

CoolGaN™ Transistor 100 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

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

Product validation

Fully qualified according to JEDEC for Industrial Applications

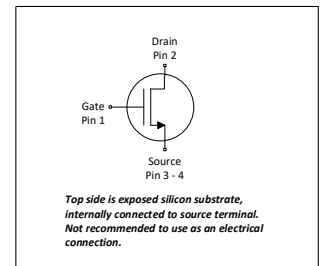
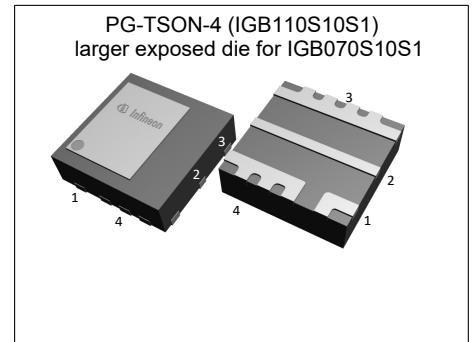


Table 1 Key Performance Parameters

Parameter	Value	Unit
V_{DS}	100	V
$R_{DS(on),max}$	7	mΩ
I_D	33	A
Q_{oss}	19	nC
Q_G	4.7	nC
Q_{rr}	0	nC



RoHS



Type / Ordering Code	Package	Marking	Related Links
IGB070S10S1	PG-TSON-4	AA1	-

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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}	-	-	100	V	$V_{GS}=0$ V
Pulsed drain-source voltage ¹⁾	$V_{DS, pulse}$	-	-	120	V	$V_{GS}=0$ V, 1 h total time
Continuous drain current	I_D	-	-	33 13	A	$V_{GS}=5$ V, $T_C=25$ °C $V_{GS}=5$ V, $T_A=25$ °C, $R_{THJA}=46$ °C/W ²⁾
Pulsed drain current ³⁾	$I_{D, pulse}$	-	-	t.b.d. t.b.d.	A	$T_j=25$ °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}	-	-	18 2.7	W	$T_C=25$ °C $T_A=25$ °C, $R_{THJA}=46$ °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	$R_{thJC(top)}$	-	1.1	1.4	°C/W	-
Thermal resistance, junction - case, bottom	$R_{thJC(bottom)}$	-	3.7	5.6	°C/W	-
Device on 1 layer PCB	R_{thJA}	-	68	77	°C/W	1s0p
Device on 4 layer PCB	R_{thJA}	-	46	-	°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	$V_{DS}=V_{GS}$, $I_D=4.5\text{ mA}$, 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}	-	0.15 30	15 380	μA	$V_{DS}=100\text{ V}$, $V_{GS}=0\text{ V}$, $T_j=25\text{ °C}$ $V_{DS}=100\text{ V}$, $V_{GS}=0\text{ V}$, $T_j=125\text{ °C}$
Gate-source leakage current	I_{GSS}	-	11 0.01 82 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⁾	$R_{DS(on)}$	-	5.3	7	$\text{m}\Omega$	$V_{GS}=5\text{ V}$, $I_D=13\text{ A}$
Gate resistance ³⁾	R_G	-	1.0	-	Ω	-

Table 5 Dynamic characteristics³⁾

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Input capacitance	C_{iss}	-	430	-	pF	$V_{GS}=0\text{ V}$, $V_{DS}=50\text{ V}$, $f=1\text{ MHz}$
Output capacitance	C_{oss}	-	240	-	pF	$V_{GS}=0\text{ V}$, $V_{DS}=50\text{ V}$, $f=1\text{ MHz}$
Reverse transfer capacitance	C_{rss}	-	3.1	-	pF	$V_{GS}=0\text{ V}$, $V_{DS}=50\text{ V}$, $f=1\text{ MHz}$

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	$V_{DD}=50\text{ V}$, $I_D=13\text{ A}$, $V_{GS}=0\text{ to }5\text{ V}$
Gate charge at threshold	$Q_{g(th)}$	-	t.b.d.	-	nC	$V_{DD}=50\text{ V}$, $I_D=13\text{ A}$, $V_{GS}=0\text{ to }5\text{ V}$
Gate to drain charge ³⁾	Q_{gd}	-	1.3	-	nC	$V_{DD}=50\text{ V}$, $I_D=13\text{ A}$, $V_{GS}=0\text{ to }5\text{ V}$
Switching charge	Q_{sw}	-	t.b.d.	-	nC	$V_{DD}=50\text{ V}$, $I_D=13\text{ A}$, $V_{GS}=0\text{ to }5\text{ V}$
Gate charge total ³⁾	Q_g	-	4.7	-	nC	$V_{DD}=50\text{ V}$, $I_D=13\text{ A}$, $V_{GS}=0\text{ to }5\text{ V}$
Gate plateau voltage	$V_{plateau}$	-	2.7	-	V	$V_{DD}=50\text{ V}$, $I_D=13\text{ A}$, $V_{GS}=0\text{ to }5\text{ V}$
Output charge ³⁾	Q_{oss}	-	19	-	nC	$V_{DD}=50\text{ V}$, $V_{GS}=0\text{ V}$

