

MOSFET

600V CoolMOS™ CM8 Power Transistor

Built on Infineon's world-class super-junction MOSFET platform with an integrated fast body diode, making it suitable for a wide range of applications. It enables highest power density at lowest possible system cost with superior reliability. It is enhancing Infineon's WBG offering and the successor of the 600 V CoolMOS™ 7 MOSFET family.

Features

- Best-In-Class SJ Mosfet Performance
- Address broad hard and soft switching applications with outstanding commutation ruggedness
- Integrated fast body diode and ESD protection
- .XT interconnection technology for best-in-class thermal performance

Benefits

- Provides the best price performance ratio with Best-In-Class SJ Mosfet Performance
- Ease of use and shorter design in cycle
- Enable multiple topologies
- 14-42% lower R_{th} for improved thermal performance

Potential applications

- Datacenter, AI server, Telecom Power Supply
- Micro and Residential Hybrid Inverter
- Portable and Residential Energy Storage, UPS
- EV Charging, Light electric vehicles, Electric Forklift
- High Voltage Solid State Power Distribution
- Home & Professional Tools
- Charger, Adapters, TV and Console SMPS

Product validation

Fully qualified according to JEDEC for Industrial Applications

Please note: For MOSFET paralleling the use of ferrite beads on the gate or separate totem poles is generally recommended.

Table 1 Key performance parameters

Parameter	Value	Unit
$V_{DS} @ T_{j,max}$	650	V
$R_{DS(on),max}$	120	mΩ
$Q_{g,typ}$	24	nC
$I_{D,pulse}$	68	A
$E_{oss} @ 400V$	3.4	μJ
Body diode di_F/dt	1300	A/μs
ESD class (HBM)	2	

Type / Ordering code	Package	Marking	Related links
IPT60R120CM8	PG-HSOF-8	60R120C8	see Appendix A

TOLL

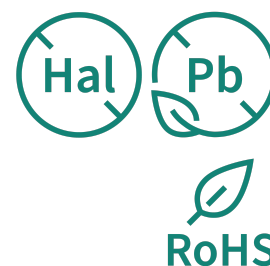
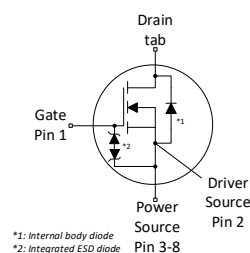
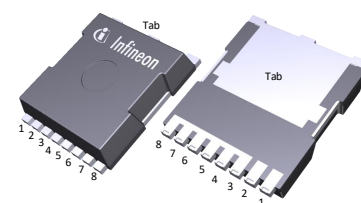




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1 Maximum ratings

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

Table 2 Maximum ratings

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Continuous drain current ¹⁾	I_D	-	-	24	A	$T_C = 25^\circ\text{C}$
Continuous drain current	I_D	-	-	15	A	$T_C = 100^\circ\text{C}$
Pulsed drain current ²⁾	$I_{D,pulse}$	-	-	68	A	$T_C = 25^\circ\text{C}$
Avalanche energy, single pulse	E_{AS}	-	-	40	mJ	$I_D = 2.2\text{A}$; $V_{DD} = 50\text{V}$; see table 10
Avalanche energy, repetitive	E_{AR}	-	-	0.20	mJ	
Avalanche current, single pulse	I_{AS}	-	-	2.2	A	-
MOSFET dv/dt ruggedness	dv/dt	-	-	120	V/ns	$V_{DS} = 0 \dots 400\text{V}$
Gate source voltage (static)	V_{GS}	-20	-	20	V	static;
Gate source voltage (dynamic)	V_{GS}	-30	-	30	V	AC ($f > 1\text{ Hz}$)
Power dissipation	P_{tot}	-	-	154	W	$T_C = 25^\circ\text{C}$
Storage temperature	T_{stg}	-55	-	150	$^\circ\text{C}$	-
Operating junction temperature	T_j	-55	-	150	$^\circ\text{C}$	
Extended operating junction temperature	T_j	150	-	175	$^\circ\text{C}$	$\leq 50\text{ h}$ in the application lifetime
Mounting torque	-	-	-	-	Ncm	-
Continuous diode forward current	I_S	-	-	24	A	$T_C = 25^\circ\text{C}$
Diode pulse current ²⁾	$I_{S,pulse}$	-	-	68	A	
Reverse diode dv/dt ³⁾	dv/dt	-	-	70	V/ns	$V_{DS} = 0 \dots 400\text{V}$, $I_{SD} \leq 24\text{A}$, $T_j = 25^\circ\text{C}$ see table 8
Maximum diode commutation speed	di_F/dt	-	-	1300	A/ μs	
Insulation withstand voltage	V_{ISO}	-	-	n.a.	V	V_{rms} , $T_C = 25^\circ\text{C}$, $t = 1\text{min}$

