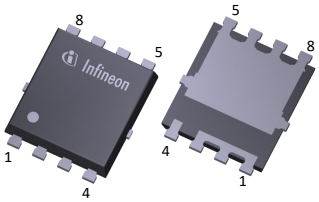
Automotive MOSFET

OptiMOS™ P2 Power-Transistor

PG-TDSON-8

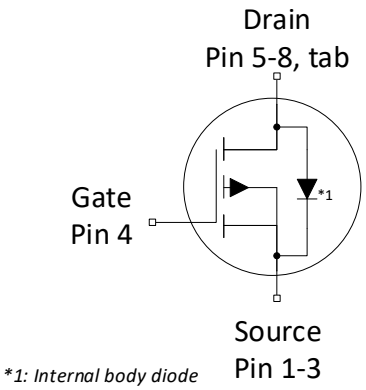


Features

- OptiMOS™ power MOSFET for automotive applications
- P-channel - Enhancement mode - Logic Level
- Extended qualification beyond AEC-Q101
- Enhanced electrical testing
- Robust design
- MSL1 up to 260°C peak reflow
- 175°C operating temperature
- RoHS compliant
- 100% Avalanche tested

Potential applications

General automotive applications.



Product validation

Qualified according to Automotive applications.
Product validation according to AEC-Q101.

Table 1 Key performance parameters

Parameter	Value	Unit
$-V_{DS}$	40	V
$R_{DS(on)}$	3.70	mΩ
$-I_D$(chip limited)	163	A

AEC Qualified

Extended quality

RoHS

Part number	Package	Marking	Related links
IAUCP04P4L040	PG-TDSON-8	4P04L040	see Appendix A

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1 Maximum ratings

at T_j=25 °C, unless otherwise specified

Table 2 Maximum ratings

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Continuous drain current	$-I_D$	-	-	163	A	Chip limitation, $-V_{GS}$ = 10 V [1) 2)]
				160		DC current, $-V_{GS}$ = 10 V
				22		R_{thJA} on 2s2p, $-V_{GS}$ = 10 V, T_a = 100 °C [1) 3)]
Pulsed drain current [1)]	$-I_{D,pulse}$	-	-	490	A	T_C = 25 °C, t_p = 100 µs
Avalanche energy, single pulse [1)]	E_{AS}	-	-	31	mJ	$-I_D$ = 80 A
Avalanche current, single pulse	$-I_{AS}$	-	-	160	A	-
Gate source voltage	$-V_{GS}$	-5		16	V	
Power dissipation	P_{tot}	-	-	150	W	T_C = 25 °C
Operating temperature	T_j	-55	-	175	°C	-

1) The parameter is not subject to production testing - specified by design.

2) The current is limited by the overall system design, including the customer-specific PCB.

3) Device on 2s2p FR4 PCB defined in accordance with JEDEC standards (JESD51-5, -7). PCB is vertical in still air.

2 Thermal characteristics

Table 3 Thermal characteristics

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Thermal resistance, junction - case [4]	R_{thJC}	-	-	1.00	K/W	-
Thermal resistance, junction - ambient [5] [4]	R_{thJA}		27.0	-		

[4] The parameter is not subject to production testing - specified by design.

[5] Device on 2s2p FR4 PCB defined in accordance with JEDEC standards (JESD51-5, -7). 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	$-V_{(BR)DSS}$	40	-	-	V	$-I_D$ = 1 mA, $-V_{GS}$ = 0 V
Gate threshold voltage	$-V_{GS(th)}$	1.2	1.7	2.2	V	V_{DS}=V_{GS}, $-I_D$ = 220 µA
Zero gate voltage drain current	$-I_{DSS}$	-	-	1	µA	T_j = 25 °C, $-V_{GS}$ = 0 V, $-V_{DS}$ = 32 V
				200		$-V_{GS}$ = 0 V, T_j = 125 °C, $-V_{DS}$ = 32 V [6]
Gate-source leakage current	$-I_{GSS}$	-	-	100	nA	$-V_{DS}$ = 0 V, $-V_{GS}$ = 16 V
Drain-source on-state resistance	$R_{DS(on)}$	-	5.0	6.4	mΩ	$-I_D$ = 50 A, $-V_{GS}$ = 4.5 V
			3.10	3.70		$-I_D$ = 100 A, $-V_{GS}$ = 10 V

[6] The parameter is not subject to production testing - specified by design.

Table 5 Dynamic characteristics

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Input capacitance [7]	C_{iss}	-	7830	10180	pF	$-V_{GS}$ = 0 V, f = 1 MHz, $-V_{DS}$ = 25 V
Output capacitance [7]	C_{oss}		2470	3710		
Reverse transfer capacitance [7]	C_{rss}		95	190		
Turn-on delay time [7]	$t_{d(on)}$	-	32	-	ns	$-V_{GS}$ = 10 V, $-V_{DD}$ = 20 V, R_G = 3.5 Ω, $-I_D$ = 160 A
Rise time [7]	t_r		45			
Turn-off delay time [7]	$t_{d(off)}$		129			
Fall time [7]	t_f		100			

[7] The parameter is not subject to production testing - specified by design.