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	-	-	5	A	$T_C=25\text{ °C}$
Pulsed current, reverse	$I_{S,pulse}$	-	-	50	A	$T_C=25\text{ °C}$
Source-Drain reverse voltage	V_{SD}	-	2.5	3.4	V	$V_{GS}=0\text{ V}, I_{S,pulse}=13\text{ A}, T_j=25\text{ °C}$
Reverse recovery charge ¹⁾	Q_{rr}	-	0	-	nC	$V_R=50\text{ V}, I_{S,pulse}=13\text{ A}, di_{S,pulse}/dt=100\text{ A}/\mu\text{s}$

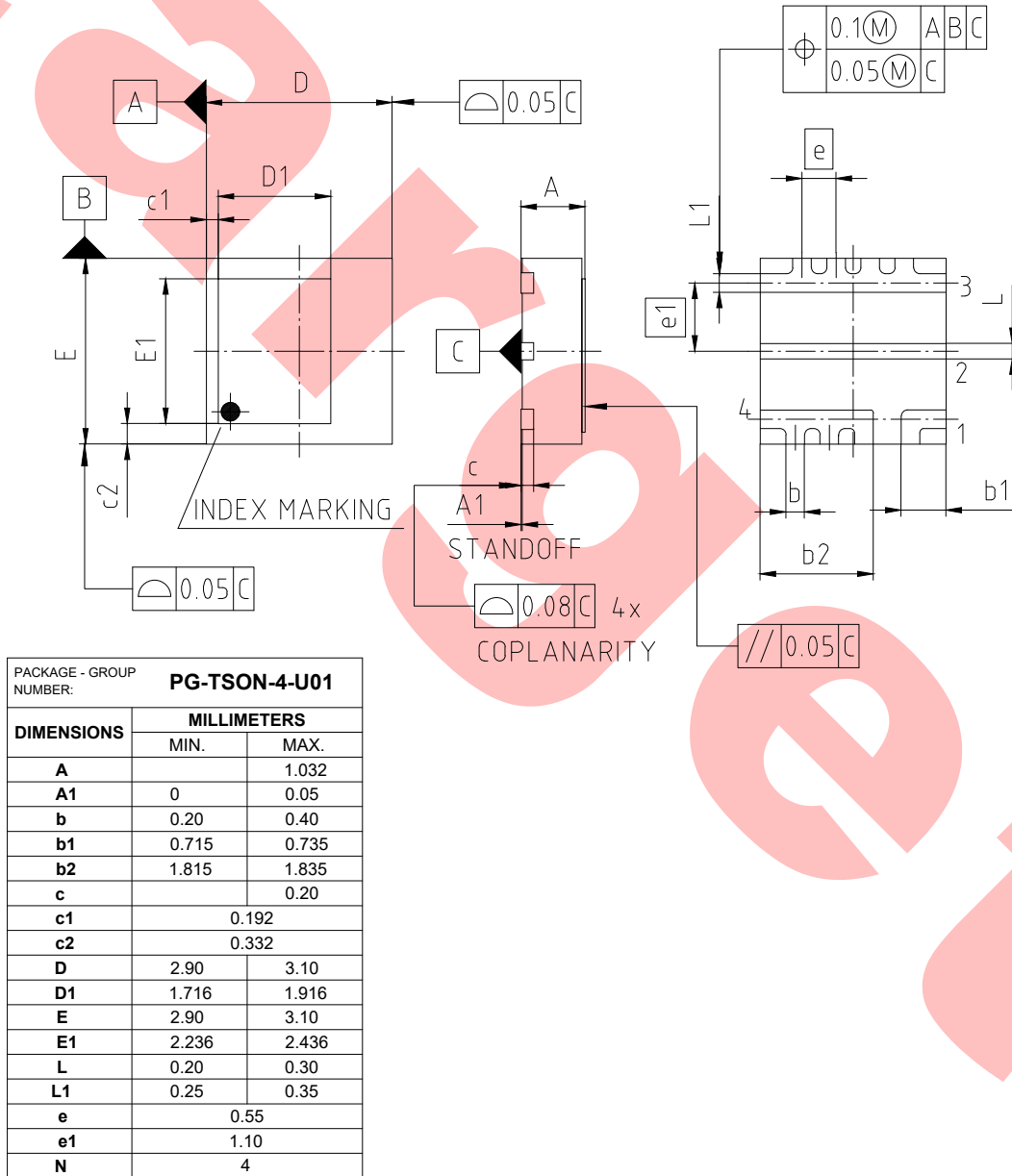
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¹⁾ Defined by design. Not subject to production test.

4 Electrical characteristics diagrams

Target

5 Package Outlines



NOTE:
DIMENSIONS DO NOT INCLUDE MOLD FLASH, PROTRUSION OR GATE BURRS

Figure 1 Outline PG-TSON-4, dimensions in mm
Exposed die shown for IGB110S10S1, for IGB070S10S1 D1 changes to 2.65 mm typ.

Revision History

IGB070S10S1

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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