¹⁾ Limited by $T_{j,max}$.

²⁾ Pulse width t_p limited by $T_{j,max}$.

³⁾ Identical low side and high side switch with identical R_G .

2 Thermal characteristics

Table 3 Thermal characteristics

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Thermal resistance, junction - case	R_{thJC}	-	-	0.81	K/W	-
Thermal resistance, junction - ambient	R_{thJA}	-	-	62	K/W	device on PCB, minimal footprint
Thermal resistance, junction - ambient for SMD version	R_{thJA}	-	-	-	K/W	Device on 40mm*40mm*1.5mm epoxy PCB FR4 with 6cm ² (one layer, 70μm thickness) copper area for drain connection and cooling. PCB is vertical without air stream cooling.
Soldering temperature, wave- & reflow soldering allowed	T_{sold}	-	-	260	°C	reflow MSL1

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	$V_{(BR)DSS}$	600	-	-	V	$V_{GS}=0V, I_D=1mA$
Gate threshold voltage	$V_{(GS)th}$	3.7	4.2	4.7	V	$V_{DS}=V_{GS}, I_D=0.2mA$
Zero gate voltage drain current	I_{DSS}	-	- 31.2	1 -	μA	$V_{DS}=600V, V_{GS}=0V, T_j=25^\circ\text{C}$ $V_{DS}=600V, V_{GS}=0V, T_j=150^\circ\text{C}$
Gate-source leakage current	I_{GSS}	-	-	1.2	μA	$V_{GS}=20V, V_{DS}=0V$
Drain-source on-state resistance	$R_{DS(on)}$	-	0.100 0.22	0.120 -	Ω	$V_{GS}=10V, I_D=8.3A, T_j=25^\circ\text{C}$ $V_{GS}=10V, I_D=8.3A, T_j=150^\circ\text{C}$
Gate resistance	R_G	-	9.8	-	Ω	$f=1MHz$

Table 5 Dynamic characteristics

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Input capacitance	C_{iss}	-	1045	-	pF	$V_{GS}=0V, V_{DS}=400V, f=250kHz$
Output capacitance	C_{oss}	-	15	-	pF	
Effective output capacitance, energy related ⁴⁾	$C_{o(er)}$	-	42	-	pF	$V_{GS}=0V, V_{DS}=0...400V$
Effective output capacitance, time related ⁵⁾	$C_{o(tr)}$	-	421	-	pF	$I_D=\text{constant}, V_{GS}=0V, V_{DS}=0...400V$
Turn-on delay time	$t_{d(on)}$	-	16.5	-	ns	$V_{DD}=400V, V_{GS}=13V, I_D=4.0A,$ $R_G=10.0\Omega$; see table 9
Rise time	t_r	-	6	-	ns	
Turn-off delay time	$t_{d(off)}$	-	89.5	-	ns	
Fall time	t_f	-	10.6	-	ns	

⁴⁾ $C_{o(er)}$ is a fixed capacitance that gives the same stored energy as C_{oss} while V_{DS} is rising from 0 to 400V

⁵⁾ $C_{o(tr)}$ is a fixed capacitance that gives the same charging time as C_{oss} while V_{DS} is rising from 0 to 400V

Table 6 Gate charge characteristics

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Gate to source charge	Q_{gs}	-	6	-	nC	$V_{DD}=400V, I_D=4.0A, V_{GS}=0 \text{ to } 10V$
Gate to drain charge	Q_{gd}	-	9	-	nC	
Gate charge total	Q_g	-	24	-	nC	
Gate plateau voltage	$V_{plateau}$	-	6.1	-	V	

