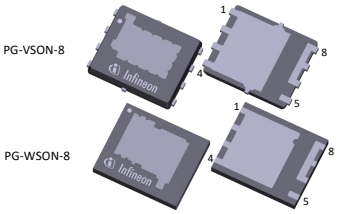
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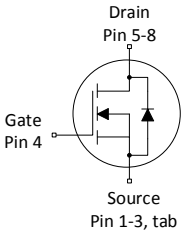
PG-VSON-8 / PG-WSON-8

OptiMOS™ 5 Power-Transistor, 150 V



Features

- Dual-side cooled package with lowest junction-top thermal resistance
- N-channel, normal level
- Excellent gate charge x $R_{DS(on)}$ product (FOM)
- Very low on-resistance $R_{DS(on)}$
- Very low reverse recovery charge (Qrr)
- 175 °C operating temperature
- Pb-free lead plating; RoHS compliant
- Ideal for high-frequency switching and synchronous rectification



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}	150	V
$R_{DS(on),max}$	16	mΩ
I_D	56	A
Q_{rr}	26	nC

Hal Pb RoHS

Part number	Package	Marking	Related links
BSC160N15NS5SC	PG-VSON-8 / PG-WSON-8	160N15SC	-

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1 Maximum ratings

at T_A=25 °C, unless otherwise specified

Table 2 Maximum ratings

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Continuous drain current [1]	I_D	-	-	56	A	V_{GS}=10 V, T_C=25 °C
				40		V_{GS}=10 V, T_C=100 °C
Pulsed drain current [2]	$I_{D,pulse}$	-	-	224	A	T_C=25 °C
Avalanche energy, single pulse [3]	E_{AS}	-	-	43	mJ	I_D=45 A, R_{GS}=25 Ω
Gate source voltage	V_{GS}	-20	-	20	V	-
Power dissipation	P_{tot}	-	-	115	W	T_C=25 °C
Operating and storage temperature	T_j, T_{stg}	-55	-	175	°C	-

[1] Rating refers to the product only with datasheet specified absolute maximum values, maintaining case temperature as specified. For other case temperatures please refer to Diagram 2. De-rating will be required based on the actual environmental conditions.

[2] See Diagram 3 for more detailed information

[3] See Diagram 13 for more detailed information

2 Thermal characteristics

Table 3 Thermal characteristics

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Thermal resistance, junction - case, bottom	R_{thJC}	-	0.78	1.3	K/W	-
Thermal resistance, junction - case, top	R_{thJC}		0.47	0.94		
Thermal resistance, junction - ambient, 6 cm^2 cooling area [4]	R_{thJA}		-	50		

[4] Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm^2 (one layer, 70 µm thick) copper area for drain connection. PCB is vertical in still air.

3 Electrical characteristics

at T_j=25 °C, unless otherwise specified

Table 4 Static characteristics

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Drain-source breakdown voltage	$V_{(BR)DSS}$	150	-	-	V	V_{GS}=0 V, I_D=1 mA
Gate threshold voltage	$V_{GS(th)}$	3.0	3.8	4.6	V	V_{DS}=V_{GS}, I_D=60 µA
Zero gate voltage drain current	I_{DSS}	-	0.1	1	µA	V_{DS}=120 V, V_{GS}=0 V, T_j=25 °C
			10	100		V_{DS}=120 V, V_{GS}=0 V, T_j=125 °C
Gate-source leakage current	I_{GSS}	-	1	100	nA	V_{GS}=20 V, V_{DS}=0 V
Drain-source on-state resistance	$R_{DS(on)}$	-	13.7	16	mΩ	V_{GS}=10 V, I_D=28 A,
			15.1	18.5		V_{GS}=8 V, I_D=14 A
Gate resistance	R_G	-	1.0	1.5	Ω	-
Transconductance	g_{fs}	20	40	-	S	$\|V_{DS}\|>2\|I_D\|R_{DS(on)max}$, I_D=28 A

Table 5 Dynamic characteristics

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Input capacitance	C_{iss}	-	1370	1820	pF	V_{GS}=0 V, V_{DS}=75 V, f=1 MHz
Output capacitance [5)]	C_{oss}		341	454		
Reverse transfer capacitance [5)]	C_{rss}		9.6	17		
Turn-on delay time	$t_{d(on)}$	-	9.6	-	ns	V_{DD}=75 V, V_{GS}=10 V, I_D=28 A, $R_{G,ext}$=3 Ω
Rise time	t_r		3			
Turn-off delay time	$t_{d(off)}$		10.8			
Fall time	t_f		2.6			

5) Defined by design. Not subject to production test

Table 6 Gate charge characteristics [6]

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Gate to source charge	Q_{gs}	-	8	-	nC	V_{DD}=75 V, I_D=28 A, V_{GS}=0 to 10 V
Gate to drain charge [7]	Q_{gd}		4	5.9	nC	
Switching charge	Q_{sw}		7.8	-	nC	
Gate charge total [7]	Q_g		19	23.1	nC	
Gate plateau voltage	$V_{plateau}$		5.8	-	V	
Output charge [7]	Q_{oss}	-	51	68.2	nC	V_{DD}=75 V, V_{GS}=0 V