Table 6 Gate Charge Characteristics

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Gate to source charge [8]	Q_{gs}	-	29	38	nC	$-V_{GS}$ = 0 V to 10 V, $-V_{DS}$ = 32 V, $-I_D$ = 160 A
Gate to drain charge [8]	Q_{gd}		17	34	nC	
Gate charge total [8]	Q_g		112	146	nC	
Gate plateau voltage [8]	$-V_{plateau}$		3.7	-	V	

[8] The parameter is not subject to production testing - specified by design.

Table 7 Reverse Diode

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Diode continuous forward current [9]	$-I_S$	-	-	160	A	T_C = 25 °C
Diode pulse current [9]	$-I_{S,pulse}$	-	-	490	A	T_C = 25 °C, t_p = 100 µs
Diode forward voltage	$-V_{SD}$	-	0.9	1.2	V	T_j = 25 °C, $-V_{GS}$ = 0 V, $-I_F$ = 100 A
Reverse recovery time [9]	t_{rr}	-	48	-	ns	di_F/dt =100 A/µs, $-V_R$ = 20 V, $-I_F$ = 50 A
Reverse recovery charge [9]	Q_{rr}		36		nC	

[9] The parameter is not subject to production testing - specified by design.

4 Electrical characteristics diagrams

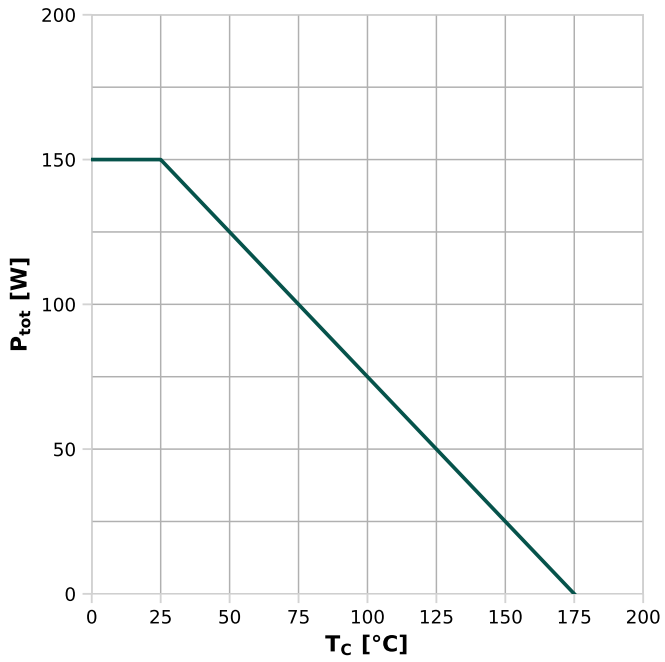
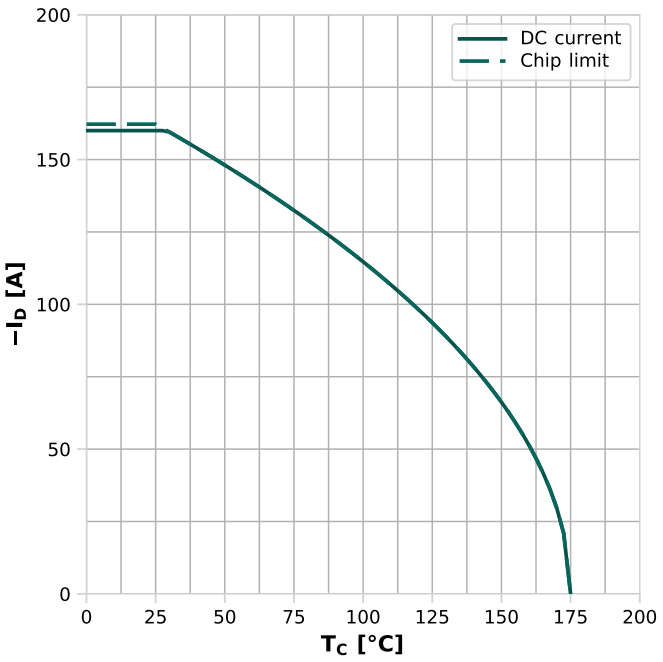
Diagram 1: Power dissipation	Diagram 2: Drain Current
	
