

MOSFET

OptiMOS™ 6 Power-Transistor, 150 V

Features

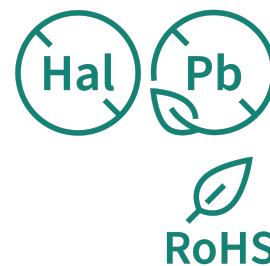
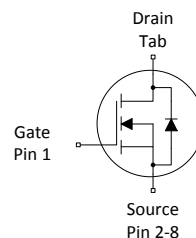
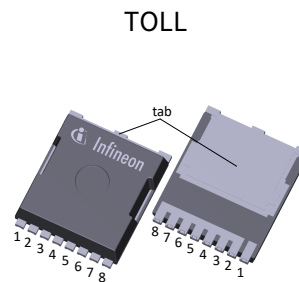
- N-channel
- Very low on-resistance $R_{DS(on)}$
- Superior thermal resistance
- 100% avalanche tested
- Pb-free lead plating; RoHS compliant
- Halogen-free according to IEC61249-2-21
- MSL 1 classified according to J-STD-020

Product validation

Fully qualified according to JEDEC for Industrial Applications

Table 1 Key performance parameters

Parameter	Value	Unit
V_{DS}	150	V
$R_{DS(on),max}$	3.4	mΩ
I_D	194	A
Q_{oss}	205	nC
Q_G	69	nC
Q_{rr} (500A/μs)	156	nC



Type / Ordering code	Package	Marking	Related links
IPT034N15NM6	PG-HSOF-8	034N15N6	-



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1 Maximum ratings

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

Table 2 Maximum ratings

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Continuous drain current ¹⁾	I_D	-	-	194	A	$V_{GS}=10\text{ V}, T_C=25\text{ °C}$ $V_{GS}=10\text{ V}, T_C=100\text{ °C}$ $V_{GS}=8\text{ V}, T_C=100\text{ °C}$ $V_{GS}=10\text{ V}, T_A=25\text{ °C}, R_{thJA}=40\text{ °C/W}$ ²⁾
				137		
				125		
				22		
Pulsed drain current ³⁾	$I_{D,pulse}$	-	-	776	A	$T_C=25\text{ °C}$
Avalanche current, single pulse ⁴⁾	I_{AS}	-	-	84	A	
Avalanche energy, single pulse	E_{AS}	-	-	484	mJ	$I_D=53\text{ A}, R_{GS}=25\text{ }\Omega$
Gate source voltage	V_{GS}	-20	-	20	V	-
Power dissipation	P_{tot}	-	-	294	W	$T_C=25\text{ °C}$ $T_A=25\text{ °C}, R_{thJA}=40\text{ °C/W}$ ²⁾
				3.8		
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 cm² (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	R_{thJC}	-	-	0.51	°C/W	-
Thermal resistance, junction - ambient, 6 cm ² cooling area ⁵⁾	R_{thJA}	-	-	40	°C/W	
Thermal resistance, junction - ambient, minimal footprint	R_{thJA}	-	-	62	°C/W	

⁵⁾ Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm² (one layer, 70 µm thick) copper area for drain connection. PCB is vertical in still air.

3 Electrical characteristics

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

Table 4 Static characteristics

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Drain-source breakdown voltage	$V_{(BR)DSS}$	150	-	-	V	$V_{GS}=0\text{ V}$, $I_D=1\text{ mA}$
Gate threshold voltage	$V_{GS(th)}$	3.0	3.5	4.0	V	$V_{DS}=V_{GS}$, $I_D=179\text{ }\mu\text{A}$
Zero gate voltage drain current	I_{DSS}	-	0.1 10	1 100	μA	$V_{DS}=120\text{ V}$, $V_{GS}=0\text{ V}$, $T_j=25\text{ °C}$ $V_{DS}=120\text{ V}$, $V_{GS}=0\text{ V}$, $T_j=125\text{ °C}$
Gate-source leakage current	I_{GSS}	-	10	100	nA	$V_{GS}=20\text{ V}$, $V_{DS}=0\text{ V}$
Drain-source on-state resistance	$R_{DS(on)}$	-	2.8 3.1 3.5	3.2 3.4 4.1	m Ω	$V_{GS}=15\text{ V}$, $I_D=84\text{ A}$ $V_{GS}=10\text{ V}$, $I_D=84\text{ A}$ $V_{GS}=8\text{ V}$, $I_D=42\text{ A}$
Gate resistance	R_G	-	0.98	1.47	Ω	-
Transconductance	g_{fs}	70	140	-	S	$ V_{DS} \geq 2 I_D $, $R_{DS(on)max}$, $I_D=84\text{ A}$

Table 5 Dynamic characteristics

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Input capacitance ⁶⁾	C_{iss}	-	4900	6400	pF	$V_{GS}=0\text{ V}$, $V_{DS}=75\text{ V}$, $f=1\text{ MHz}$
Output capacitance ⁶⁾	C_{oss}	-	1500	2000	pF	
Reverse transfer capacitance ⁶⁾	C_{rss}	-	19	33	pF	
Turn-on delay time	$t_{d(on)}$	-	15	-	ns	$V_{DD}=75\text{ V}$, $V_{GS}=10\text{ V}$, $I_D=42\text{ A}$, $R_{G,ext}=1.6\text{ }\Omega$
Rise time	t_r	-	9	-	ns	
Turn-off delay time	$t_{d(off)}$	-	26	-	ns	
Fall time	t_f	-	12	-	ns	

⁶⁾ Defined by design. Not subject to production test.