[6] See "Gate charge waveforms" for parameter definition

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

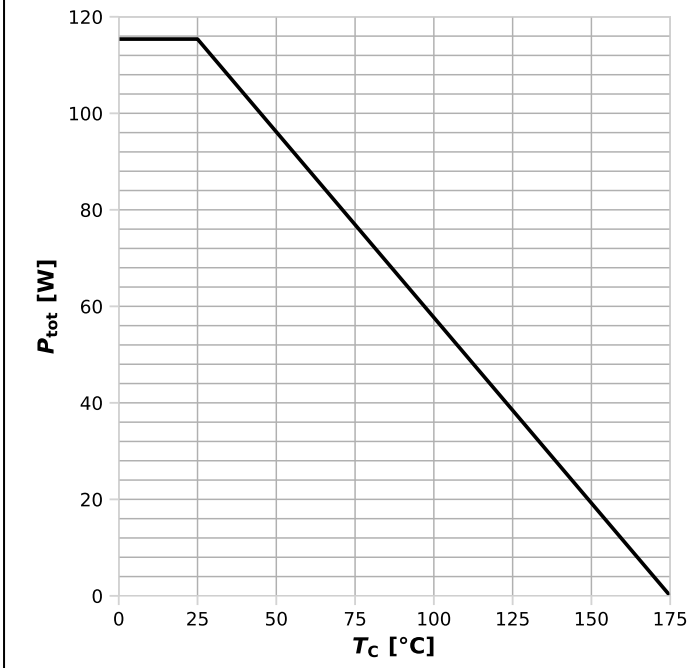
Table 7 Reverse diode

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Diode continous forward current	I_S	-	-	56	A	T_C=25 °C
Diode pulse current	$I_{S,pulse}$			224		
Diode forward voltage	V_{SD}	-	0.88	1.2	V	V_{GS}=0 V, I_F=28 A, T_j=25 °C
Reverse recovery time [8]	t_{rr}	-	30	60	ns	V_R=75 V, I_F=*28 A*, di_F/dt=100 A/µs
Reverse recovery charge [8]	Q_{rr}		26	52	nC	

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

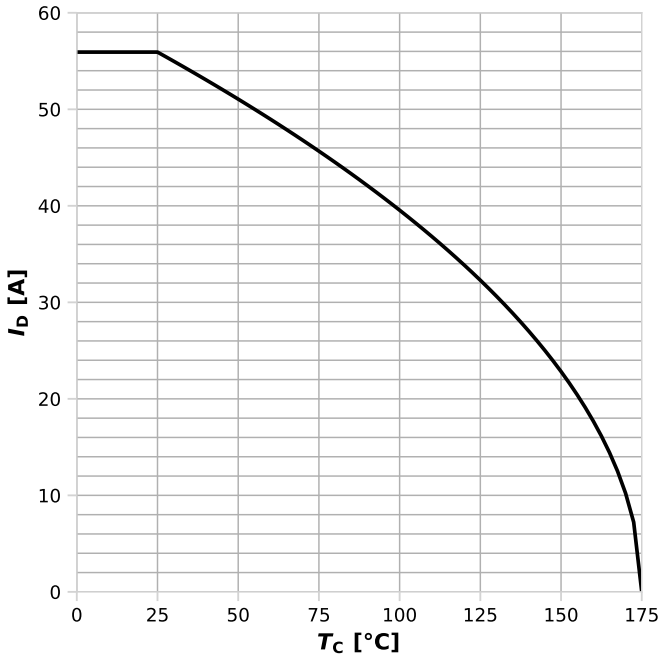
4 Electrical characteristics diagrams

Diagram 1: Power dissipation



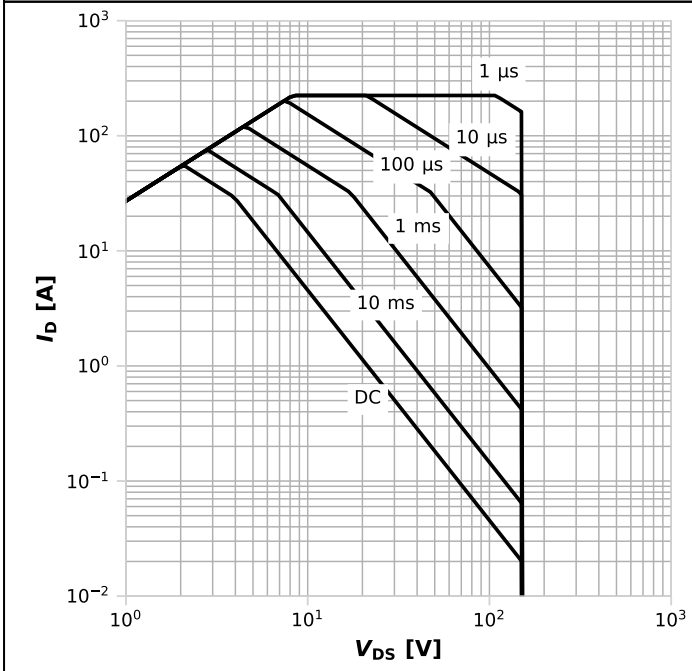
P_{tot}=f(T_C)

