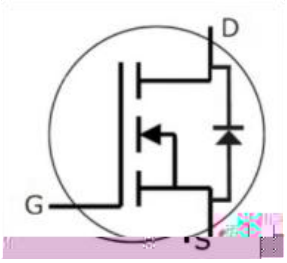
SG2M035120BJ

TriQSiC™ 1200V Silicon Carbide Power MOSFET G2 N Channel Enhancement

Features

- High speed switching
- Very low switching losses
- Fully controllable dv/dt
- High blocking voltage with low on-resistance
- Fast intrinsic diode with low reverse recovery (Qrr)
- Temperature independent turn-off switching losses
- Halogen free, RoHS compliant



Benefits

- Cooling effort reduction
- Efficiency improvement
- Reduced cooling requirements
- Increased power density
- Increased system switching frequency

Part number	Die size W x L mm
SG2M035120BJ	3.0 * 4.4

Applications

- On-board charger/PFC
- EV battery chargers
- Booster/DC-DC converter
- Switch mode power supplies

Table 1 Key performance and package parameters

Type	V_{DS}	I_{DS} (T_C = 25 , $R_{th\ (j\text{-}c),max}$ 0.56 °C/W)	$R_{DS(on),\ typ}$ (V_{GS} = 18V, I_D = 32A, T_J = 25)	$T_{J,max}$
SG2M035120BJ	1200V	66A	33mΩ	175

1 Maximum ratings

Table 2 **Maximum rating** (Tc = 25°C unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions	Note
$V_{DS,max}$	Drai				

SG2M035120BJ

Q_{gs}	Gate source charge	-	18	-	nC	V_{DS} = 800V, V_{GS} = -4/+18V I_D = 32A	Fig.12
Q_{gd}	Gate drain charge	-	18	-			
Q_g	Gate charge	-	57	-			

2.3 Switching characteristics

Table 6 Dynamic characteristics(Tc = 25°C unless otherwise specified,the data comes from TO-247-4L)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions	Note
E_{on}	Turn on switching energy	-	212	-	μJ	V_{DS} = 800V, V_{GS} = -4/+18V I_D = 32A, Rg = 2.5Ω L = 120μH	
E_{off}	Turn off switching energy	-	48	-			
$t_{d\ on}$	Turn on delay time	-	12.5	-	ns		
t_r	Rise time	-	12.2	-			
$t_{d\ off}$	Turn off delay time	-	25.6	-			
t_f	Fall time	-	7.4	-			

Table 7 Body diode characteristics(The data comes from TO-247-4L)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions	Note
V_{SD}	Diode forward voltage	-	3.7	-	V	V_{GS} = -4V, I_{SD} = 16A	Fig.8,9, 10
		-	3.3	-	V	V_{GS} = -4V, I_{SD} = 16A T_J = 175°C	
I_S	Continuous diode forward current	-	63	-	A	V_{GS} = -4V, Tc = 25°C	Note2
t_{rr}	Reverse recovery time	-	31	-	ns	V_R = 800V, V_{GS} = -4V I_{SD} 0 ⊊36	

