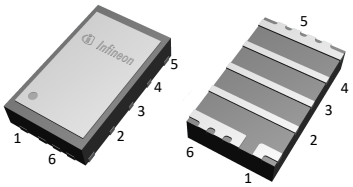
CoolGaN

PG-TSON-6

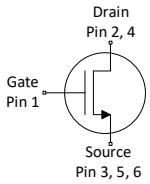
CoolGaN™ Transistor 200 V G3

- Enhancement mode power transistor - normally OFF switch
- No reverse recovery charge
- Reverse conduction capability
- Low gate charge, low output charge
- Qualified according to JEDEC for target applications



Potential applications

- Telecom AC/DC Synchronous Rectifiers
- Telecom DC/DC Synchronous Rectifiers
- Robotics
- Battery powered tool
- e-Mobility, UAVs
- Wireless charging
- ClassD Audio



Top side is exposed silicon substrate, internally connected to source terminal. Not recommended to use as an electrical connection.

Product validation

Fully qualified according to JEDEC for Industrial Applications

Table 1 Key Performance Parameters

Parameter	Value	Unit
V_{DS}	200	V
$R_{DS(on),max}$	9	mΩ
I_D	43	A
Q_{oss}	50	nC
Q_G	8.2	nC
Q_{rr}	0	nC

GaN Hal Pb RoHS

Type/Ordering Code	Package	Marking	Related Links
IGC090S20S1	PG-TSON-6	90SB1	-

Table of Contents

1 Maximum ratings

at T_j = 25 °C, unless otherwise specified. Stresses beyond max ratings may cause permanent damage to the device. For optimum lifetime and reliability, Infineon recommends operating conditions that do not continuously exceed 80 % of the maximum ratings stated (unless otherwise explicitly stated). For further information, contact your local Infineon sales office.

Table 2 Maximum ratings

Parameter	Symbol	Values			Unit	Note/ Test Condition
		Min.	Typ.	Max.		
Continuous drain-source voltage	V_{DS}	-	-	200	V	V_{GS}=0 V
Pulsed drain-source voltage [1]	$V_{DS,\ pulse}$	-	-	240	V	V_{GS}=0 V, 1 h total time
Continuous drain current	I_D	-	-	45 12	A	V_{GS}=5 V, T_C=25 °C V_{GS}=5 V, T_A=25 °C, R_{THJA}=38 °C/W [2]
Pulsed drain current	$I_{D,pulse}$	-	-	280 135	A	T_j=25 °C [3] T_j=150 °C
Pulsed gate-source voltage [1]	V_{GS}	-6.5	-	6.5	V	100 h total time
Power dissipation	P_{tot}	-	-	45 3.3	W	T_C=25 °C T_A=25 °C, R_{THJA}=38 °C/W
Storage temperature	T_{stg}	-55	-	150	°C	-

1) Provided as measure of robustness under abnormal operating conditions and not recommended for normal operation

2) Device on 4-layer FR4 PCB, vertical in still air.

3) Pulse current limited by transfer characteristic.

2 Recommended operating conditions

Table 3 Recommended operating conditions

Parameter	Symbol	Values			Unit	Note/ Test Condition
		Min.	Typ.	Max.		
Gate-source voltage	V_{GS}	-4	5	5.5	V	-
Operating temperature	T_j	-40	-	150	°C	-

3 Thermal characteristics

Table 4 Thermal characteristics

Parameter	Symbol	Values			Unit	Note/ Test Condition
		Min.	Typ.	Max.		
Thermal resistance, junction - case, top	$R_{thJC(top)}$	-	0.5	0.6	°C/W	-
Thermal resistance, junction - case, bottom	$R_{thJC(bottom)}$	-	1.9	2.8	°C/W	-
Thermal resistance, junction - Ambient on 1 layer PCB	R_{thJA}	-	60	70	°C/W	1s0p
Thermal resistance, junction - Ambient on 4 layer PCB	R_{thJA}	-	38	45	°C/W	2s2p with vias

