

MOSFET

OptiMOS™ 6 Power-Transistor, 60 V

Features

- Optimized for high performance SMPS
- Optimized for Synchronous rectification
- N-channel, logic level
- 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

Product validation

Fully qualified according to JEDEC for Industrial Applications

Table 1 Key performance parameters

Parameter	Value	Unit
V_{DS}	60	V
$R_{DS(on),max}$	0.7	mΩ
I_D	440	A
Q_{oss}	190	nC
Q_G	85	nC
Q_{rr} (1000A/μs)	361	nC

Part number	Package	Marking	Related links
ISC007N06LM6	PG-TSON-8	007N6L6	-

PG-TSON-8

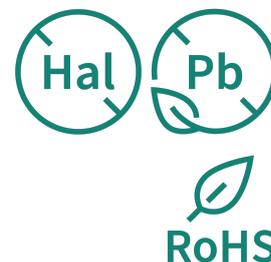
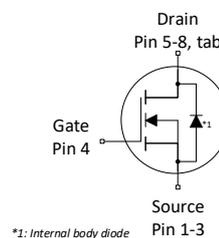
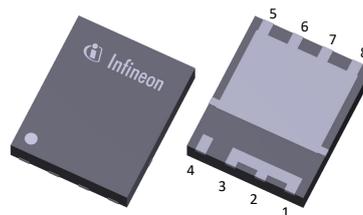




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1 Maximum ratings

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	-	-	440	A	$V_{GS}=10\text{ V}, T_C=25\text{ °C}$
				312		$V_{GS}=10\text{ V}, T_C=100\text{ °C}$
				278		$V_{GS}=4.5\text{ V}, T_C=100\text{ °C}$
				48		$V_{GS}=10\text{ V}, T_A=25\text{ °C}, R_{thJA}=50\text{ °C/W}^2)$
Pulsed drain current ³⁾	$I_{D,pulse}$	-	-	1760	A	$T_A=25\text{ °C}$
Avalanche energy, single pulse ⁴⁾	E_{AS}	-	-	929	mJ	$I_D=50\text{ A}, R_{GS}=25\text{ }\Omega$
Gate source voltage	V_{GS}	-20	-	20	V	-
Power dissipation	P_{tot}	-	-	259	W	$T_C=25\text{ °C}$
				3.0		$T_A=25\text{ °C}, R_{thJA}=50\text{ °C/W}^2)$
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 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, bottom	R_{thJC}		0.29	0.58	°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 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	$V_{(BR)DSS}$	60	-	-	V	$V_{GS}=0\text{ V}$, $I_D=1\text{ mA}$
Gate threshold voltage	$V_{GS(th)}$	1.1	1.7	2.3	V	$V_{DS}=V_{GS}$, $I_D=149\text{ }\mu\text{A}$
Zero gate voltage drain current	I_{DSS}	-	0.1	1.0	μA	$V_{DS}=48\text{ V}$, $V_{GS}=0\text{ V}$, $T_j=25\text{ °C}$
			10	100		$V_{DS}=48\text{ V}$, $V_{GS}=0\text{ V}$, $T_j=125\text{ °C}$
Gate-source leakage current	I_{GSS}	-	10	100	nA	$V_{GS}=20\text{ V}$, $V_{DS}=0\text{ V}$
Drain-source on-state resistance	$R_{DS(on)}$	-	0.62	0.7	m Ω	$V_{GS}=10\text{ V}$, $I_D=50\text{ A}$
			0.76	0.88		$V_{GS}=4.5\text{ V}$, $I_D=25\text{ A}$
Gate resistance	R_G	-	0.9	-	Ω	-
Transconductance ⁶⁾	g_{fs}	170	340	-	S	$ V_{DS} \geq 2 I_D $, $R_{DS(on)max}$, $I_D=50\text{ A}$

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}	-	13000	17000	pF	$V_{GS}=0\text{ V}$, $V_{DS}=30\text{ V}$, $f=1\text{ MHz}$
Output capacitance ⁷⁾	C_{oss}		3300	4300		
Reverse transfer capacitance ⁷⁾	C_{rss}		60	100		
Turn-on delay time	$t_{d(on)}$	-	13.5	-	ns	$V_{DD}=30\text{ V}$, $V_{GS}=10\text{ V}$, $I_D=50\text{ A}$, $R_{G,ext}=1.6\text{ }\Omega$
Rise time	t_r		6.0			
Turn-off delay time	$t_{d(off)}$		32.9			
Fall time	t_f		8.5			

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	Q_{gs}	-	33	-	nC	$V_{DD}=30\text{ V}$, $I_D=50\text{ A}$, $V_{GS}=0\text{ to }4.5\text{ V}$
Gate charge at threshold	$Q_{g(th)}$	-	21	-	nC	
Gate to drain charge ⁹⁾	Q_{gd}	-	21	32	nC	
Switching charge	Q_{sw}	-	32	-	nC	
Gate charge total ⁹⁾	Q_g	-	85	106	nC	
Gate plateau voltage	$V_{plateau}$	-	2.6	-	V	
Gate charge total ⁹⁾	Q_g	-	177	235	nC	$V_{DD}=30\text{ V}$, $I_D=50\text{ A}$, $V_{GS}=0\text{ to }10\text{ V}$
Output charge ⁹⁾	Q_{oss}	-	190	253	nC	$V_{DS}=30\text{ V}$, $V_{GS}=0\text{ V}$