3 Electrical characteristic diagrams

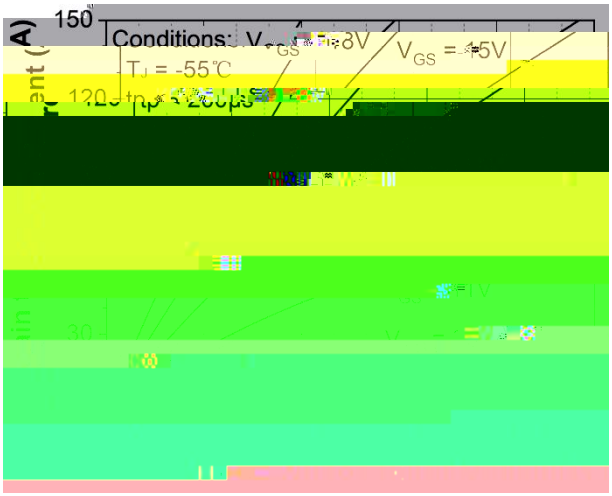


Figure 1. Output characteristics T_J = -55 ºC

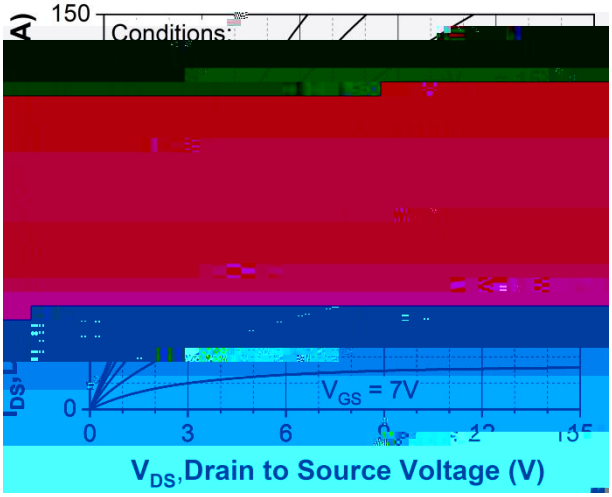


Figure 2. Output characteristics T_J = 25 ºC

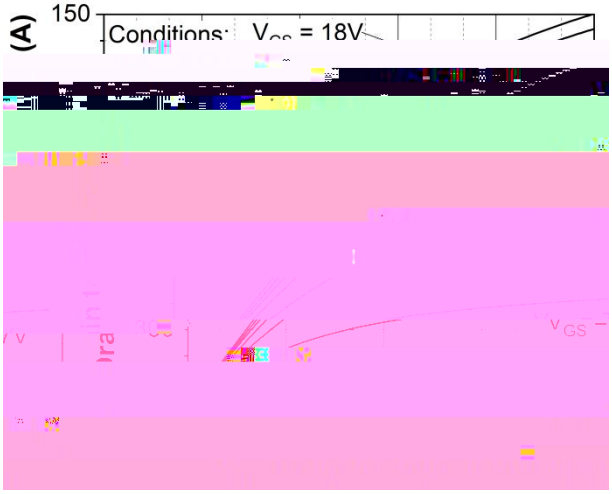


Figure 3. Output characteristics T_J = 175 ºC

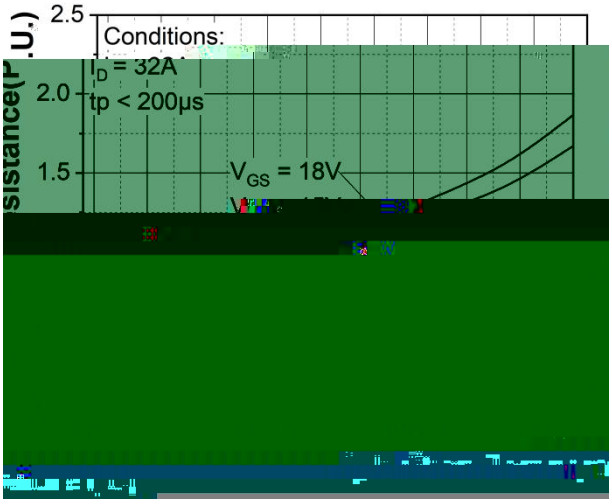


Figure 4. Normalized on-resistance vs. temperature