4 Electrical characteristics

at T_j=25 °C, unless otherwise specified

Table 5 Static characteristics

Parameter	Symbol	Values			Unit	Note/ Test Condition
		Min.	Typ.	Max.		
Gate threshold voltage [4]	$V_{GS(th)}$	1.2	2	2.9	V	V_{DS}=V_{GS}, I_D=5 mA, measured within 10 ms after a pre-bias at V_{GS}=5 V, V_{DS} =0 V for at least 5 ms
Drain-source leakage current	I_{DSS}	-	0.2 20	-	µA	V_{DS}=160 V, V_{GS}=0 V, T_j=25 °C V_{DS}=160 V, V_{GS}=0 V, T_j=125 °C
Gate-source leakage current	I_{GSS}	-	23 0.01 130 15	-	µA	V_{GS}=5 V, T_j=25 °C V_{GS}=-4 V, T_j=25 °C V_{GS}=5 V, T_j=125 °C V_{GS}=-4 V, T_j=125 °C
Drain-source on-state resistance [5]	$R_{DS(on)}$	-	6.7	9	mΩ	V_{GS}=5 V, I_D=10 A
Gate resistance [6]	R_G	-	0.5	-	Ω	-

[4] When tested without the specified V_{GS} pre-bias, $V_{GS(th)}$ will typically be 0.7 V lower than the threshold voltage measured under the specified conditions.

[5] $R_{DS(ON)}$ is measured without prior drain bias or switching stress.

[6] Defined by design. Not subject to production test.

Table 6 Dynamic characteristics [7]

Parameter	Symbol	Values			Unit	Note/ Test Condition
		Min.	Typ.	Max.		
Input capacitance	C_{iss}	-	700	910	pF	V_{GS}=0 V, V_{DS}=100 V, f=1 MHz
Output capacitance	C_{oss}	-	310	400	pF	V_{GS}=0 V, V_{DS}=100 V, f=1 MHz
Reverse transfer capacitance	C_{rss}	-	3.7	4.8	pF	V_{GS}=0 V, V_{DS}=100 V, f=1 MHz

[7] Defined by design. Not subject to production test.

Table 7 Gate charge characteristics [8)]

Parameter	Symbol	Values			Unit	Note/ Test Condition
		Min.	Typ.	Max.		
Gate to source charge	Q_{gs}	-	tbd	-	nC	V_{DD}=100 V, I_D=10 A, V_{GS}=0 to 5 V
Gate charge at threshold	$Q_{g(th)}$	-	tbd	-	nC	V_{DD}=100 V, I_D=10 A, V_{GS}=0 to 5 V
Gate to drain charge [9)]	Q_{gd}	-	tbd	-	nC	V_{DD}=100 V, I_D=10 A, V_{GS}=0 to 5 V
Switching charge	Q_{sw}	-	tbd	-	nC	V_{DD}=100 V, I_D=10 A, V_{GS}=0 to 5 V
Gate charge total [9)]	Q_g	-	8.2	11	nC	V_{DD}=100 V, I_D=10 A, V_{GS}=0 to 5 V
Gate plateau voltage	$V_{plateau}$	-	2.6	-	V	V_{DD}=100 V, I_D=10 A, V_{GS}=0 to 5 V
Output charge [9)]	Q_{oss}	-	50	65	nC	V_{DD}=100 V, I_D=10 A, V_{GS}=0 to 5 V