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	-	-	231	A	$T_C=25\text{ °C}$
Diode pulse current	$I_{S,pulse}$	-	-	1760		
Diode forward voltage	V_{SD}	-	0.79	1.0	V	$V_{GS}=0\text{ V}$, $I_F=50\text{ A}$, $T_J=25\text{ °C}$
Reverse recovery time ¹⁰⁾	t_{rr}	-	68	136	ns	$V_R=30\text{ V}$, $I_F=50\text{ A}$, $di_F/dt=100\text{ A}/\mu\text{s}$
Reverse recovery charge ¹⁰⁾	Q_{rr}	-	110	220		
Reverse recovery time ¹⁰⁾	t_{rr}	-	33	66	ns	$V_R=30\text{ V}$, $I_F=50\text{ A}$, $di_F/dt=1000\text{ A}/\mu\text{s}$
Reverse recovery charge ¹⁰⁾	Q_{rr}	-	361	722		

¹⁰⁾ Defined by design. Not subject to production test.

4 Electrical characteristics diagrams

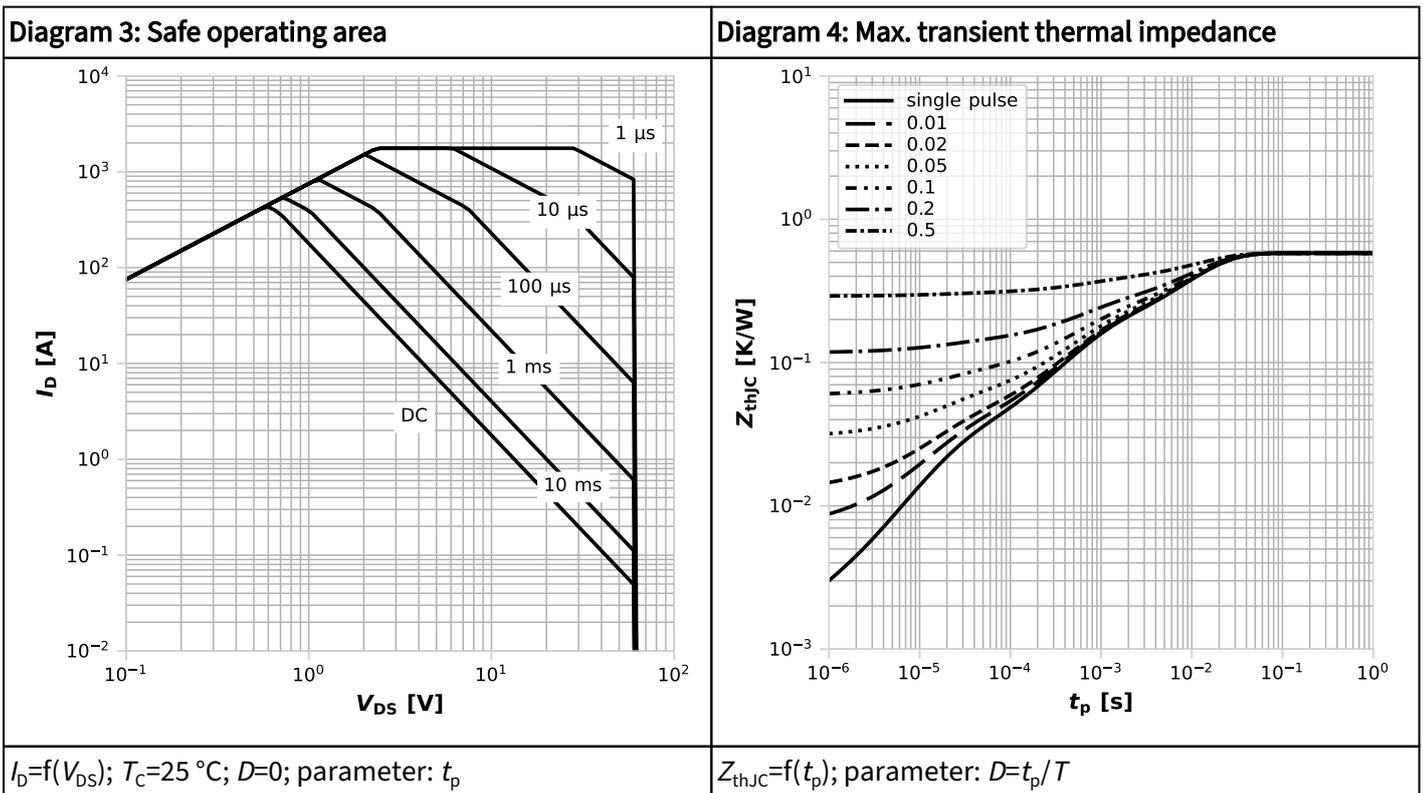
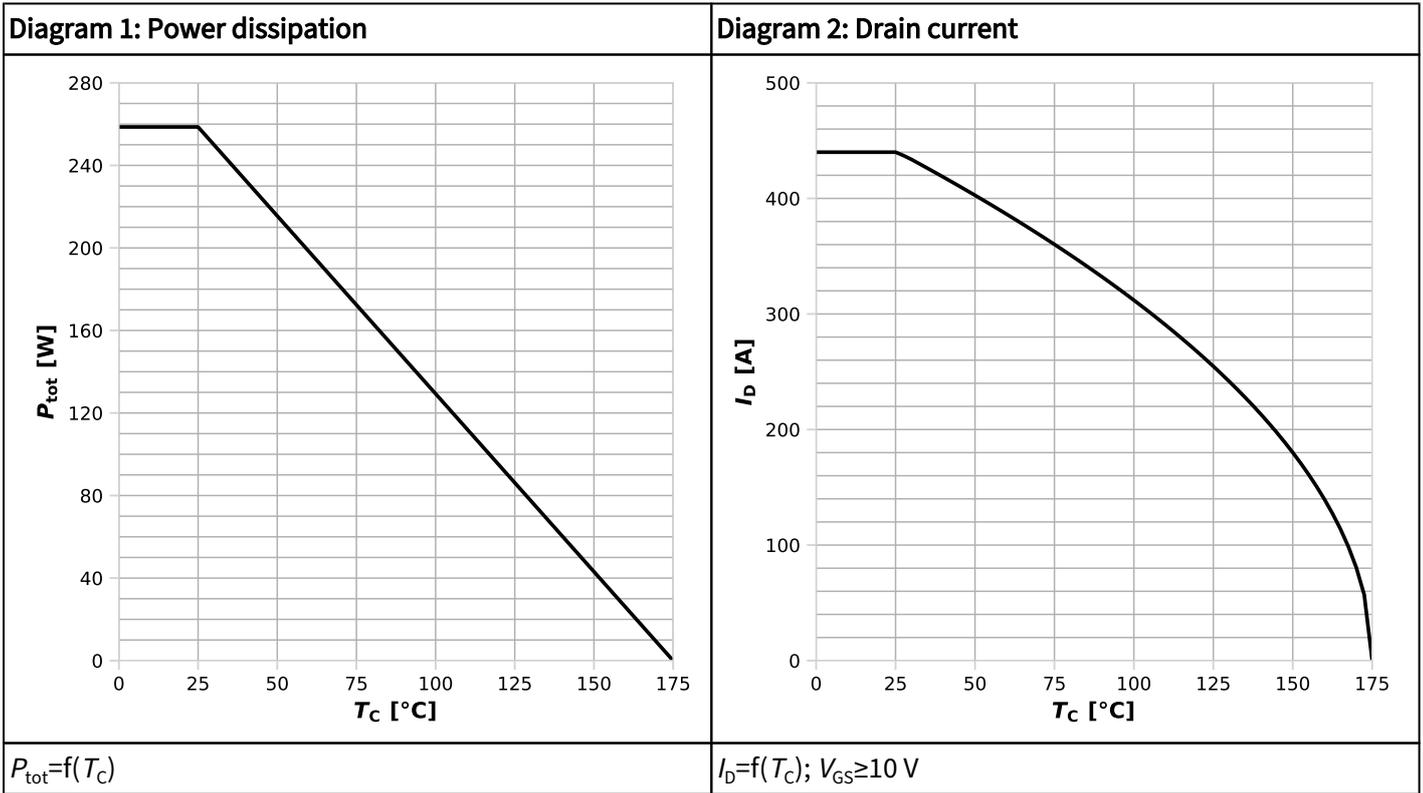
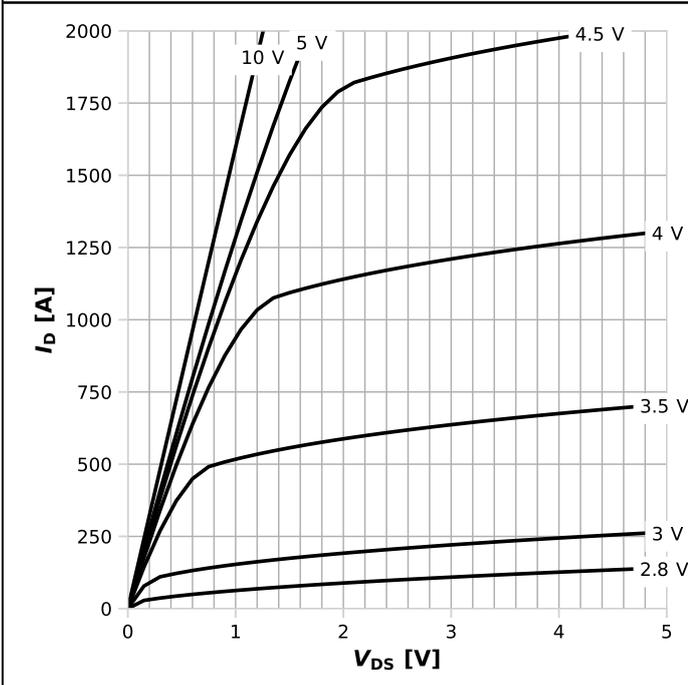
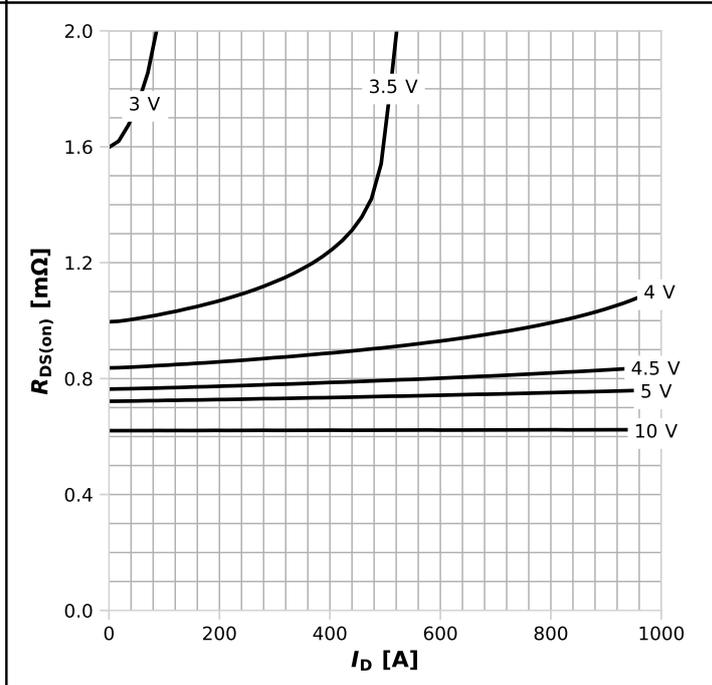