$P_{tot}=f(T_C)$; $-V_{GS} \geq 6$ V	$-I_D=f(T_C)$; $-V_{GS} \geq 6$V

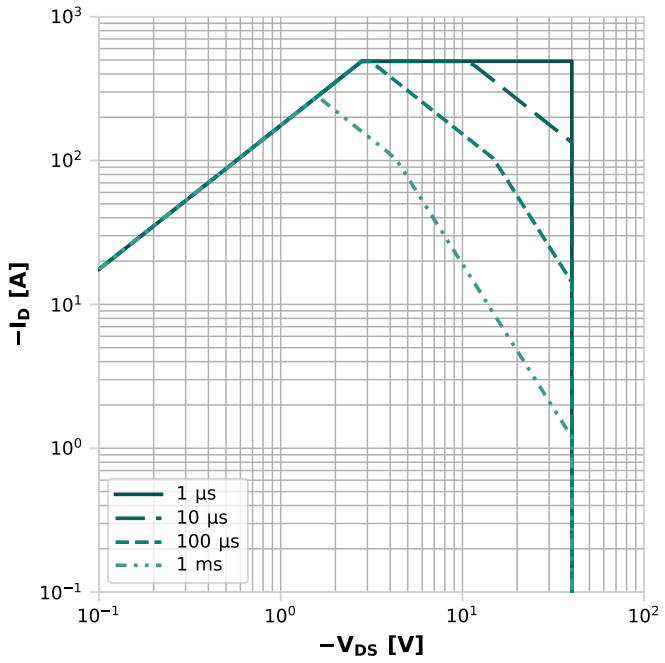
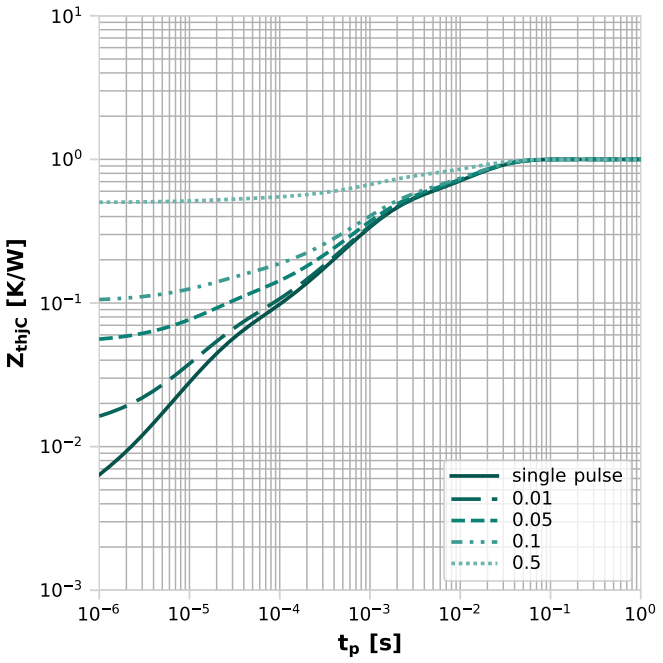
Diagram 3: Safe operating area	Diagram 4: Max. transient thermal impedance
	
$-I_D=f(-V_{DS})$; T_C= 25 °C; D=0; parameter: t_p	$Z_{thjC}=f(t_p)$; parameter: $D=t_p/T$

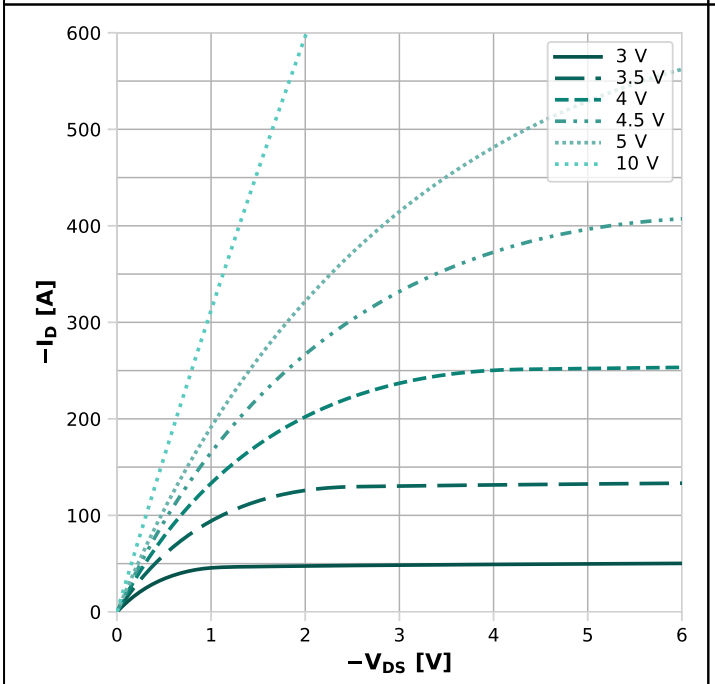
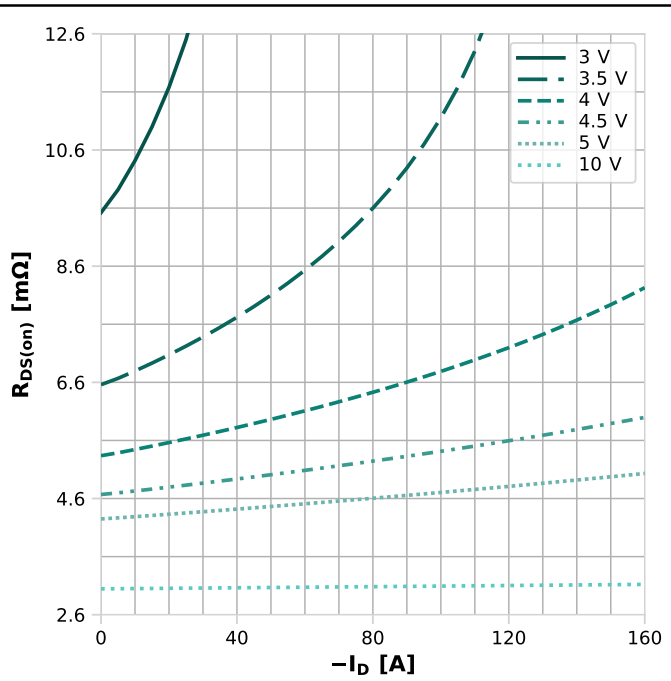
Diagram 5: Typ. output characteristics	Diagram 6: Typ. drain-source on-state resistance
	
