

## CoolGaN™

PG-VSON-4

### CoolGaN™ Transistor 100 V G3

#### Features

- Ultra fast switching and high efficiency
- Space saving and highly robust package
- No reverse recovery charge
- Ultra low gate charge and output charge
- Moisture rating MSL1
- Industrial grade 3x3 package

#### Potential applications

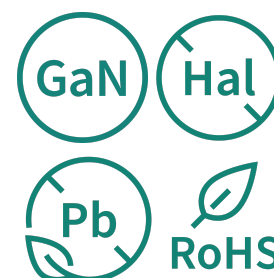
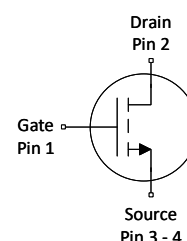
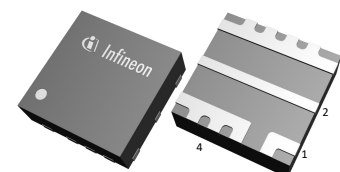
- Telecom & Datacenter 48V IBC
- Sync Rectification for AC-DC and DC-DC converters
- Robotics and drones
- Battery powered tools
- 48V servo drive
- e-Mobility, UAVs
- Class D Audio
- Solar & Energy storage systems
- Point of Load Converters

#### Product validation

Qualified for industrial applications according to the relevant tests of JEDEC JESD47, JESD22 and J-STD-020.

**Table 1** Key performance parameters

Parameter	Value	Unit
$V_{DS}$	100	V
$R_{DS(on)}$	9.4	mΩ
$I_D$	23	A
$Q_{oss}$	14	nC
$Q_G$	3.4	nC
$Q_{rr}$	0	nC



Part number	Package	Marking	Related links
IGB110S101	PG-VSON-4	BA1	see Appendix A

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## 1 Maximum ratings

at  $T_j = 25\text{ °C}$ , 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	$V_{DS}$	-	-	100	V	$V_{GS}=0\text{ V}$
Pulsed drain-source voltage <sup>1)</sup>	$V_{DS, pulse}$	-	-	120	V	$V_{GS}=0\text{ V}$ , 1 h total time
Continuous drain current	$I_D$	-	-	23	A	$V_{GS}=5\text{ V}$ , $T_C=25\text{ °C}$
				9.0		$V_{GS}=5\text{ V}$ , $T_A=25\text{ °C}$ , $R_{thJA}=50\text{ °C/W}$ <sup>2)</sup>
Pulsed drain current <sup>3)</sup>	$I_{D, pulse}$	-	-	210	A	$T_j=25\text{ °C}$
				97		$T_j=150\text{ °C}$
Pulsed gate-source voltage <sup>1)</sup>	$V_{GS}$	-6.5	-	6.5	V	Pulsed 100 h total time
Power dissipation	$P_{tot}$	-	-	15	W	$T_C=25\text{ °C}$
				2.5		$T_A=25\text{ °C}$ , $R_{thJA}=50\text{ °C/W}$ <sup>2)</sup>
Storage temperature	$T_{stg}$	-55	-	150	°C	-
Junction temperature	$T_j$	-40				

<sup>1)</sup> Provided as measure of robustness under abnormal operating conditions and not recommended for normal operation.

<sup>2)</sup> Device on 4-layer FR4 PCB, vertical in still air.

<sup>3)</sup> 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	$V_{GS}$	-4.0	5.0	5.5	V	-

### 3 Thermal characteristics

**Table 4 Thermal characteristics**

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Thermal resistance, junction - case, top	$R_{thJC}$	-	22	26	°C/W	-
Thermal resistance, junction - case, bottom			5.6	8.1		
Thermal resistance, junction - ambient 1s0p	$R_{thJA}$	-	70	-	°C/W	On 1 layer PCB, vertical in still air.
Thermal resistance, junction - ambient 2s2p	$R_{thJA}$	-	50	-	°C/W	With vias on 4 layer PCB, vertical in still air.

## 4 Electrical Characteristics

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

**Table 5 Static characteristics**

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Gate threshold voltage	$V_{GS(th)}$	1.2	2.0	2.9	V	$V_{DS}=V_{GS}$ , $I_D=3.0\text{ mA}$
Drain-source leakage current	$I_{DSS}$	-	0.1	0.5	$\mu\text{A}$	$V_{DS}=100\text{ V}$ , $V_{GS}=0\text{ V}$ , $T_j=25\text{ °C}$
			2.0	20		$V_{DS}=100\text{ V}$ , $V_{GS}=0\text{ V}$ , $T_j=125\text{ °C}$
Gate-source leakage current	$I_{GSS}$	-	5.0	80	$\mu\text{A}$	$V_{GS}=5\text{ V}$ , $T_j=25\text{ °C}$
			0.003	0.1		$V_{GS}=-4\text{ V}$ , $T_j=25\text{ °C}$
			40	370		$V_{GS}=5\text{ V}$ , $T_j=125\text{ °C}$
			0.003	0.1		$V_{GS}=-4\text{ V}$ , $T_j=125\text{ °C}$
Drain-source on-state resistance	$R_{DS(on)}$	-	9.4	11	m $\Omega$	$V_{GS}=5\text{ V}$ , $I_D=10\text{ A}$
Gate resistance <sup>4)</sup>	$R_G$	-	0.5	-	$\Omega$	-

<sup>4)</sup> Defined by design. Not subject to production test.

