

Automotive MOSFET

OptiMOS™ 7 Power-Transistor

Features

- OptiMOS™ power MOSFET for automotive applications
- N-channel - Enhancement mode - Normal 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
- Top Side Cooling

Potential applications

General automotive applications.

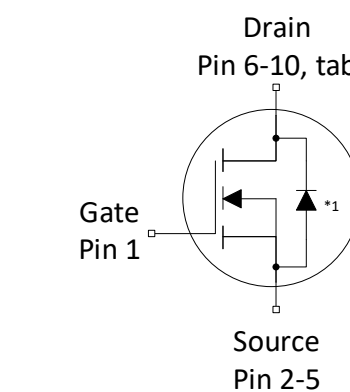
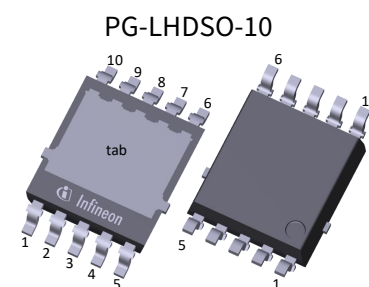
Product validation

Qualified for Automotive applications.

Product validation according to AEC-Q101.

Table 1 Key performance parameters

Parameter	Value	Unit
V_{DS}	40	V
$R_{DS(on)}$	0.75	mΩ
I_D (chip limited)	360	A



Part number	Package	Marking	Related links
IAUCN04S7N007T	PG-LHDSO-10	7B4	see Appendix A



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1 Maximum ratings

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

Table 2 Maximum ratings

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Continuous drain current	I_D	-	-	360	A	Chip limitation, $V_{GS} = 10\text{ V}$ ^{1) 2)}
				175		DC current, $V_{GS} = 10\text{ V}$
				90		R_{thJA} on 2s2p, $V_{GS} = 10\text{ V}$, $T_a = 100\text{ °C}$ ^{1) 3)}
Pulsed drain current ¹⁾	$I_{D,pulse}$	-	-	1190	A	$T_C = 25\text{ °C}$, $t_p = 100\text{ }\mu\text{s}$
Avalanche energy, single pulse ¹⁾	E_{AS}	-	-	284	mJ	$I_D = 88\text{ A}$
Avalanche current, single pulse	I_{AS}	-	-	175	A	-
Gate source voltage	V_{GS}	-20	-	20	V	
Power dissipation	P_{tot}	-	-	178	W	$T_C = 25\text{ °C}$
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}	-	-	0.9	K/W	-
Thermal characterisation parameter, source pin 4) 5)	ψ_{source}		5.3	-		
Thermal characterisation parameter, drain pin 4) 6)	ψ_{drain}		5.4	-		
Thermal resistance, junction - heatsink 4) 7)	R_{thJH}		6.9	-		
Thermal resistance, junction - ambient 4) 8)	R_{thJA}		45	-		

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

5) Thermal characterization parameter, calculated as $\psi_{source} = (T_{source} - T_{ambient})/P_{dis}$ in condition of 3). Used to determine PCB temperature at source pins for given power.

6) Thermal characterization parameter, calculated as $\psi_{drain} = (T_{drain} - T_{ambient})/P_{dis}$ in condition of 3). Used to determine PCB temperature at drain pins for given power.

7) Device on 2s2p FR4 PCB defined in acc. with JEDEC standards (JESD51-5,-7) without thermal vias, heatsink of 71 x 110 x 2 mm is attached through TIM with 3.3 W/(m*K) and 400 µm thickness to top side pad. Heatsink fixed to 85°C ambient temperature.

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

3 Electrical characteristics

at $T_j=25^\circ\text{C}$, 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	$I_D = 1\text{ mA}$, $V_{GS} = 0\text{ V}$
Gate threshold voltage	$V_{GS(th)}$	2.2	2.6	3	V	$V_{DS}=V_{GS}$, $I_D = 95\text{ }\mu\text{A}$
Zero gate voltage drain current	I_{DSS}	-	-	1	μA	$V_{DS} = 40\text{ V}$, $T_J = 25^\circ\text{C}$, $V_{GS} = 0\text{ V}$
				25		$V_{DS} = 40\text{ V}$, $T_J = 100^\circ\text{C}$, $V_{GS} = 0\text{ V}$ 9)
Gate-source leakage current	I_{GSS}	-	-	100	nA	$V_{DS} = 0\text{ V}$, $V_{GS} = 20\text{ V}$
Drain-source on-state resistance	$R_{DS(on)}$	-	0.80	0.90	mΩ	$I_D = 44\text{ A}$, $V_{GS} = 7\text{ V}$
			0.68	0.75		$I_D = 88\text{ A}$, $V_{GS} = 10\text{ V}$
Gate resistance 9)	R_G	-	1.0	-	Ω	-

9) 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 ¹⁰⁾	C_{iss}	-	6420	8340	pF	$V_{DS} = 20\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1\text{ MHz}$
Output capacitance ¹⁰⁾	C_{oss}		3200	4160		
Reverse transfer capacitance ¹⁰⁾	C_{rss}		105	158		
Turn-on delay time ¹⁰⁾	$t_{d(on)}$	-	17	-	ns	$I_D = 88\text{ A}$, $V_{GS} = 10\text{ V}$, $V_{DD} = 20\text{ V}$, $R_G = 3.5\ \Omega$
Rise time ¹⁰⁾	t_r		21			
Turn-off delay time ¹⁰⁾	$t_{d(off)}$		42			
Fall time ¹⁰⁾	t_f		30			