$-I_D=f(-V_{DS})$; T_j= 25 °C, parameter: $-V_{GS}$	$R_{DS(on)}=f(-I_D)$; T_j= 25 °C; parameter: $-V_{GS}$

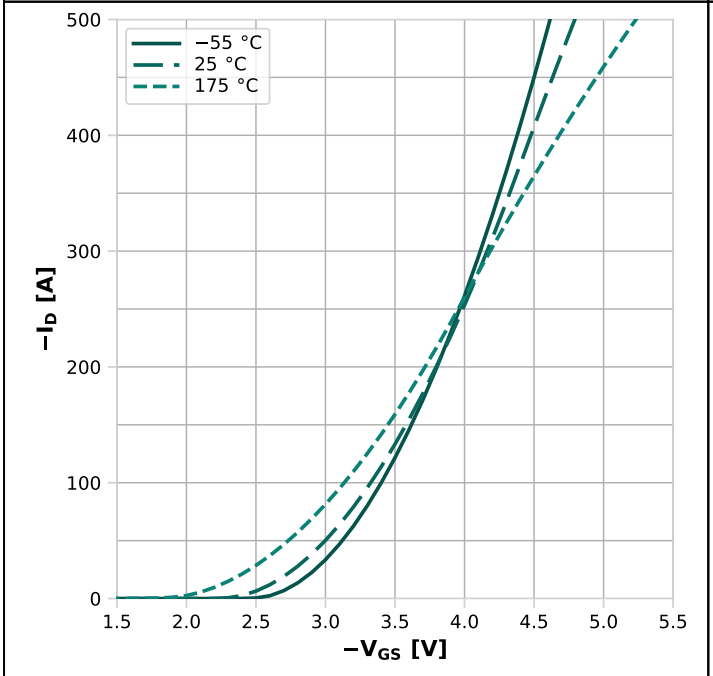
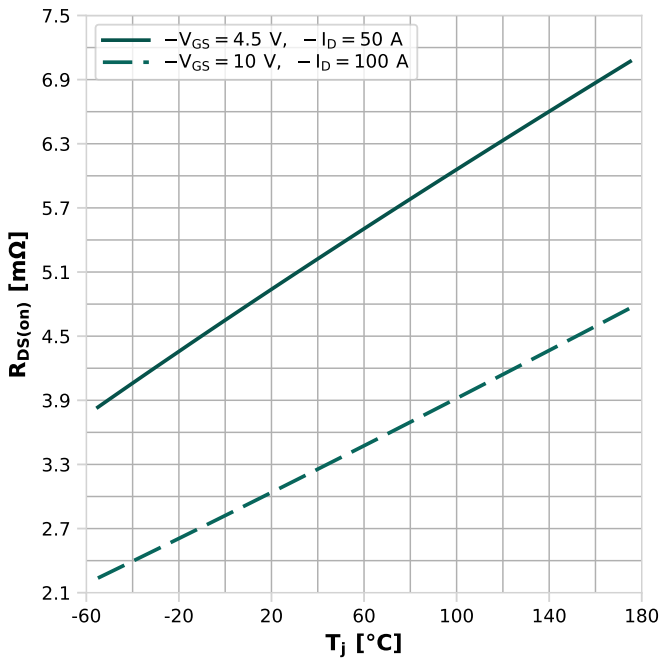
Diagram 7: Typ. transfer characteristics	Diagram 8: Typ. drain-source on-state resistance
	
$-I_D=f(-V_{GS})$; $-V_{DS}$= 6 V; parameter: T_j	$R_{DS(on)}=f(T_j)$; parameter: $-I_D$, $-V_{GS}$

