

SG2M120120BJ



TriQSiC™ 1200V Silicon Carbide Power MOSFET G2

N Channel Enhancement

FreF

SG2M120120BJ

1200V SiC Power MOSFET

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Features	1
Benefits	}

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1 Maximum ratings

Table 2 Maximum rating ($T_c = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions	Note
$V_{DS,max}$	Drain source voltage	1200	V	$V_{GS} = 0V, I_D = 100\mu A$	
$V_{GS,max}$	Gate source voltage	-8 / +22	V	Absolute maximum values	Note1
$V_{GS,pulse}$	Gate-source voltage,max. transient voltage	-10 / +25	V	$t_p \leq 0.5\mu s, D = 0.01$	
$V_{GS,op}$	Gate source voltage	-4 / +18	V	Recommended operational values	
I_D	Continuous drain current	23	A	$V_{GS} = 18V, T_c = 25^\circ\text{C}$	
		16		$V_{GS} = 18V, T_c = 100^\circ\text{C}$	
$I_{D(pulse)}$	Pulsed drain current	63	A	Pulse width $t_p = 100\mu s$ limited by $T_{J,max}$	
T_J, T_{stg}	Operating Junction and storage temperature	-55 to +175	$^\circ\text{C}$		

Note 1 when using MOSFET Body Diode $V_{GS,max} = -4 / +22V$

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Q_{gs}	Gate source charge	-	5.5	-	nC	$V_{DS} = 800V, V_{GS} = -4/+18V$ $I_D = 9A$	Fig.12
Q_{gd}	Gate drain charge	-	5.3	-			
Q_g	Gate charge	-	16.6	-			

2.3 Switching characteristics

Table 6 **Dynamic characteristics**($T_c = 25^{\circ}C$ unless otherwise specified,the data comes from TO-247-4L)

Symbol	Parameter	Min.	Max.
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3 Electrical characteristic diagrams