Diagram 5: Typ. output characteristics



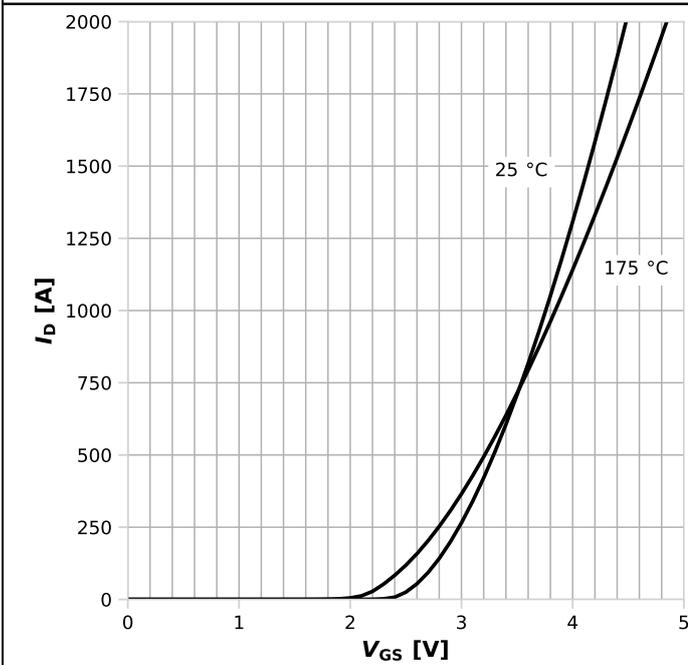
$I_D = f(V_{DS}), T_j = 25\text{ °C};$ parameter: V_{GS}

Diagram 6: Typ. drain-source on resistance



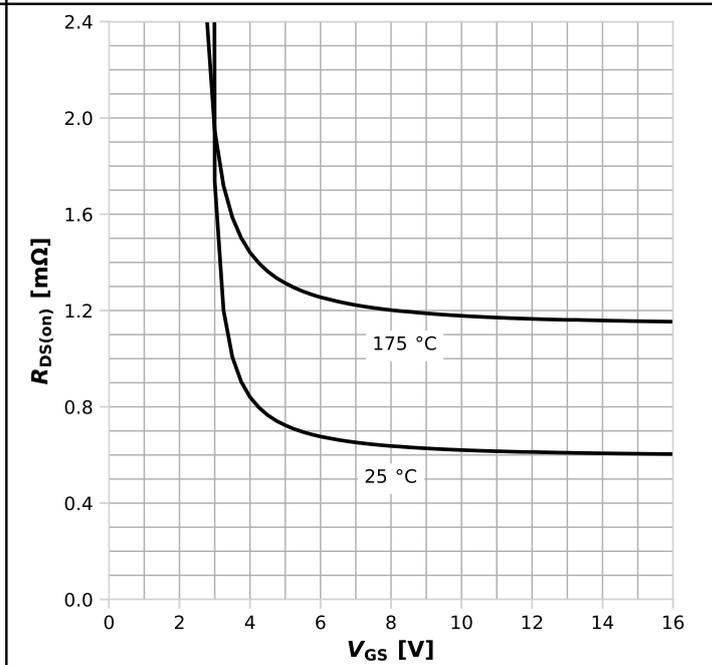
$R_{DS(on)} = f(I_D), T_j = 25\text{ °C};$ parameter: V_{GS}