**Table 6 Capacitance characteristics <sup>5)</sup>**

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Input capacitance	$C_{iss}$	-	300	340	pF	$V_{GS}=0\text{ V}$ , $V_{DS}=50\text{ V}$ , $f=1\text{ MHz}$
Output capacitance	$C_{oss}$		140	150		
Reverse transfer capacitance	$C_{rss}$		2.3	3.0		

<sup>5)</sup> Defined by design. Not subject to production test.

**Table 7 Gate charge characteristics**

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Gate to source charge	$Q_{gs}$	-	1.0	-	nC	$V_{DS}=50\text{ V}$ , $I_D=10\text{ A}$ , $V_{GS}=0\text{ to }5\text{ V}$
Gate charge at threshold	$Q_{g(th)}$		0.7	-	nC	
Gate to drain charge <sup>6)</sup>	$Q_{gd}$		0.9	-	nC	
Switching charge	$Q_{sw}$		1.2	-	nC	
Gate charge total <sup>6)</sup>	$Q_g$		3.4	4.4	nC	
Gate plateau voltage	$V_{plateau}$		2.8	-	V	
Output charge <sup>6)</sup>	$Q_{oss}$	-	14	15	nC	$V_{DS}=50\text{ V}$ , $V_{GS}=0\text{ V}$

<sup>6)</sup> 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	$I_S$	-	-	5.0	A	$T_C=25\text{ °C}$
Pulsed current, reverse	$I_{S,pulse}$			92		
Source-Drain reverse voltage	$V_{SD}$	-	2.6	3.4	V	$V_{GS}=0\text{ V}, I_{S,pulse}=10\text{ A}, T_j=25\text{ °C}$
			2.2	-		$V_{GS}=0\text{ V}, I_{S,pulse}=0.5\text{ A}, T_j=25\text{ °C}$
Reverse recovery charge <sup>7)</sup>	$Q_{rr}$	-	0	-	nC	$V_R=50\text{ V}, I_{S,pulse}=10\text{ A}, di_{S,pulse}/dt=100\text{ A}/\mu\text{s}$

<sup>7)</sup> Defined by design. Not subject to production test.

## 5 Electrical characteristics diagrams

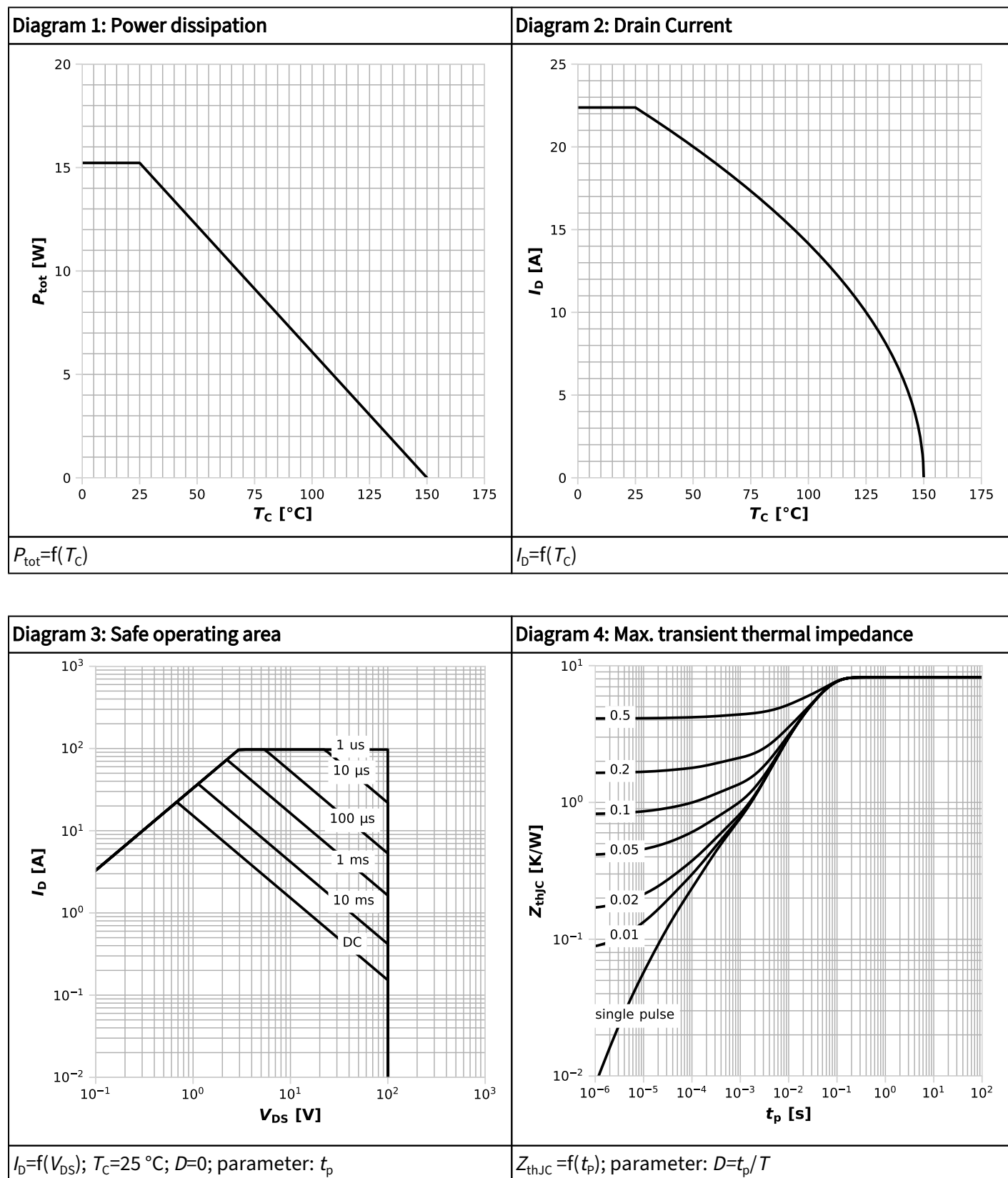
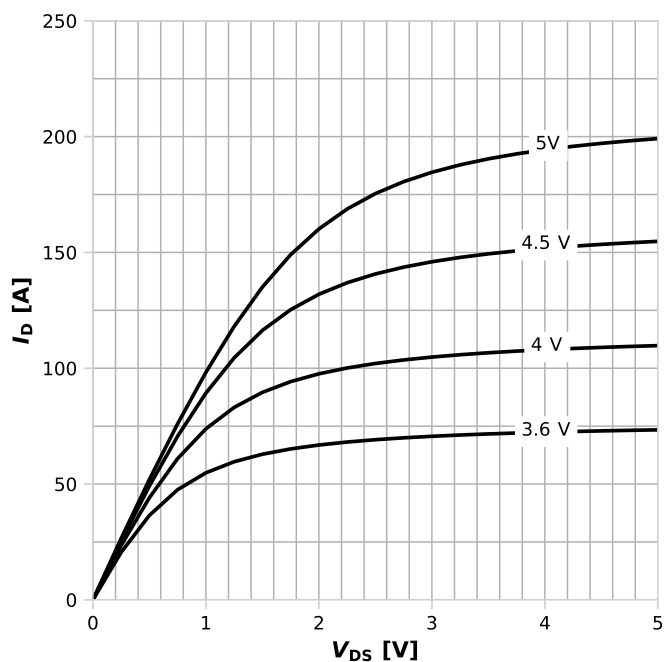