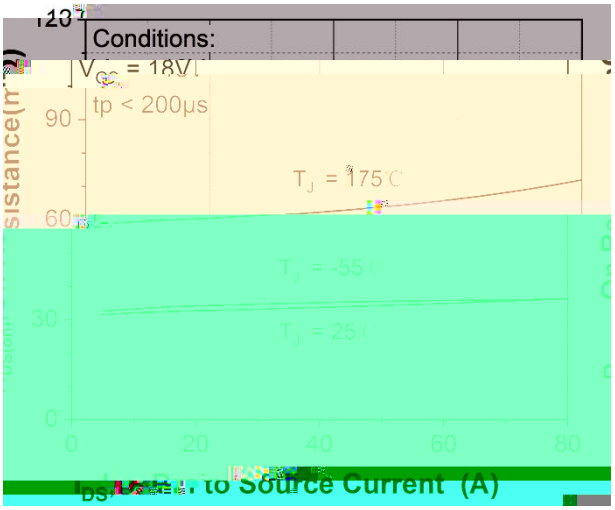


Figure 5. On-resistance vs. drain current for various temperatures

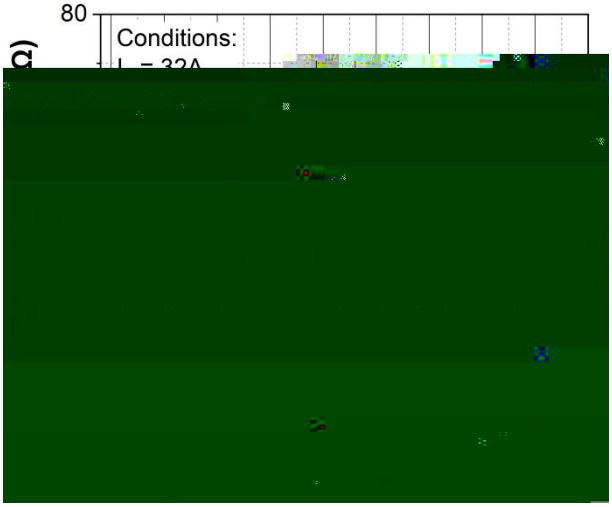


Figure 6. On-resistance vs. temperature for various gate voltages

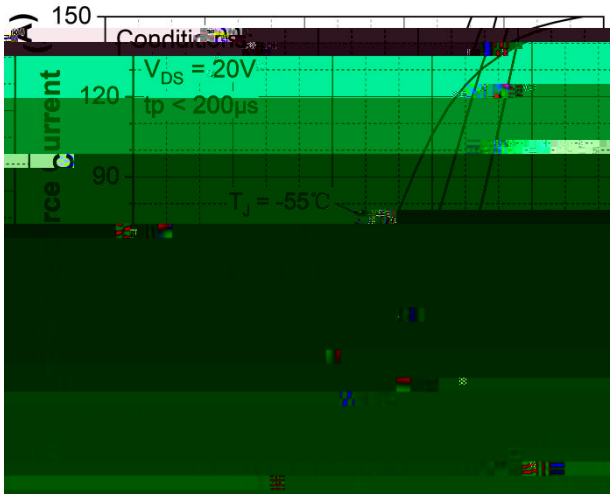


Figure 7. Transfer characteristic for various junction temperatures

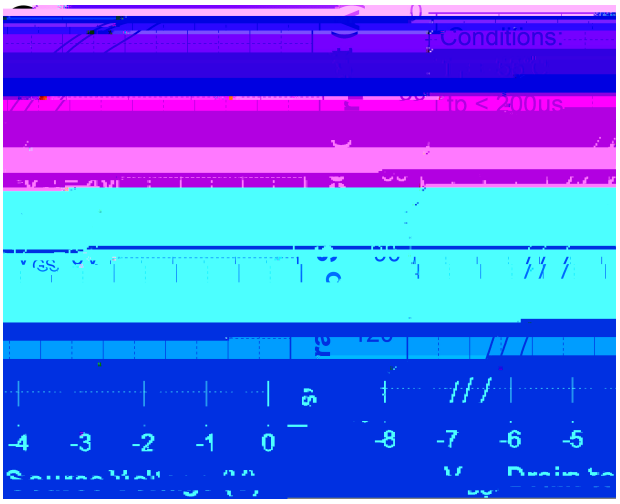


Figure 8. Body diode characteristic at T_J = -55 ºC