Diagram 7: Typ. transfer characteristics



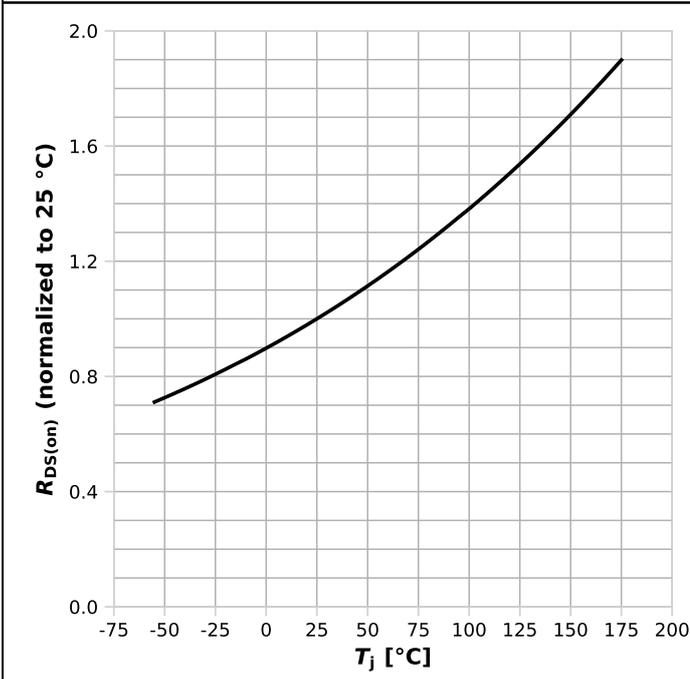
$I_D = f(V_{GS}), |V_{DS}| > 2 |I_D| R_{DS(on)max};$ parameter: T_j

Diagram 8: Typ. drain-source on resistance



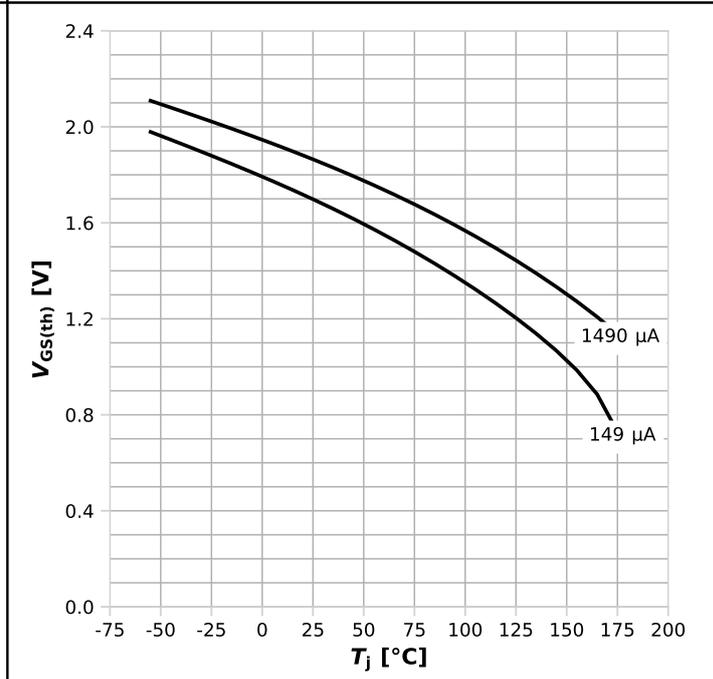
$R_{DS(on)} = f(V_{GS}), I_D = 50\text{ A};$ parameter: T_j

Diagram 9: Normalized drain-source on resistance



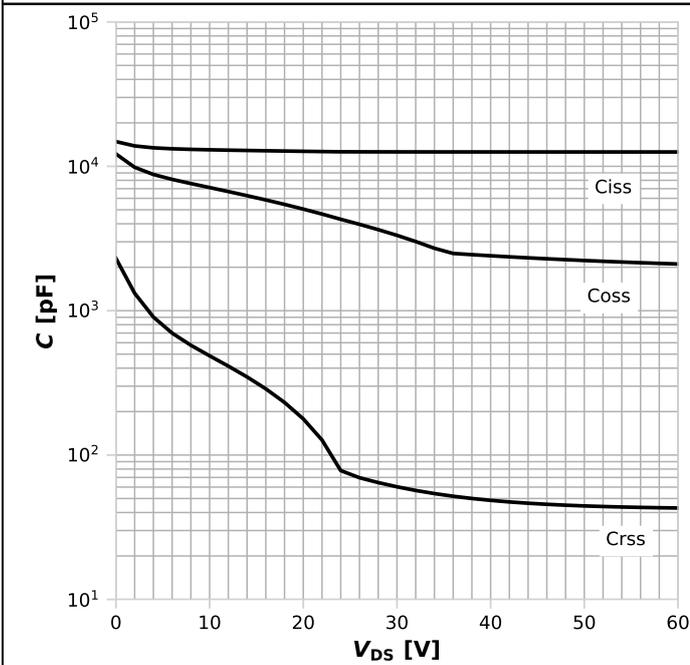
$R_{DS(on)}=f(T_j), I_D=50\text{ A}, V_{GS}=10\text{ V}$