Table 6 Gate charge characteristics ⁷⁾

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Gate to source charge ⁸⁾	Q_{gs}	-	27	36	nC	$V_{DD}=75\text{ V}$, $I_D=42\text{ A}$, $V_{GS}=0\text{ to }10\text{ V}$
Gate charge at threshold	$Q_{g(th)}$	-	17.3	-	nC	
Gate to drain charge ⁸⁾	Q_{gd}	-	15.7	24	nC	
Switching charge	Q_{sw}	-	25	-	nC	
Gate charge total ⁸⁾	Q_g	-	69	86	nC	
Gate plateau voltage	$V_{plateau}$	-	5.4	-	V	
Gate charge total, sync. FET	$Q_{g(sync)}$	-	58	-	nC	$V_{DS}=0.1\text{ V}$, $V_{GS}=0\text{ to }10\text{ V}$
Output charge ⁸⁾	Q_{oss}	-	205	273	nC	$V_{DS}=75\text{ V}$, $V_{GS}=0\text{ V}$

⁷⁾ See "Gate charge waveforms" for parameter definition

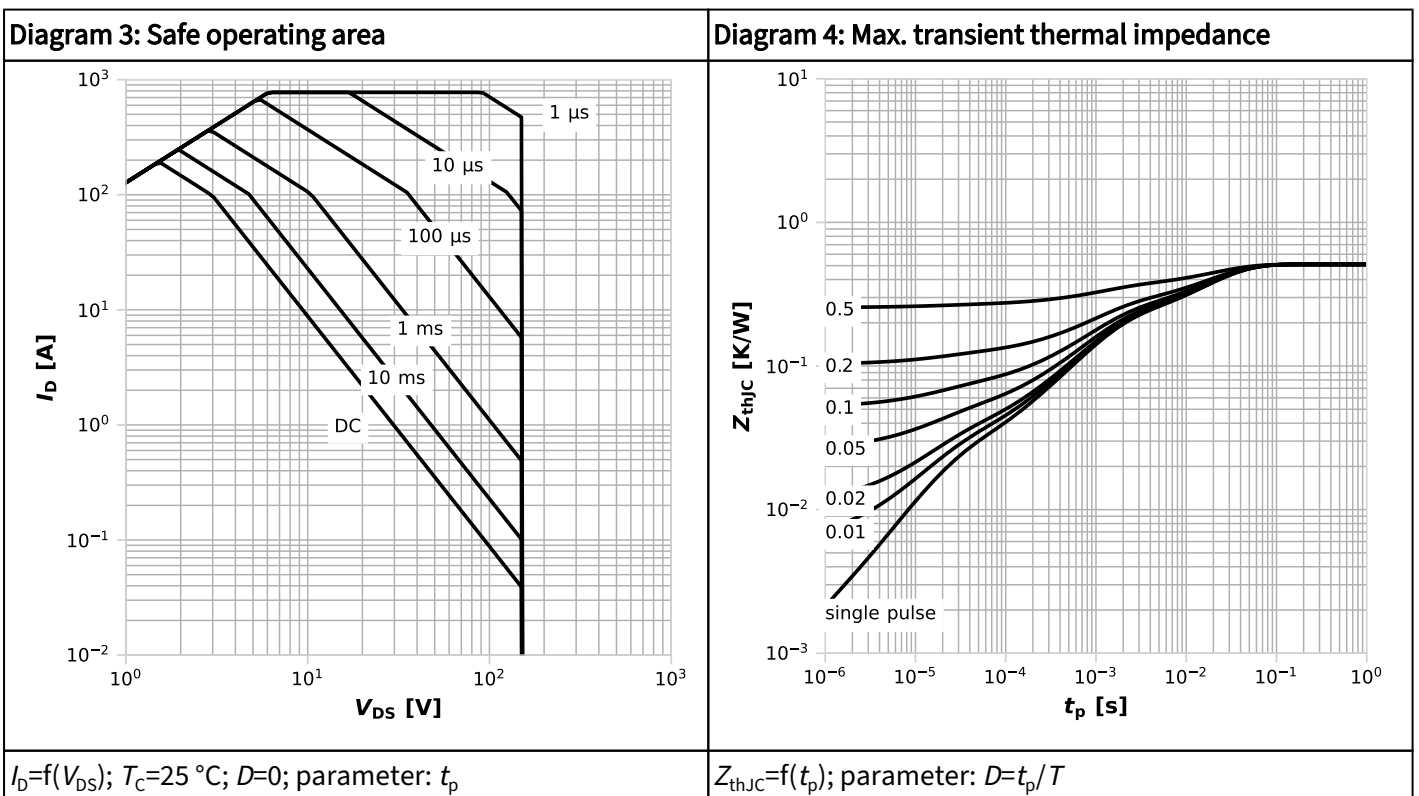
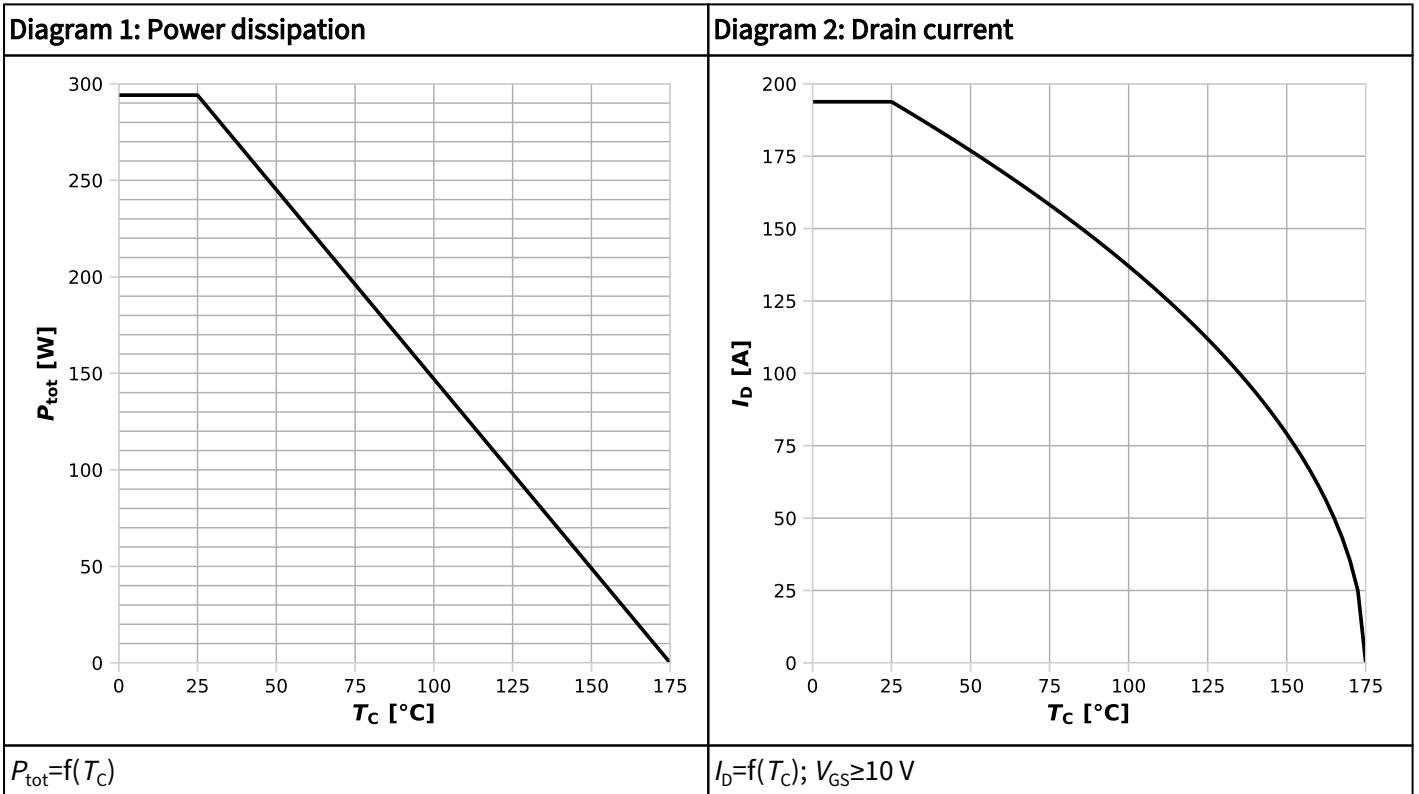
⁸⁾ Defined by design. Not subject to production test.