Diagram 2: Drain current



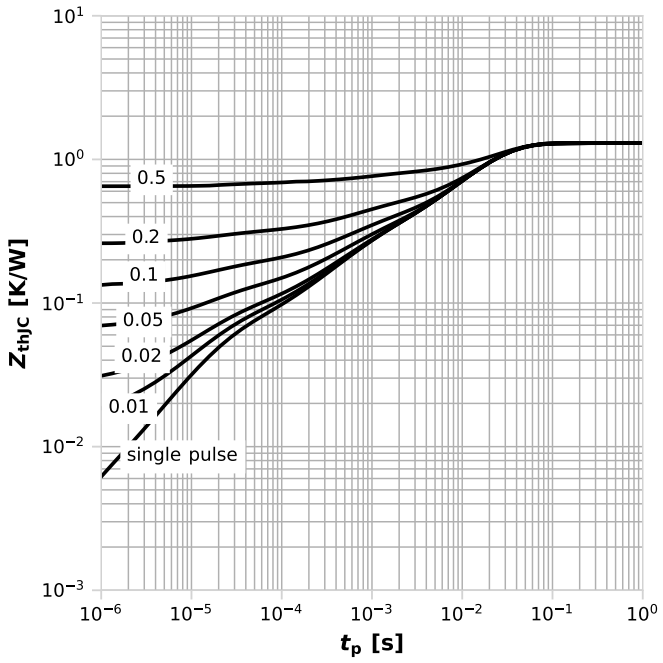
I_D=f(T_C); V_{GS}≥10 V

Diagram 3: Safe operating area



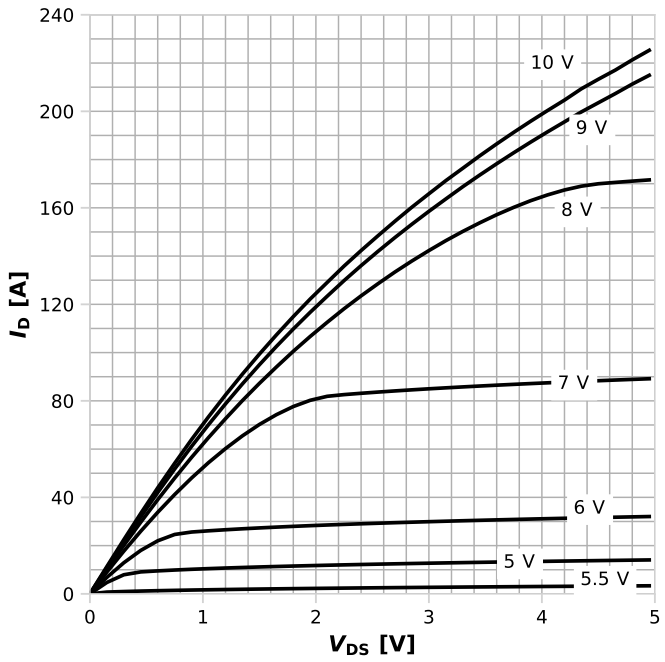
I_D=f(V_{DS}); T_C=25 °C; D=0; parameter: t_p

