 \text{ } \Omega$   
 $R_{goff} = 8 \text{ } \Omega$

**figure 11.** MOSFET

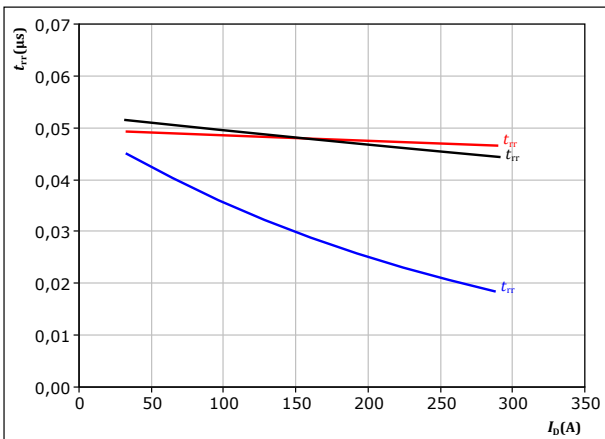
Typical switching times as a function of gate resistor  
 $t = f(R_g)$



With an inductive load at  
 $T_j = 150 \text{ }^\circ\text{C}$   
 $V_{DS} = 600 \text{ V}$   
 $V_{GS} = -4/15 \text{ V}$   
 $I_D = 160 \text{ A}$

**figure 12.** MOSFET

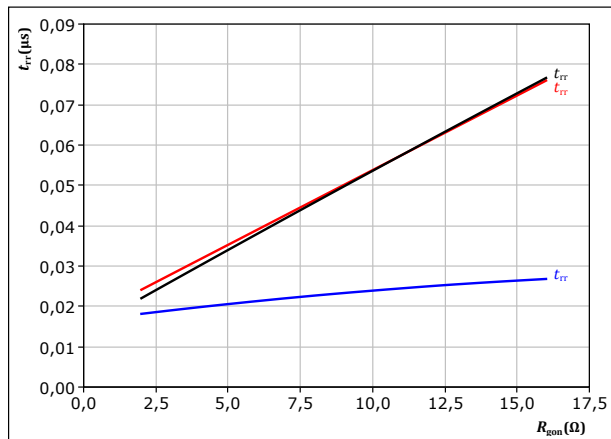
Typical reverse recovery time as a function of drain current  
 $t_{rr} = f(I_D)$



At  $V_{DS} = 600 \text{ V}$   
 $V_{GS} = -4/15 \text{ V}$   
 $R_{gon} = 8 \text{ } \Omega$   
 $T_j$ : — 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  $V_{DS} = 600 \text{ V}$   
 $V_{GS} = -4/15 \text{ V}$   
 $I_D = 160 \text{ A}$   
 $T_j$ : — 25 °C  
— 125 °C  
— 150 °C

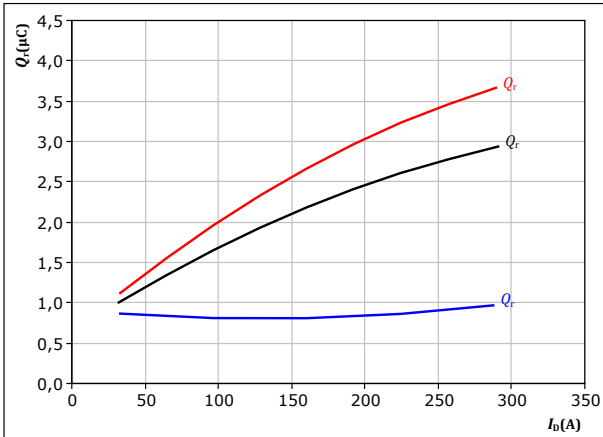


## Half-Bridge Switching Characteristics

**figure 14.** MOSFET

Typical recovered charge as a function of drain current

$$Q_r = f(I_D)$$



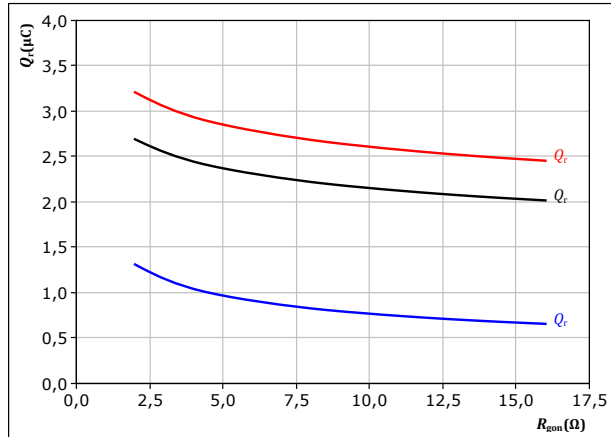
At  $V_{DS} = 600$  V  
 $V_{GS} = -4/15$  V  
 $R_{gon} = 8$   $\Omega$