Table 7 Reverse diode

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Diode continuous forward current	I_S	-	-	194	A	$T_C=25\text{ °C}$
Diode pulse current	$I_{S,pulse}$	-	-	776	A	
Diode forward voltage	V_{SD}	-	0.86	1.0	V	$V_{GS}=0\text{ V}$, $I_F=84\text{ A}$, $T_j=25\text{ °C}$
Reverse recovery time ⁹⁾	t_{rr}	-	36	72	ns	$V_R=75\text{ V}$, $I_F=42\text{ A}$, $di_F/dt=500\text{ A}/\mu\text{s}$
Reverse recovery charge ⁹⁾	Q_{rr}	-	156	312	nC	
Reverse recovery time ⁹⁾	t_{rr}	-	33	66	ns	$V_R=75\text{ V}$, $I_F=42\text{ A}$, $di_F/dt=1000\text{ A}/\mu\text{s}$
Reverse recovery charge ⁹⁾	Q_{rr}	-	277	554	nC	

⁹⁾ Defined by design. Not subject to production test.

4 Electrical characteristics diagrams



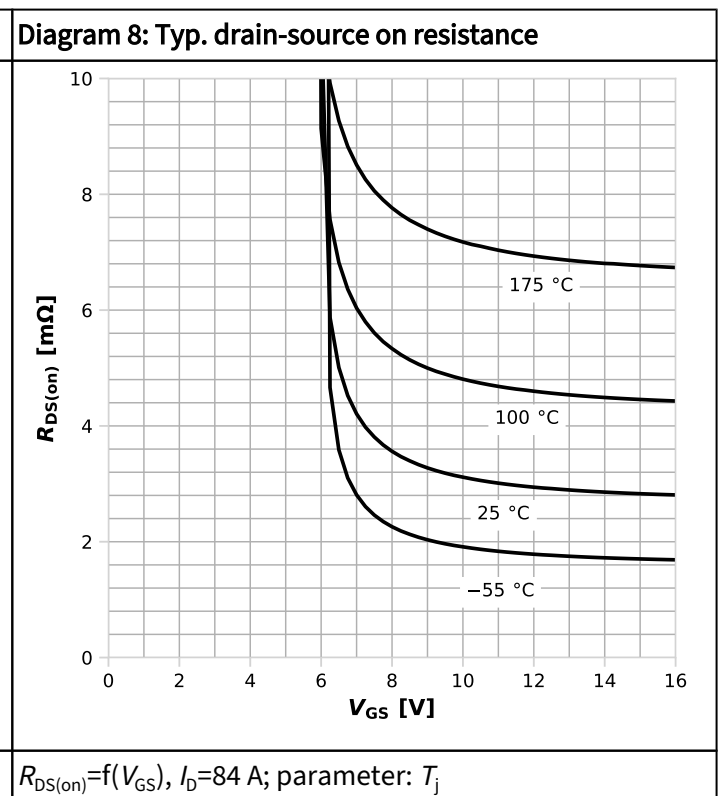
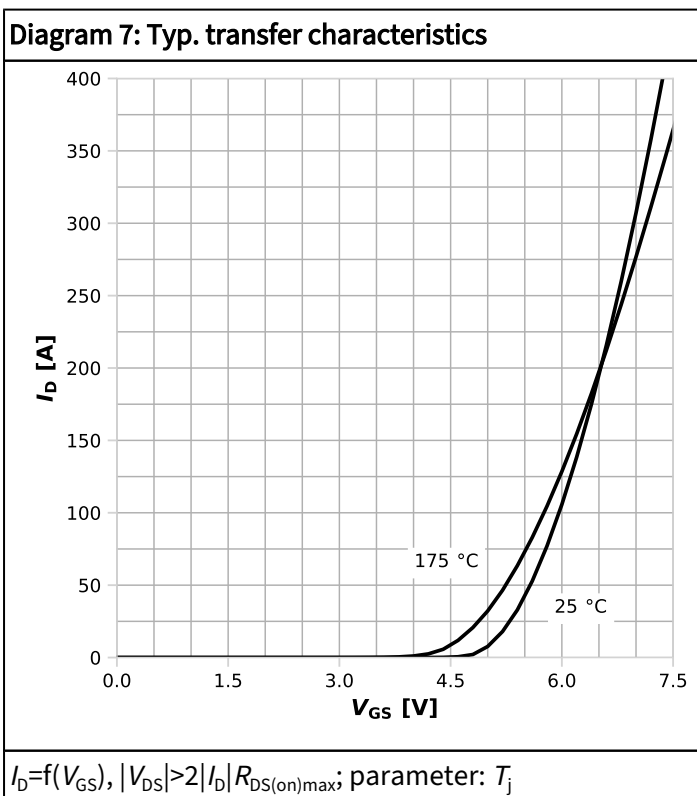
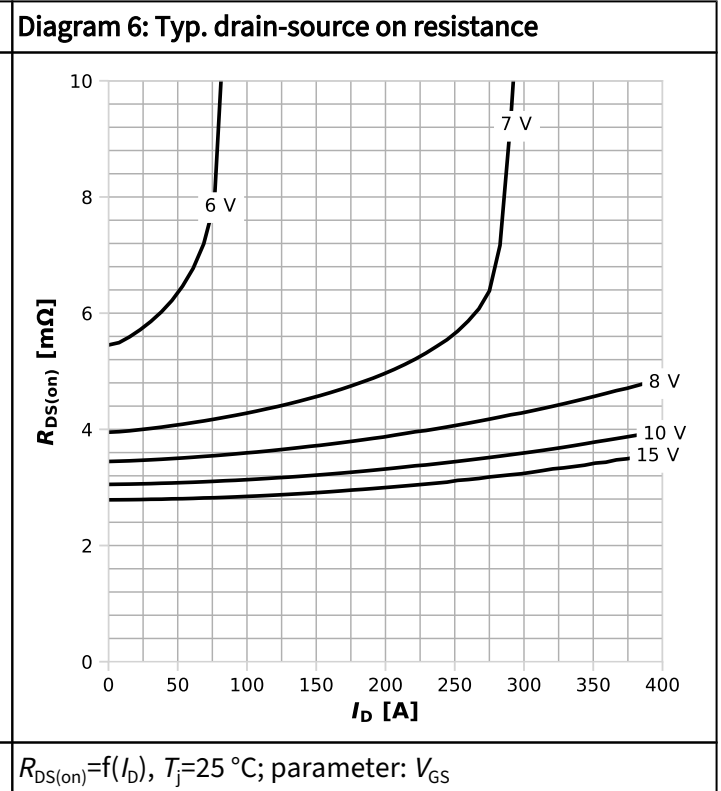
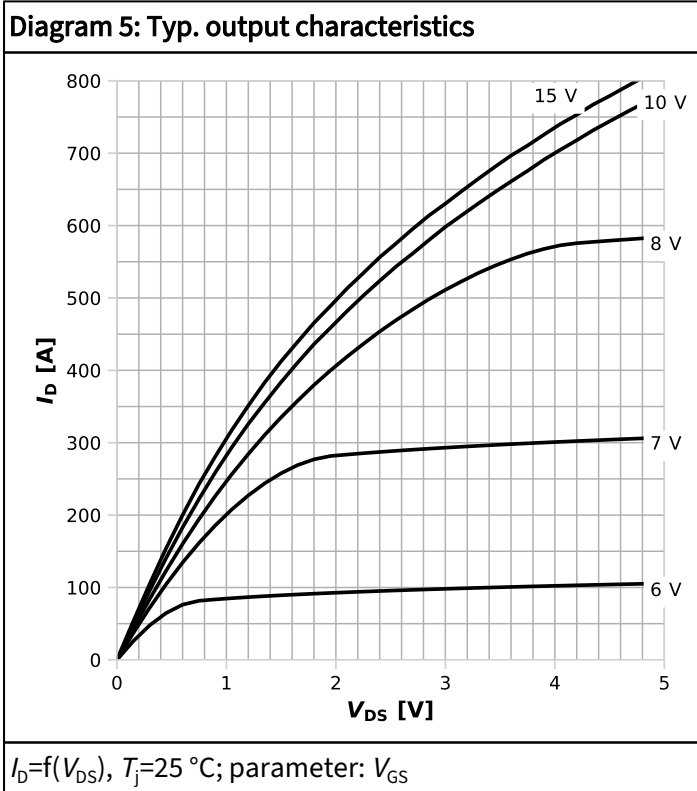
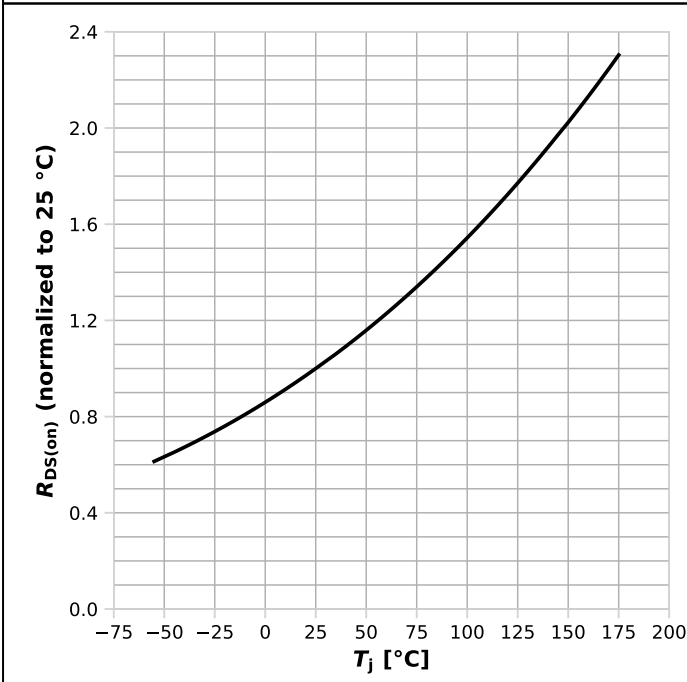
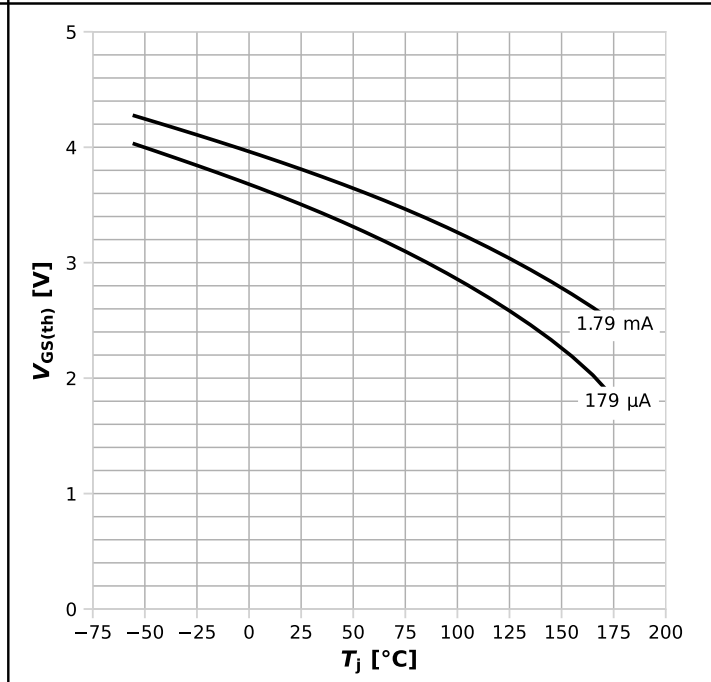