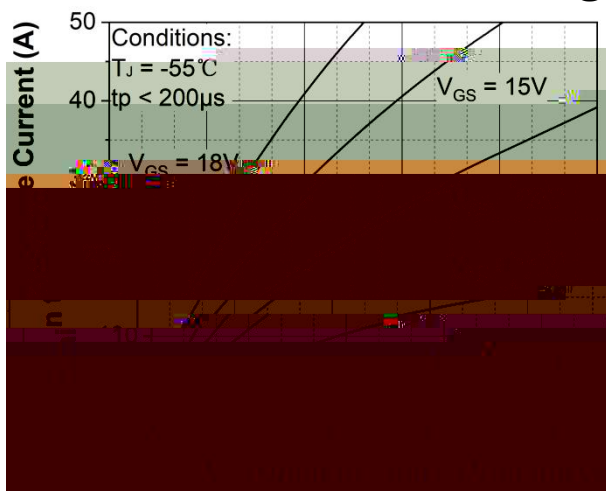


Figure 1. Output characteristics $T_J = -55^\circ\text{C}$

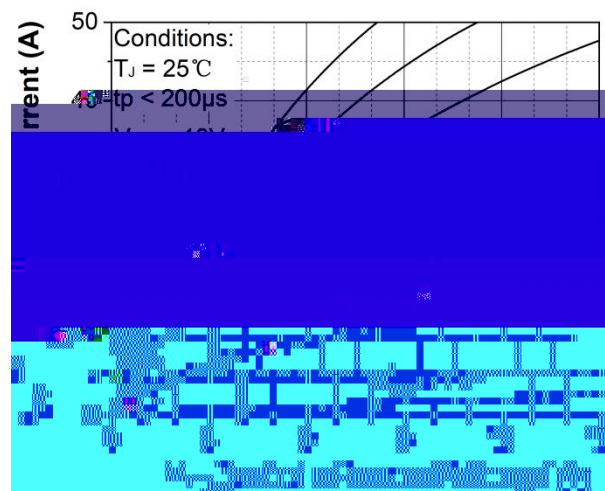


Figure 2. Output characteristics $T_J = 25^\circ\text{C}$

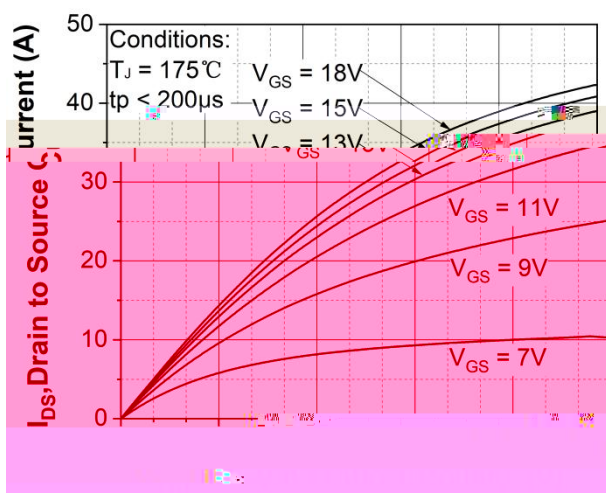


Figure 3. Output characteristics $T_J = 175^\circ\text{C}$

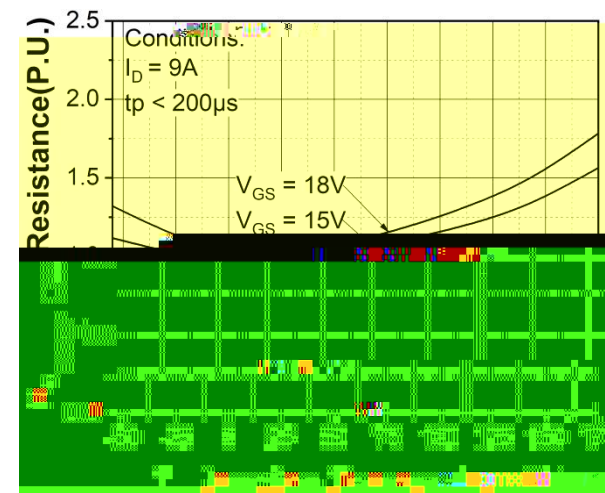


Figure 4. Normalized on-resistance vs. temperature

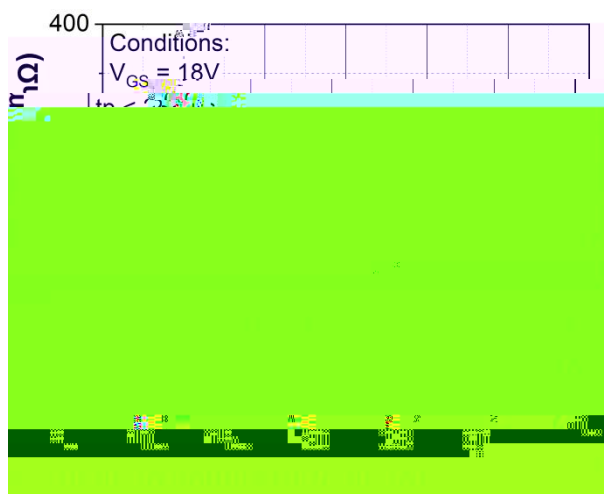


Figure 5. On-resistance vs. drain current
for various temperatures

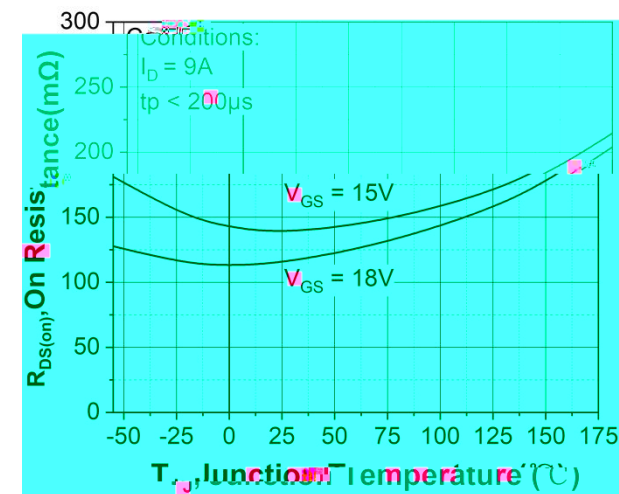


Figure 6. On-resistance vs. temperature
for various gate voltages

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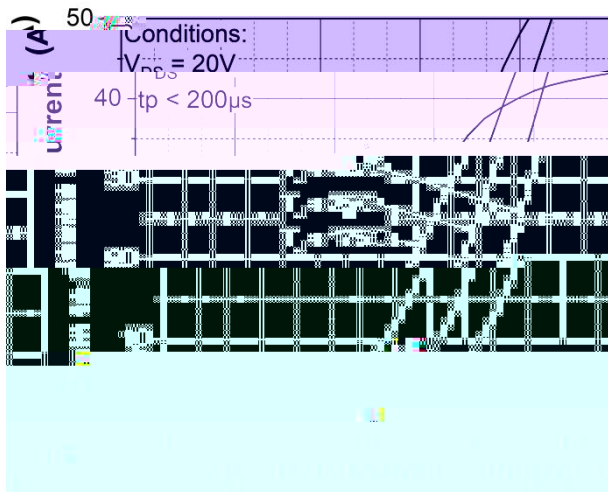