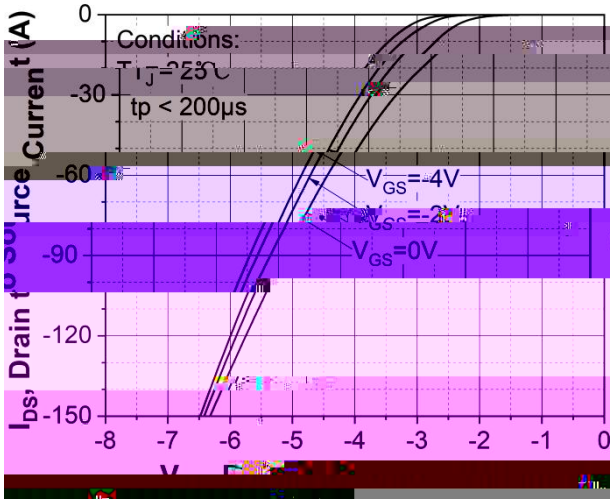


Figure 9. Body diode characteristic at T_J = 25 ºC

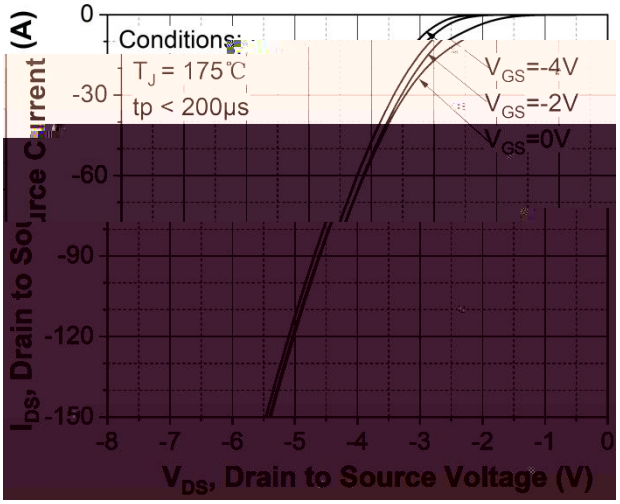


Figure 10. Body diode characteristic at T_J = 175ºC

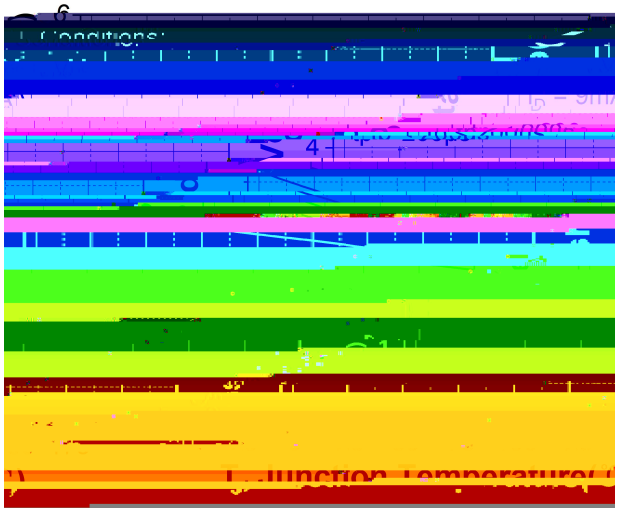


Figure 11. Threshold voltage vs. temperature

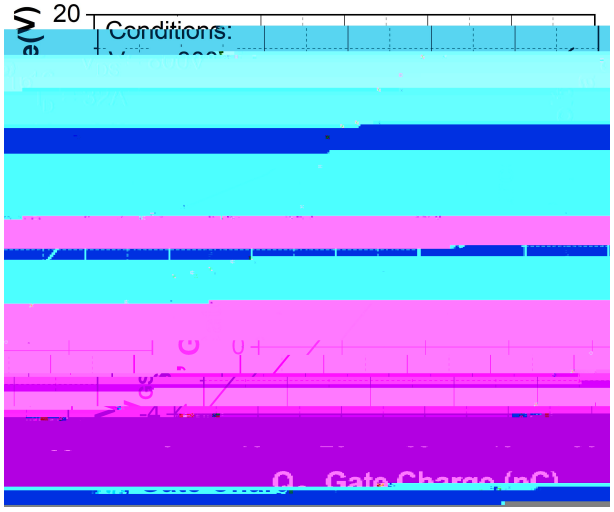


Figure 12. Gate charge characteristic

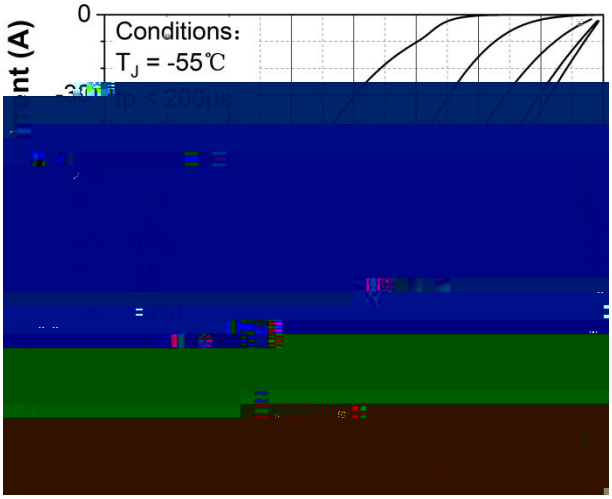