Diagram 9: Normalized drain-source on resistance



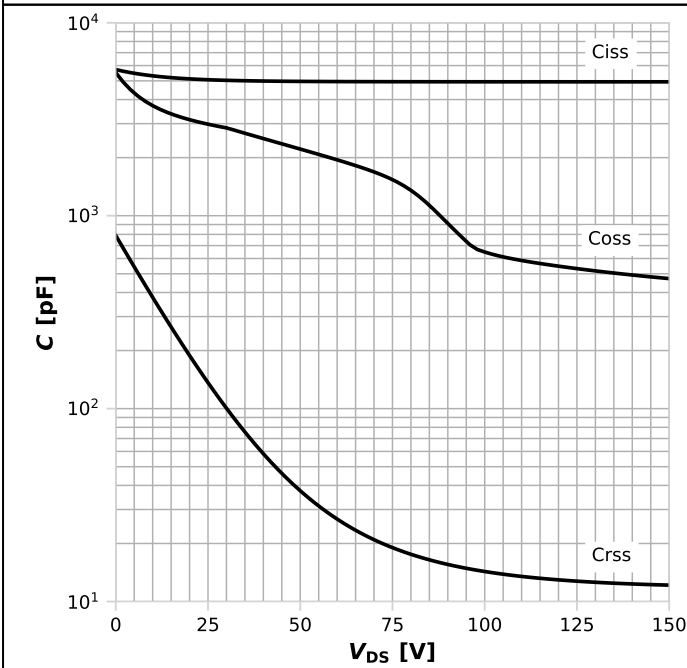
$R_{DS(on)}=f(T_j), I_D=84 \text{ A}, V_{GS}=10 \text{ V}$

