PG-TDSON-8

MOSFET

OptiMOS™ 7 Power-Transistor, 80 V

Features

- N-channel, normal level
- Optimized for synchronous rectification and motor drives
- Soft recovery body diode
- 100% avalanche tested
- 175°C rated
- Pb-free lead plating; RoHS compliant
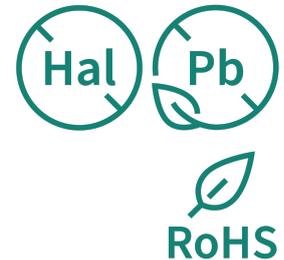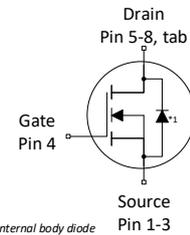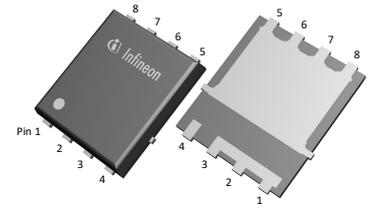- Halogen-free according to IEC61249-2-21

Product validation

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

Drain
Pin 5-8, tab

Gate
Pin 4

*1: Internal body diode

Source
Pin 1-3

Table 1   Key performance parameters

Parameter	Value	Unit
V_{DS}	80	V
$R_{DS(on),max}$	2.4	mΩ
I_D	167	A
Q_{OSS}	95	nC
$Q_G(0V..10V)$	49	nC
$Q_{rr}(100A/\mu s)$	22	nC

Part number	Package	Marking	Related links
ISC024N08NM7	PG-TDSON-8	024N08N7	-

Table of contents

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	-	-	167	A	V_{GS}=10 V, T_C=25 °C
				118		V_{GS}=10 V, T_C=100 °C
				107		V_{GS}=7 V, T_C=100 °C
				24		V_{GS}=10 V, T_A=25 °C, R_{THJA}=50 °C/W [2]
Pulsed drain current [3]	$I_{D,pulse}$	-	-	668	A	T_C=25 °C
Avalanche energy, single pulse [4]	E_{AS}	-	-	110	mJ	I_D=50 A, R_{GS}=25 Ω
Gate source voltage	V_{GS}	-20	-	20	V	-
Power dissipation	P_{tot}	-	-	150	W	T_C=25 °C
				3.0		T_A=25 °C, R_{THJA}=50 °C/W [2]
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] 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] See Diagram 3 for more detailed information

[4] 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}	-	-	1	°C/W	-
Thermal resistance, junction - case, top	R_{thJC}			20		
Thermal resistance, junction - ambient, 6 cm^2 cooling area [5]	R_{thJA}			50		

[5] 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	$V_{(BR)DSS}$	80	-	-	V	V_{GS}=0 V, I_D=1 mA
Gate threshold voltage	$V_{GS(th)}$	2.3	2.8	3.2	V	V_{DS}=V_{GS}, I_D=71 µA
Zero gate voltage drain current	I_{DSS}	-	-	1	µA	V_{DS}=80 V, V_{GS}=0 V, T_j=25 °C
Zero gate voltage drain current [6]	I_{DSS}	-	-	100	µA	V_{DS}=80 V, V_{GS}=0 V, T_j=125 °C
Gate-source leakage current	I_{GSS}	-	-	100	nA	V_{GS}=20 V, V_{DS}=0 V
Drain-source on-state resistance	$R_{DS(on)}$	-	2.1	2.4	mΩ	V_{GS}=10 V, I_D=50 A
			2.4	2.9		V_{GS}=7 V, I_D=25 A
Gate resistance	R_G	-	1.2	-	Ω	-
Transconductance [6]	g_{fs}	65	130	-	S	$\lvert V_{DS}\rvert \geq 2\lvert I_D\rvert R_{DS(on)max}$, I_D=50 A

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

Table 5   Dynamic characteristics

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Input capacitance [7]	C_{iss}	-	3500	4600	pF	V_{GS}=0 V, V_{DS}=40 V, f=1 MHz
Output capacitance [7]	C_{oss}		1440	1870		
Reverse transfer capacitance [7]	C_{rss}		21	37		
Turn-on delay time	$t_{d(on)}$	-	10.3	-	ns	V_{DD}=40 V, V_{GS}=10 V, I_D=50 A, $R_{G,ext}$=1.6 Ω
Rise time	t_r		3.8			
Turn-off delay time	$t_{d(off)}$		20.4			
Fall time	t_f		5.0			

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

Table 6   Gate charge characteristics [8]

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Gate to source charge [9]	Q_{gs}		16	21	nC	
Gate charge at threshold	$Q_{g(th)}$		9.9	-	nC	
Gate to drain charge [9]	Q_{gd}	-	8.9	13	nC	V_{DD}=40 V, I_D=50 A, V_{GS}=0 to 10 V
Switching charge	Q_{sw}		15	-	nC	
Gate charge total [9]	Q_g		49	64	nC	
Gate plateau voltage	$V_{plateau}$		4.6	-	V	
Gate charge total, sync. FET	$Q_{g(sync)}$	-	44	-	nC	V_{DS}=0.1 V, V_{GS}=0 to 10 V
Output charge [9]	Q_{oss}	-	95	124	nC	V_{DS}=40 V, V_{GS}=0 V