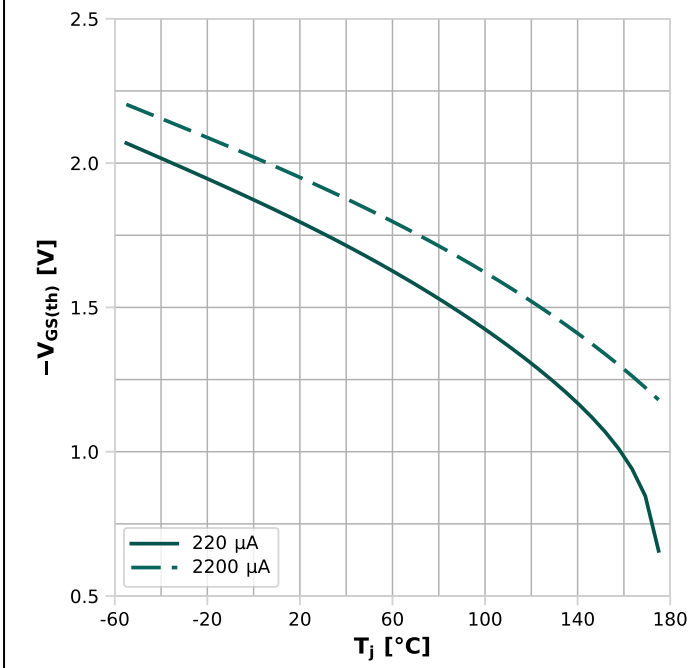
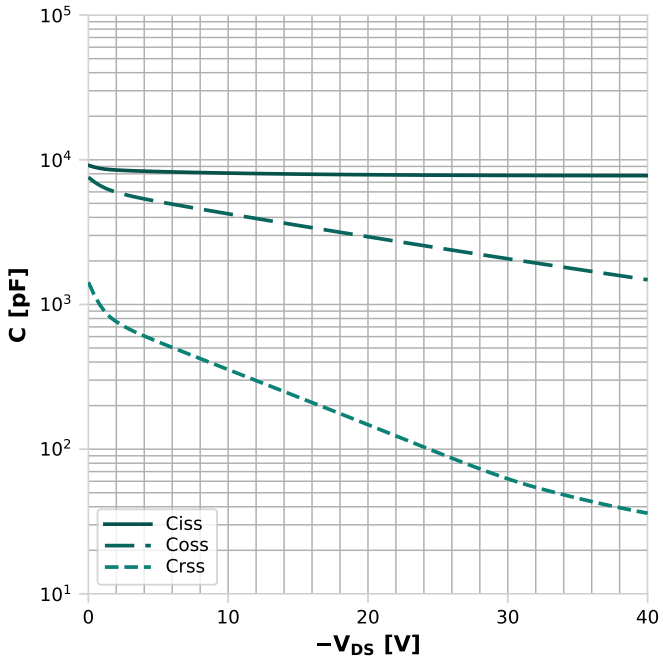
Diagram 9: Typ. gate threshold voltage	Diagram 10: Typ. capacitances
	
$-V_{GS(th)}=f(T_j)$; $-V_{GS}= -V_{DS}$; parameter: $-I_D$	$C=f(-V_{DS})$; $-V_{GS}= 0$ V; f=1 MHz

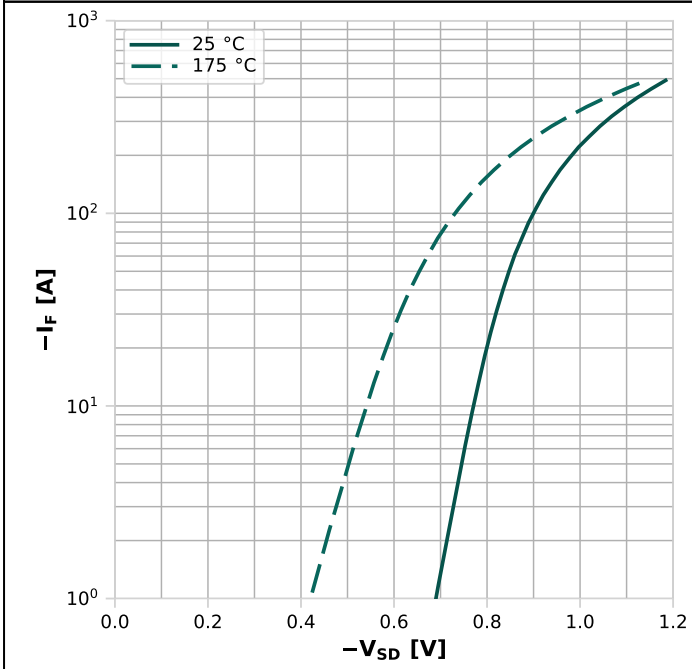
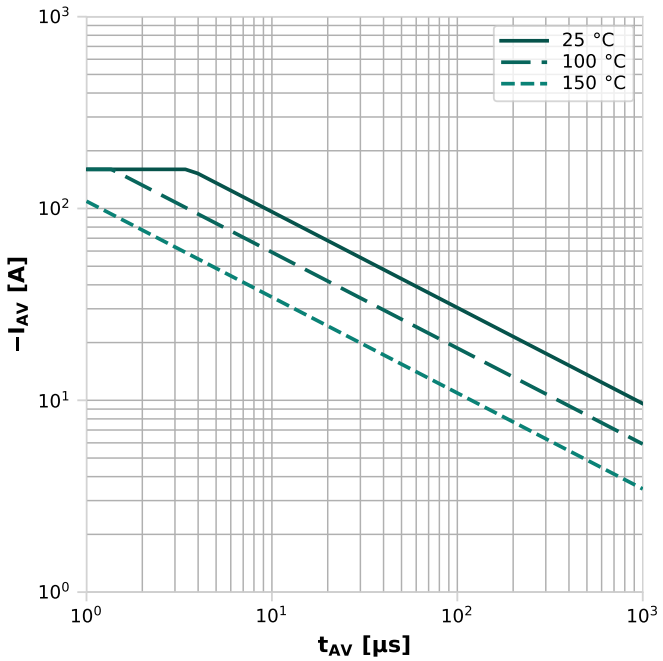
Diagram 11: Typ. forward diode characteristics	Diagram 12: Typ. avalanche characteristics
	