Diagram 10: Typ. gate threshold voltage



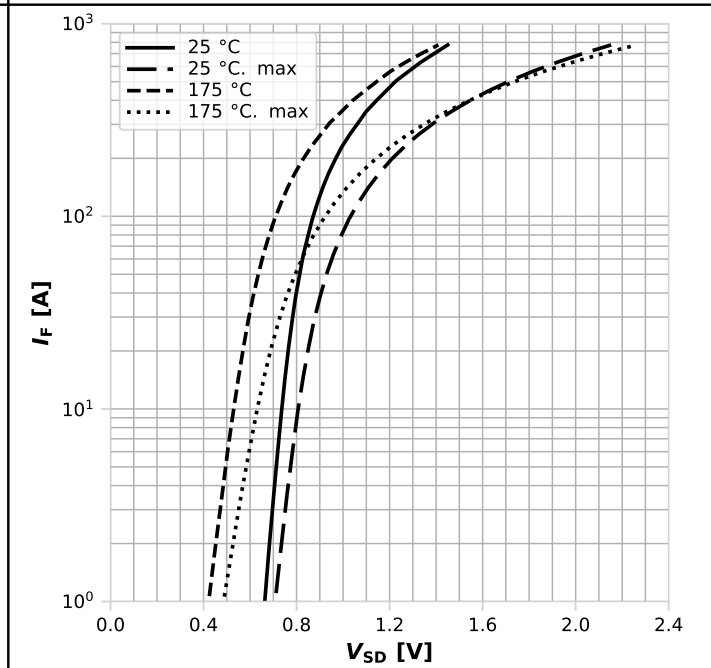
$V_{GS(th)}=f(T_j), V_{GS}=V_{DS}; \text{parameter: } I_D$

Diagram 11: Typ. capacitances



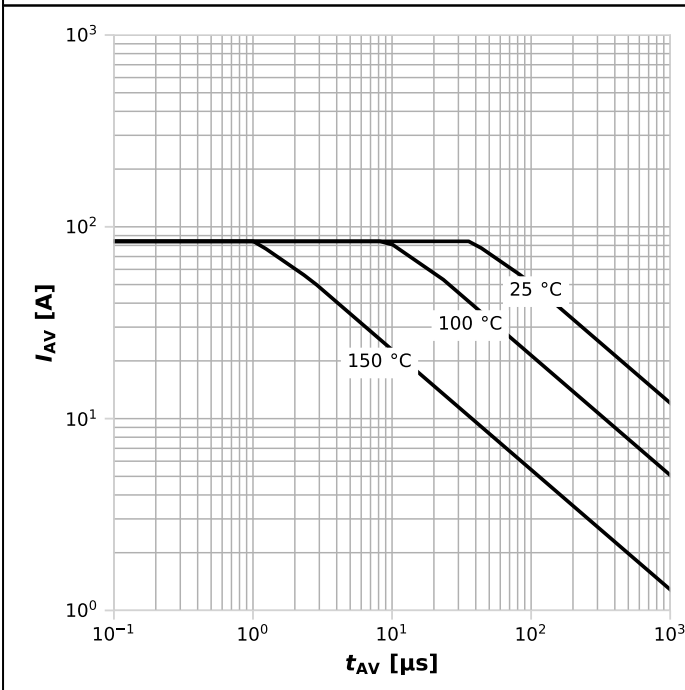
$C=f(V_{DS}); V_{GS}=0 \text{ V}; f=1 \text{ MHz}$