Diagram 4: Max. transient thermal impedance



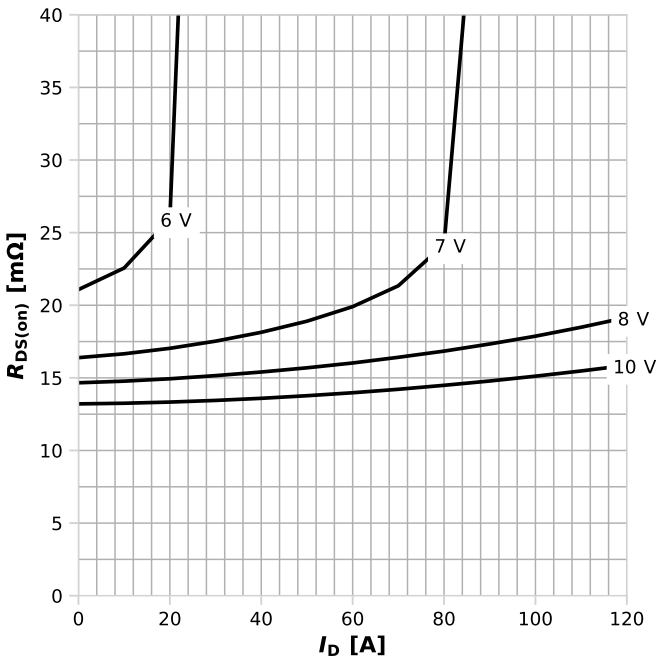
Z_{thJC}=f(t_p); parameter: D=t_p/T

Diagram 5: Typ. output characteristics



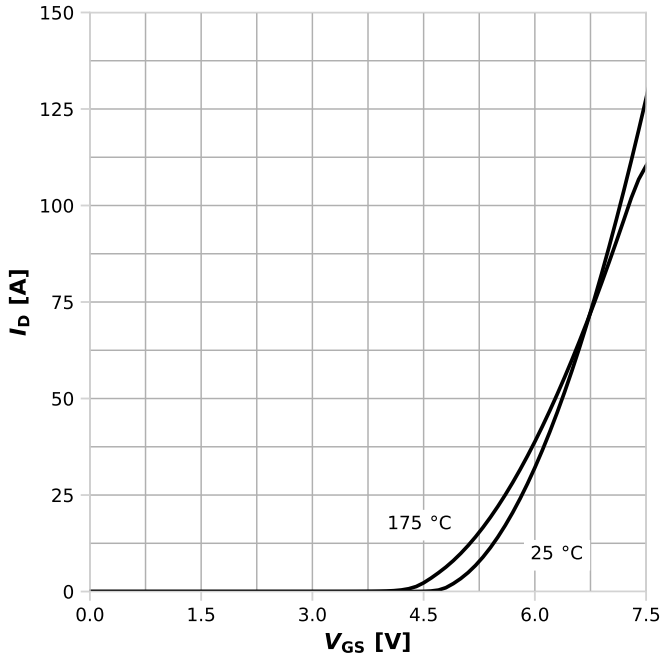
I_D=f(V_{DS}), T_j=25 °C; parameter: V_{GS}

Diagram 6: Typ. drain-source on resistance



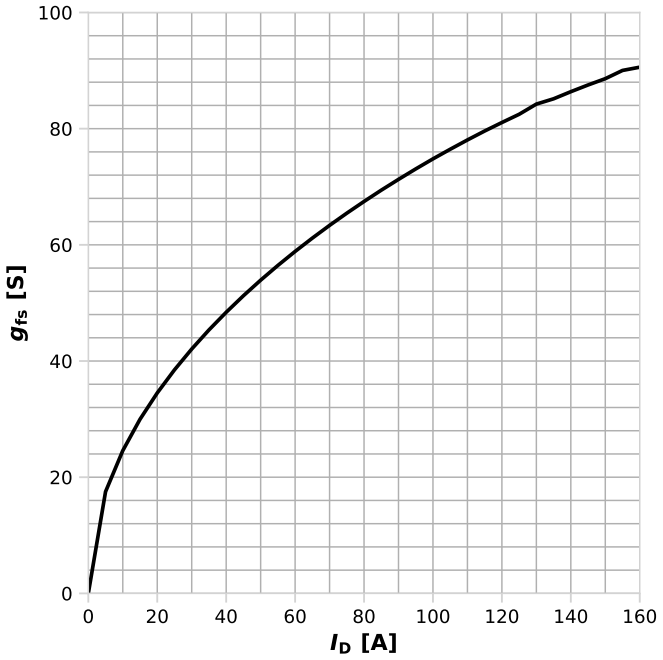
$R_{DS(on)}$=f(I_D), T_j=25 °C; parameter: V_{GS}