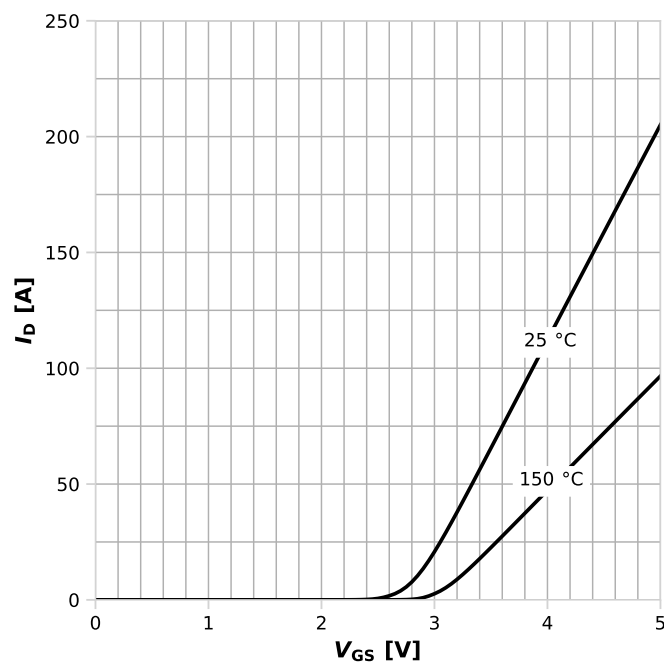


Diagram 5: Typ. output characteristics



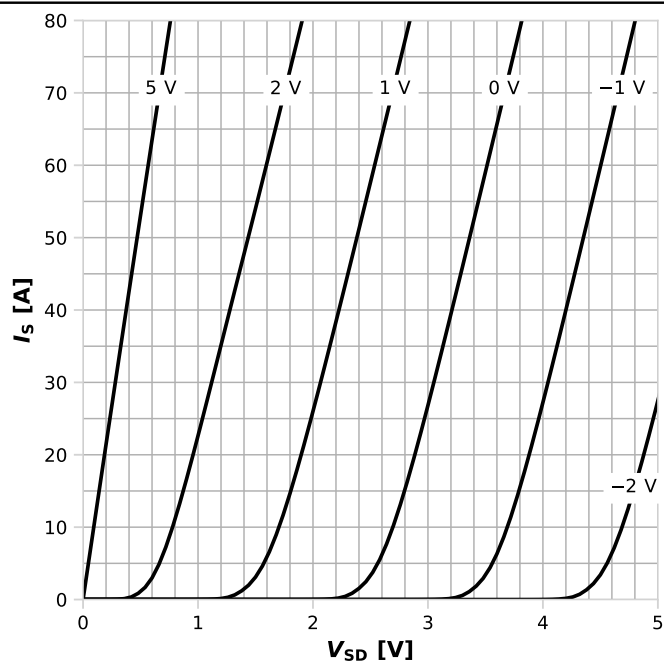
$I_D = f(V_{DS})$ ;  $T_j = 25^\circ\text{C}$ ; parameter:  $V_{GS}$