Diagram 12: Forward characteristics of reverse diode



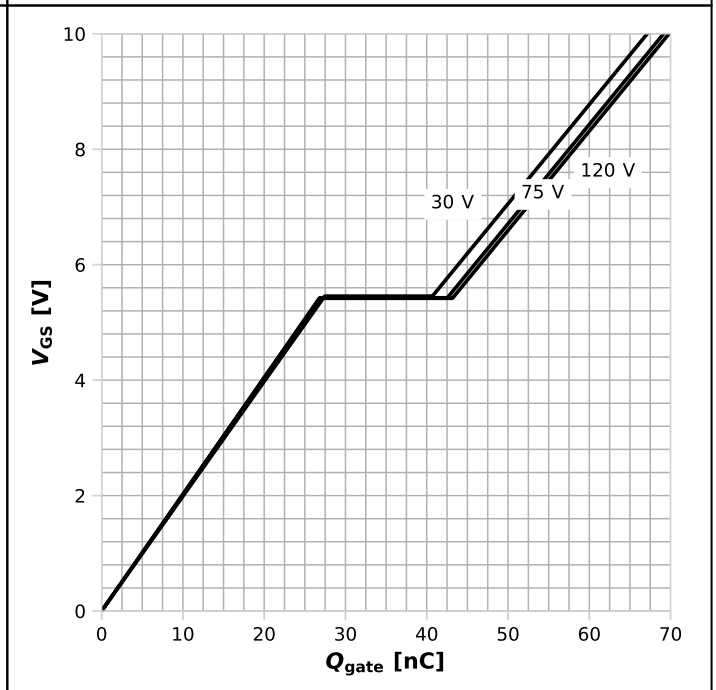
$I_F=f(V_{SD}); \text{parameter: } T_j$

Diagram 13: Avalanche characteristics



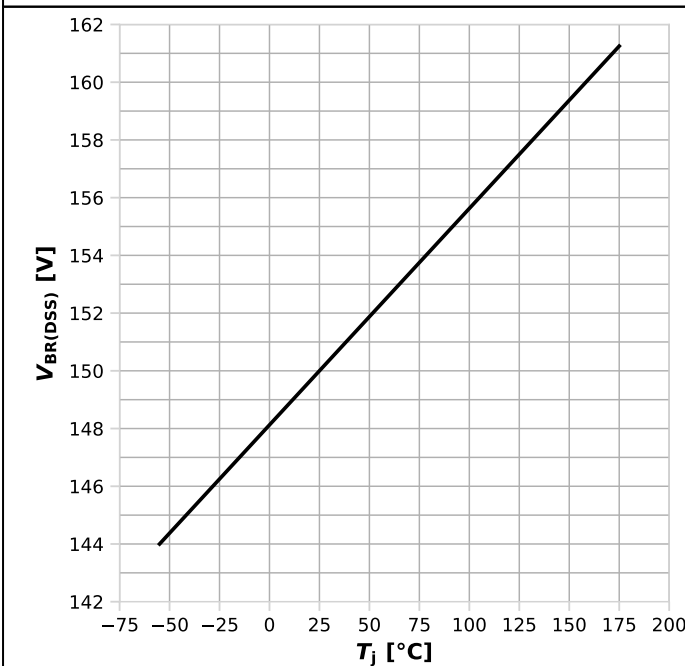
$I_{AS}=f(t_{AV}); R_{GS}=25 \Omega$; parameter: $T_{j,start}$

Diagram 14: Typ. gate charge



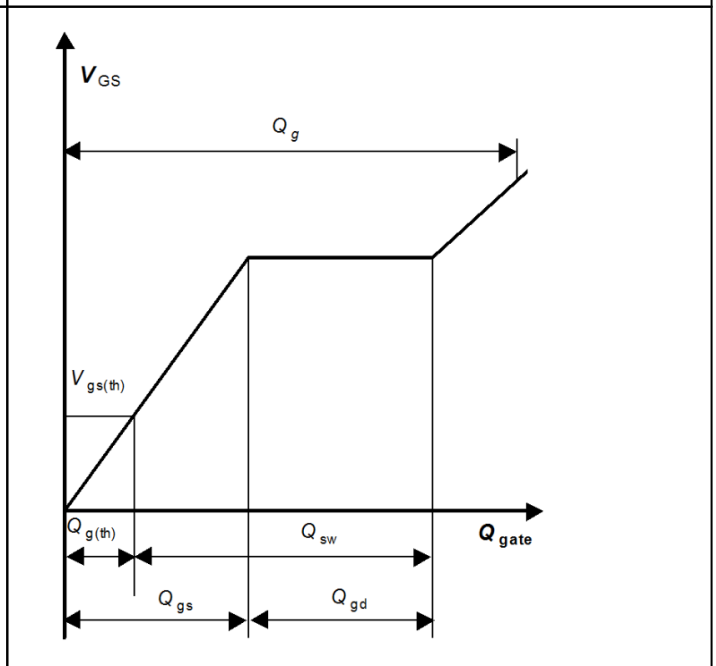
$V_{GS}=f(Q_{gate}), I_D=42 \text{ A pulsed}, T_j=25 \text{ °C}$; parameter: V_{DD}

Diagram 15: Min. drain-source breakdown voltage



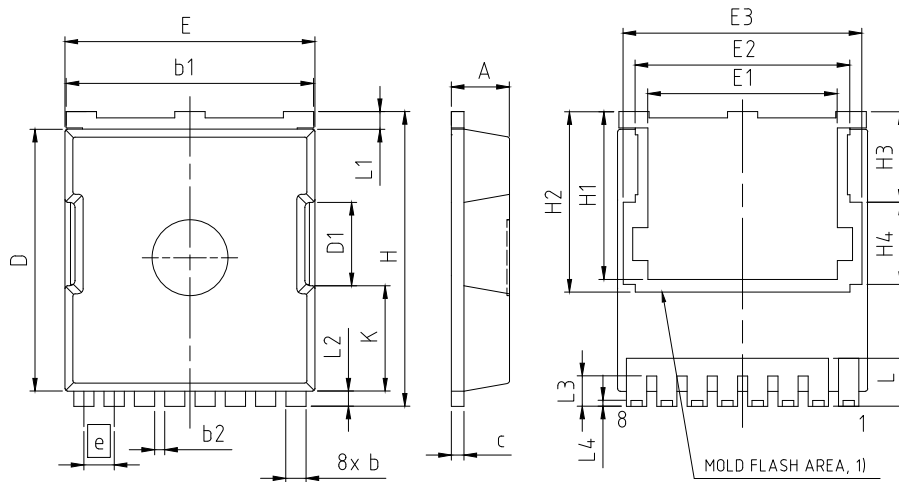
$V_{BR(DSS)}=f(T_j); I_D=1 \text{ mA}$

Gate charge waveforms



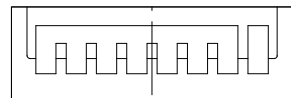
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5 Package outlines



PACKAGE - GROUP NUMBER:		PG-HSOF-8-U01	
DIMENSIONS	MILLIMETERS		
	MIN.	MAX.	
A	2.20	2.40	
b	0.70	0.90	
b1	9.70	9.90	
b2	0.42	0.50	
c	0.40	0.60	
D	10.28	10.58	
D1	3.30		
E	9.70	10.10	
E1	7.50		
E2	8.50		
E3	9.46		
e	1.20 (BSC)		
H	11.48	11.88	
H1	6.55	6.95	
H2	7.15		
H3	3.59		
H4	3.26		
N	8		
K	4.18		
L	1.60	2.10	
L1	0.50	0.90	
L2	0.50	0.70	
L3	1.00	1.30	
L4	0.13	0.33	