Figure 7. Transfer characteristic for various junction temperatures

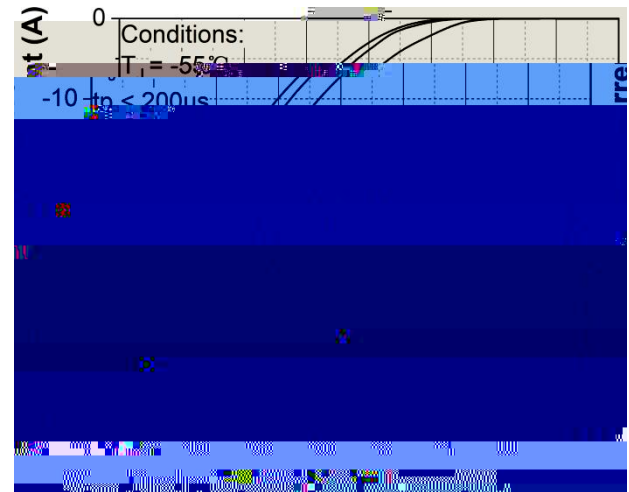


Figure 8. Body diode characteristic at $T_J = -55\text{ }^{\circ}\text{C}$

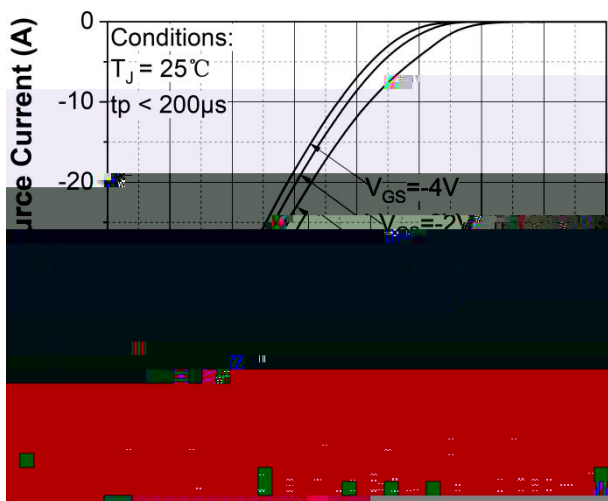


Figure 9. Body diode characteristic at $T_J = 25\text{ }^{\circ}\text{C}$

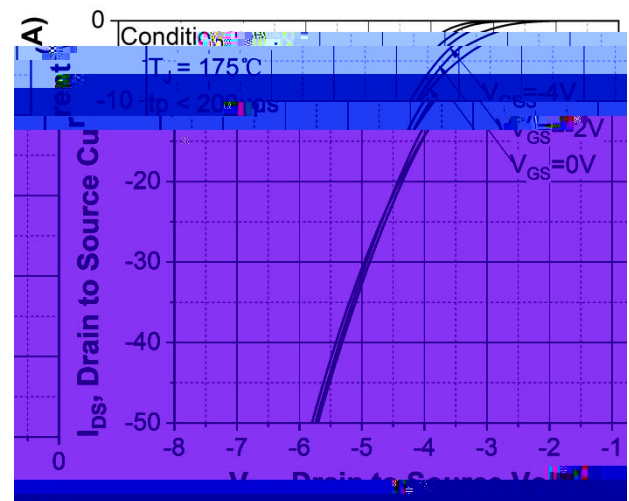


Figure 10. Body diode characteristic at $T_J = 175\text{ }^{\circ}\text{C}$