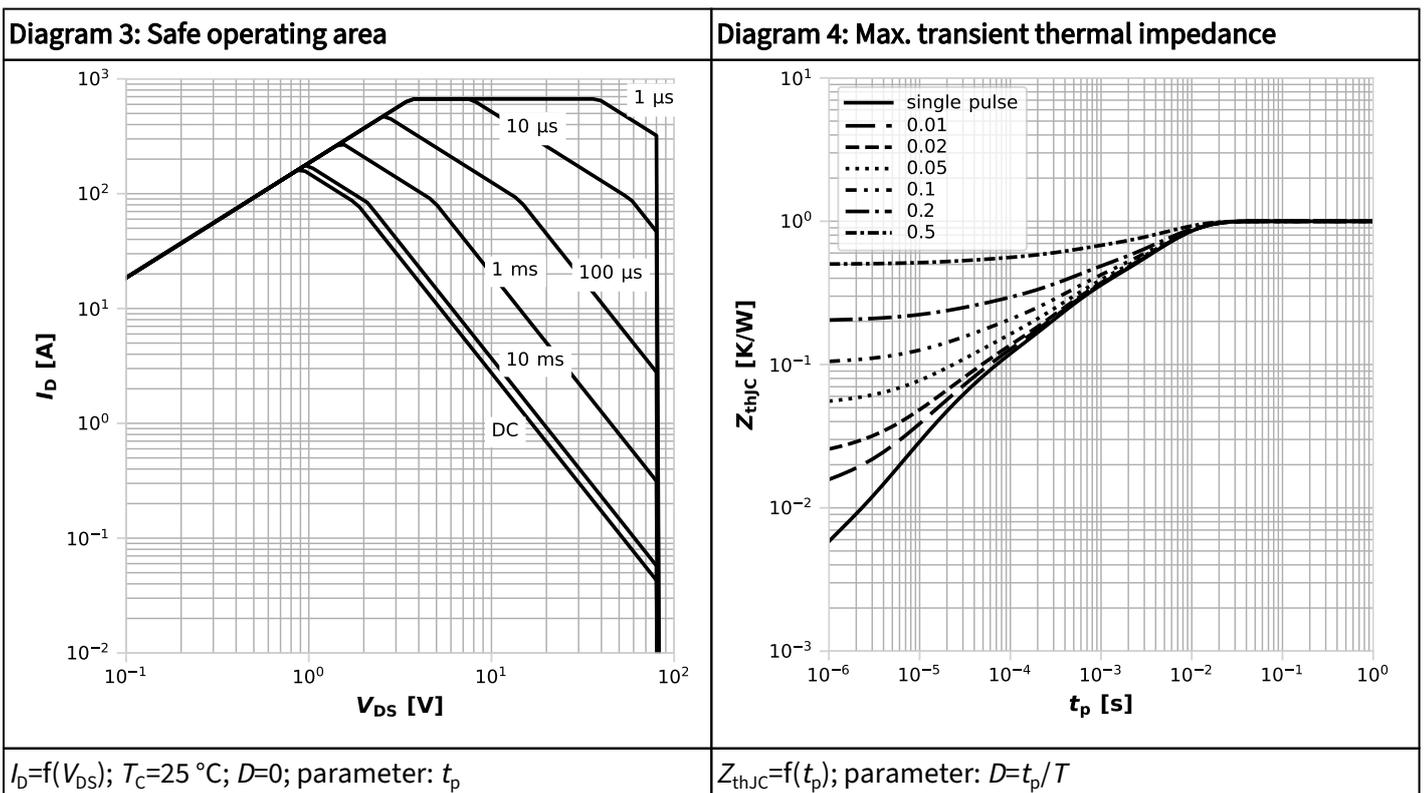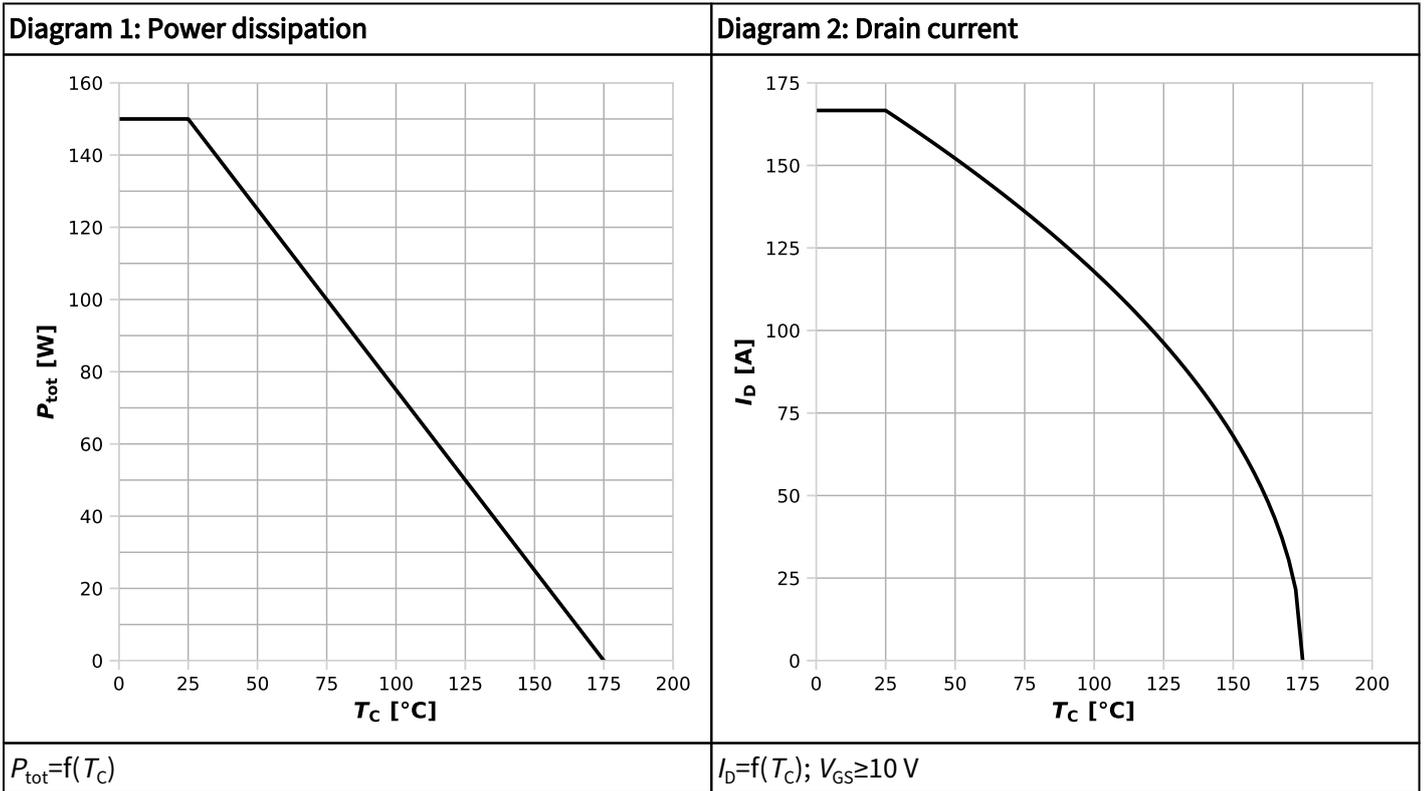[8]   See "Gate charge waveforms" for