Diagram 6: Typ. transfer characteristics



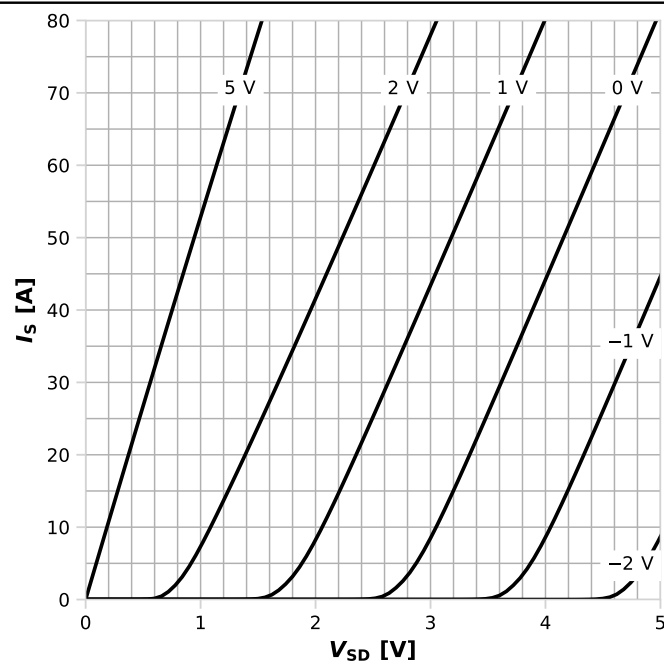
$I_D = f(V_{GS})$ ;  $|V_{DS}| > 2|I_D|R_{DS(on)max}$ ; parameter:  $T_j$

Diagram 7: Typ. channel reverse characteristics



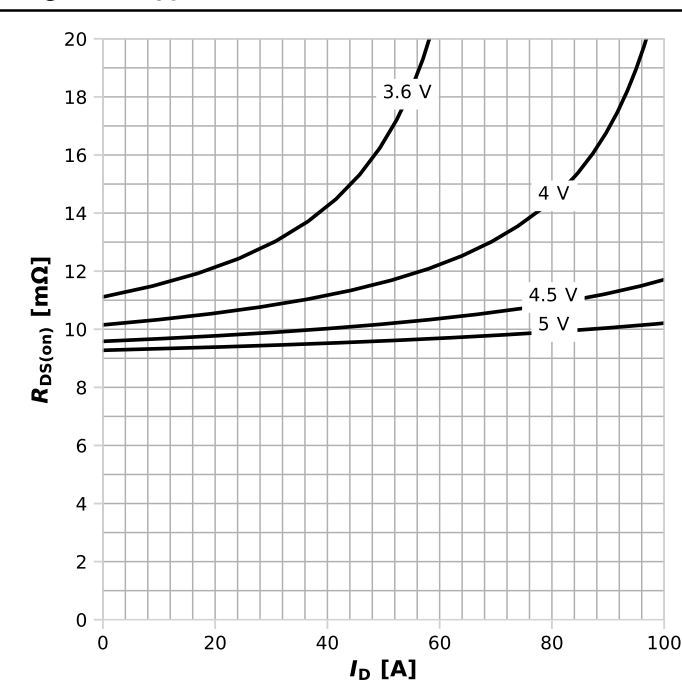
$I_S = f(V_{SD})$ ;  $T_j = 25^\circ\text{C}$ ; parameter:  $V_{GS}$

Diagram 8: Typ. channel reverse characteristics



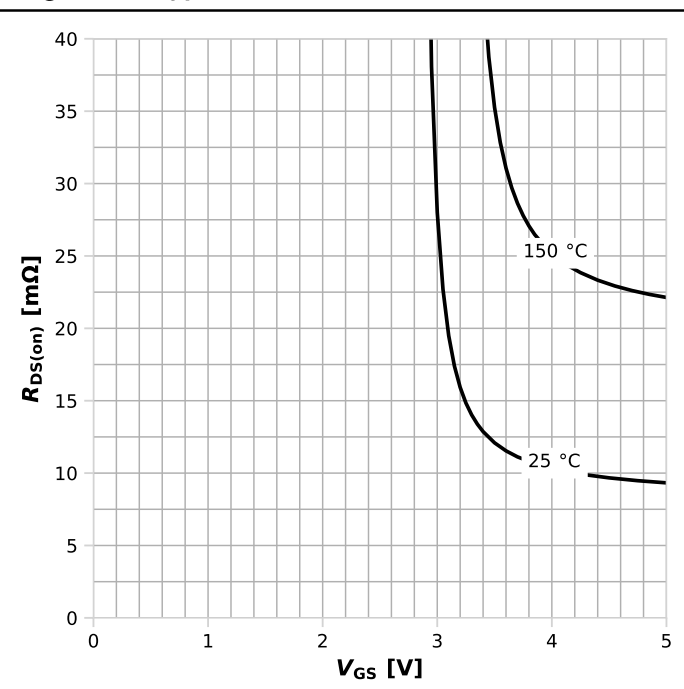
$I_S = f(V_{SD})$ ;  $T_j = 125^\circ\text{C}$ ; parameter:  $V_{GS}$

