

CoolGaN™ Transistor 60 V G3

Features

- 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 DC/DC
- Charger/Adapter
- Battery powered tools
- e-Mobility, UAVs

Product validation

Fully qualified according to JEDEC for Industrial Applications

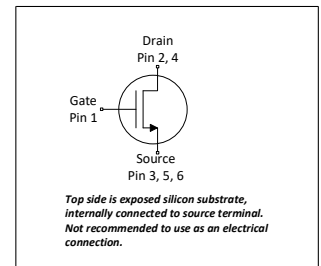
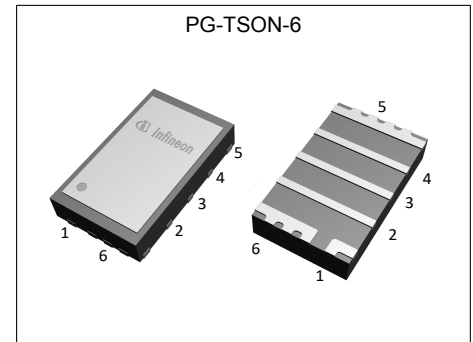


Table 1 Key Performance Parameters

Parameter	Value	Unit
V_{DS}	60	V
$R_{DS(on),max}$	1.9	m Ω
I_D	100	A
Q_{oss}	32	nC
Q_G	13	nC
Q_{rr}	0	nC



RoHS



Type / Ordering Code	Package	Marking	Related Links
IGC019S06S1	PG-TSON-6	19SC1	-

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Target

1 Maximum ratings

Table 2 Maximum ratings

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Continuous drain-source voltage	V_{DS}	-	-	60	V	$V_{GS}=0$ V
Pulsed drain-source voltage ¹⁾	$V_{DS, pulse}$	-	-	72	V	$V_{GS}=0$ V, 1 h total time
Continuous drain current	I_D	-	-	100 27	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 ³⁾	$I_{D, pulse}$	-	-	t.b.d. t.b.d.	A	$T_i=25$ °C $T_j=150$ °C
Gate-source voltage	V_{GS}	-4 -6.5	5 -	5.5 6.5	V	Continuous Pulsed
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	-
Operating temperature	T_j	-40	-	150	°C	-

2 Thermal characteristics

Table 3 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	-
Device on 1 layer PCB	R_{thJA}	-	60	70	°C/W	1s0p
Device on 4 layer PCB	R_{thJA}	-	38	-	°C/W	2s2p with vias

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. See diagram 6.

3 Electrical characteristics

at $T_j=25\text{ °C}$, unless otherwise specified

Table 4 Static characteristics

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Gate threshold voltage ¹⁾	$V_{GS(th)}$	1.2	2.0	2.9	V	$V_{DS}=V_{GS}$, $I_D=14\text{ mA}$, measured within 10 ms after a pre-bias at $V_{GS}=5\text{ V}$, $V_{DS}=0\text{ V}$ for at least 5 ms
Drain-source leakage current	I_{DSS}	-	0.2 20	-	μA	$V_{DS}=60\text{ V}$, $V_{GS}=0\text{ V}$, $T_j=25\text{ °C}$ $V_{DS}=60\text{ V}$, $V_{GS}=0\text{ V}$, $T_j=125\text{ °C}$
Gate-source leakage current	I_{GSS}	-	23 0.01 130 15	-	μA	$V_{GS}=5\text{ V}$, $T_j=25\text{ °C}$ $V_{GS}=-4\text{ V}$, $T_j=25\text{ °C}$ $V_{GS}=5\text{ V}$, $T_j=125\text{ °C}$ $V_{GS}=-4\text{ V}$, $T_j=125\text{ °C}$
Drain-source on-state resistance ²⁾	$R_{DS(on)}$	-	1.4	1.9	$\text{m}\Omega$	$V_{GS}=5\text{ V}$, $I_D=35\text{ A}$
Gate resistance ³⁾	R_G	-	0.5	-	Ω	-

Table 5 Dynamic characteristics³⁾

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Input capacitance	C_{iss}	-	1200	-	pF	$V_{GS}=0\text{ V}$, $V_{DS}=30\text{ V}$, $f=1\text{ MHz}$
Output capacitance	C_{oss}	-	640	-	pF	$V_{GS}=0\text{ V}$, $V_{DS}=30\text{ V}$, $f=1\text{ MHz}$
Reverse transfer capacitance	C_{rss}	-	19.0	-	pF	$V_{GS}=0\text{ V}$, $V_{DS}=30\text{ V}$, $f=1\text{ MHz}$