parameter definition
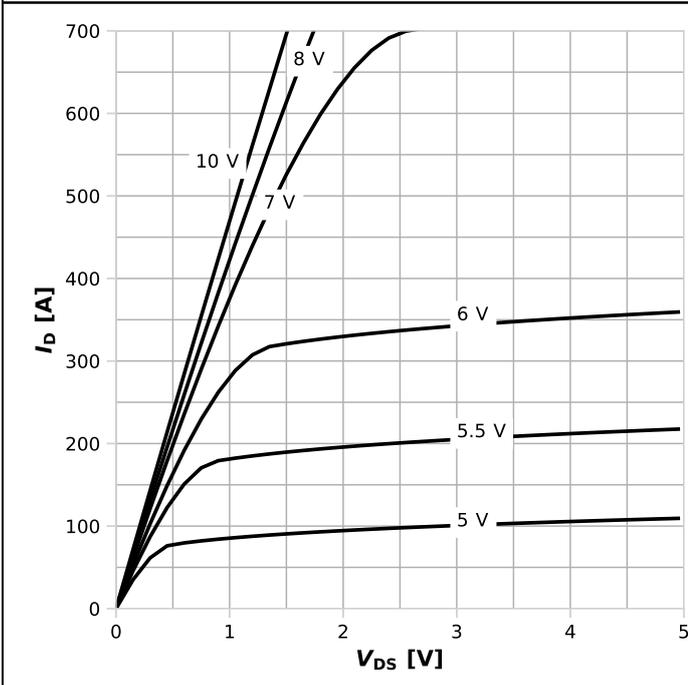[9]   Defined by design. Not subject to production test.