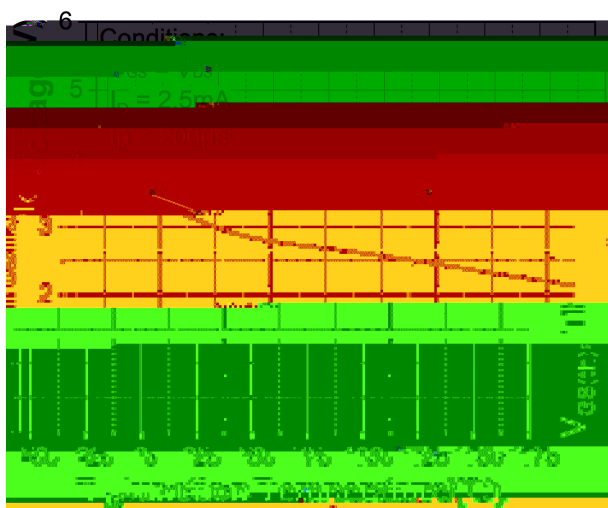


Figure 11. Threshold voltage vs. temperature

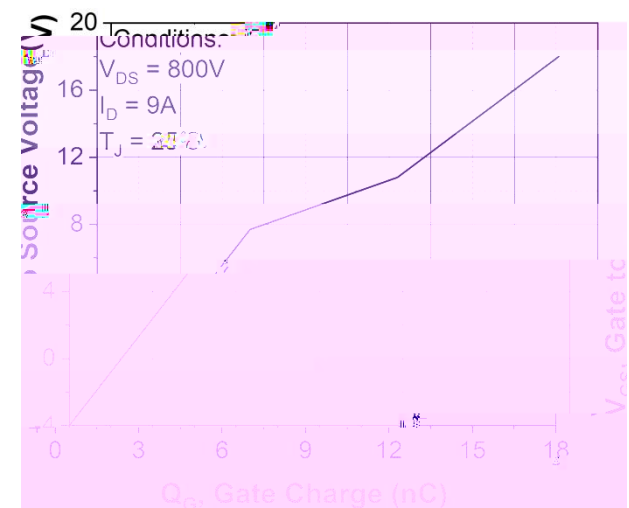


Figure 12. Gate charge characteristic

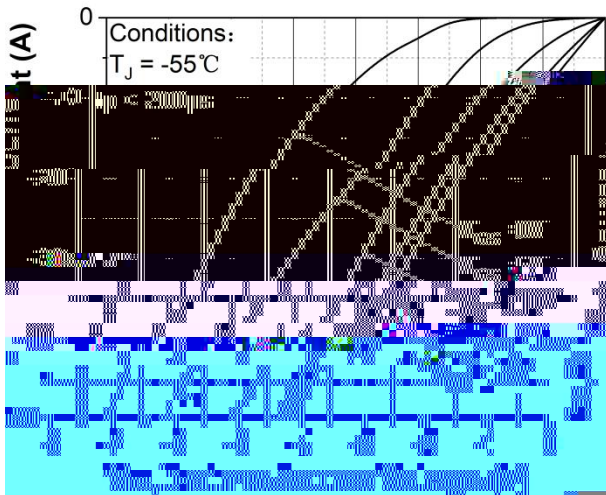


Figure 13. 3rd quadrant characteristic at $T_J = -55^\circ\text{C}$

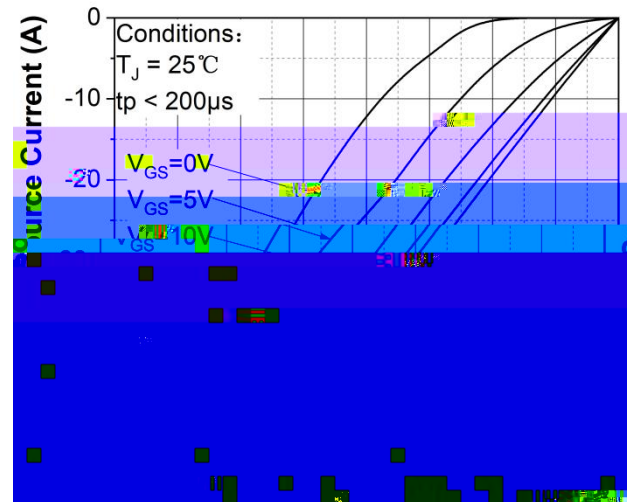


Figure 14. 3rd quadrant characteristic at $T_J = 25^\circ\text{C}$