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

**figure 15.** MOSFET

Typical recovered charge as a function of turn on gate resistor

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



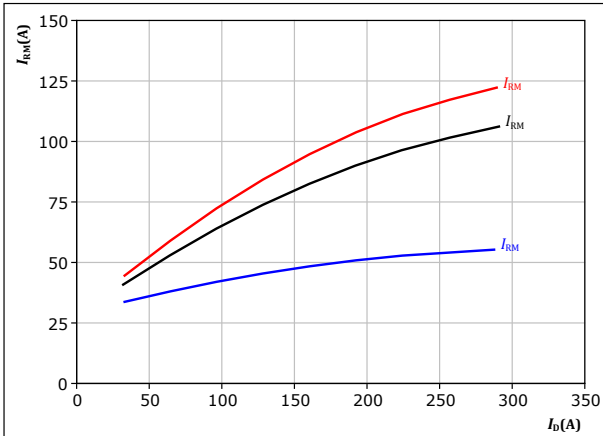
At  $V_{DS} = 600$  V  
 $V_{GS} = -4/15$  V  
 $I_D = 160$  A

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

**figure 16.** MOSFET

Typical peak reverse recovery current as a function of drain current

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



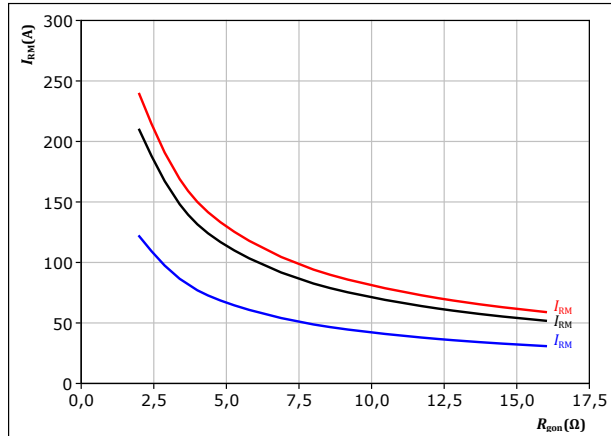
At  $V_{DS} = 600$  V  
 $V_{GS} = -4/15$  V  
 $R_{gon} = 8$   $\Omega$

$T_j$ : — 25 °C  
 — 125 °C  
 — 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  
 $V_{GS} = -4/15$  V  
 $I_D = 160$  A

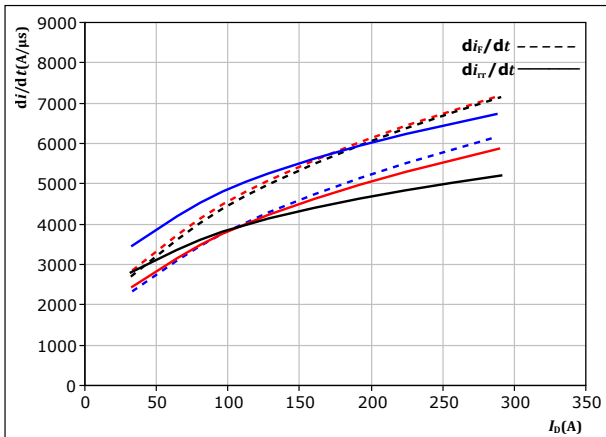
$T_j$ : — 25 °C  
 — 125 °C  
 — 150 °C



## Half-Bridge Switching Characteristics

**figure 18.** MOSFET

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

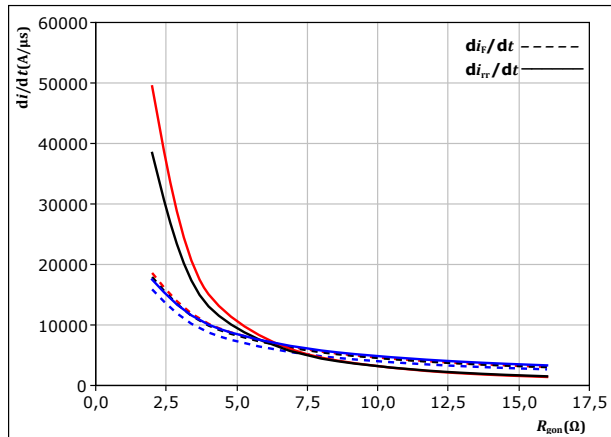


At  $V_{DS} = 600$  V  
 $V_{GS} = -4/15$  V  
 $R_{g(on)} = 8$   $\Omega$

$T_j$ : 25 °C (blue), 125 °C (black), 150 °C (red)