Table 7   Reverse diode

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Diode continuous forward current	I_S	-	-	142	A	T_C=25 °C
Diode pulse current	$I_{S,pulse}$			668		
Diode forward voltage	V_{SD}	-	0.87	1.0	V	V_{GS}=0 V, I_F=50 A, T_j=25 °C
Reverse recovery time [10]	t_{rr}	-	34	51	ns	V_R=40 V, I_F=50 A, di_F/dt=100 A/µs
Reverse recovery charge [10]	Q_{rr}		22	44	nC	

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

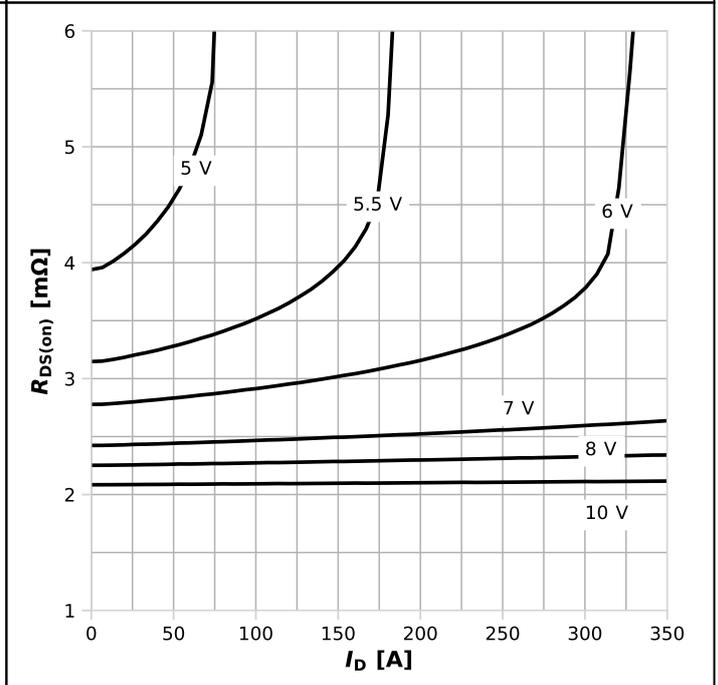# 4 Electrical characteristics diagrams

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

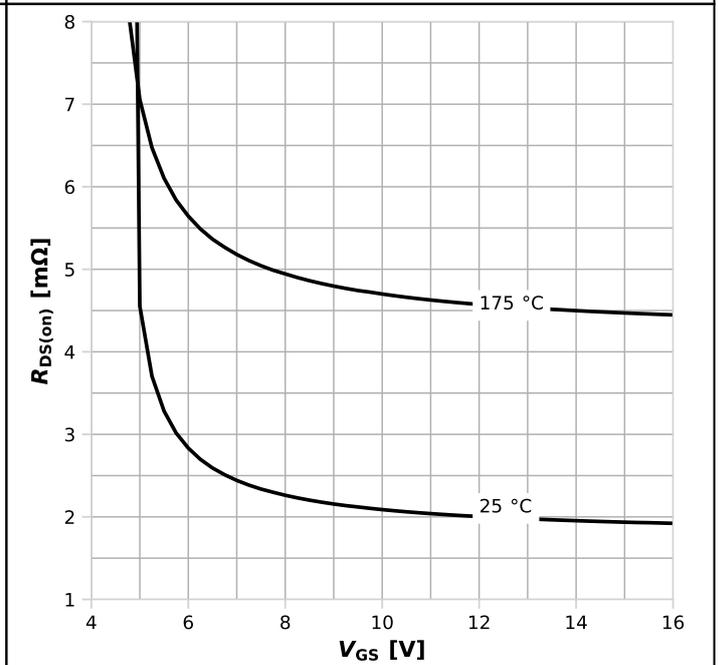$R_{DS(on)}$=f(I_D), T_j=25 °C; parameter: V_{GS}
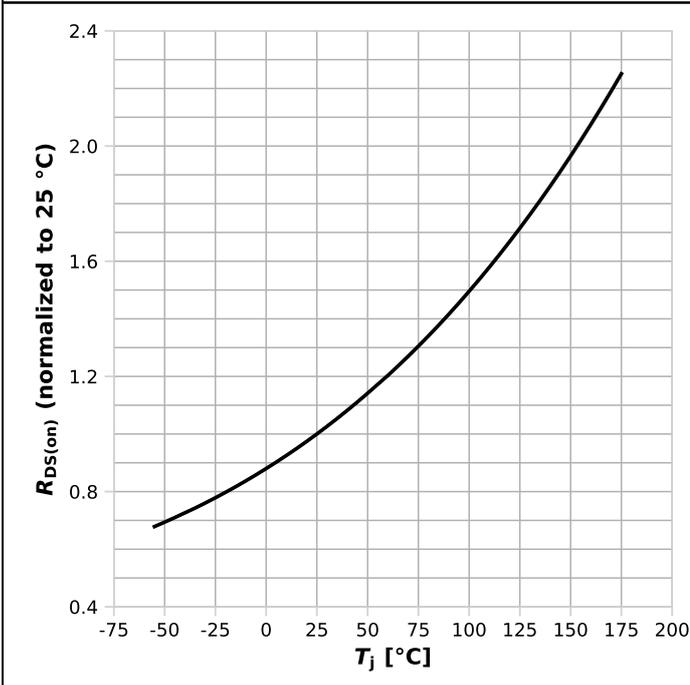
Diagram 7: Typ. transfer characteristics
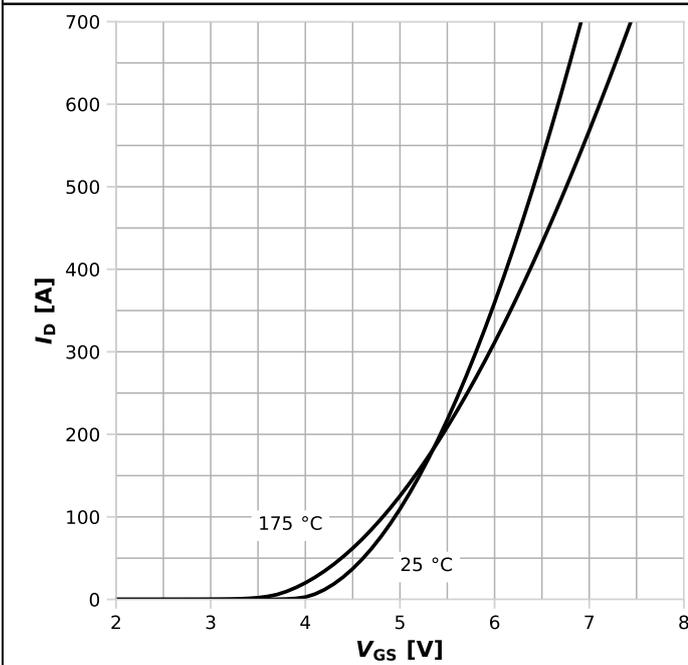
I_D=f(V_{GS}), $|V_{DS}|$>2$|I_D|R_{DS(on)max}$; parameter: T_j
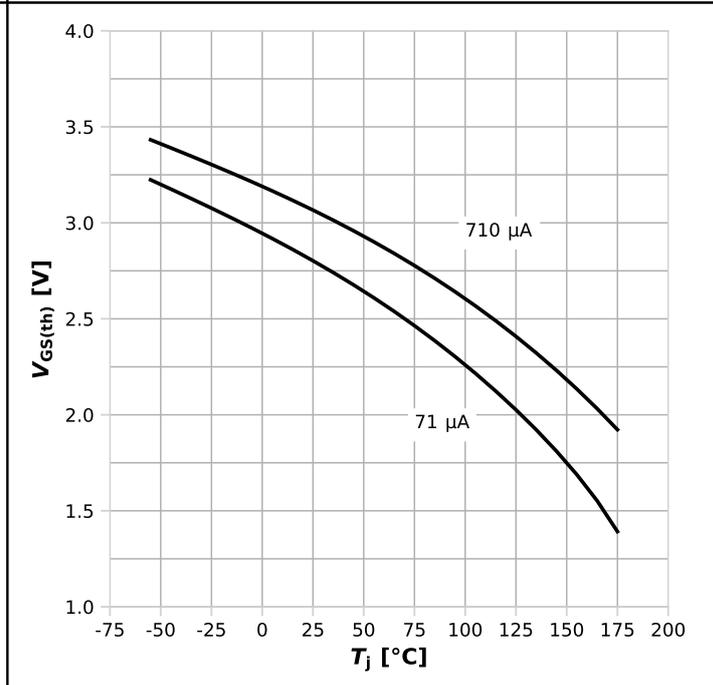
Diagram 8: Typ. drain-source on resistance