Diagram 9: Typ. drain-source on-state resistance



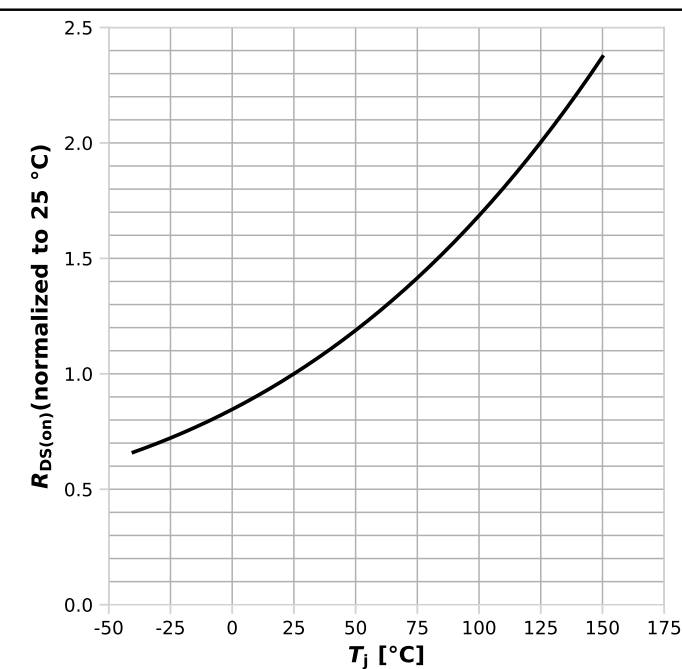
$R_{DS(on)} = f(I_D); T_j = 25^\circ\text{C}; \text{parameter: } V_{GS}$

Diagram 10: Typ. Drain-source on-state resistance



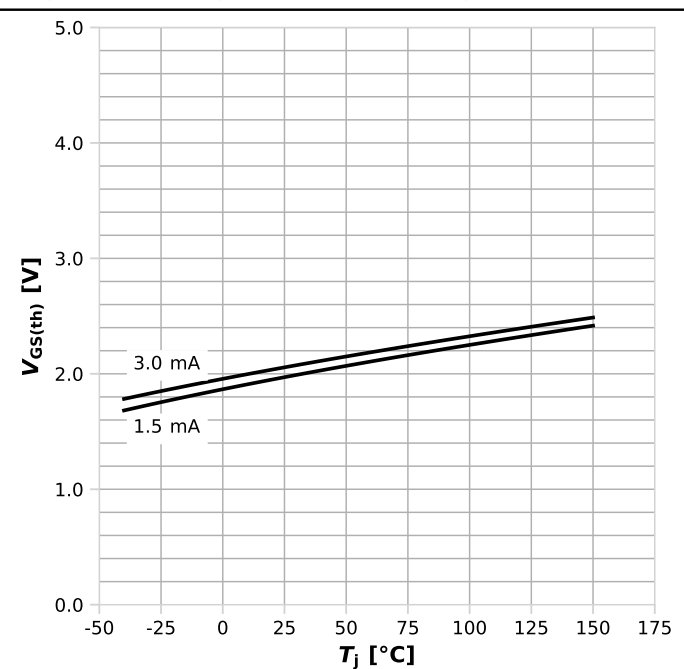
$R_{DS(on)} = f(V_{GS}); I_D = 10\text{ A}; \text{parameter: } T_j$

Diagram 11: Drain-source on-state resistance



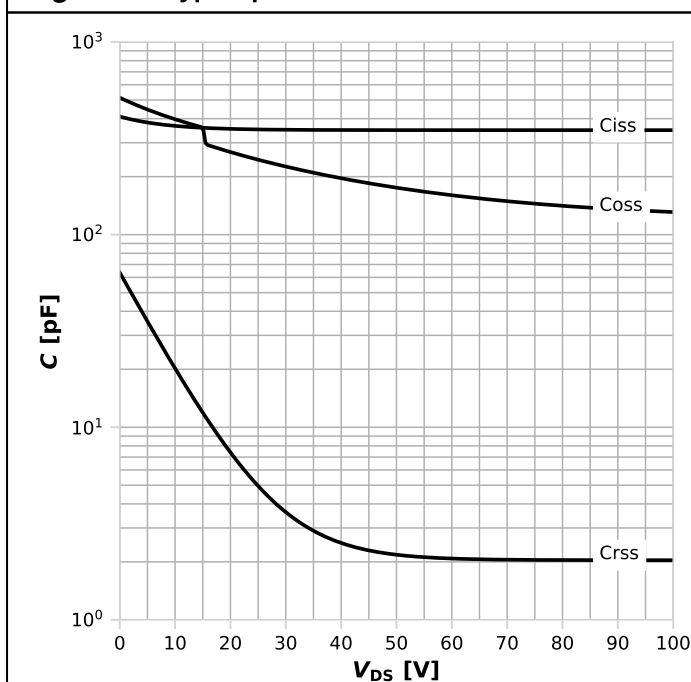
$R_{DS(on)} = f(T_j); I_D = 10\text{ A}, V_{GS} = 5\text{ V}$