**figure 19.** MOSFET

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



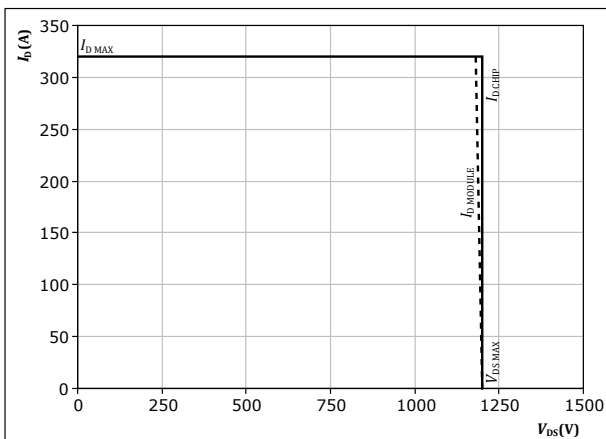
At  $V_{DS} = 600$  V  
 $V_{GS} = -4/15$  V  
 $I_D = 160$  A

$T_j$ : 25 °C (blue), 125 °C (black), 150 °C (red)

**figure 20.** MOSFET

Reverse bias safe operating area

$I_D = f(V_{DS})$



At  $T_j = 150$  °C  
 $R_{g(on)} = 8$   $\Omega$   
 $R_{g(off)} = 8$   $\Omega$



## Half-Bridge Switching Definitions

figure 21. MOSFET

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

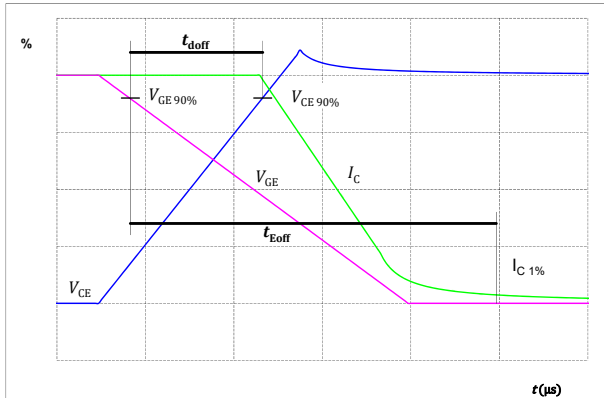


figure 22. MOSFET

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

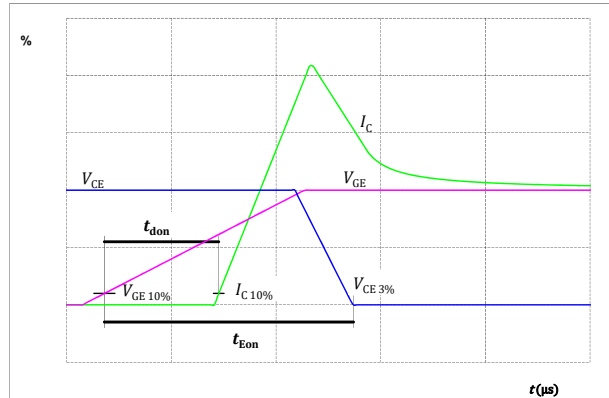


figure 23. MOSFET

Turn-off Switching Waveforms & definition of  $t_f$

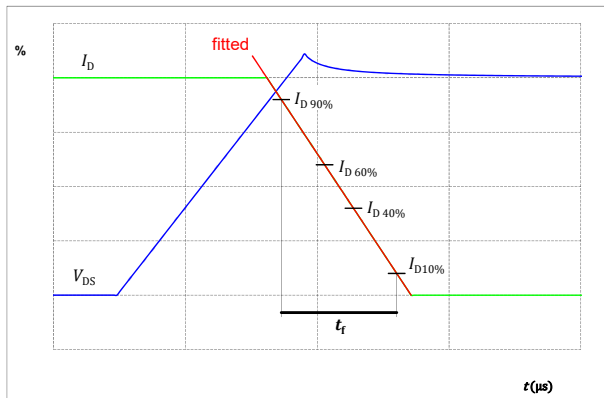
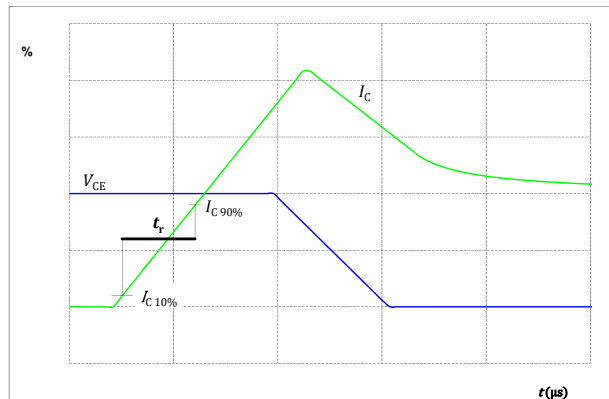