$R_{DS(on)}$=f(V_{GS}), I_D=50 A; parameter: T_j

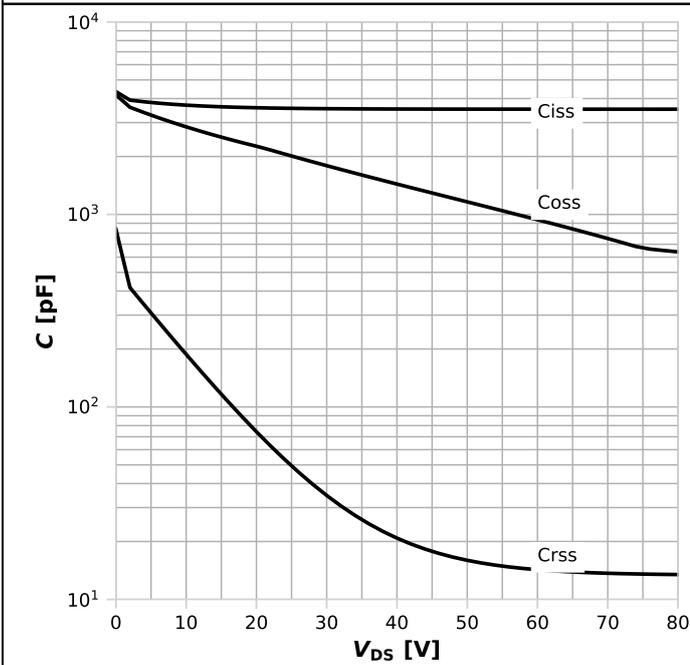**Diagram 9: Normalized drain-source on resistance**