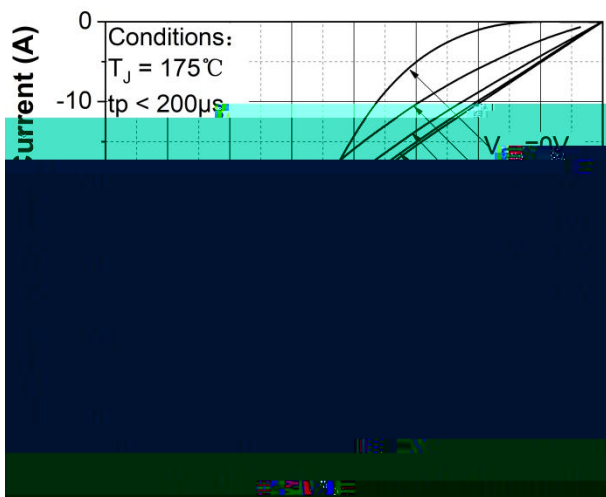


Figure 15. 3rd quadrant characteristic at $T_J = 175^\circ\text{C}$

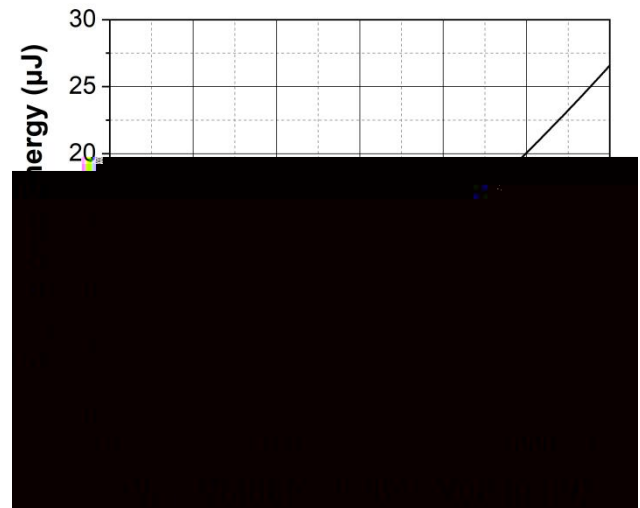


Figure 16. Output capacitor stored energy

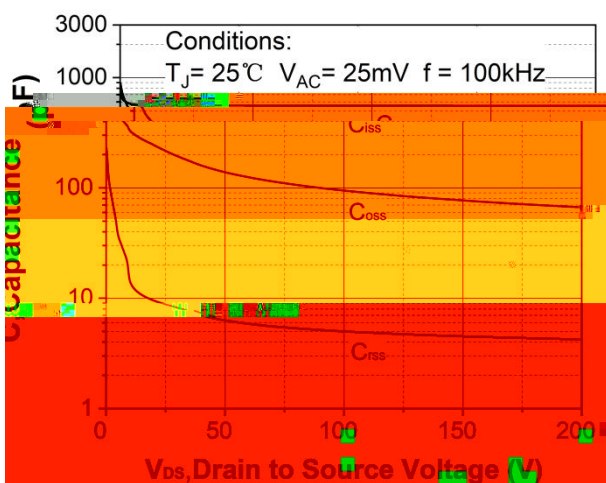


Figure 17. Capacitances vs. drain-source voltage (0 - 200V)

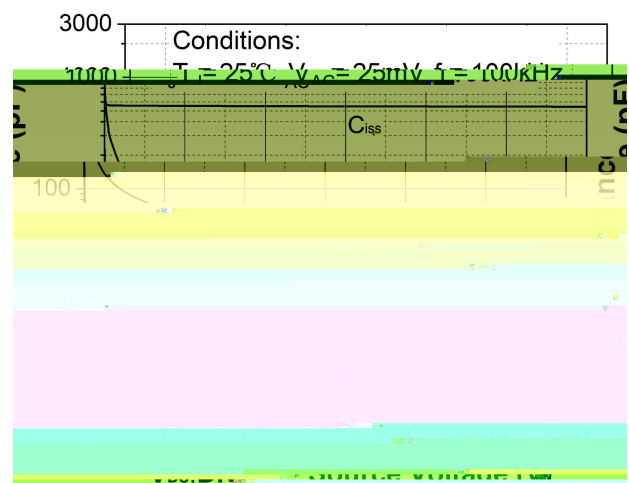


Figure 18. Capacitances vs. drain-source voltage (0 - 1200V)