Diagram 7: Typ. transfer characteristics



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

Diagram 8: Typ. forward transconductance



g_{fs}=f(I_D), T_j=25 °C; parameter: V_{DS}

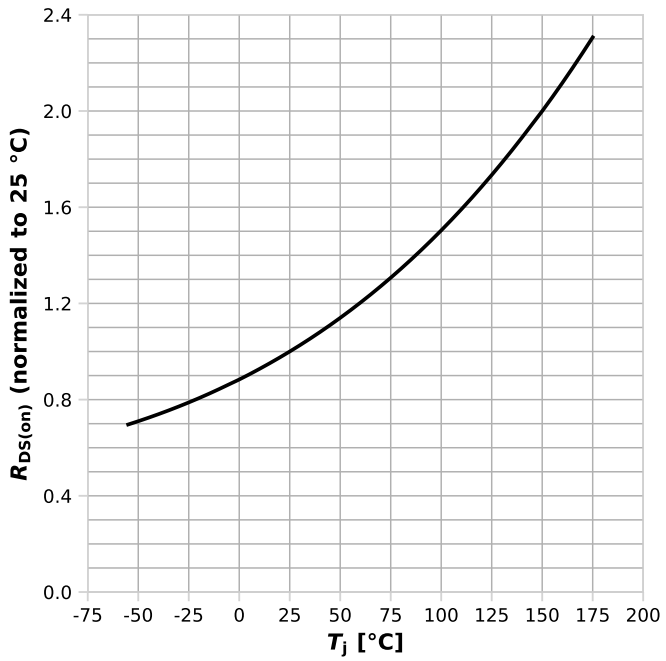
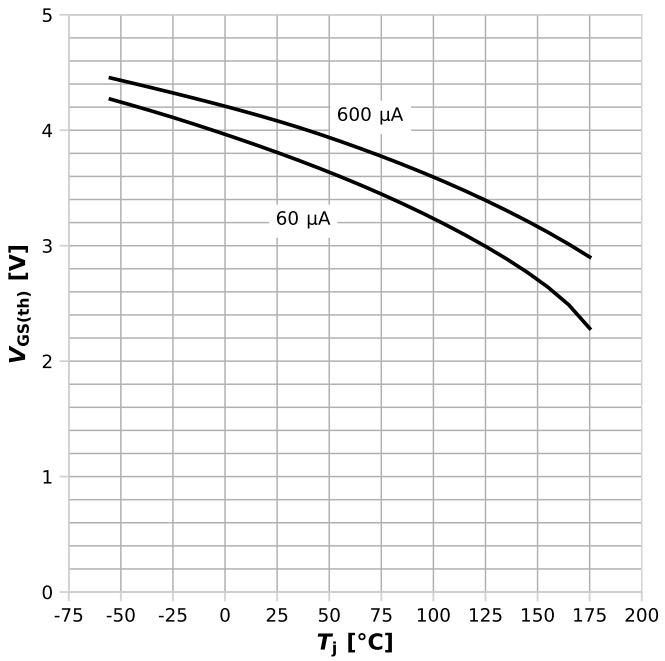
Diagram 9: Drain-source on-state resistance	Diagram 10: Typ. gate threshold voltage
	
$R_{DS(on)}$=f(T_j), I_D=28 A, V_{GS}=10 V	$V_{GS(th)}$=f(T_j), V_{GS}=V_{DS}; parameter: I_D

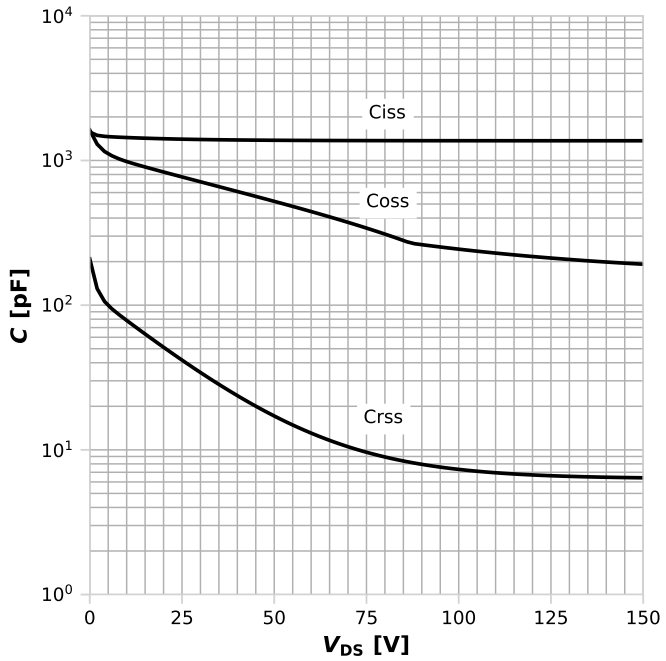
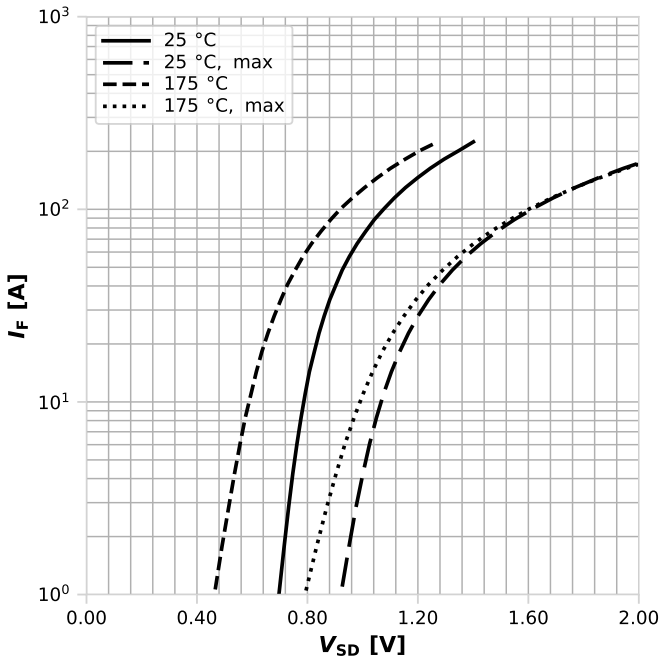
Diagram 11: Typ. capacitances	Diagram 12: Forward characteristics of reverse diode
	