$R_{DS(on)}$=f(T_j), I_D=50 A, V_{GS}=10 V

Diagram 10: Typ. gate threshold voltage
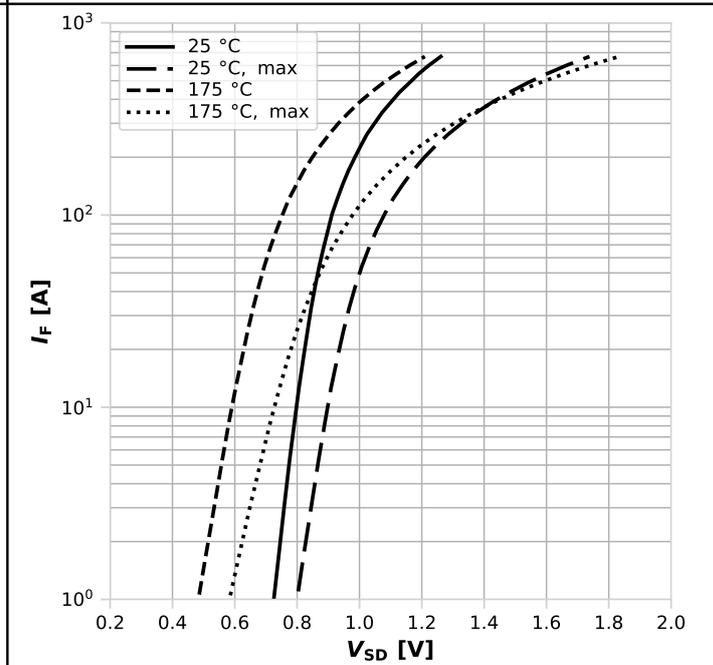

$V_{GS(th)}$=f(T_j), V_{GS}=V_{DS}; parameter: I_D
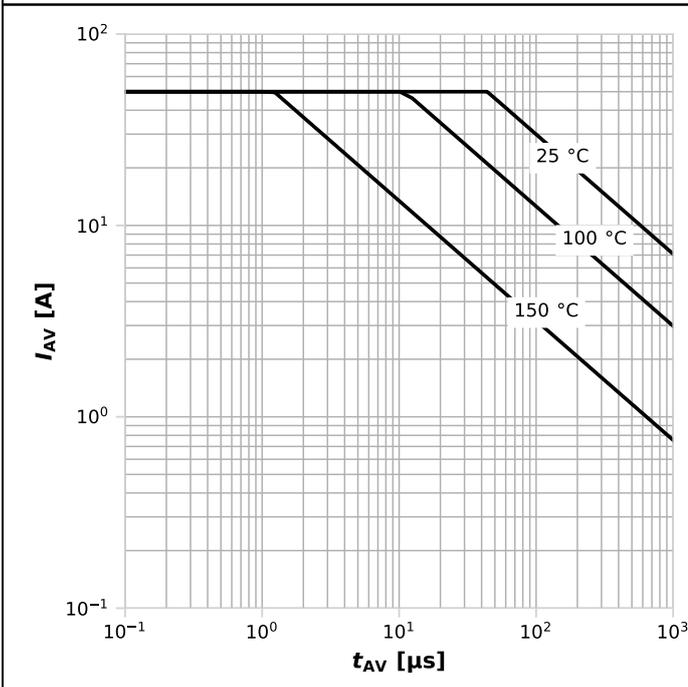
Diagram 11: Typ. capacitances

C=f(V_{DS}); V_{GS}=0 V; f=1 MHz

Diagram 12: Forward characteristics of reverse diode
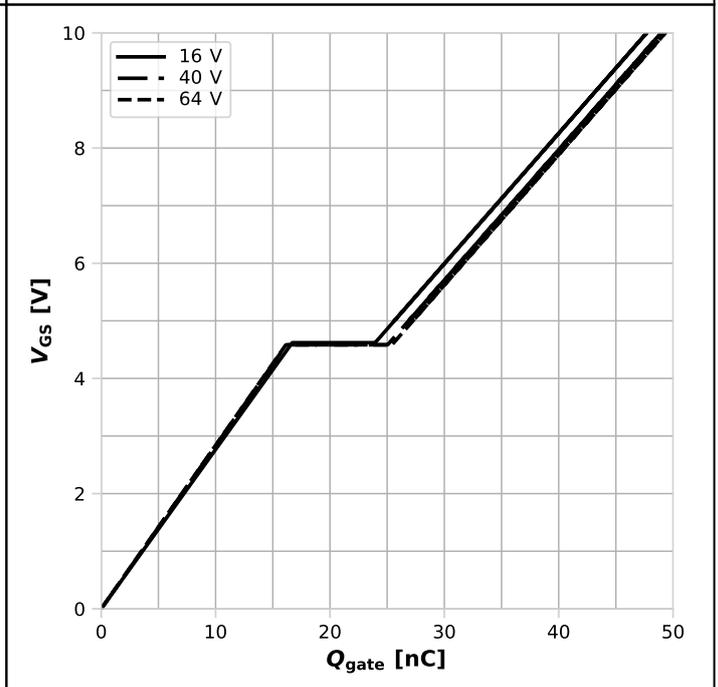

I_F=f(V_{SD}); parameter: T_j
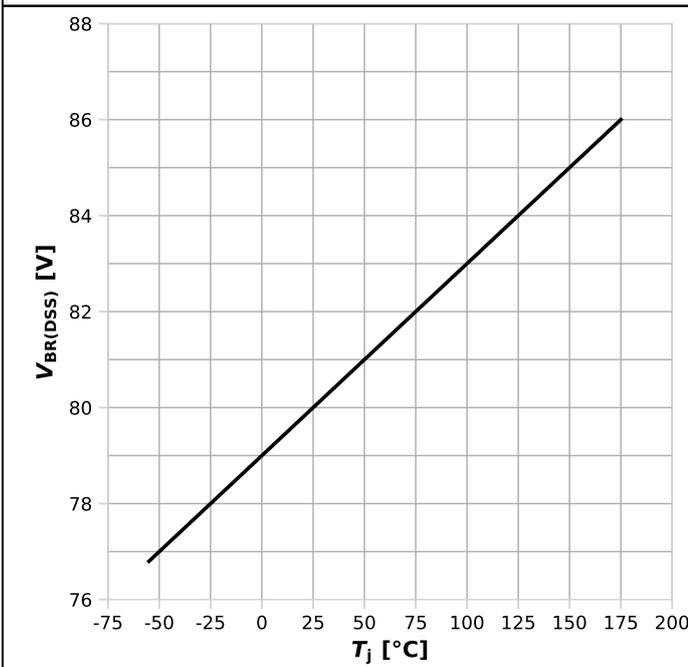
Diagram 13: Avalanche characteristics

I_{AS}=f(t_{AV}); R_{GS}=25 Ω; parameter: $T_{j,start}$
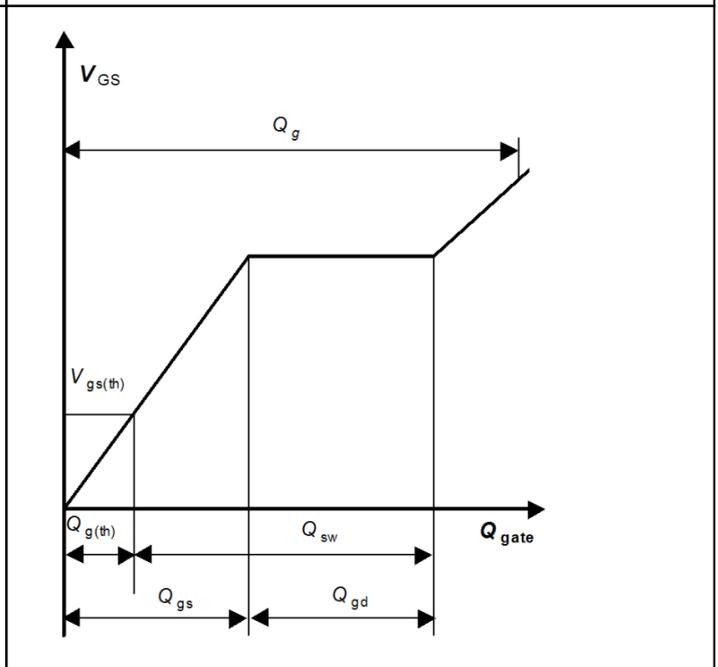
Diagram 14: Typ. gate charge