Diagram 12: Typ. gate threshold voltage



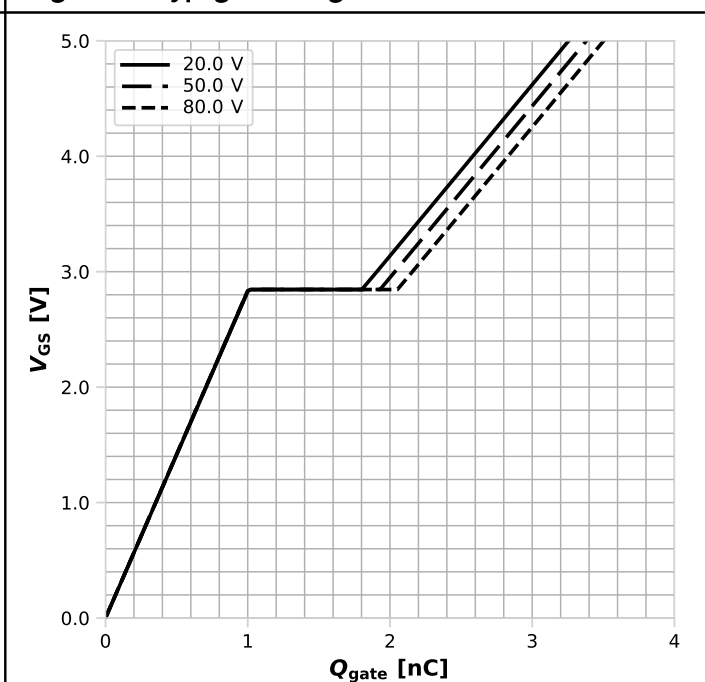
$V_{GS(th)} = f(T_j), V_{GS} = V_{DS}; \text{parameter: } I_D$

Diagram 13: Typ. capacitances



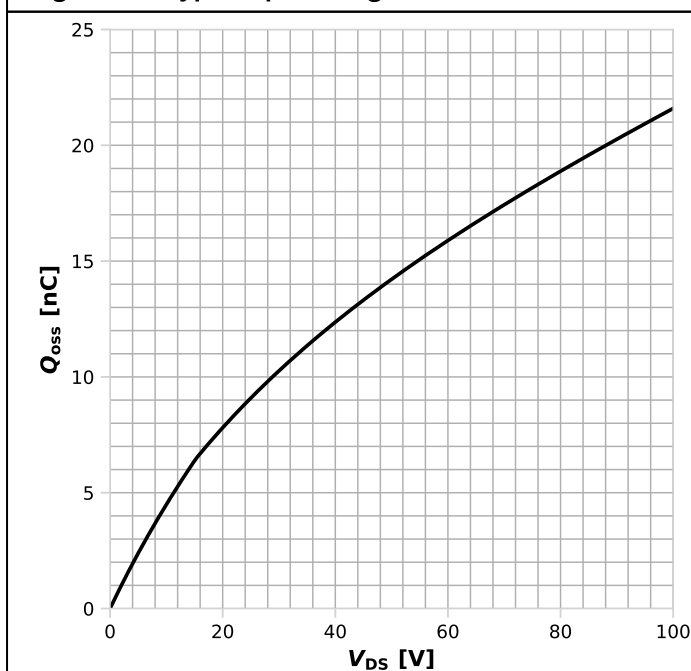
$$C=f(V_{DS}); V_{GS}=0\text{ V}$$

Diagram 14 Typ. gate charge



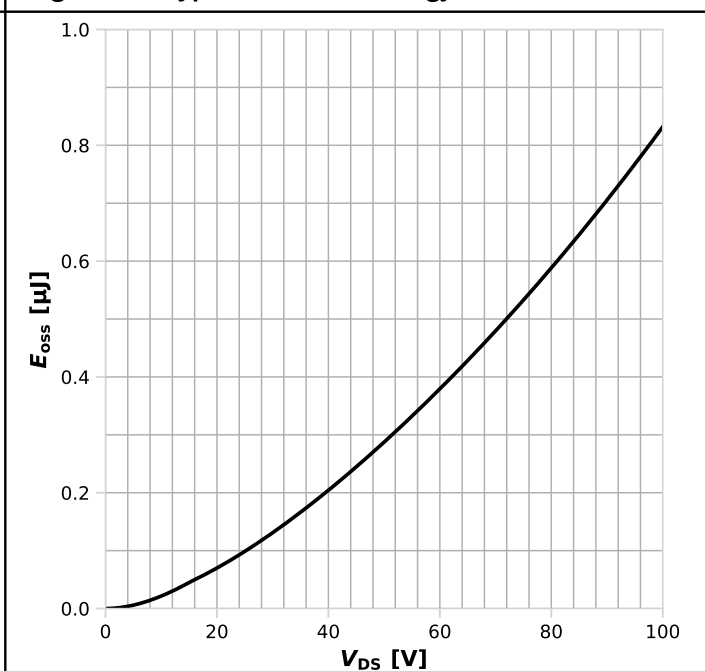
$$V_{GS}=f(Q_{gate}); I_D=10\text{ A pulsed; parameter: }V_{DS}$$