¹⁰⁾ 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 ¹¹⁾	Q_{gs}	-	25	33	nC	$I_D = 88\text{ A}$, $V_{DS} = 20\text{ V}$, $V_{GS} = 0\text{ V to } 10\text{ V}$
Gate to drain charge ¹¹⁾	Q_{gd}		19	29	nC	
Gate charge total ¹¹⁾	Q_g		95	124	nC	
Gate plateau voltage ¹¹⁾	$V_{plateau}$		4.0	-	V	

¹¹⁾ 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 ¹²⁾	I_S	-	-	175	A	$T_C = 25\text{ °C}$
Diode pulse current ¹²⁾	$I_{S,pulse}$	-	-	1190	A	$T_C = 25\text{ °C}$, $t_p = 100\ \mu\text{s}$
Diode forward voltage	V_{SD}	-	0.8	0.95	V	$T_J = 25\text{ °C}$, $V_{GS} = 0\text{ V}$, $I_F = 88\text{ A}$
Reverse recovery time ¹²⁾	t_{rr}	-	46	69	ns	$di_F/dt = 100\text{ A}/\mu\text{s}$, $V_R = 20\text{ V}$, $I_F = 50\text{ A}$
Reverse recovery charge ¹²⁾	Q_{rr}		41	82	nC	

¹²⁾ The parameter is not subject to production testing - specified by design.