$-I_F=f(-V_{SD})$; parameter: T_j	$-I_{AS}=f(t_{AV})$; parameter: $T_{j(start)}$

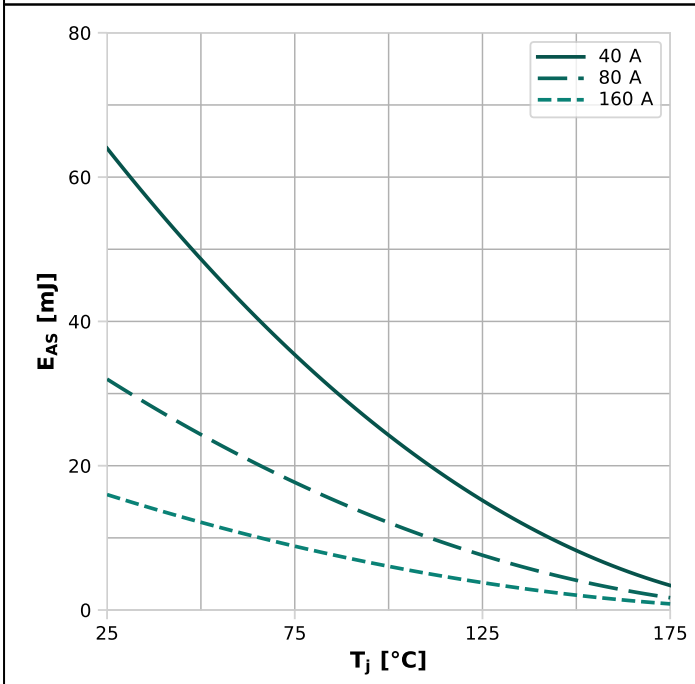
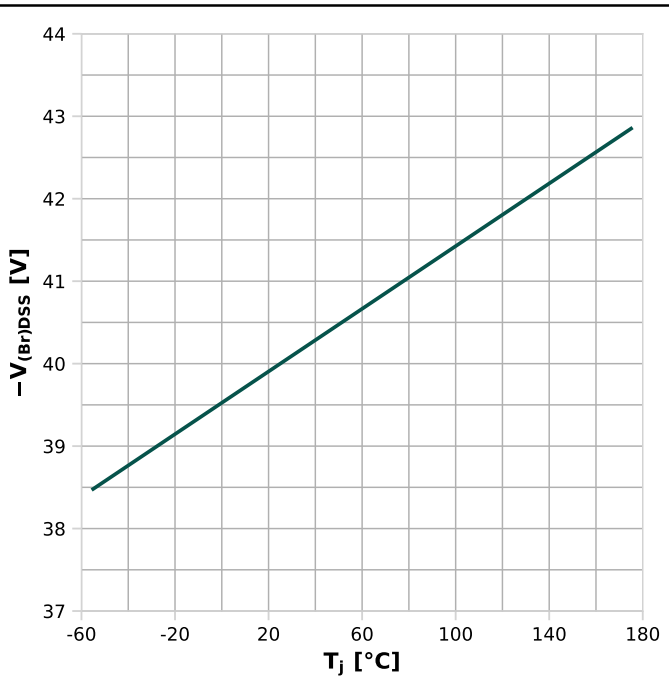