Diagram 10: Typ. gate threshold voltage



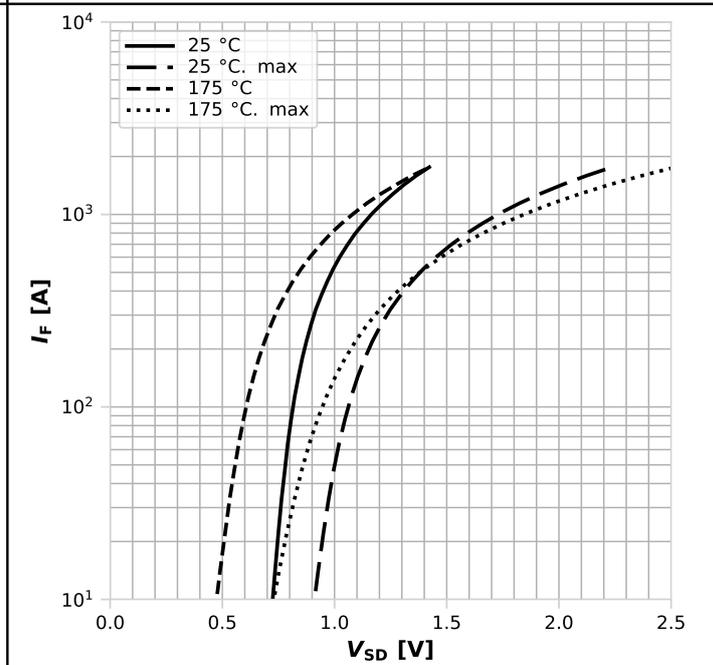
$V_{GS(th)}=f(T_j), V_{GS}=V_{DS};$ parameter: I_D

Diagram 11: Typ. capacitances



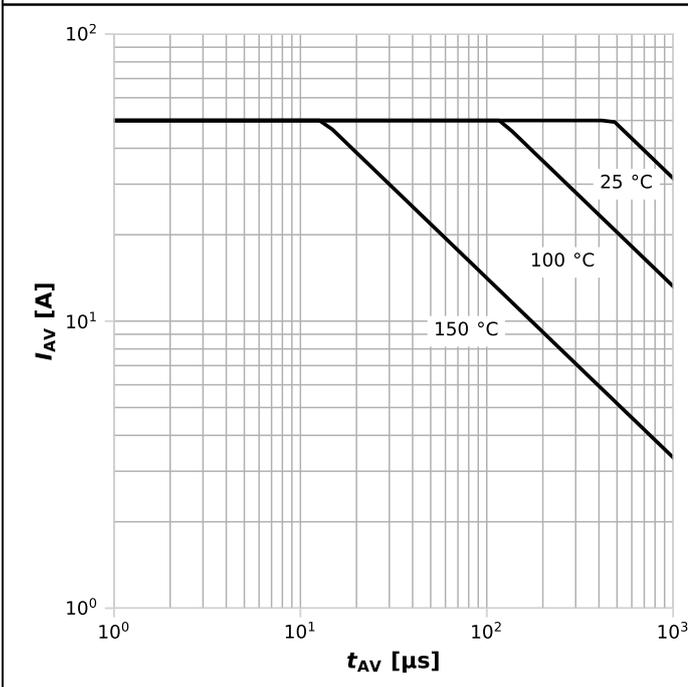
$C=f(V_{DS}); V_{GS}=0\text{ V}; f=1\text{ MHz}$