C=f(V_{DS}); V_{GS}=0 V; f=1 MHz	I_F=f(V_{SD}); parameter: T_j

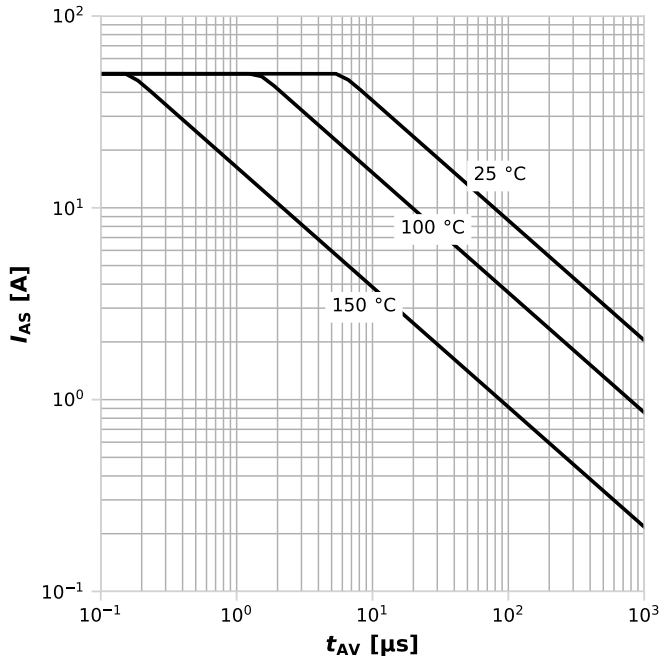
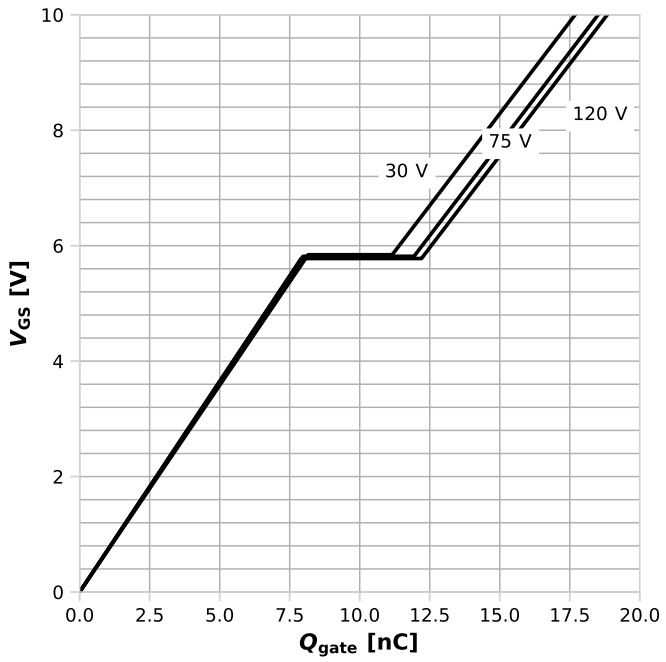
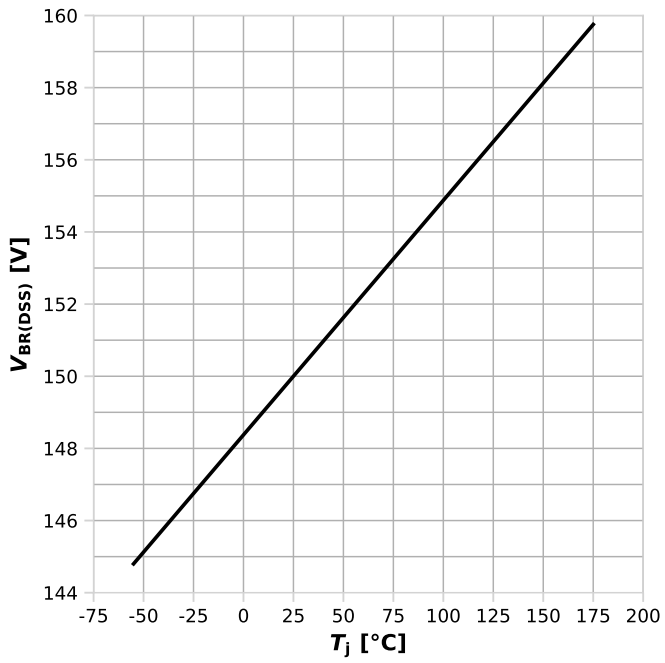
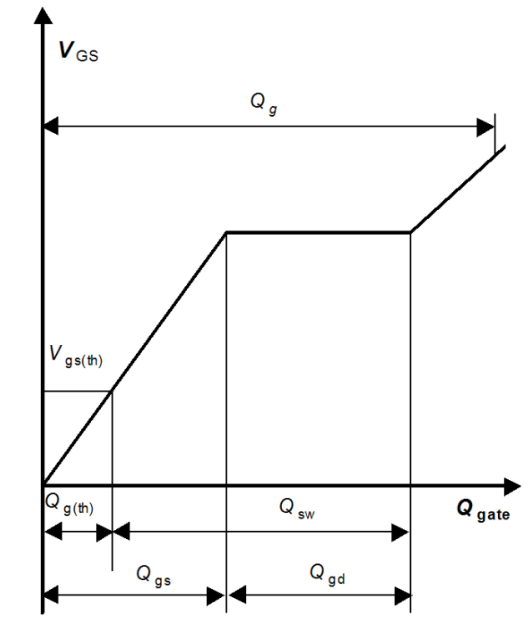
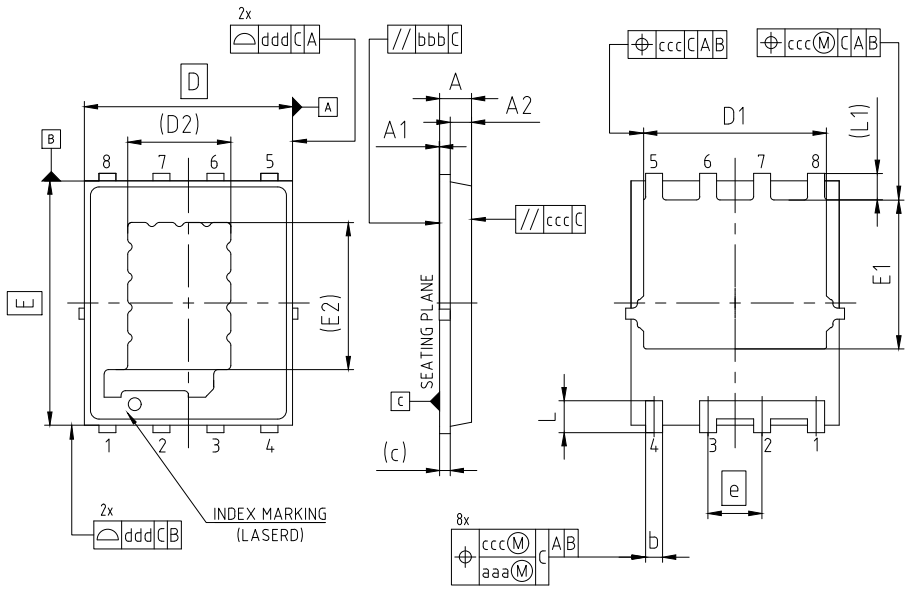
Diagram 13: Avalanche characteristics	Diagram 14: Typ. gate charge
	