8) See "Gate charge waveforms" for parameter definition

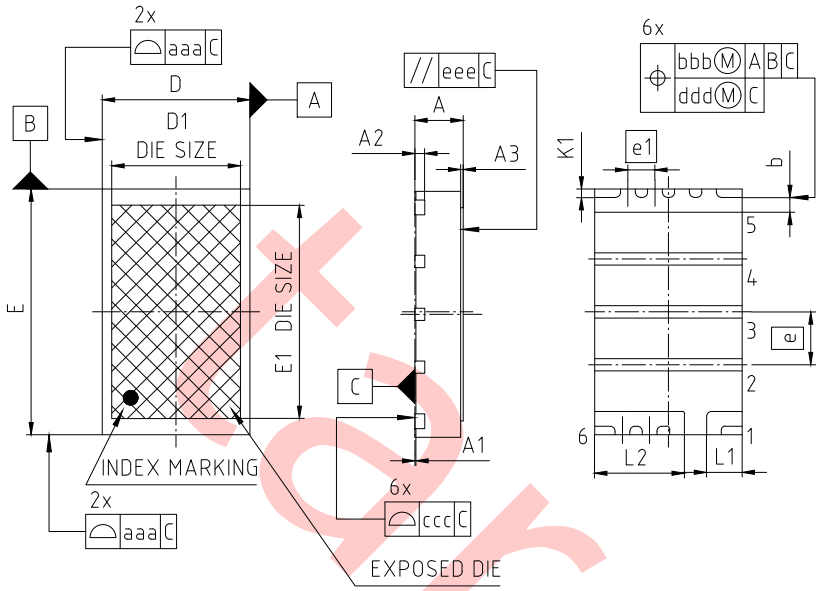
9) Defined by design. Not subject to production test.

Table 8 Reverse operation

Parameter	Symbol	Values			Unit	Note/ Test Condition
		Min.	Typ.	Max.		
Reverse continuous current	I_S	-	-	tbd	A	T_C=25 °C
Pulsed current, reverse	$I_{S,pulse}$	-	-	tbd	A	T_C=25 °C
Source-Drain reverse voltage	V_{SD}	-	2.4	3.4	V	V_{GS}=0 V, $I_{S,pulse}$=10 A, T_j=25 °C
Reverse recovery charge [10)]	Q_{rr}	-	0	-	nC	V_R=100 V, $I_{S,pulse}$=10 A, $di_{S,pulse}/dt$ =100 A/µs

10) Defined by design. Not subject to production test.

5 Package Outlines



PACKAGE - GROUP NUMBER:	PG-TSON-6-U01	
DIMENSIONS	MILLIMETERS	
	MIN.	MAX.
A	-	1.032
A1	-	0.05
A2	0.20	
A3	-	0.05
b	0.18	0.30
D	2.90	3.10
D1	2.616	
E	4.90	5.10
E1	4.336	
e	1.075	
e1	0.55	
K1	0.125	0.225
L1	0.625	0.825
L2	1.725	1.925
aaa	0.05	
bbb	0.10	
ccc	0.08	
ddd	0.05	
eee	0.10	