4 Electrical characteristics diagrams

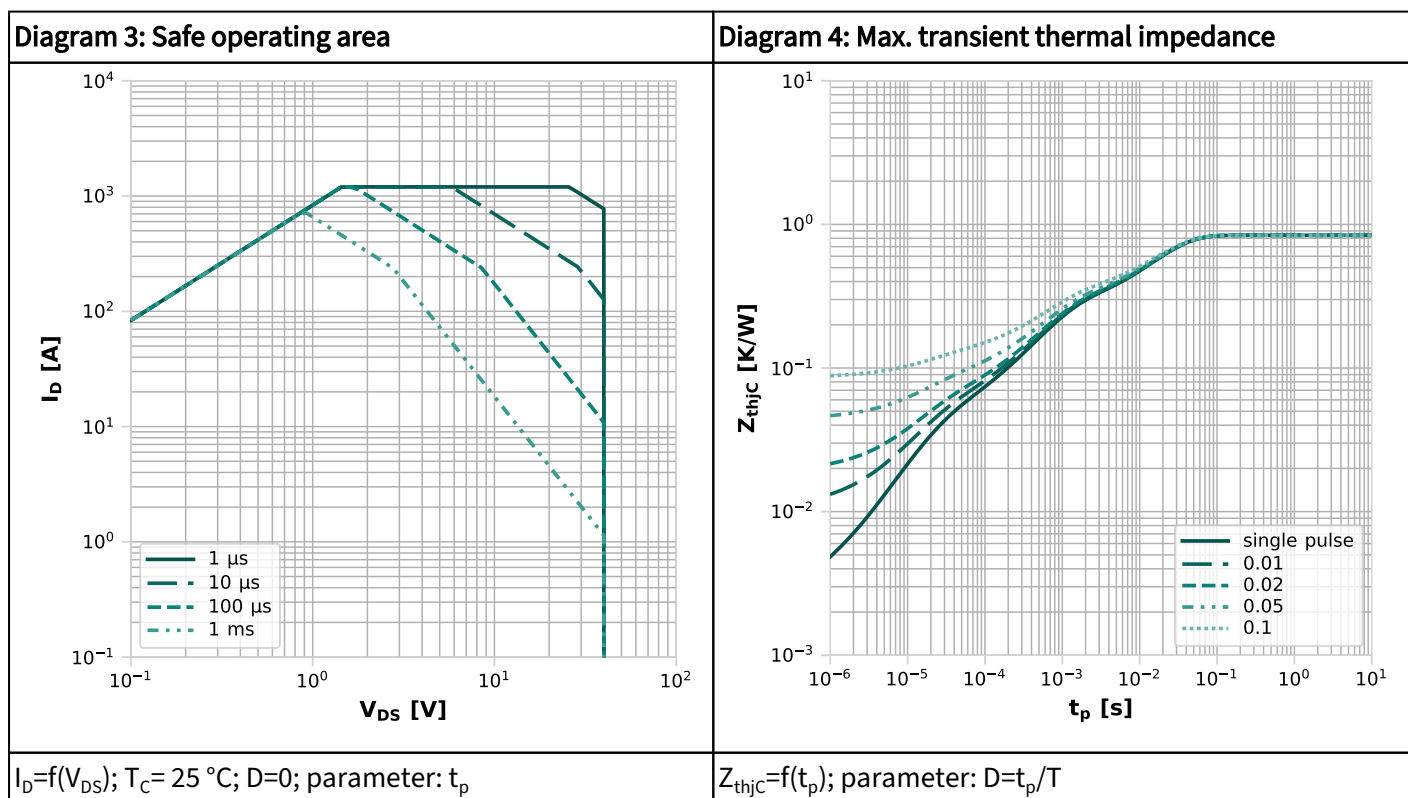
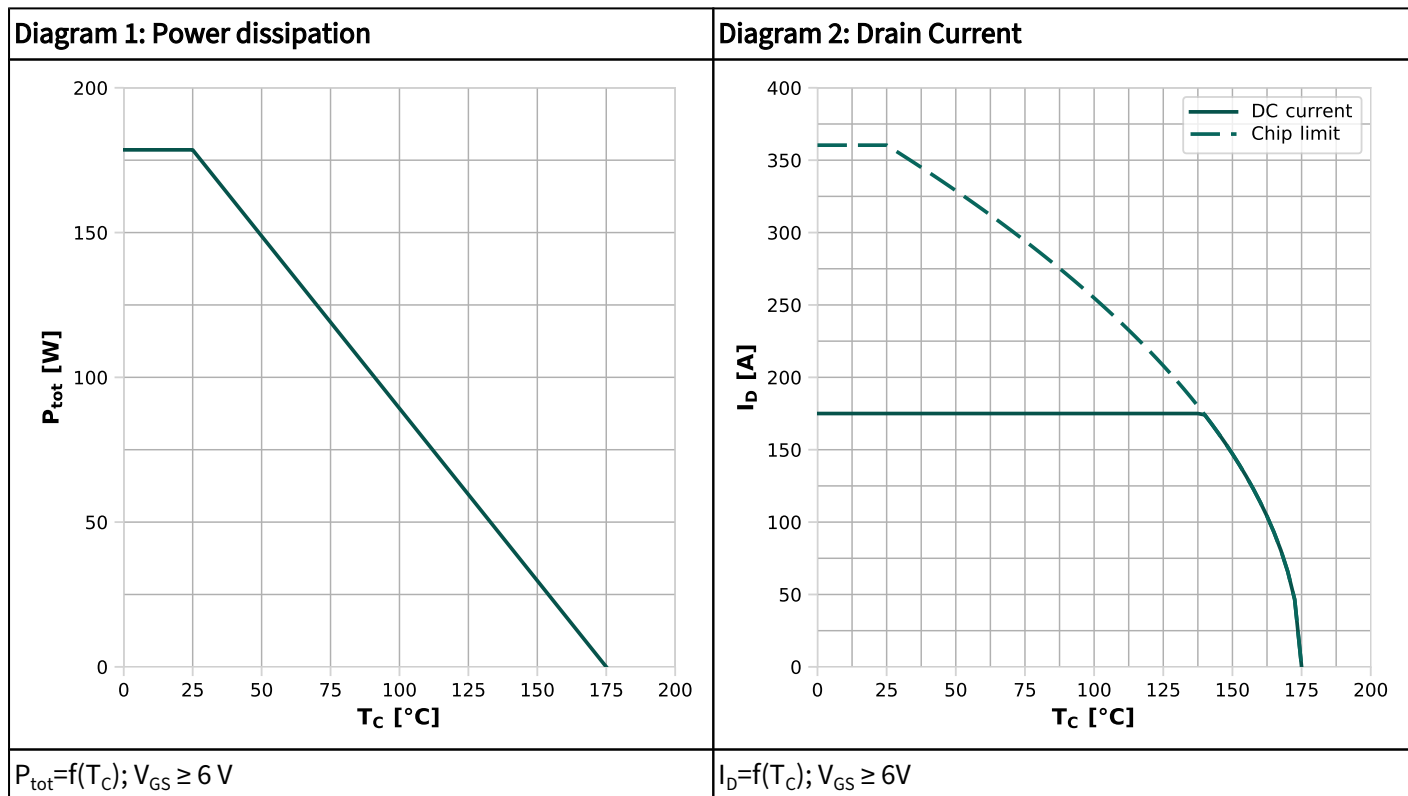
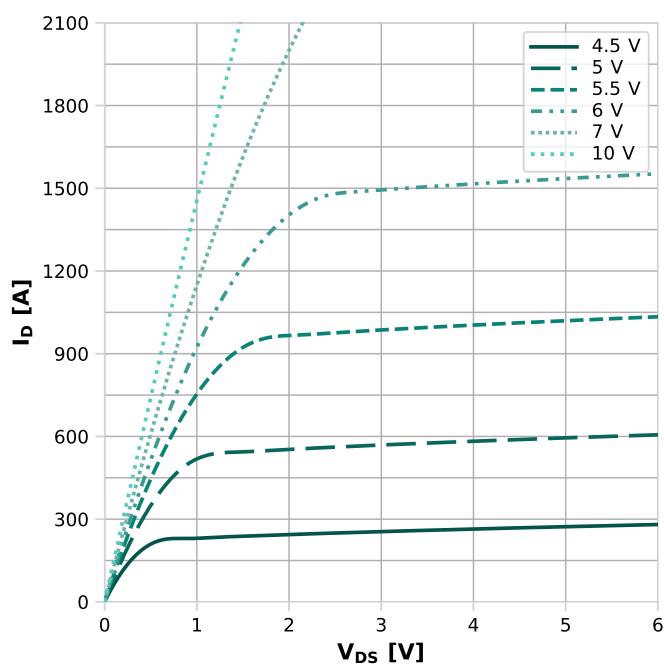
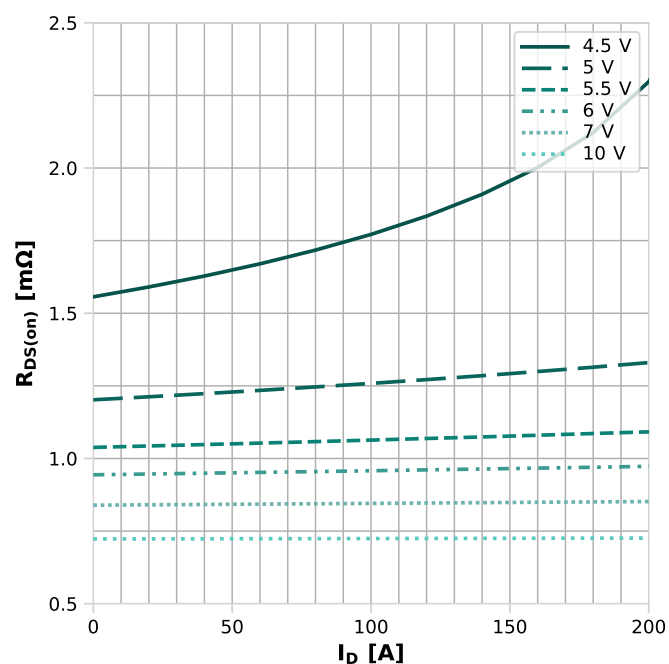