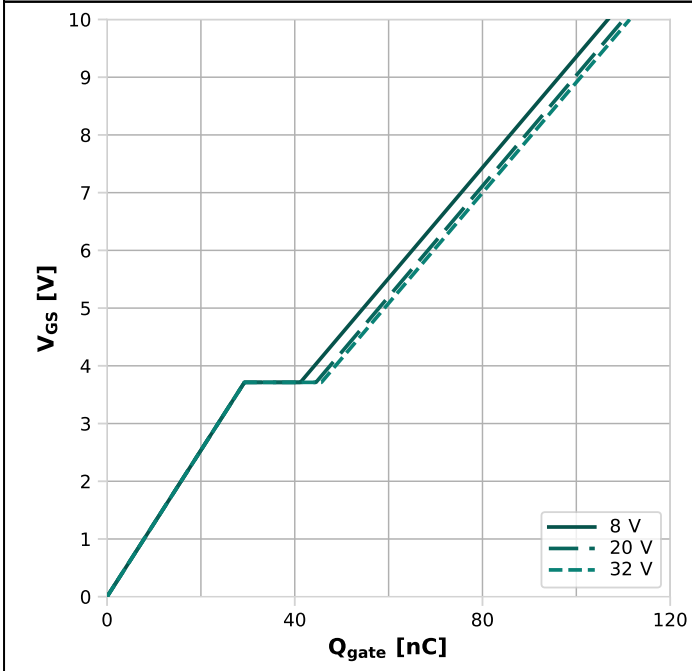
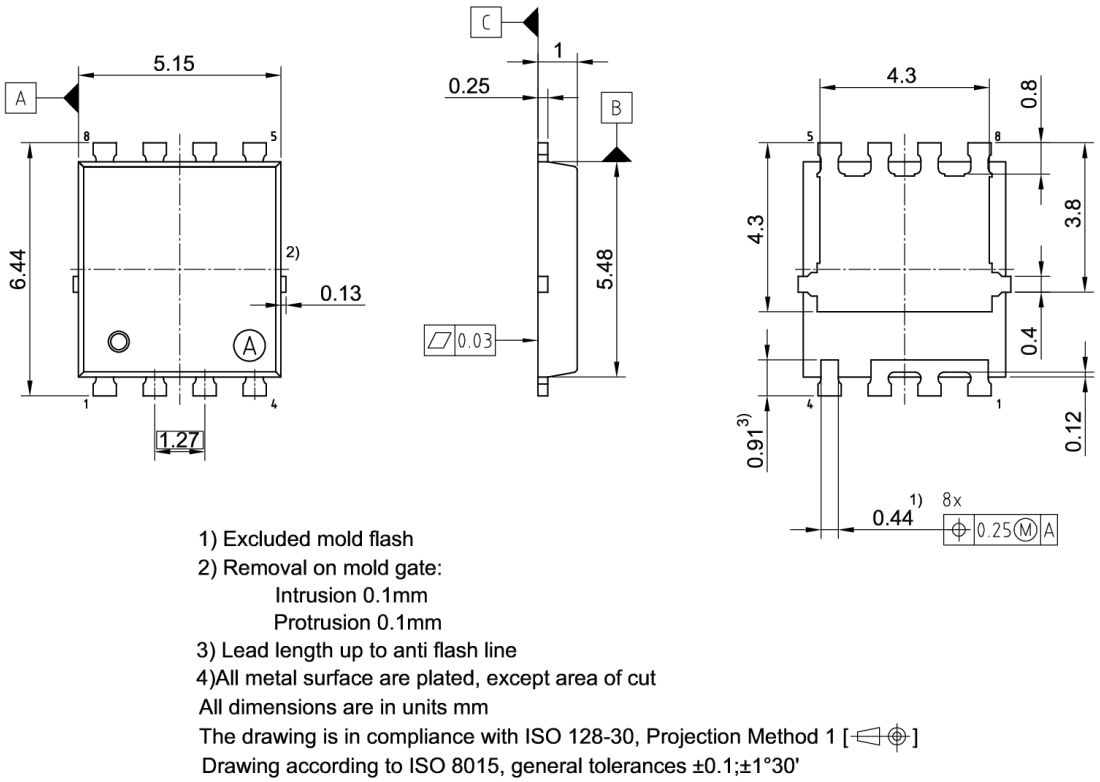
Diagram 13: Typical avalanche Energy	Diagram 14: Drain-source breakdown voltage
	