I_{AS}=f(t_{AV}); R_{GS}=25 Ω; parameter: $T_{j,start}$	V_{GS}=f(Q_{gate}), I_D=28 A pulsed, T_j=25 °C; parameter: V_{DD}

Diagram 15: Drain-source breakdown voltage	Gate charge waveforms
	
$V_{BR(DSS)}$=f(T_j); I_D=1 mA	-

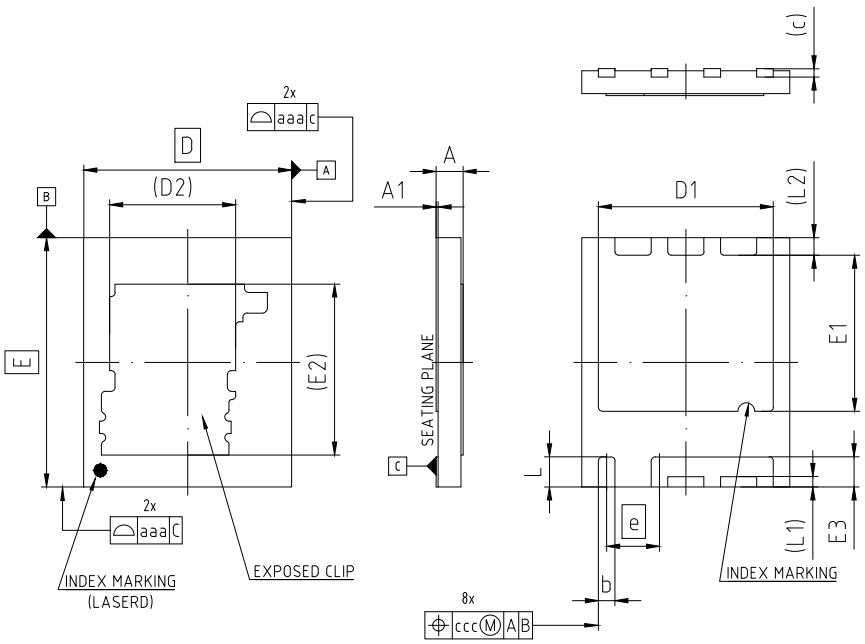
5 Package outlines



PACKAGE - GROUP NUMBER:	PG-VSON-8-U01				
DIMENSIONS	MILLIMETERS		DIMENSIONS	MILLIMETERS	
	MIN.	MAX.		MIN.	MAX.
A	0.65	0.85	e	1.27	
A1	0.00	0.05	L	0.70	0.90
A2	0.45	0.55	L1	0.52	0.72
b	0.35	0.55	aaa	0.05	
c	0.25		bbb	0.08	
D	4.90		ccc	0.10	
D1	4.20	4.40	ddd	0.15	
D2	2.43				
E	5.75				
E1	3.40	3.60			
E2	3.46				