Diagram 12: Forward characteristics of reverse diode



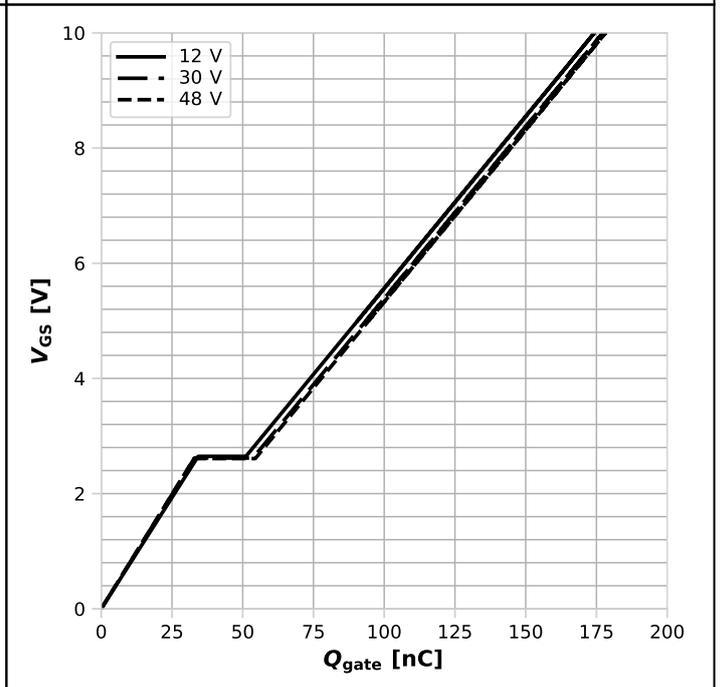
$I_F=f(V_{SD});$ parameter: T_j

Diagram 13: Avalanche characteristics



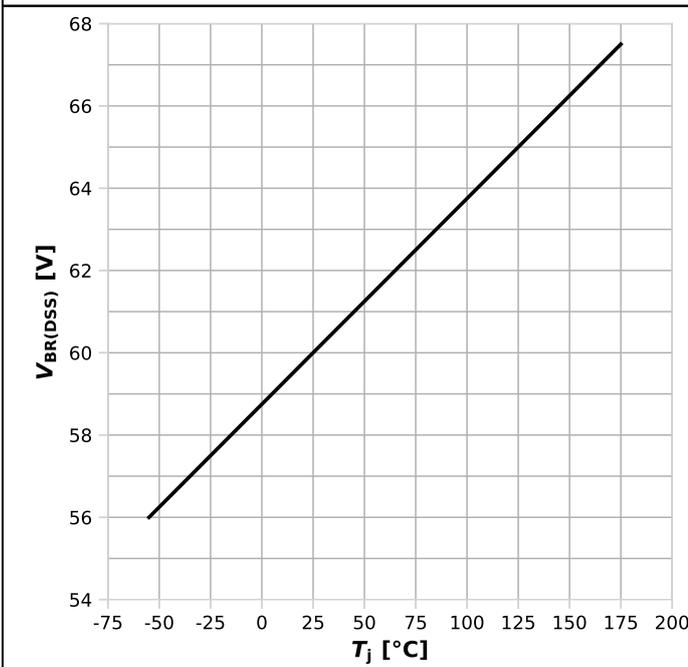
$I_{AS}=f(t_{AV}); R_{GS}=25 \Omega; \text{parameter: } T_{j,start}$

Diagram 14: Typ. gate charge



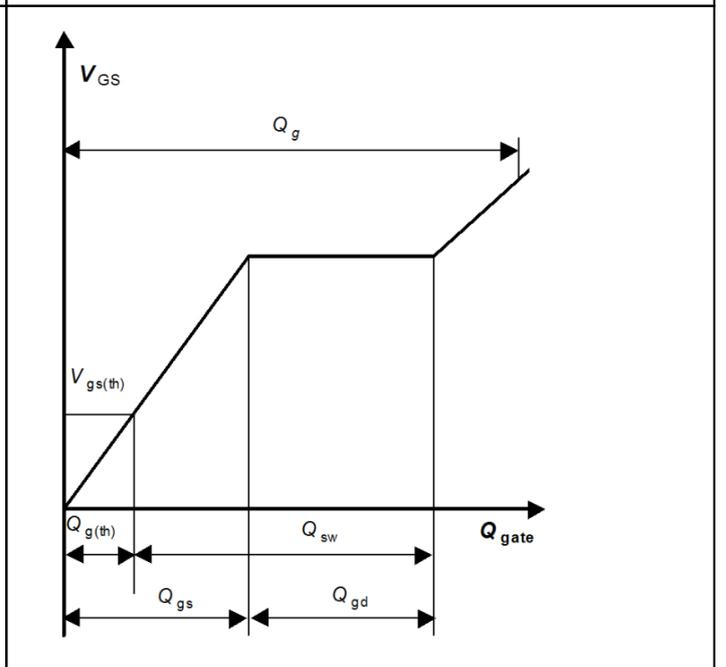
$V_{GS}=f(Q_{gate}), I_D=50 \text{ A pulsed}, T_j=25 \text{ °C}; \text{parameter: } V_{DD}$

Diagram 15: Min. drain-source breakdown voltage



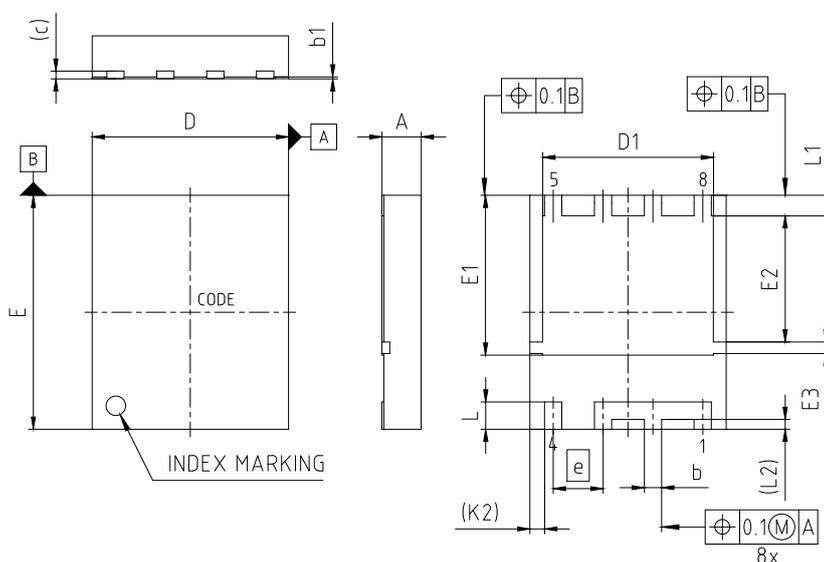
$V_{BR(DSS)}=f(T_j); I_D=10 \text{ mA}$

Gate charge waveforms



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5 Package outlines



PACKAGE - GROUP NUMBER: PG-TSON-8-U05		
DIMENSION	MILLIMETERS	
	MIN.	MAX.
A	0.90	1.10
b	0.34	0.54
b1	0.00	0.05
c	0.20	
D	4.90	5.10
D1	4.25	4.45
E	5.90	6.10
E1	4.00	4.20
E2	3.14	3.34
E3	0.20	0.40
e	1.27	
K2	0.38	
L	0.60	0.80
L1	0.43	0.63
L2	0.25	