Figure 13. 3rd quadrant characteristic at T_J = -55 ºC

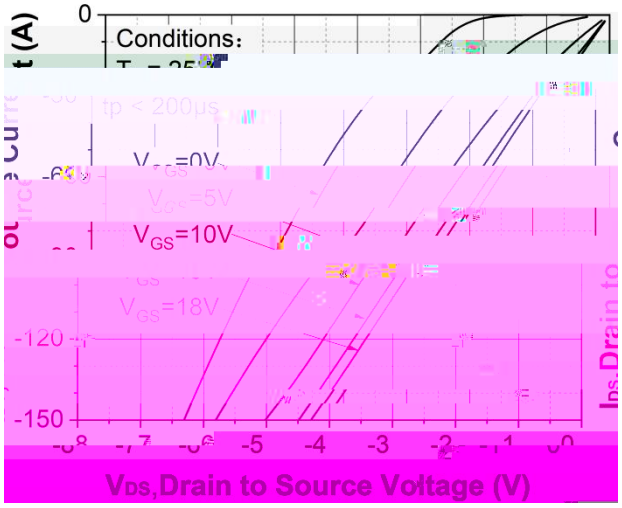


Figure 14. 3rd quadrant characteristic at T_J = 25 ºC

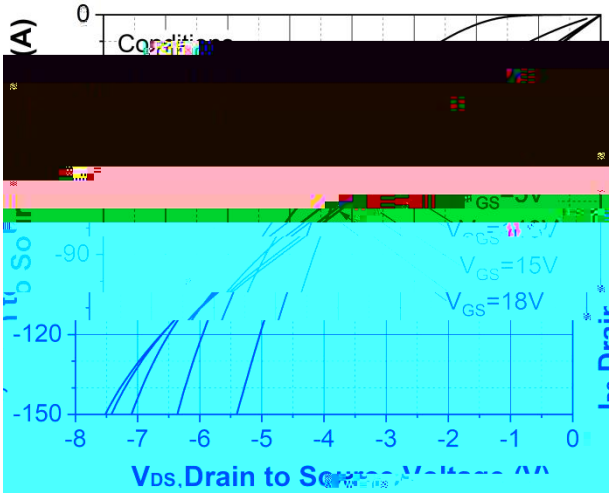


Figure 15. 3rd quadrant characteristic at T_J = 175 ºC

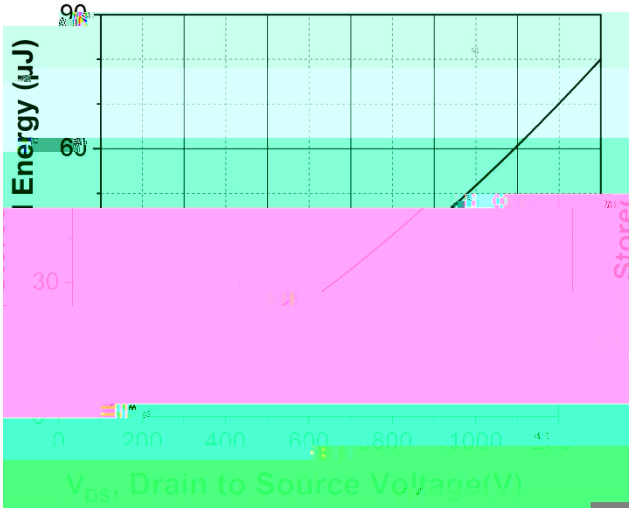


Figure 16. Output capacitor stored energy

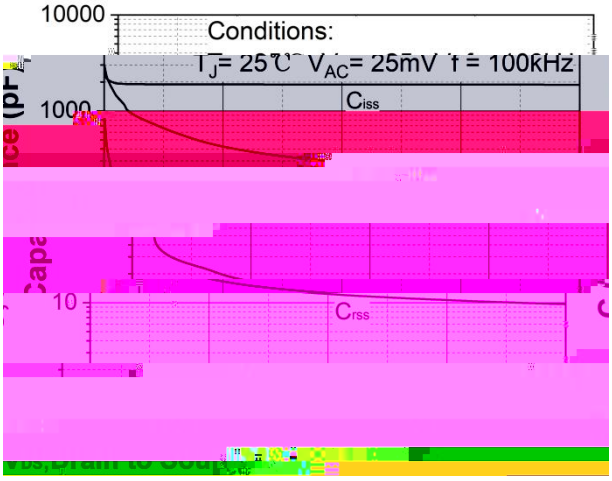


Figure 17. Capacitances vs. drain-source voltage (0 - 200V)