V_{GS}=f(Q_{gate}), I_D=50 A pulsed, T_j=25 °C; parameter: V_{DD}

Diagram 15: Drain-source breakdown voltage

$V_{BR(DSS)}$=f(T_j); I_D=1 mA

Gate charge waveforms

-

5 Package outlines

PACKAGE - GROUP NUMBER:	**PG-TDSON-8-U04**	
DIMENSIONS	**MILLIMETERS**	
	MIN.	MAX.
A	0.90	1.20
A1	0	0.05
b	0.26	0.54
c	0.15	0.35
D	4.80	5.35
D1	3.70	4.40
D2	2.94	3.25
D3	4.80	5.61
E	5.70	6.10
E1	3.40	3.76
E2	0.69	0.90
e	1.27	
L	0.45	0.72
L1	0.69	0.90
aaa	0.10	0.25
P	8°	12°

1) EXCLUDING MOLD FLASH
2) REMOVAL ON MOLD GATE
   INTRUSION 0.1 MM
   PROTRUSION 0.1 MM
3) LEAD LENGTH UP TO ANTI FLASH LINE
4) ALL METAL SURFACES ARE PLATED,
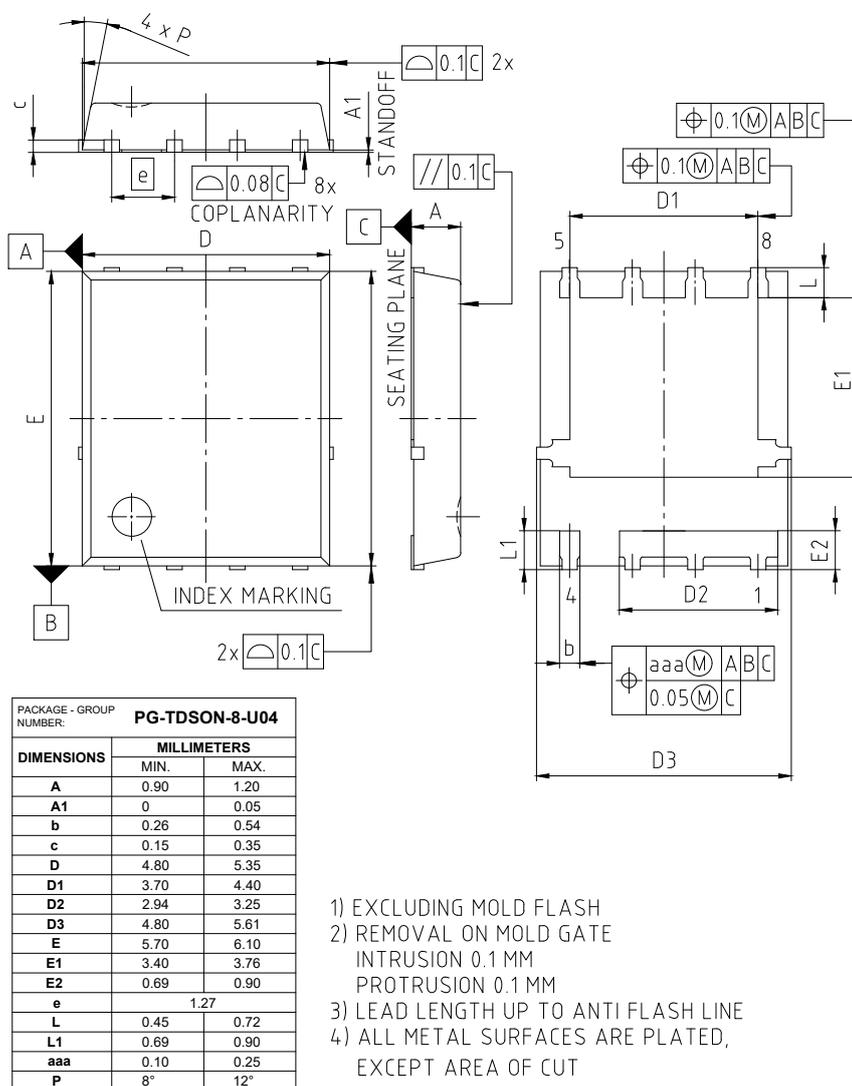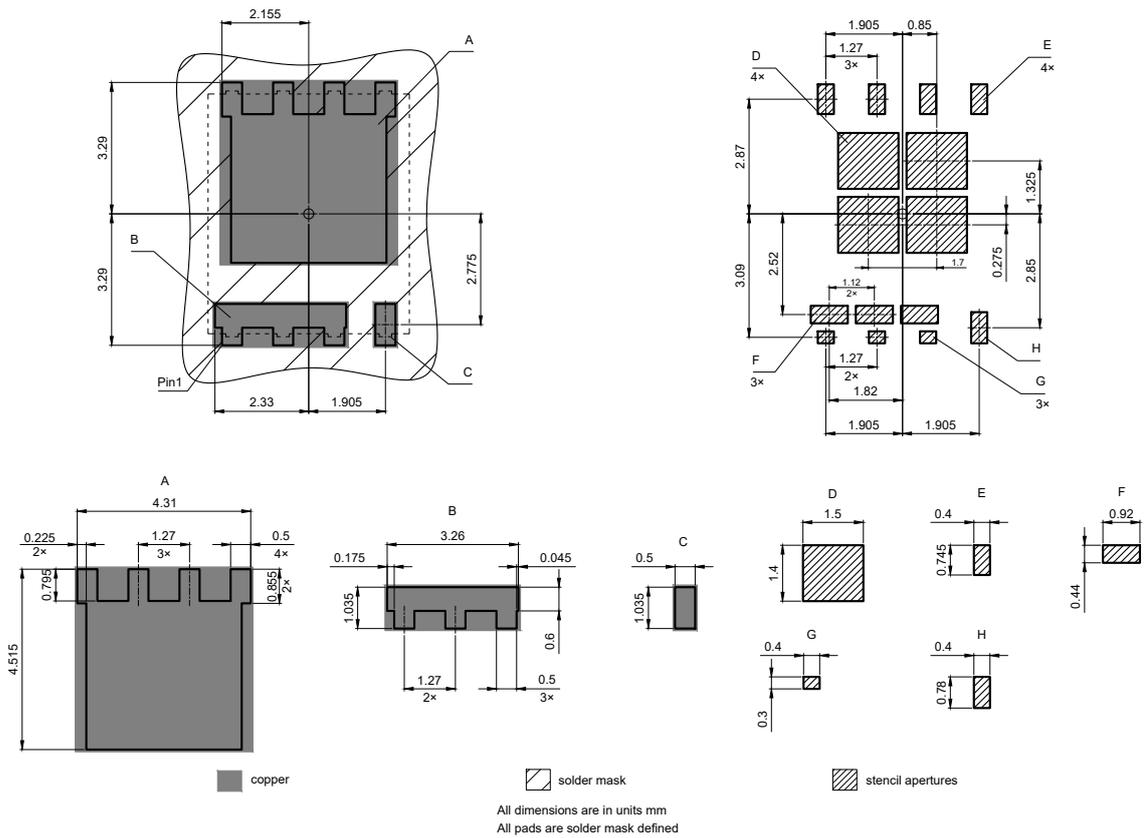   EXCEPT AREA OF CUT

