New Release

LTEC Corporation

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SiC MOSFET(1200V): SiC MOSFET of Chinese makers Survey and Benchmark Report (2025 Edition)

Overview

As SiC wafer production yields has been improving in China, major global SiC MOSFET manufacturers have begun to adopt wafers from Chinese companies, and improvements in wafer quality, yields, and costs have been reported.

In addition to wafers, Chinese companies are also expanding their presence in the SiC power device manufacturing field (estimated 100 companies), and it is predicted that Chinese SiC power devices will be rapidly adopted in a variety of products in the future.

LTEC has been analyzing and evaluating products from major Chinese manufacturers since 2021. Chinese SiC MOSFETs have begun to appear with performance equivalent to that of major manufacturers, so LTEC believes that it is necessary to regularly check the technical level of Chinese SiC MOSFETs, just like major manufacturers.

Report overview

LTEC has conducted structural/material analysis and electrical characteristic analysis of approximately 60 SiC power devices (2014-2025) and nine Chinese SiC power devices since 2021. This report summarizes the trends of Chinese manufacturers, and technical comparison with major global manufacturers (see page 3).Report Contents/Overview of Results

Maker	Gen.	Product number	BVds(V)	Io(A)	Ron(mΩ)
BASIC	Gen2	B2M065120Z	1200	47	65
INVENTCHIP	Gen2	IV2Q12040T4Z	1200	65	40
INVENTCHIP	Gen3	IV3Q12040T4Z	1200	147	13.5
HESTIA	Gen2	H2M12DF080	1200	33	80
HUNAN SANAN	Gen2	SMS1200075M2	1200	35	72

Report contents

Chinese manufacturers' FOM RONxAA is beginning to rival the third generation of major manufacturers.

The epitaxial/buffer layer thicknesses of all SiC MOSFETs evaluated are very similar, possibly indicating commonality (SiC substrate, epitaxial layer, and buffer layer).

The impact on reliability is unknown, but shaping abnormalities have been confirmed around the source electrode and contacts in some products.

Cost analysis suggests that the cost price of Chinese manufacturers is significantly lower than that of US manufacturers.

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Please contact us for report pricing.

(1) Table of Contents

Excerpt (1) from the report

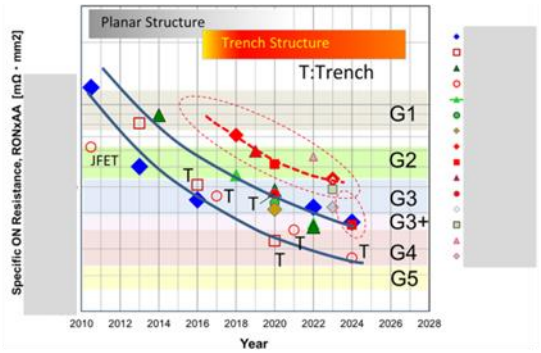
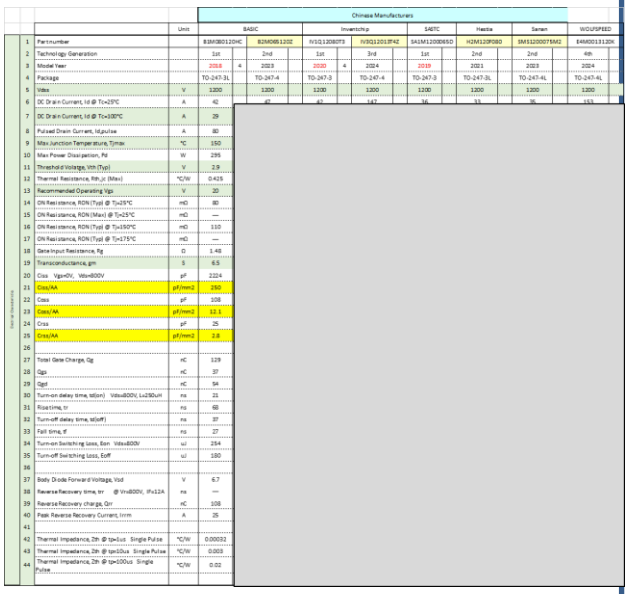


Fig. 1-6-1 対面積当たりON抵抗（RONxA）の指標トレンド

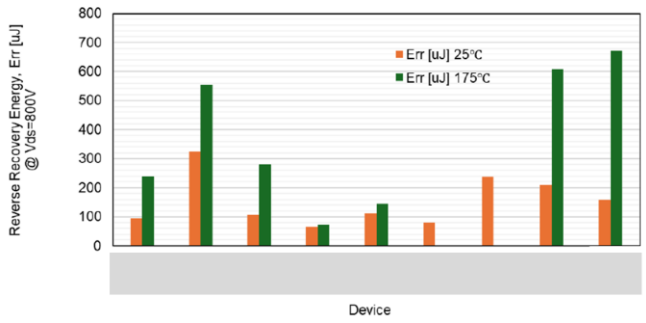
★このグラフは 当社の2015年—2024年で実施した解析データである

1)下の線は、大手 SiC デバイスメーカー ( ) を表している → RONxA が最も低い
2) 中央の線は、マイナーメーカー ( ) を含む傾向である。
3) 赤い破線は、中国メーカーの傾向です → 2023年以前では技術の遅れが明らかとなっていたが、
2023年度以降、 や など一部のメーカーは主要メーカーに追いつきつつある。