figure 24. MOSFET

Turn-on Switching Waveforms & definition of  $t_r$





## Half-Bridge Switching Definitions

figure 25. FWD

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

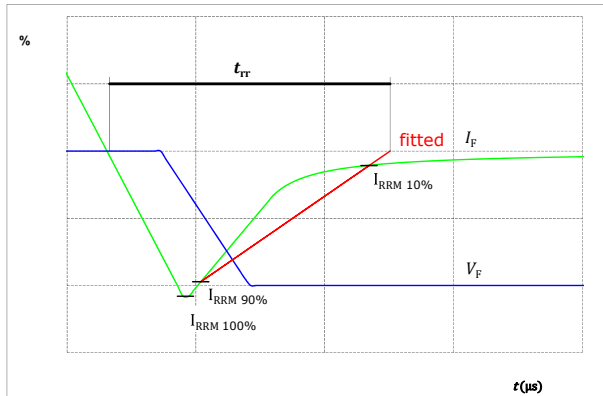


figure 26. FWD

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

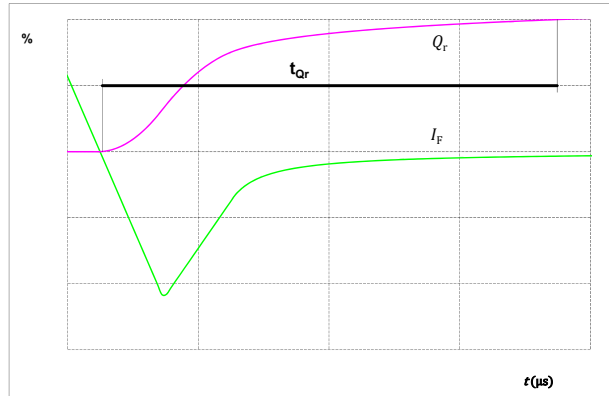
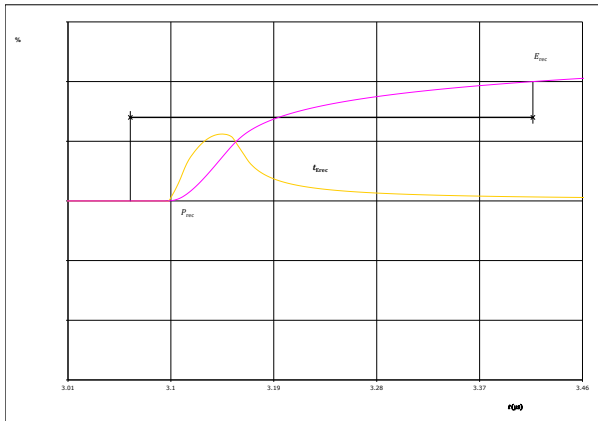


figure 27. FWD


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



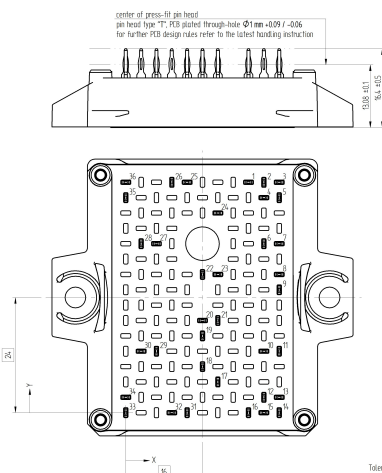


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Ordering Code	
<b>Version</b>	<b>Ordering Code</b>
Without thermal paste	10-EY122PA008ME-LU38F08T
With thermal paste	10-EY122PA008ME-LU38F08T-/3/