Figure 1   Outline PG-TDSON-8, dimensions in mm

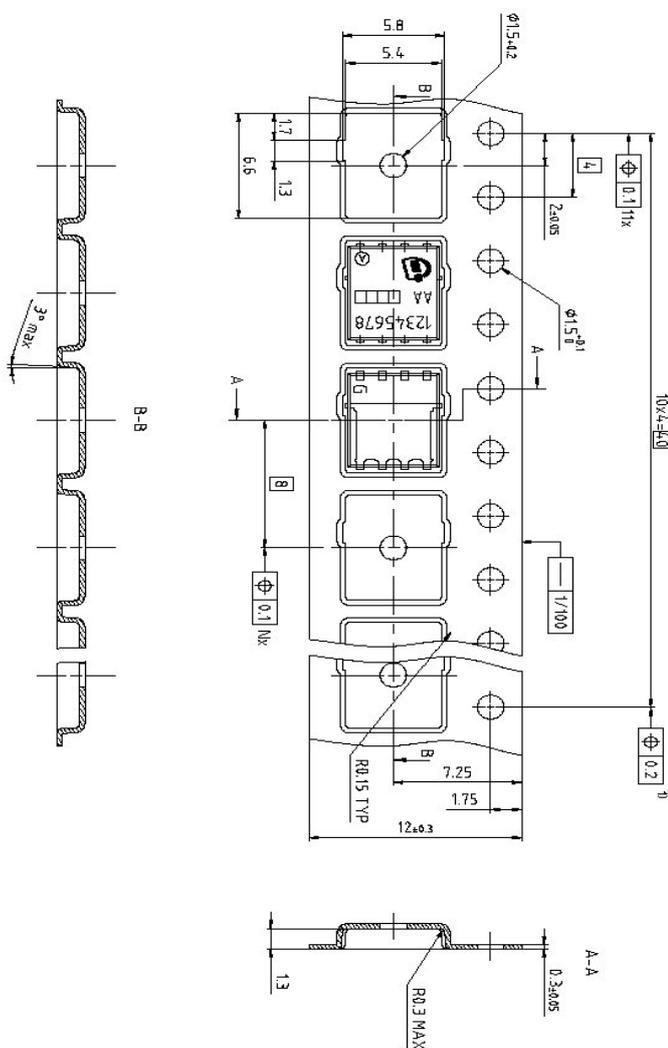**Figure 2   Footprint drawing PG-TDSON-8, dimensions in mm**

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Figure 3   Packaging variant PG-TDSON-8, dimensions in mm

Revision history

ISC024N08NM7

Revision 2025-10-31, Rev. 1.0

Previous revisions

Revision	Date	Subjects (major changes since last revision)
1.0	2025-10-31	Release of final version

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