

## TRENCHSTOP™ IGBT3 Chip

### Features:

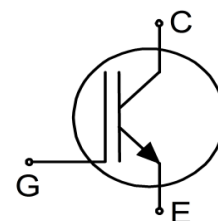
- 650V trench & field stop technology
- Low  $V_{CEsat}$
- Low turn-off losses
- Short tail current
- Positive temperature coefficient
- Easy paralleling

### Recommended for:

- Power modules

### Applications:

- Drives



Chip Type	$V_{CE}$	$I_{Cn}$	Die Size	Package
SIGC54T65R3E	650V	100A	5.97mm x 8.97mm	Sawn on foil

### Mechanical Parameters

Die size	5.97 x 8.97		mm <sup>2</sup>
Emitter pad size	See chip drawing		
Gate pad size	1.615 x 0.817		
Area total	53.55		
Silicon thickness	70		μm
Wafer size	200		mm
Maximum possible chips per wafer	486		
Passivation frontside	Photoimide		
Pad metal	3200nm AlSiCu		
Backside metal	Ni Ag – system To achieve a reliable solder connection it is strongly recommended not to consume the Ni layer completely during production process		
Die bond	Electrically conductive epoxy glue and soft solder		
Wire bond	Al, ≤500μm		
Reject ink dot size	Ø 0.65mm; max. 1.2mm		
Storage environment (<6 months)	for original and sealed MBB bags	Ambient atmosphere air, temperature 17°C – 25°C	
	for open MBB bags	Acc. IEC 62258-3; Section 9.4 Storage Environment.	

## Maximum Ratings

In general, from reliability and lifetime point of view, the lower the operation junction temperature and/or the applied voltage, the greater the expected lifetime of any semiconductor device.

Parameter	Symbol	Value	Unit
Collector-emitter voltage, $T_{vj}=25^{\circ}\text{C}$	$V_{CE}$	650	V
DC collector current, limited by $T_{vj\text{ max}}^1$	$I_C$	-	A
Pulsed collector current, $t_p$ limited by $T_{vj\text{ max}}^2$	$I_{C,puls}$	300	A
Gate-emitter voltage	$V_{GE}$	$\pm 20$	V
Junction temperature	$T_{vj}$	-40 ... +175	$^{\circ}\text{C}$
Operating junction temperature	$T_{vj\text{ op}}$	-40 ... +150	$^{\circ}\text{C}$
Short circuit data <sup>1/2/3</sup> $V_{GE}=15\text{V}$ , $V_{CC}=360\text{V}$ , $T_{vj}=150^{\circ}\text{C}$	$t_{sc}$	6	$\mu\text{s}$

## Static Characteristics (tested on wafer), $T_{vj}=25^{\circ}\text{C}$

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
Collector-emitter breakdown voltage	$V_{(BR)CES}$	$V_{GE}=0\text{V}$ , $I_C=4\text{mA}$	650	-	-	V
Collector-emitter saturation voltage	$V_{CEsat}$	$V_{GE}=15\text{V}$ , $I_C=100\text{A}$	0.93	1.45	1.77	
Gate-emitter threshold voltage	$V_{GE(th)}$	$I_C=1.6\text{mA}$ , $V_{GE}=V_{CE}$	5.1	5.8	6.4	
Zero gate voltage collector current	$I_{CES}$	$V_{CE}=650\text{V}$ , $V_{GE}=0\text{V}$	-	-	5.4	$\mu\text{A}$
Gate-emitter leakage current	$I_{GES}$	$V_{CE}=0\text{V}$ , $V_{GE}=20\text{V}$	-	-	600	nA
Integrated gate resistor	$r_G$		-	2	-	$\Omega$

## Electrical Characteristics <sup>2</sup>

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
Collector-emitter saturation voltage	$V_{CEsat}$	$V_{GE}=15\text{V}$ , $I_C=100\text{A}$ $T_{vj}=150^{\circ}\text{C}$	-	1.7	-	V
Input capacitance	$C_{ies}$	$V_{CE}=25\text{V}$ , $V_{GE}=0\text{V}$ , $f=1\text{MHz}$ $T_{vj}=25^{\circ}\text{C}$	-	6160	-	pF
Reverse transfer capacitance	$C_{res}$		-	183	-	

<sup>1</sup> Depending on thermal properties of assembly.

<sup>2</sup> Not subject to production test - verified by design/characterization.

<sup>3</sup> Allowed number of short circuits: <1000; time between short circuits: >1s.