$E_{AS}=f(T_j)$; parameter: $-I_D$	$-V_{(Br)DSS}=f(T_j)$; $-I_D$= 1 mA

Diagram 15: Typ. gate charge

$-V_{GS}=f(Q_{gate})$; $-I_D$= 160 A pulsed; parameter: $-V_{DS}$

5 Package outlines



1) Excluded mold flash
2) Removal on mold gate:
Intrusion 0.1mm
Protrusion 0.1mm
3) Lead length up to anti flash line
4)All metal surface are plated, except area of cut
All dimensions are in units mm
The drawing is in compliance with ISO 128-30, Projection Method 1 [ ]
Drawing according to ISO 8015, general tolerances ±0.1;±1°30'

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

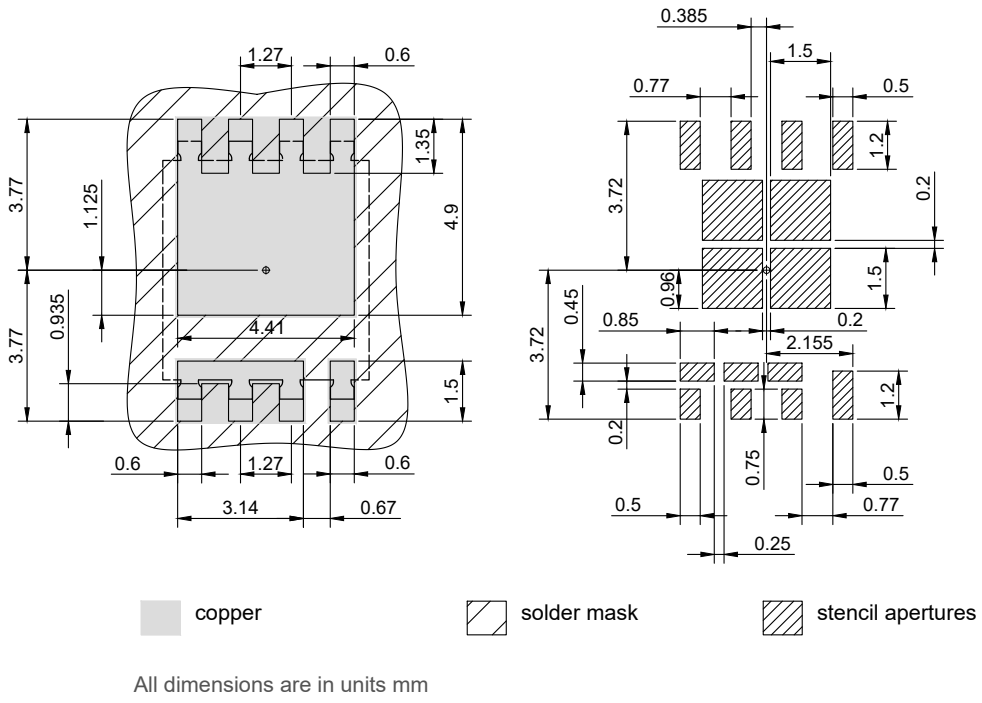


Figure 2 Footprint drawing PG-TDSON-8, dimensions in mm

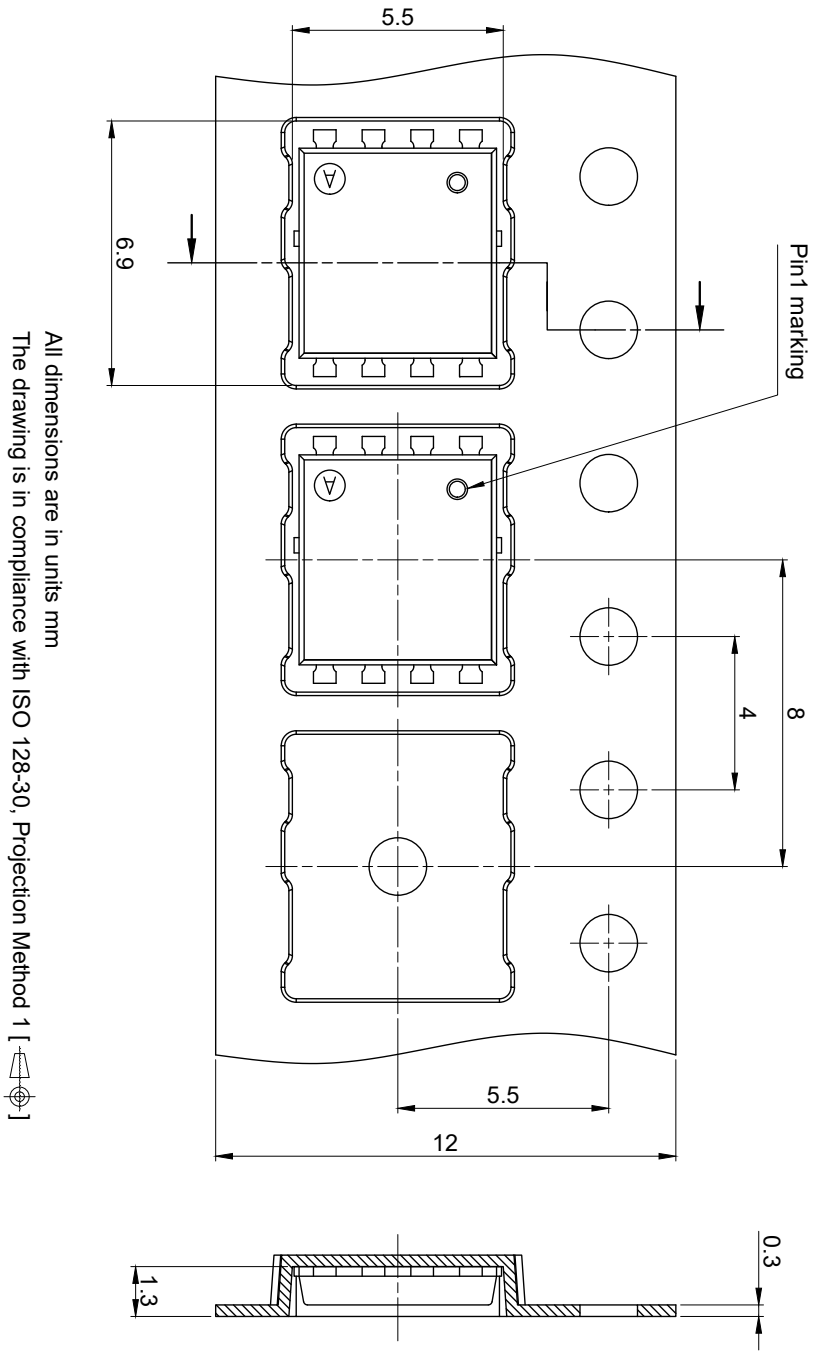


Figure 3 Packaging variant PG-TDSON-8, dimensions in mm

6 Appendix A

Table 8 Related links

- IFX Optimos™ Power-Transistor Webpage

Revision history

IAUCP04P4L040

Revision 2026-07-14, Rev. 1.0

Previous revisions

Revision	Date	Subjects (major changes since last revision)
1.0	2026-07-14	Release of Final Datasheet

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