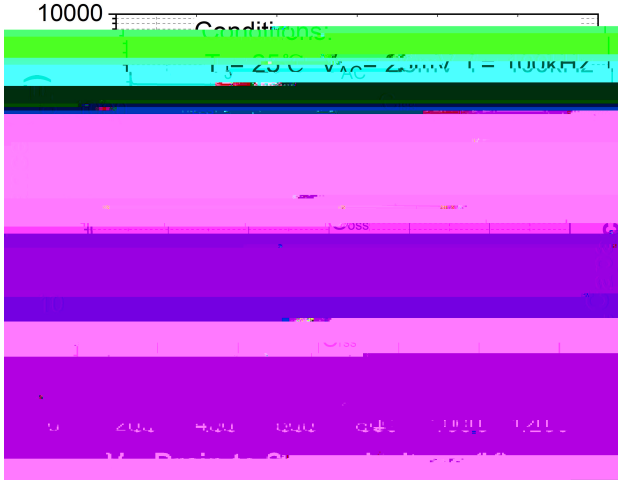


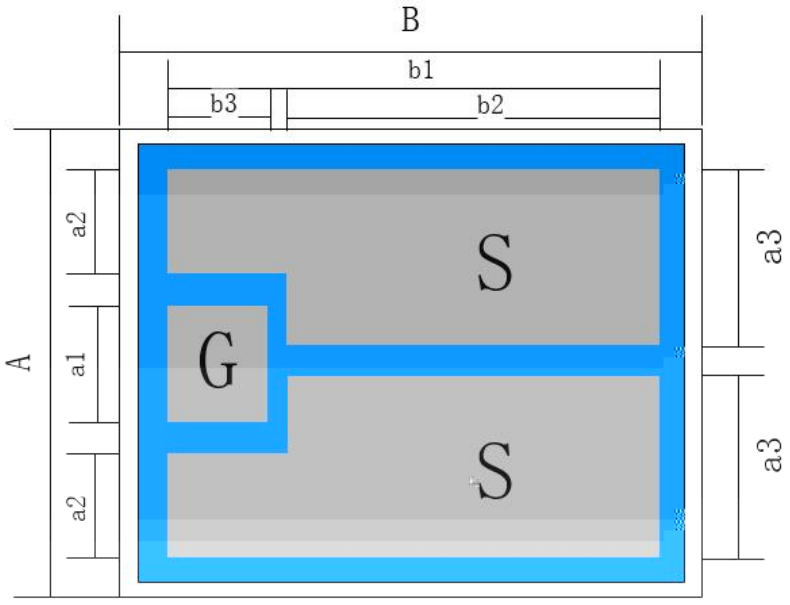
Figure 18. Capacitances vs. drain-source voltage (0 - 1200V)

4 Mechanical parameters

4.1 Dimensions and metallization

Parameter	Typical value	Unit	Metallization
Die size W x L	3.00 * 4.40	mm	
Gate pad size W x L	0.80 * 0.70	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	4.40
b1	3.70
b2	2.85
b3	0.70
A	3.00
a1	0.80
a2	0.60
a3	1.05

5 Test conditions

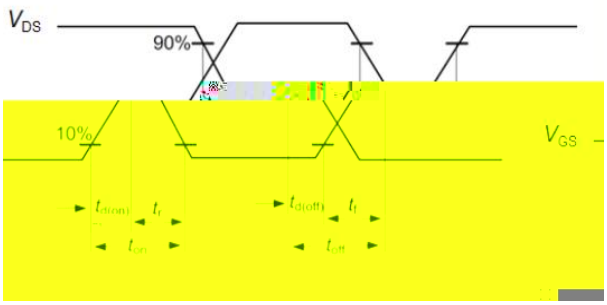


Figure A. Definition of switching times

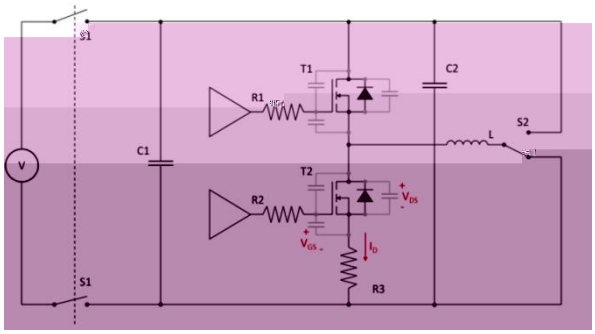


Figure B. Dynamic test circuit

Revision history

Document version	Date of release	Document stage	Description of changes
V01_00	2025-09-17	——	——
V01_01	2025-12-11	——	——
V01_02	2026-02-03	Final	——

Attention

1. **RoHS compliance**

The levels 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 used 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.

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6. Due to technical requirements products may contain dangerous substances. For information on the types in question please contact Sichain office.

7. Except as otherwise