5:1



OPTIONAL LEAD FORM:
 WITHOUT LTI OPTION

1) PARTIALLY COVERED WITH MOLD FLASH

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

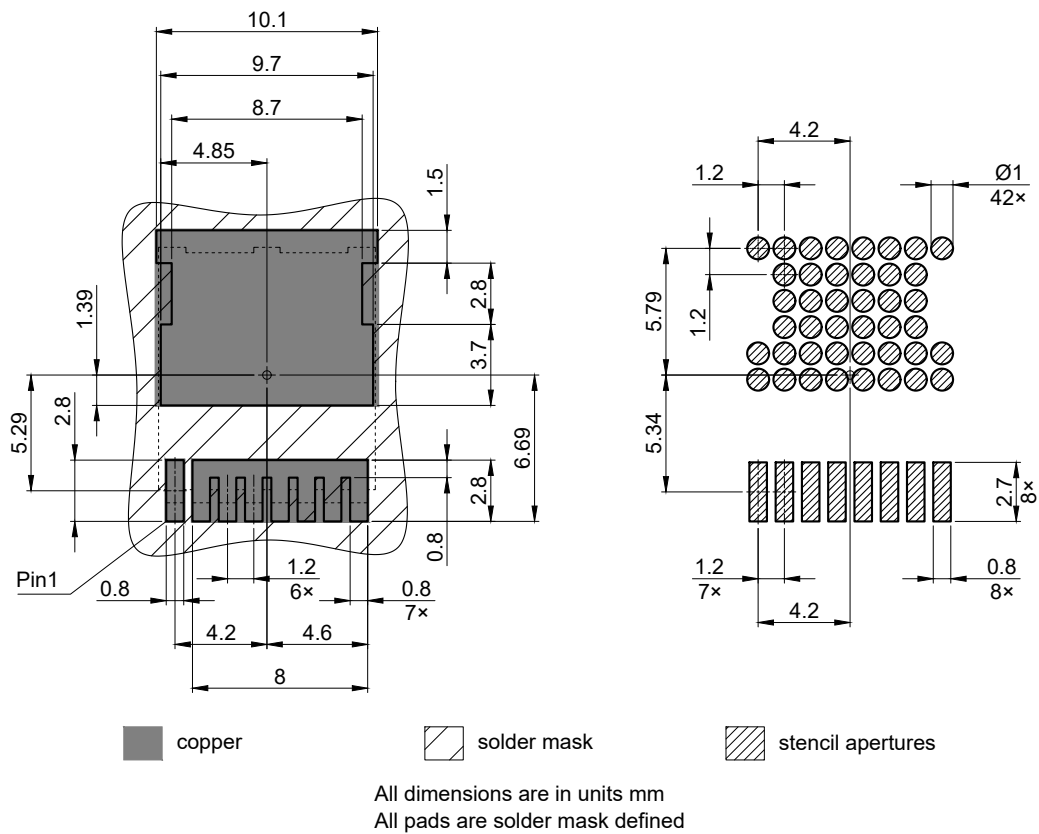
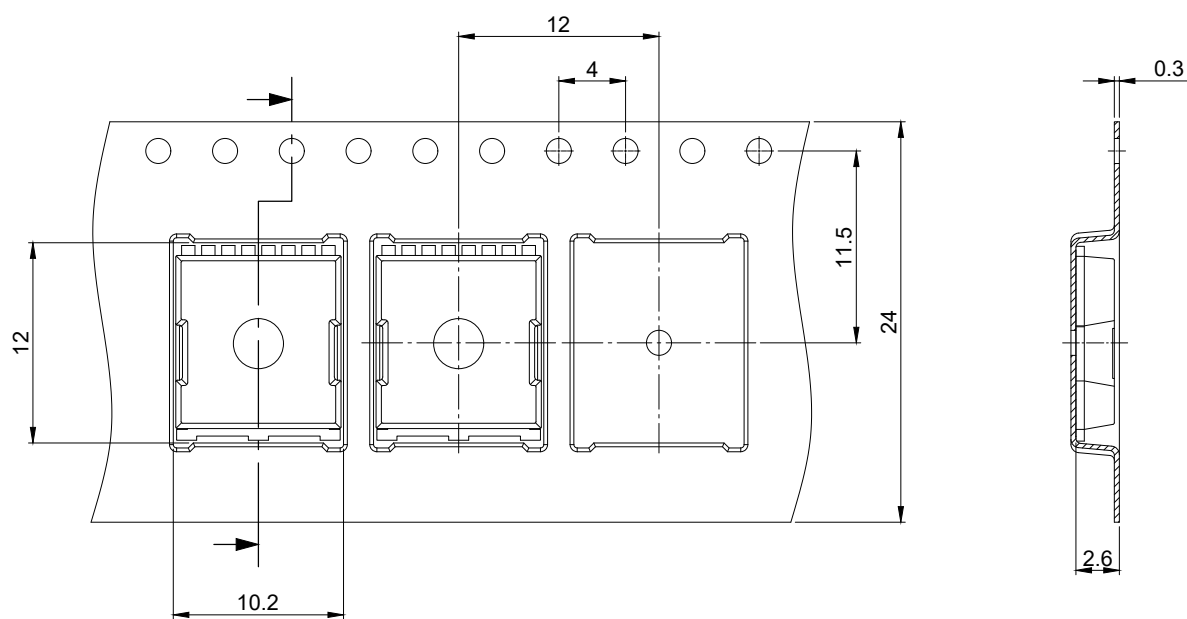


Figure 2 Footprint drawing PG-HSOF-8, dimensions in mm




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

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

Revision history

IPT034N15NM6

Revision 2024-12-09, Rev. 1.0

Previous revisions

Revision	Date	Subjects (major changes since last revision)
1.0	2024-12-09	Release of final datasheet

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