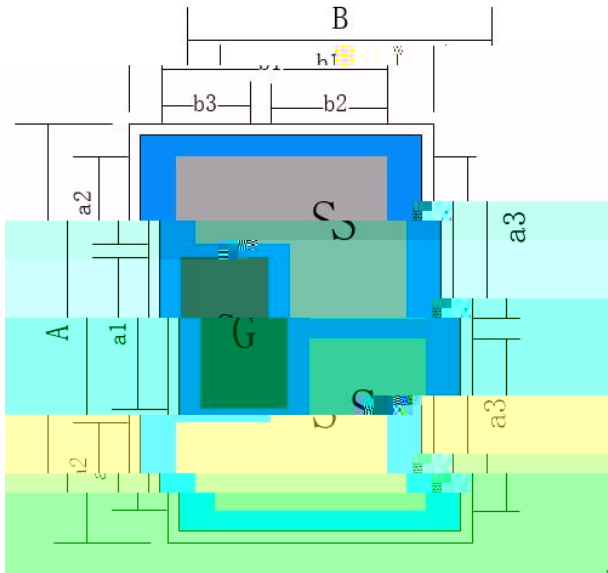
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4 Mechanical parameters

4.1 Dimensions and metallization

Parameter	Typical value	Unit	Metallization
Die size W x L	2.645 * 1.850	mm	
Gate pad size W x L	0.749 * 0.449	mm	
Die thickness	175	μm	
Top side source gate metallization	4	μm	Al
Back side drain metallization	1	μm	Ag

4.2 Layout



Symbol	Dimension / mm
B	1.850
b1	1.249
b2	0.750
b3	0.449
A	2.645
a1	0.749
a2	0.478
a3	0.900

5 Test conditions

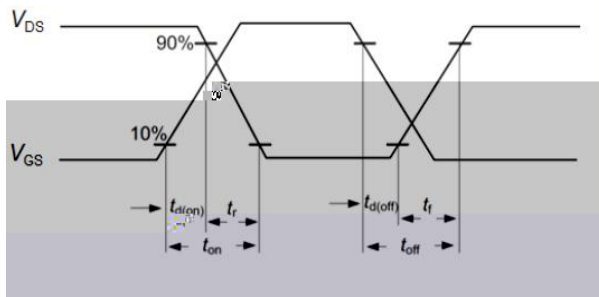


Figure A. Definition of switching times

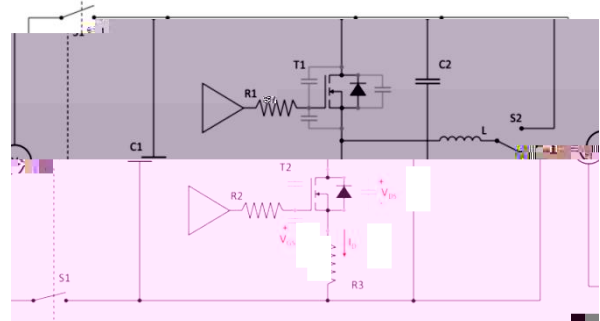


Figure B. Dynamic test circuit

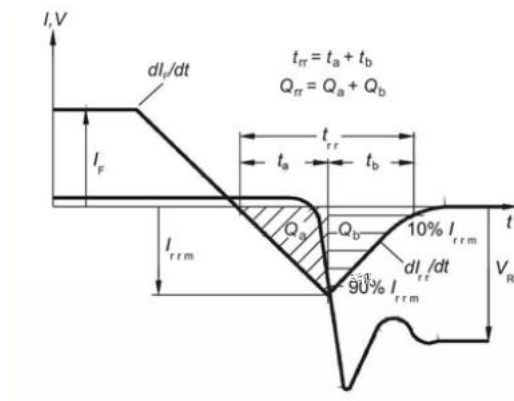


Figure C. Definition of body diode switching characteristics

Revision history

Document version	Date of release	Document stage	Description of changes
V01_00	2026-05-11	Final	

Attention

1. RoHS compliance

The level of RoHS restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are listed in an exempted application, in accordance with EU Directive 2011/65/ EC (RoHS2), as implemented January 2, 2013.

2. REACH compliance

REACH substances of high concern (SVHCs) information is available for this product. Since the European Chemical Agency (ECHA) has published notice of their intent to frequently revise the SVHC listing for the foreseeable future, please contact a Sichain representative to insure you get the most up-to-date REACH SVHC Declaration. REACH banned substance information (REACH Article 67) is also available upon request.

3. With respect to information regarding the application of this product, Sichain hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

4. Any

7. Except as otherwise explicitly approved by Sichain in a written document signed by authorized representatives of Sichain, Sichain' products may not be used in any applications where a failure of the product or any consequences of the use thereof can reasonably be expected to result in personal injury.

8. For use of our products in applications requiring a high degree of reliability (as exemplified below), please contact and consult with a Sichain representatives, for example but not limited to: transportation equipment, primary communication equipment, traffic