3. 電気的特性のベンチマーク



		Unit	Chinese Manufacturers									
			BASIC		Inventchip		SASTC	Hestia	Sanan	WOLFSPEED		
	Part number		B1M080120HC	B2M065120Z	IV1Q12080T3	IV3Q12013T4Z	SA1M1200065D	H2M120F080	SMS1200075M2	E4M0013120K		
	Technology Generation		1st	2nd	1st	3rd	1st	2nd	2nd	4th		
Device Structure	Chip Size, X x Y	mm x mm	3									
	Chip Size, A =X x Y	mm2										
	Transistor Active Area, AA	mm2										
	Chip Edge (Uneffective) width, We	mm										
	FOM 1：単位面積当たりON抵抗, RONxAA	mΩ・mm2										
	FOM 2: RONxQg	Ω・nC										
	MOSFET Total Channel width, W	mm										
	Transistor cell structure											
	Transistor cell array configuration											
	Transistor cell Pitch, P	μm										
	Tox	nm										
	N-Epi thickness	μm										
	Chip Thickness, dsic	μm										



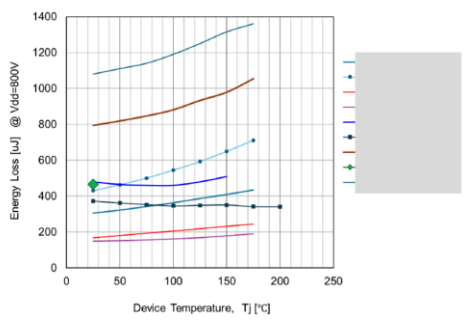
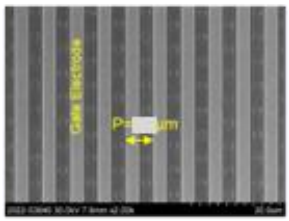
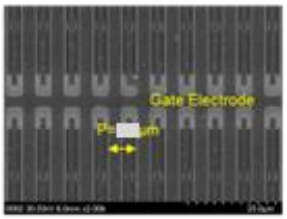
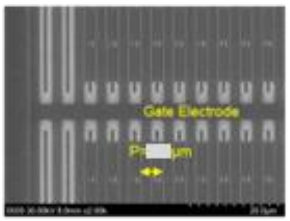
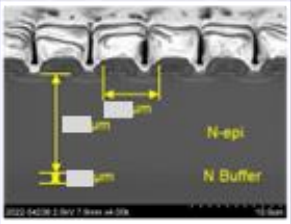
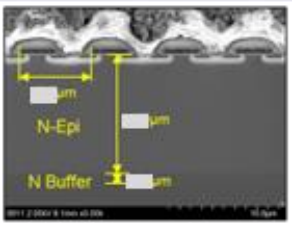
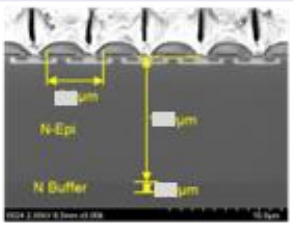


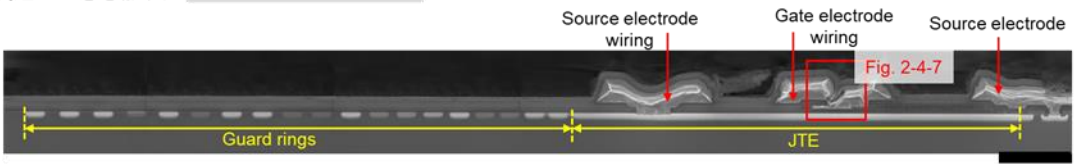
Fig.X-1 1200V, Ron~32-40mΩ SiC MOSFET (a) Reverse recovery energy loss of the body diode (Err @ 25℃, 800V) and (b) total switching energy loss

Excerpt (2) from the report

表2. トランジスタの主な構造的特徴の概要

	BASiC社	Inventchip社	Inventchip社
製品	B2M065120Z	IV2Q12040T4Z	IV3Q12013T4Z
Die image			
Transistor cell Plane view SEM Image			
Transistor cell Cross section SEM Image Epi			

製造上の懸念点(3)（ ）



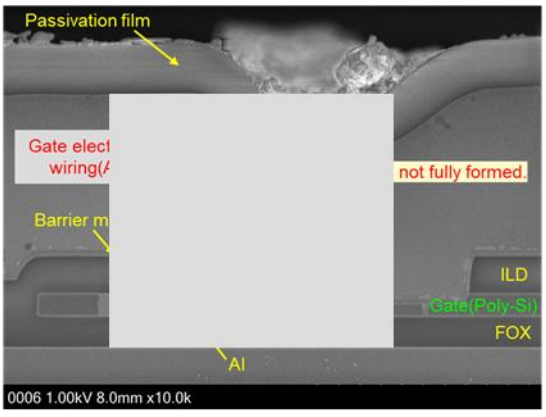


Fig. 2-4-7 外周部 断面SEM像

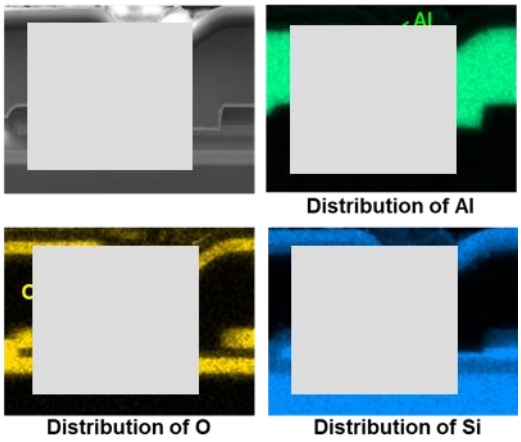


Fig. 2-4-8 SEM-EDXマッピング結果