Diagram 5: Typ. output characteristics



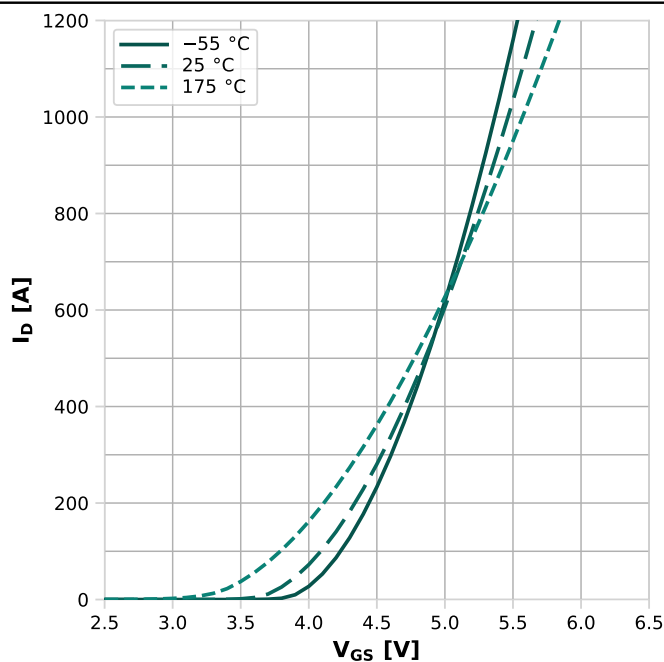
$I_D = f(V_{DS})$; $T_j = 25\text{ °C}$; parameter: V_{GS}

Diagram 6: Typ. drain-source on-state resistance



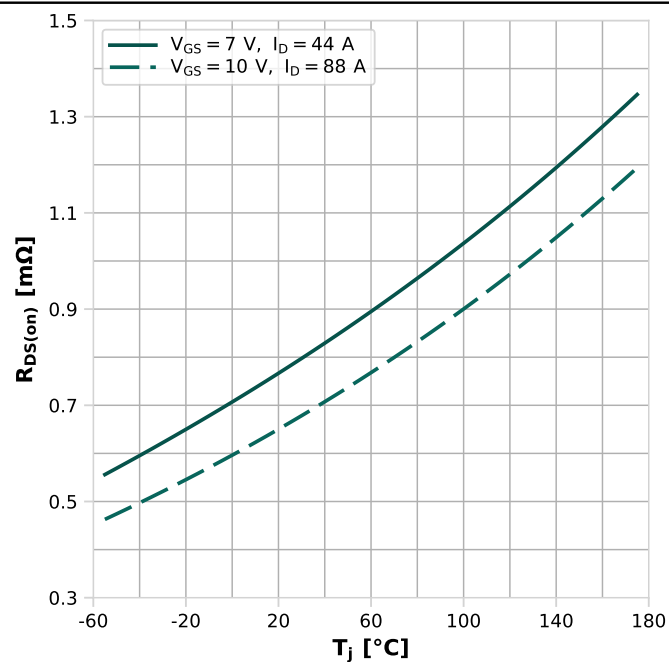
$R_{DS(on)} = f(I_D)$; $T_j = 25\text{ °C}$; parameter: V_{GS}

Diagram 7: Typ. transfer characteristics



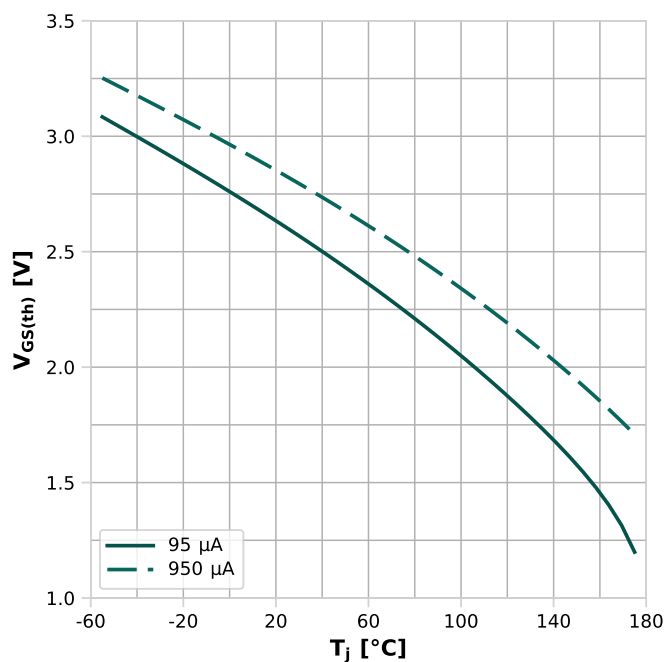
$I_D = f(V_{GS})$; $V_{DS} = 6\text{ V}$; parameter: T_j