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

Figure 1 Outline PG-VSON-8 / PG-WSON-8, dimensions in mm



PACKAGE - GROUP NUMBER:	PG-WSON-8-U01					
DIMENSIONS	MILLIMETERS		DIMENSIONS	MILLIMETERS		
	MIN.	MAX.		MIN.	MAX.	
A	0.55	0.75	e	1.27		
A1	0.00	0.05	L	0.68	0.78	
b	0.35	0.45	L1	0.25		
c	0.20		L2	0.42		
D	5.00		aaa	0.05		
D1	4.11	4.31	ccc	0.10		
D2	3.03					
E	6.00					
E1	3.66	3.86				
E2	4.11					
E3	0.63	0.83				

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

Figure 2 PG-VSON-8 / PG-WSON-8, dimensions in mm

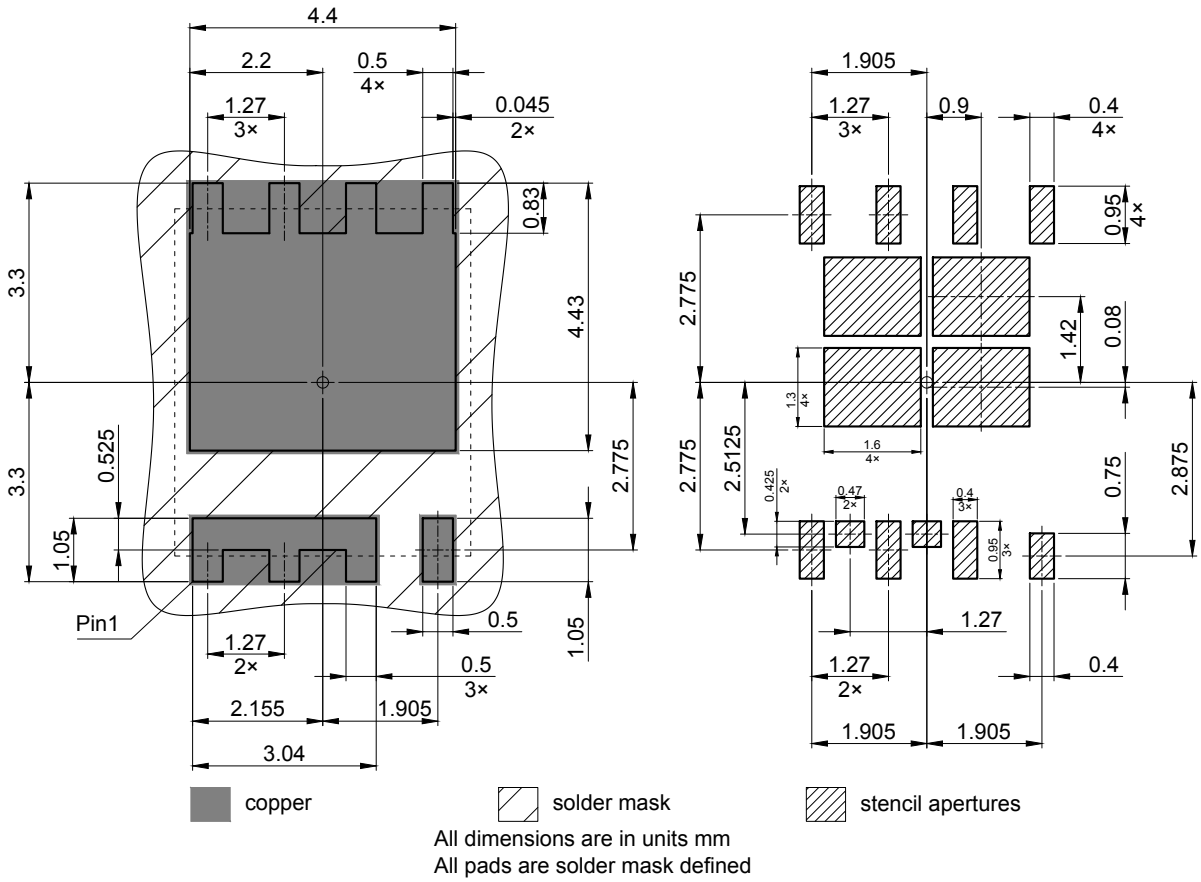


Figure 3 Bonding diagram PG-VSON-8 / PG-WSON-8, dimensions in mm

Revision history

BSC160N15NS5SC

Revision 2025-05-23, Rev. 2.2

Previous revisions

Revision	Date	Subjects (major changes since last revision)
2.0	2022-09-17	Release of final version
2.1	2022-10-07	Update "Features
2.2	2025-05-23	Update package drawings

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