Diagram 15: Typ. output charge



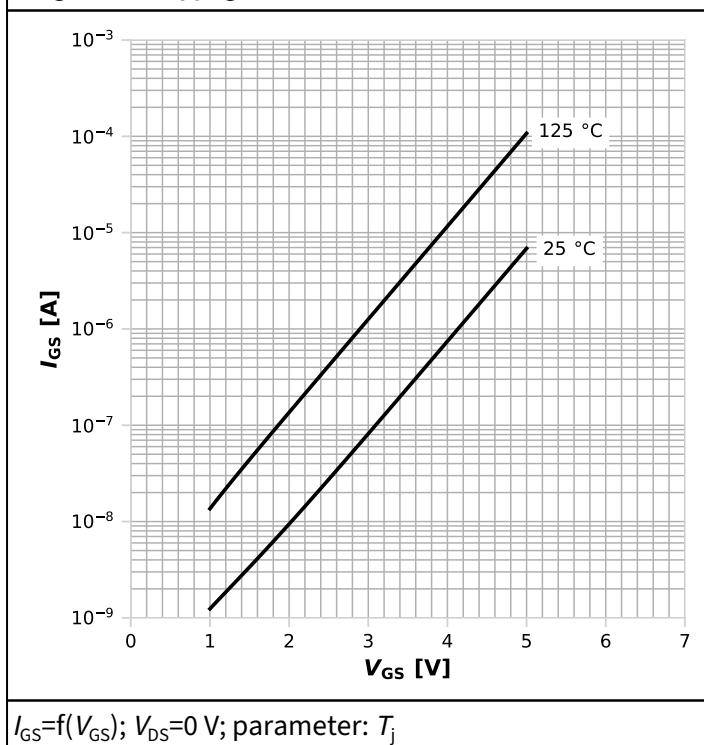
$$Q_{oss}=f(V_{DS}), V_{GS}=0\text{ V}$$