Diagram 8: Typ. drain-source on-state resistance



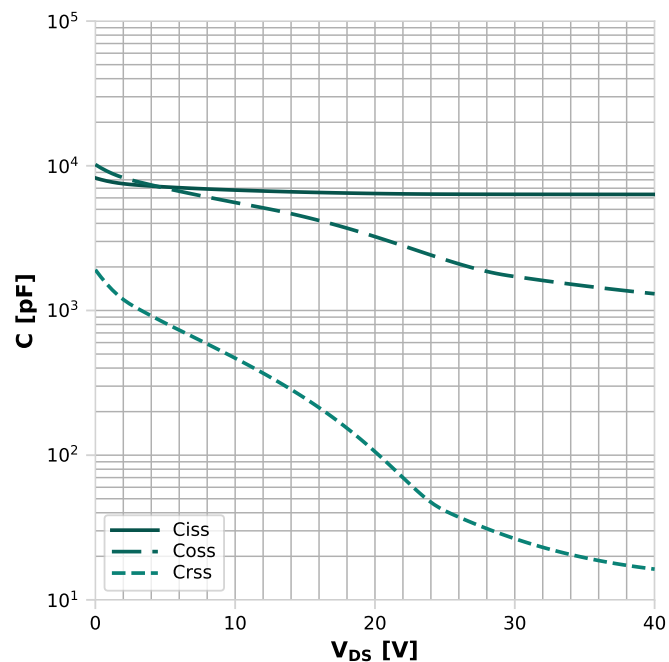
$R_{DS(on)} = f(T_j)$; parameter: I_D , V_{GS}

Diagram 9: Typ. gate threshold voltage



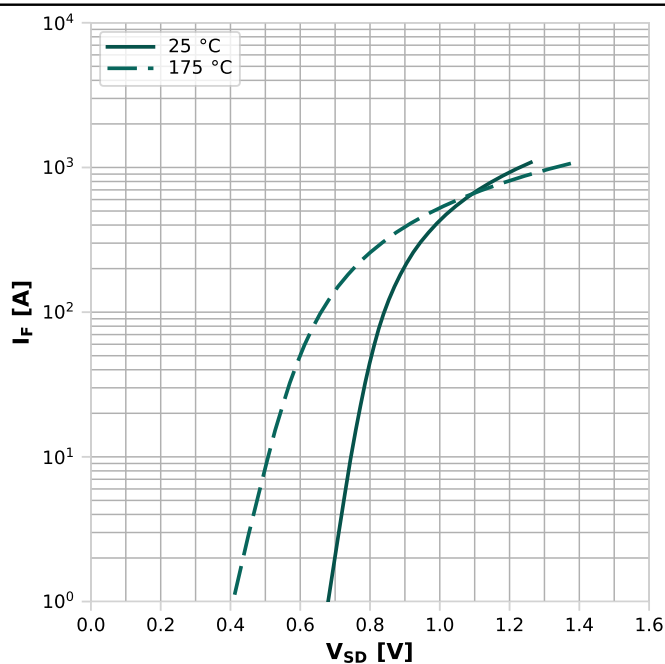
$V_{GS(th)} = f(T_j)$; $V_{GS} = V_{DS}$; parameter: I_D

Diagram 10: Typ. capacitances



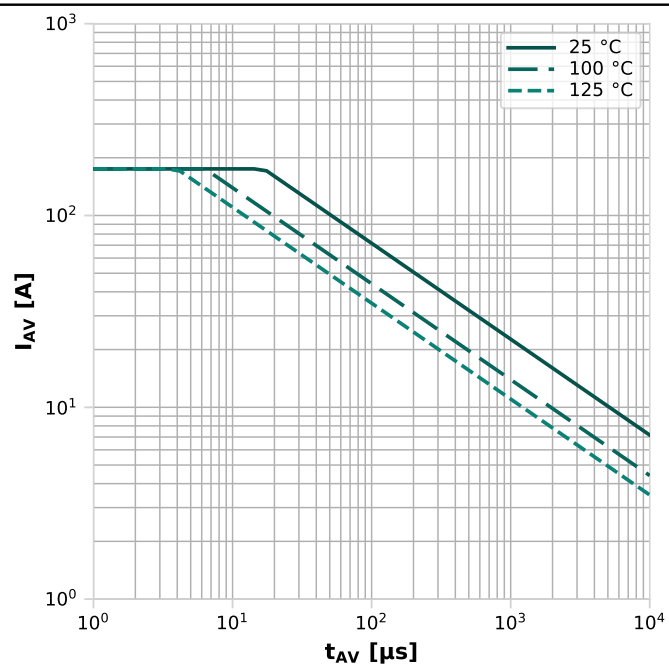
$C = f(V_{DS})$; $V_{GS} = 0$ V; $f = 1$ MHz