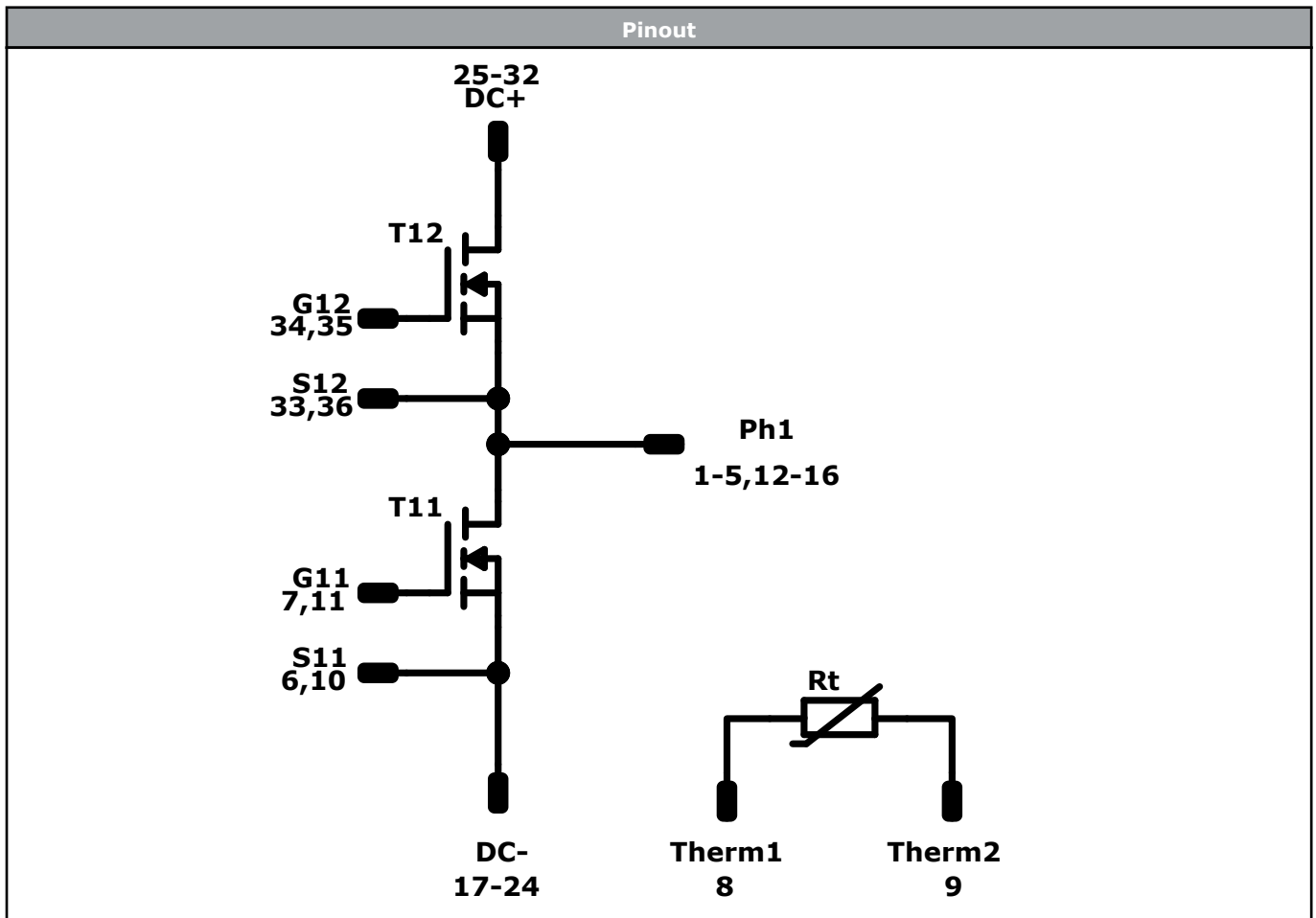
Marking						
	<b>Text</b>	<b>Name</b> NN-NNNNNNNNNNNNNN- TTTTTVV	<b>Date code</b> WWYY	<b>UL &amp; VIN</b> UL VIN	<b>Lot</b> LLLLL	<b>Serial</b> SSSS
	<b>Datamatrix</b>	<b>Type&amp;Ver</b> TTTTTTTV	<b>Lot number</b> LLLLL	<b>Serial</b> SSSS	<b>Date code</b> WWYY	

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	



center of press-fit pin base  
pin base type: TP, PCB plated through-hole  $\Phi 1mm - 0.097 - 0.06$   
for further PCB design rules refer to the latest handling instruction

Tolerance of positions:  $\pm 0.04mm$  at the end of pins  
Dimension of coordinate axis is only offset without tolerance



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 <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 certified according to UL 1557 standard, UL file number E192116. For more information see vincotech.com website. 

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2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.