Diagram 16: Typ. Coss stored Energy

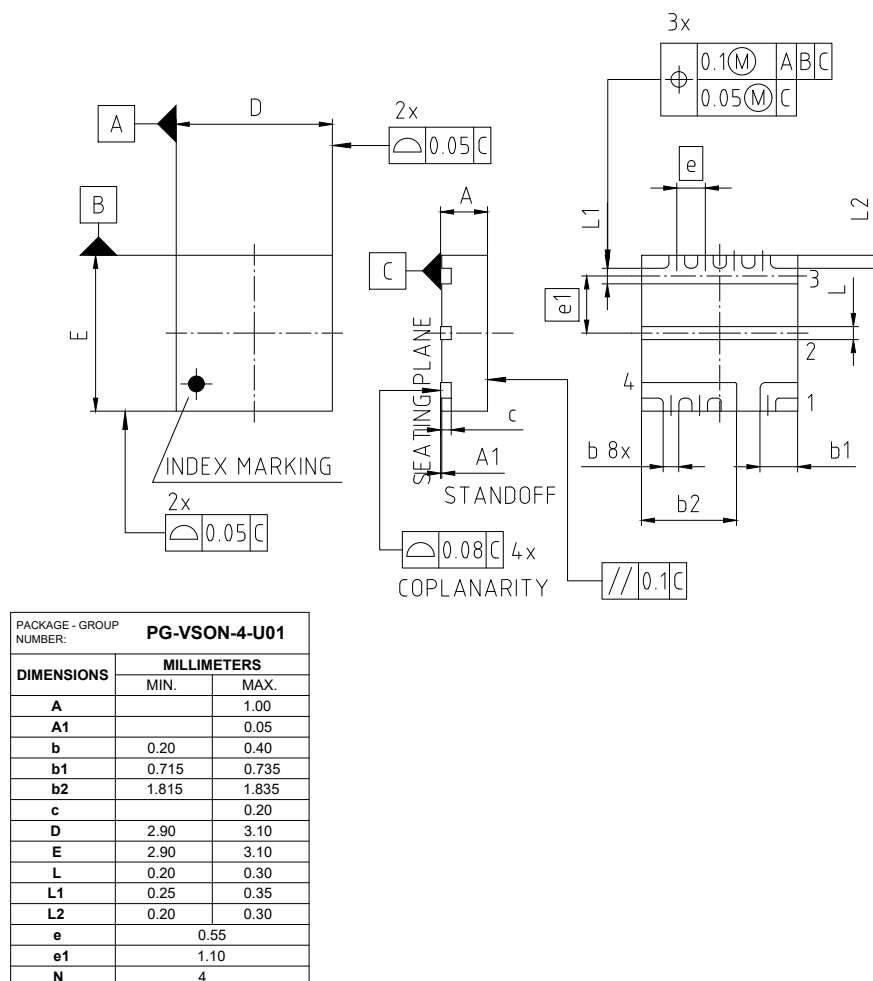


$$E_{oss}=f(V_{DS}), V_{GS}=0\text{ V}$$

Diagram 17: Typ. gate characteristics forward

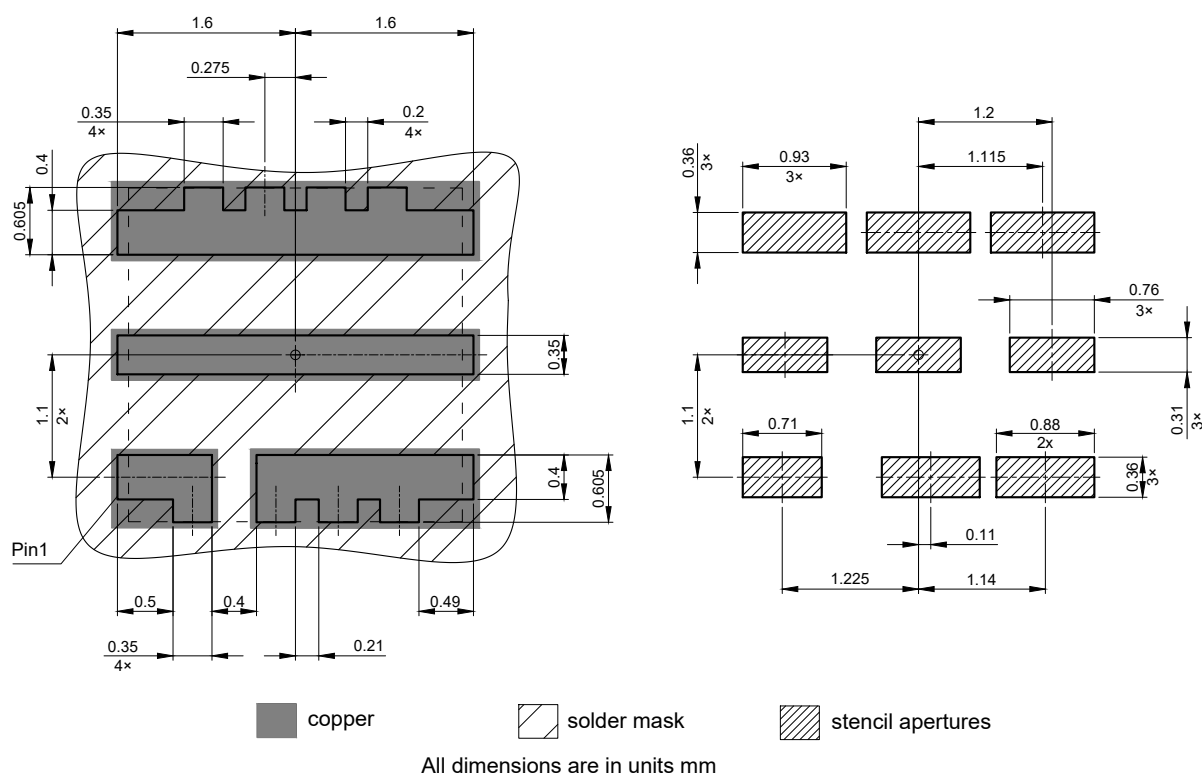


## 6 Package outlines

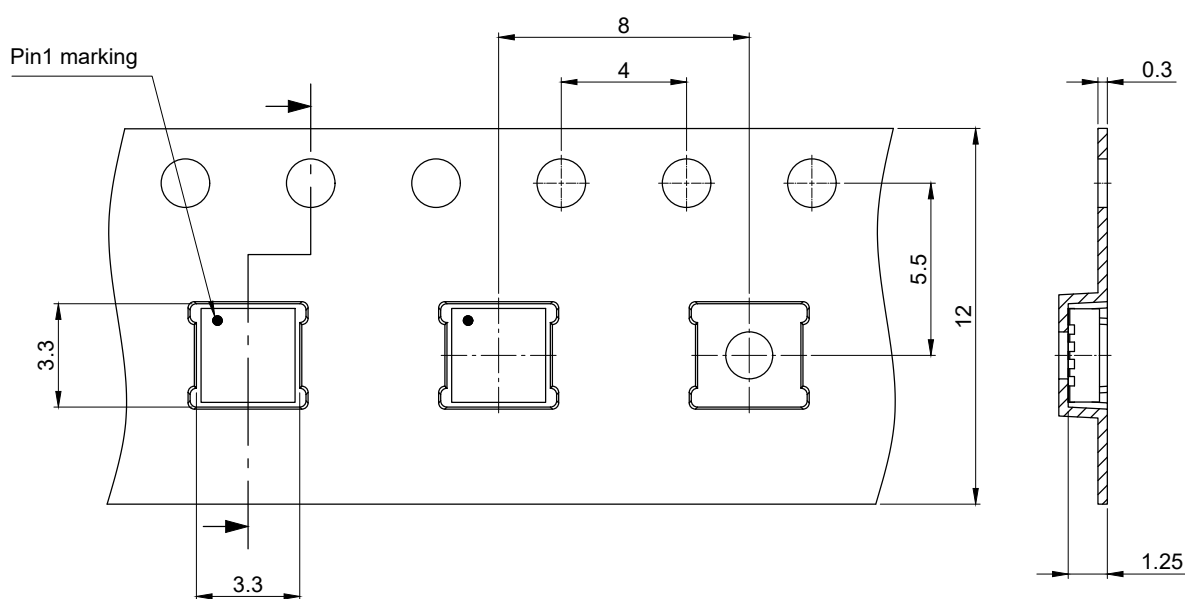



NOTE:  
DIMENSIONS DO NOT INCLUDE MOLD FLASH, PROTRUSION OR GATE BURRS

Figure 1 Outline PG-VSON-4, dimensions in mm



**Figure 2** Footprint drawing PG-VSON-4, dimensions in mm



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

**Figure 3** Packaging variant PG-VSON-4, dimensions in mm

## 7 Appendix A

**Table 9**    **Related links**

- [IFX CoolGaN™ GaN webpage](#)
- [IFX CoolGaN™ reliability white paper](#)
- [IFX CoolGaN™ gate driver application note](#)
- [IFX CoolGaN™ Evaluation Boards](#)
- [IFX Packages Description-PG-VSON-4-3](#)



## Revision history

IGB110S101

### Revision 2025-04-22, Rev. 1.1

Previous revisions

Revision	Date	Subjects (major changes since last revision)
1.0	2024-12-13	Release of final version
1.1	2025-04-22	Updated static IGSS characteristics

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