Table 6 Gate charge characteristics⁴⁾

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Gate to source charge	Q_{gs}	-	t.b.d.	-	nC	$V_{DD}=30\text{ V}$, $I_D=35\text{ A}$, $V_{GS}=0\text{ to }5\text{ V}$
Gate charge at threshold	$Q_{g(th)}$	-	t.b.d.	-	nC	$V_{DD}=30\text{ V}$, $I_D=35\text{ A}$, $V_{GS}=0\text{ to }5\text{ V}$
Gate to drain charge ³⁾	Q_{gd}	-	3.0	-	nC	$V_{DD}=30\text{ V}$, $I_D=35\text{ A}$, $V_{GS}=0\text{ to }5\text{ V}$
Switching charge	Q_{sw}	-	t.b.d.	-	nC	$V_{DD}=30\text{ V}$, $I_D=35\text{ A}$, $V_{GS}=0\text{ to }5\text{ V}$
Gate charge total ³⁾	Q_g	-	13.0	-	nC	$V_{DD}=30\text{ V}$, $I_D=35\text{ A}$, $V_{GS}=0\text{ to }5\text{ V}$
Gate plateau voltage	$V_{plateau}$	-	2.6	-	V	$V_{DD}=30\text{ V}$, $I_D=35\text{ A}$, $V_{GS}=0\text{ to }5\text{ V}$
Output charge ³⁾	Q_{oss}	-	32	-	nC	$V_{DD}=30\text{ V}$, $V_{GS}=0\text{ V}$

¹⁾ 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.

²⁾ $R_{DS(ON)}$ is measured without prior drain bias or switching stress. An upcoming application note will provide detailed information about dynamic $R_{DS(ON)}$ and recommendations for *in situ* measurement in target application conditions.

³⁾ Defined by design. Not subject to production test.

⁴⁾ See "Gate charge waveforms" for parameter definition

Table 7 Reverse operation

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Reverse continuous current	I_S	-	-	t.b.d.	A	$T_C=25\text{ °C}$
Pulsed current, reverse	$I_{S,pulse}$	-	-	t.b.d.	A	$T_C=25\text{ °C}$
Source-Drain reverse voltage	V_{SD}	-	2.4	3.4	V	$V_{GS}=0\text{ V}$, $I_{S,pulse}=35\text{ A}$, $T_j=25\text{ °C}$
Reverse recovery charge ¹⁾	Q_{rr}	-	0	-	nC	$V_R=30\text{ V}$, $I_{S,pulse}=35\text{ A}$, $di_{S,pulse}/dt=100\text{ A}/\mu\text{s}$

Draft

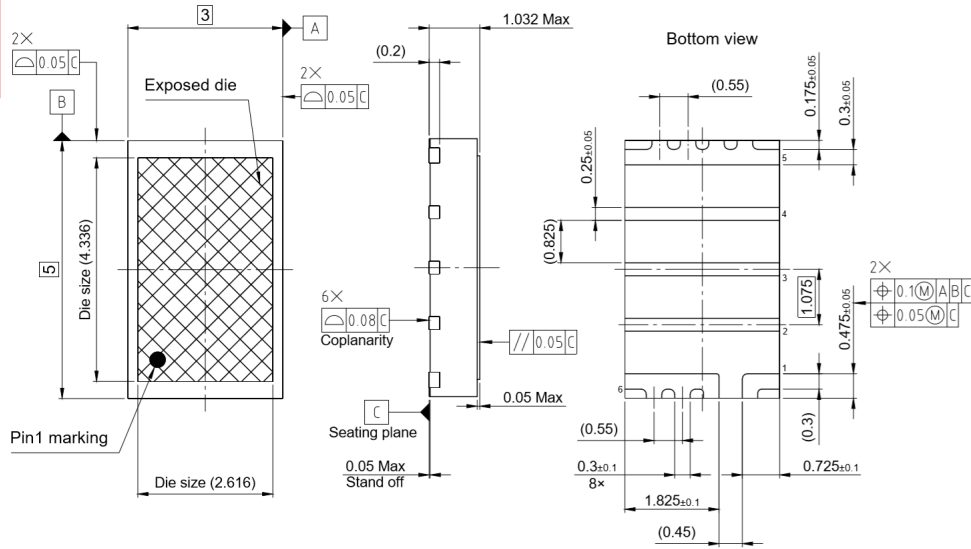
¹⁾ Defined by design. Not subject to production test.

4 Electrical characteristics diagrams

Target

5 Package Outlines

PG-TSON-6-2



All dimensions are in units mm
The drawing is in compliance with ISO 128-30, Projection Method 1 []

Z8B00184886
02.06.2020

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

Revision History

IGC019S06S1

Revision: 2024-05-20, Rev. 0.1

Previous Revision

Revision	Date	Subjects (major changes since last revision)
0.1	-	Release of target version

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