Figure 1 Outline PG-TSON-6, dimensions in mm

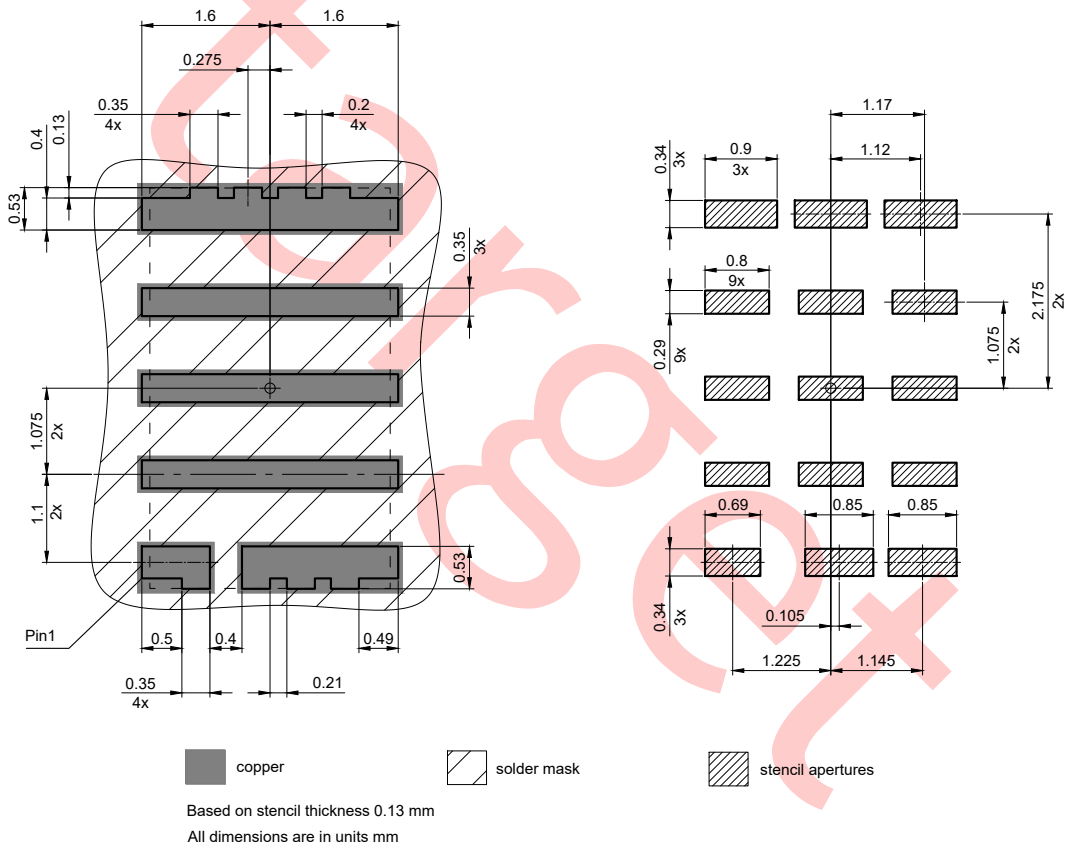


Figure 2 Outline PG-TSON-6, dimensions in mm

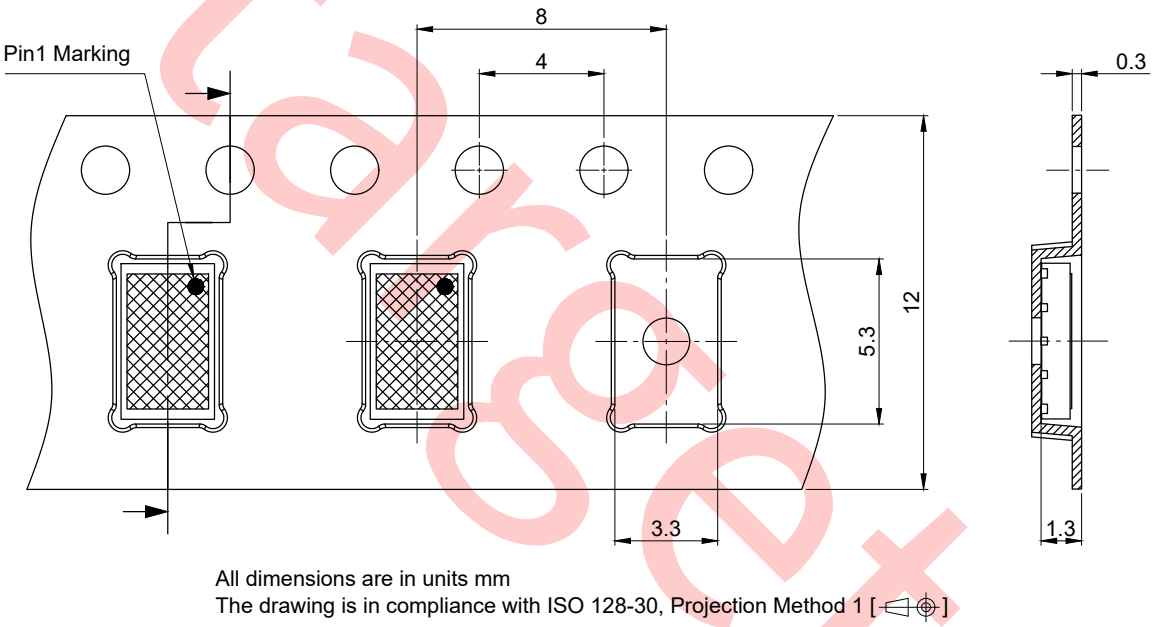


Figure 3 Outline PG-TSON-6, dimensions in mm

Revision History

IGC090S20S1

Revision 2024-07-04, Rev. 0.1

Previous Revision

Revision	Date	Subjects (major changes since last revision)
0.1	2024-07-04	Release of target

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