Diagram 11: Typ. forward diode characteristics



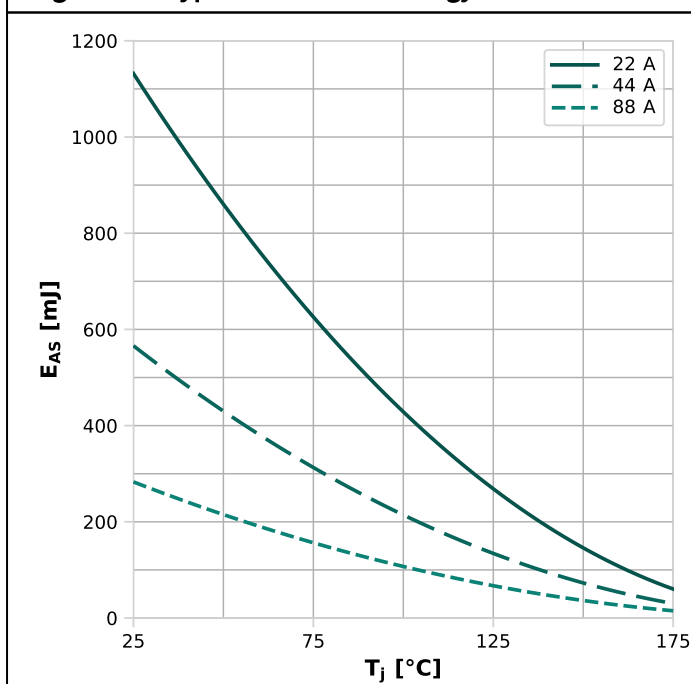
$I_F = f(V_{SD})$; parameter: T_j

Diagram 12: Typ. avalanche characteristics



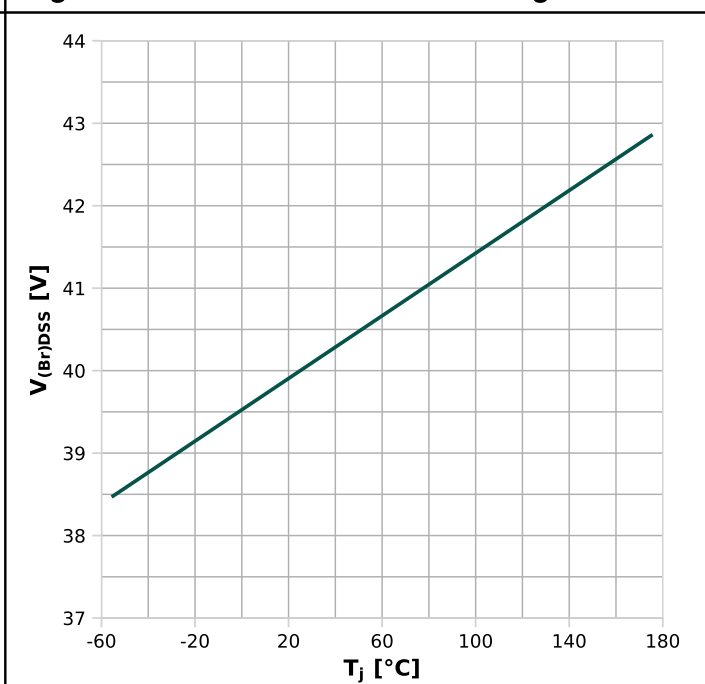
$I_{AS} = f(t_{AV})$; parameter: $T_{j(start)}$

Diagram 13: Typical avalanche Energy



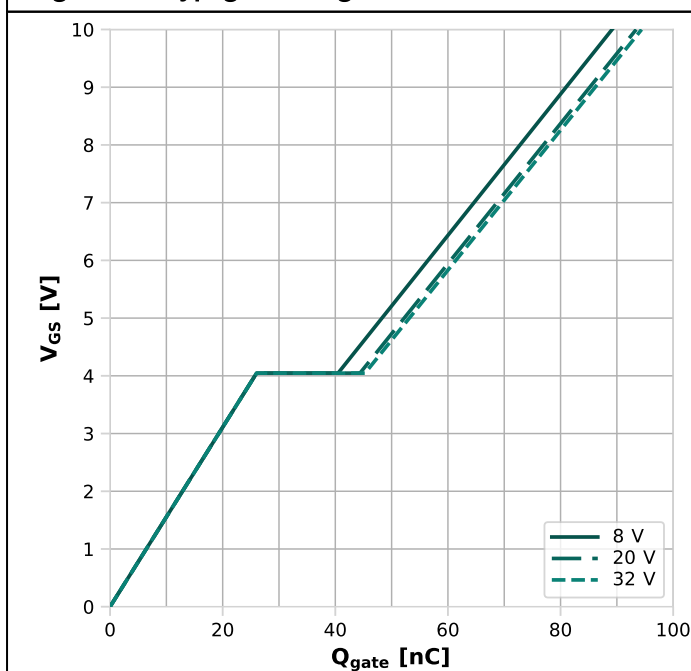
$E_{AS}=f(T_J)$; parameter: I_D

Diagram 14: Drain-source breakdown voltage



$V_{(Br)DSS}=f(T_J)$; $I_D=1\text{ mA}$

Diagram 15: Typ. gate charge



$V_{GS}=f(Q_{gate})$; $I_D=88\text{ A pulsed}$; parameter: V_{DD}

5 Test circuits

Table 8 Diode characteristics

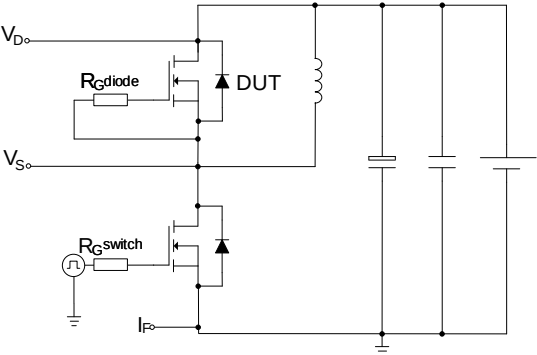
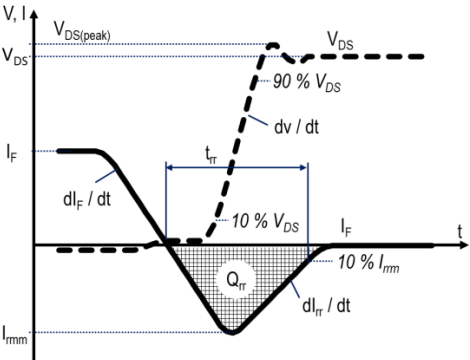
Test circuit for diode characteristics	Diode recovery waveform
	