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

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

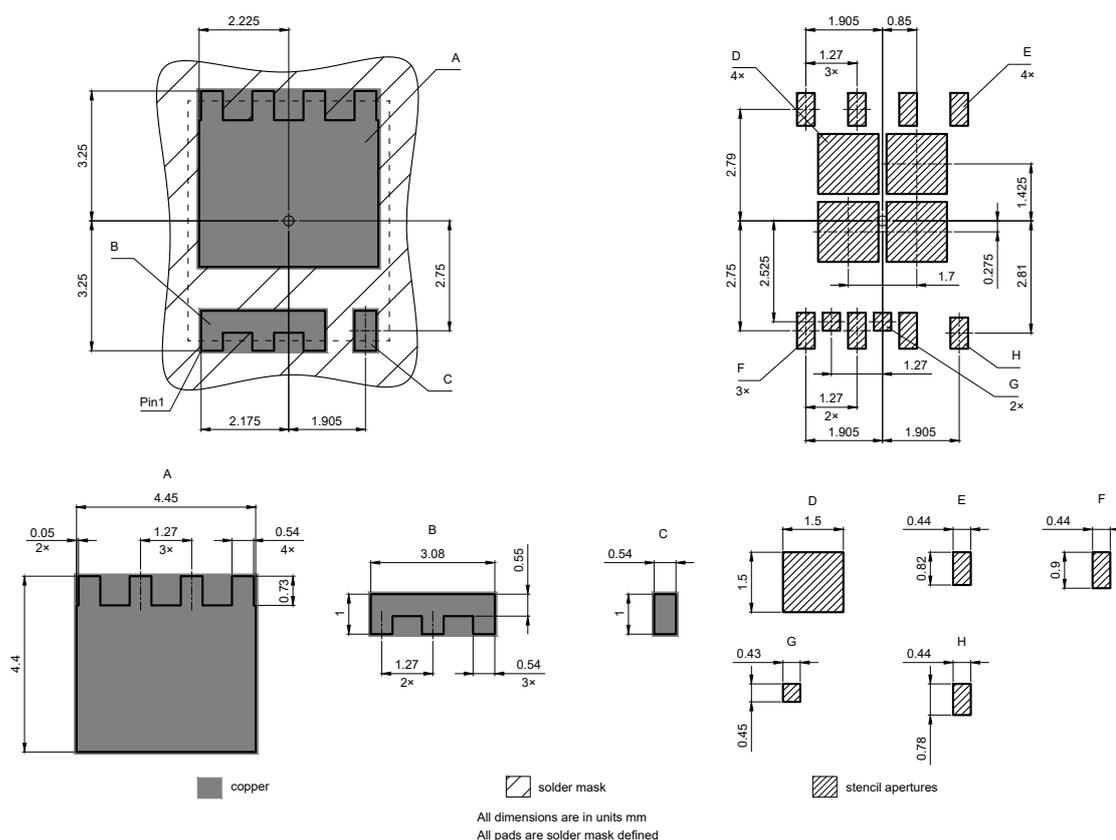
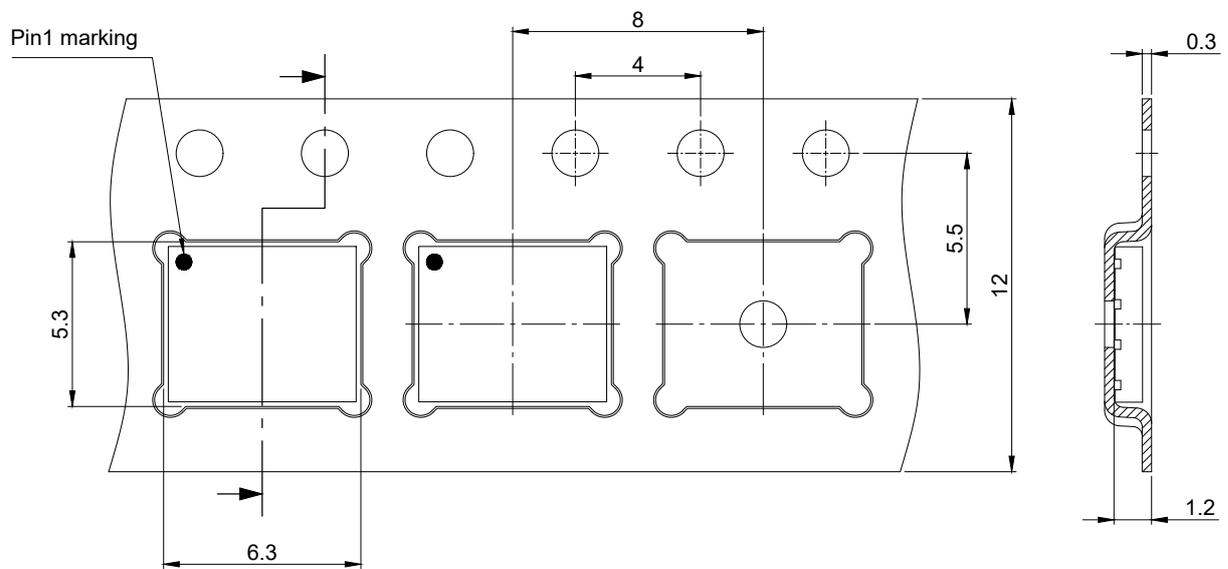


Figure 2 Footprint drawing PG-TSON-8, dimensions in mm



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

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



Revision history

ISC007N06LM6

Revision 2025-03-24, Rev. 2.1

Previous revisions

Revision	Date	Subjects (major changes since last revision)
2.0	2024-05-07	Release of final
2.1	2025-03-24	Updated POD index misalignment against outline

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