Table 9 Unclamped inductive load test circuit

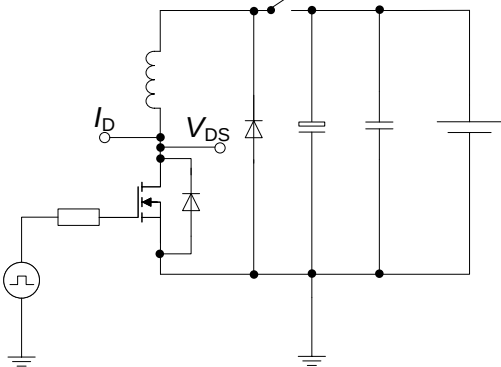
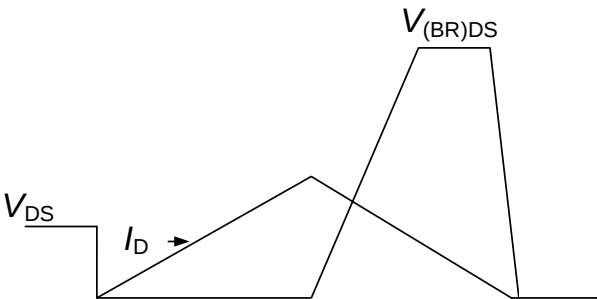
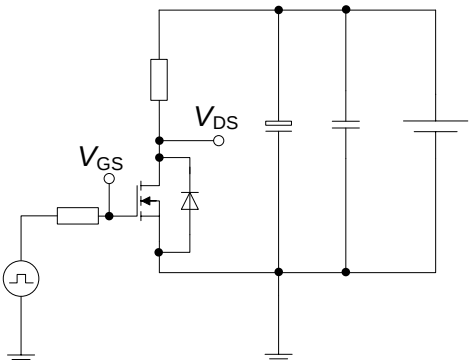
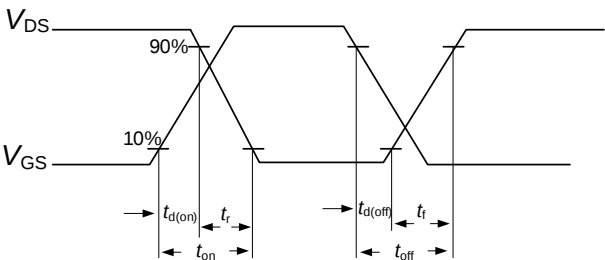
Unclamped inductive load test circuit	Unclamped inductive waveform
	

Table 10 Switching times test circuit for resistive load

Switching times test circuit for resistive load	Switching times waveform
	

6 Package outlines

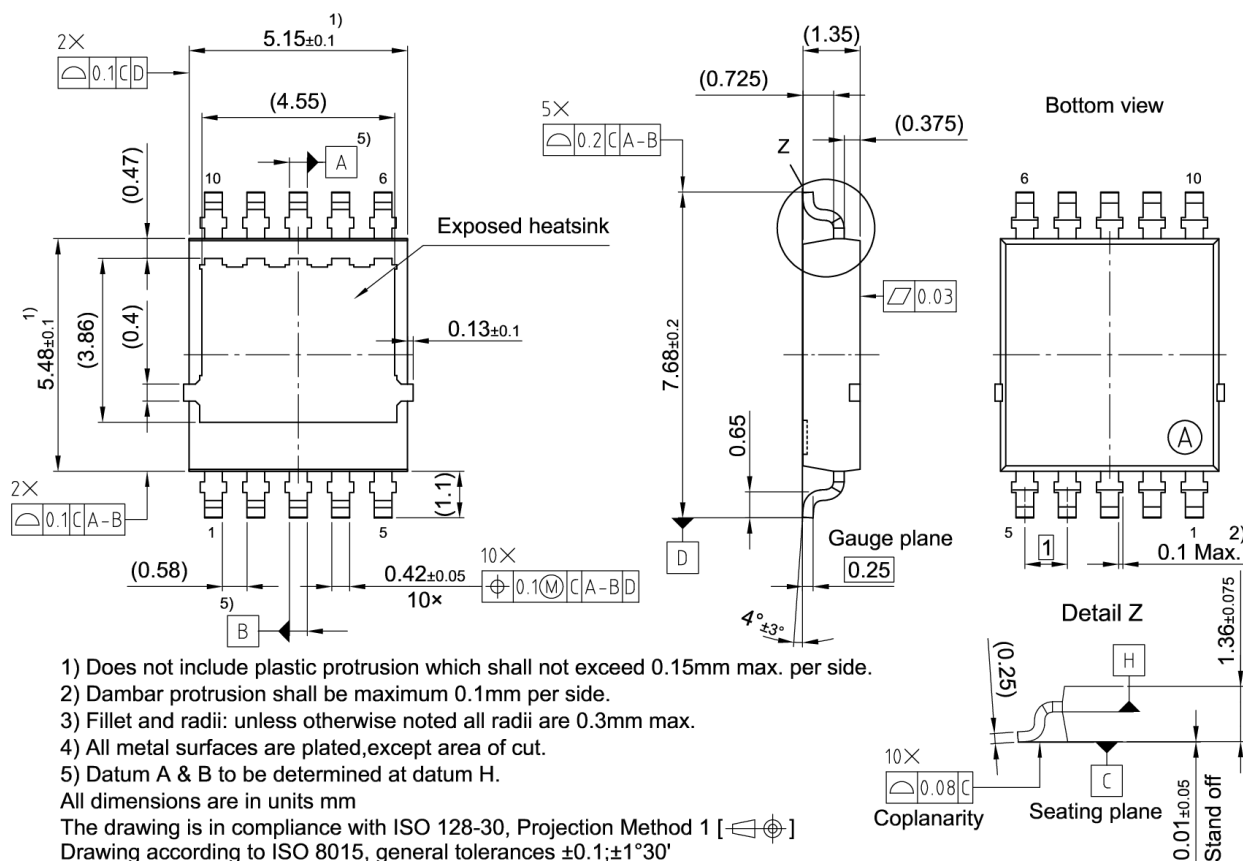


Figure 1 Outline PG-LHDSO-10, dimensions in mm

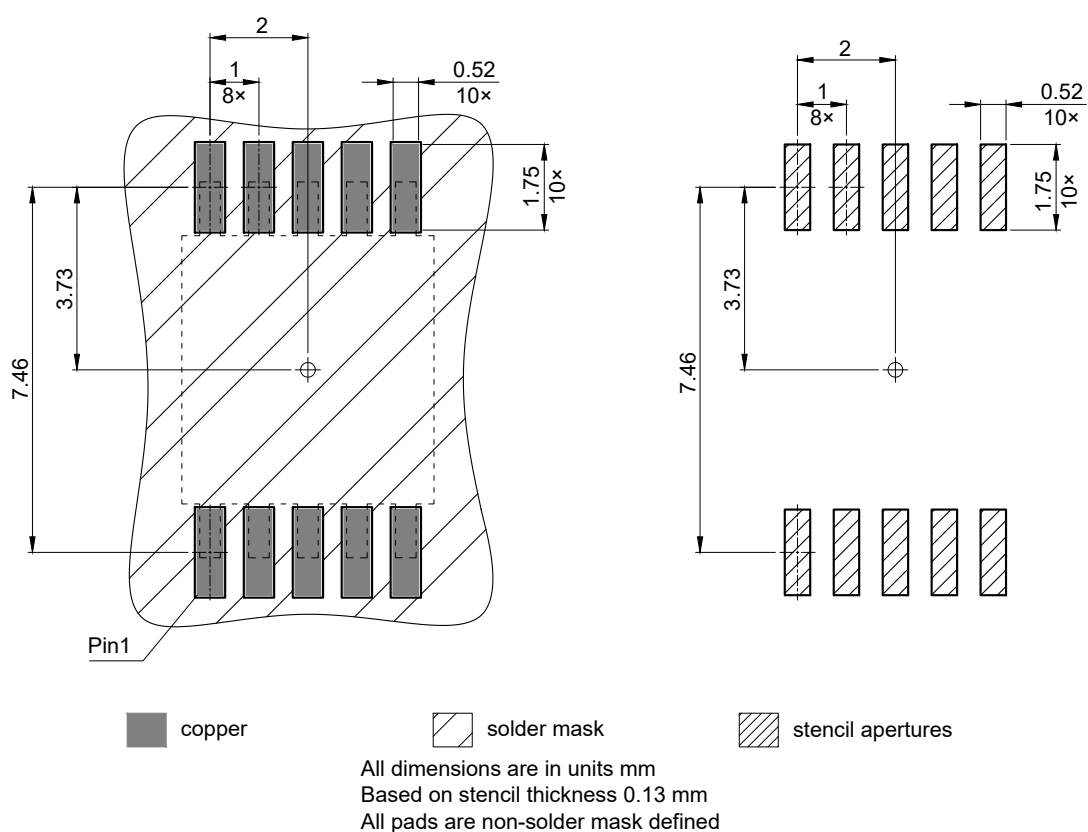
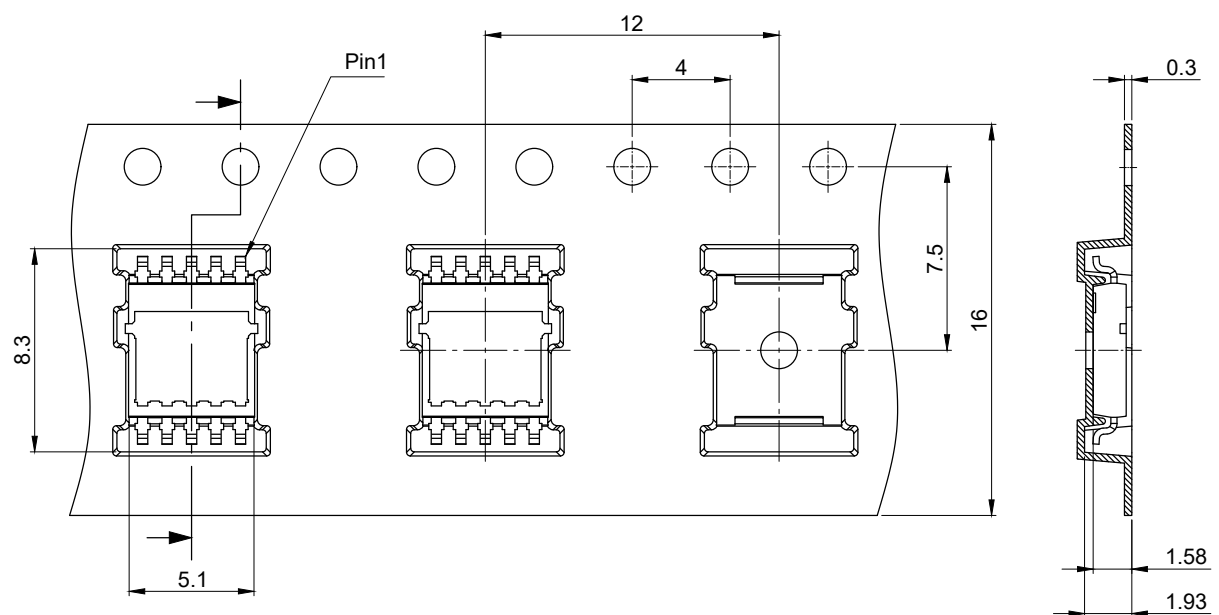


Figure 2 Footprint drawing PG-LHDSO-10, dimensions in mm



All dimensions are in units mm

The drawing is in compliance with ISO 128-30, Projection Method 1 []

Figure 3 Packaging variant PG-LHDSO-10, dimensions in mm

7 Appendix A

Table 11 **Related links**

- IFX Optimos™ Power-Transistor Webpage

Revision history

IAUCN04S7N007T

Revision 2026-08-06, Rev. 1.0

Previous revisions

Revision	Date	Subjects (major changes since last revision)
1.0	2026-08-06	Final Datasheet

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