Table 7 Reverse diode characteristics

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Diode forward voltage	V_{SD}	-	0.9	-	V	$V_{GS}=0V, I_F=4.0A, T_j=25^\circ C$
Reverse recovery time	t_{rr}	-	69.53	86.91	ns	$V_R=400V, I_F=4.0A, di_F/dt=100A/\mu s$; see table 8
Reverse recovery charge	Q_{rr}	-	0.24	0.36	μC	
Peak reverse recovery current	I_{rrm}	-	6.87	-	A	

4 Electrical characteristics diagrams

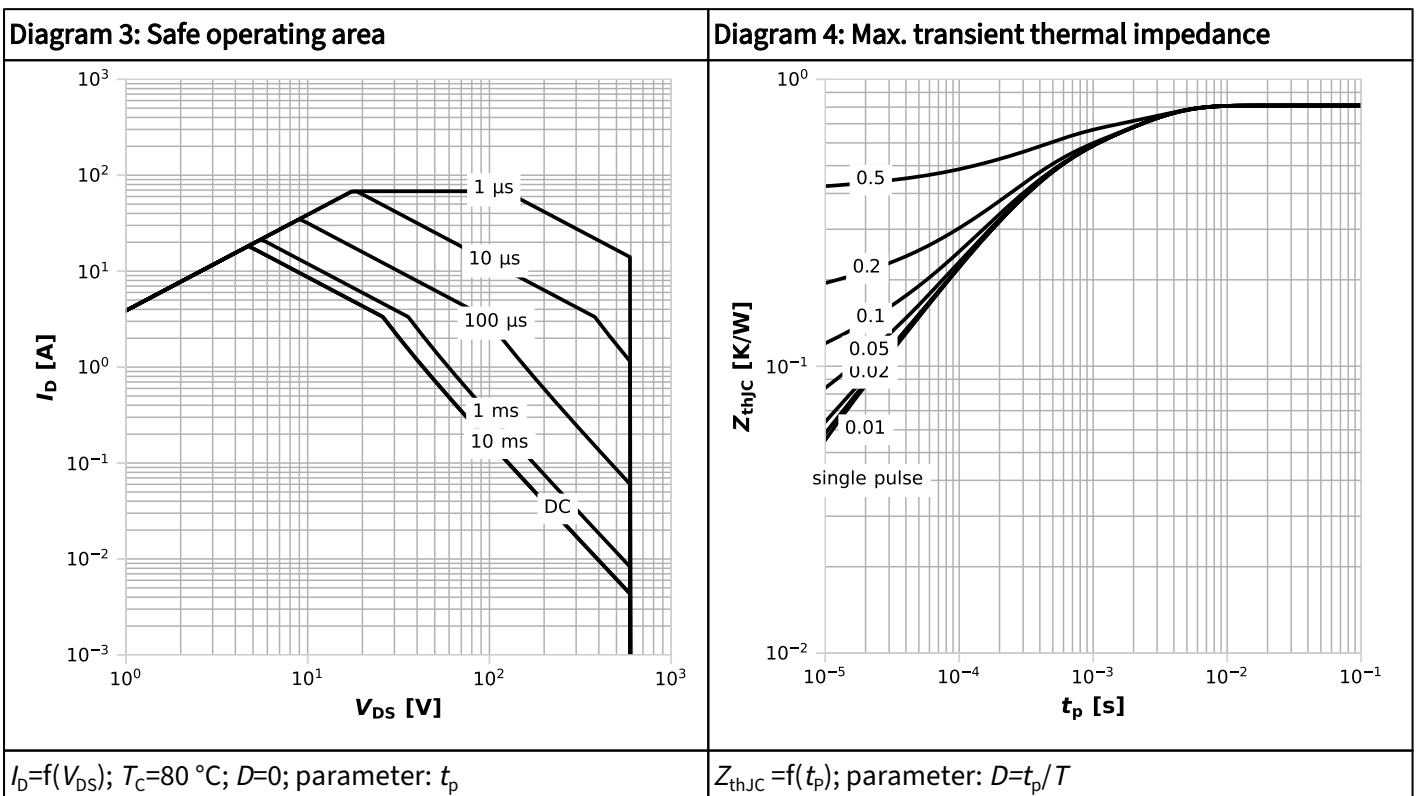
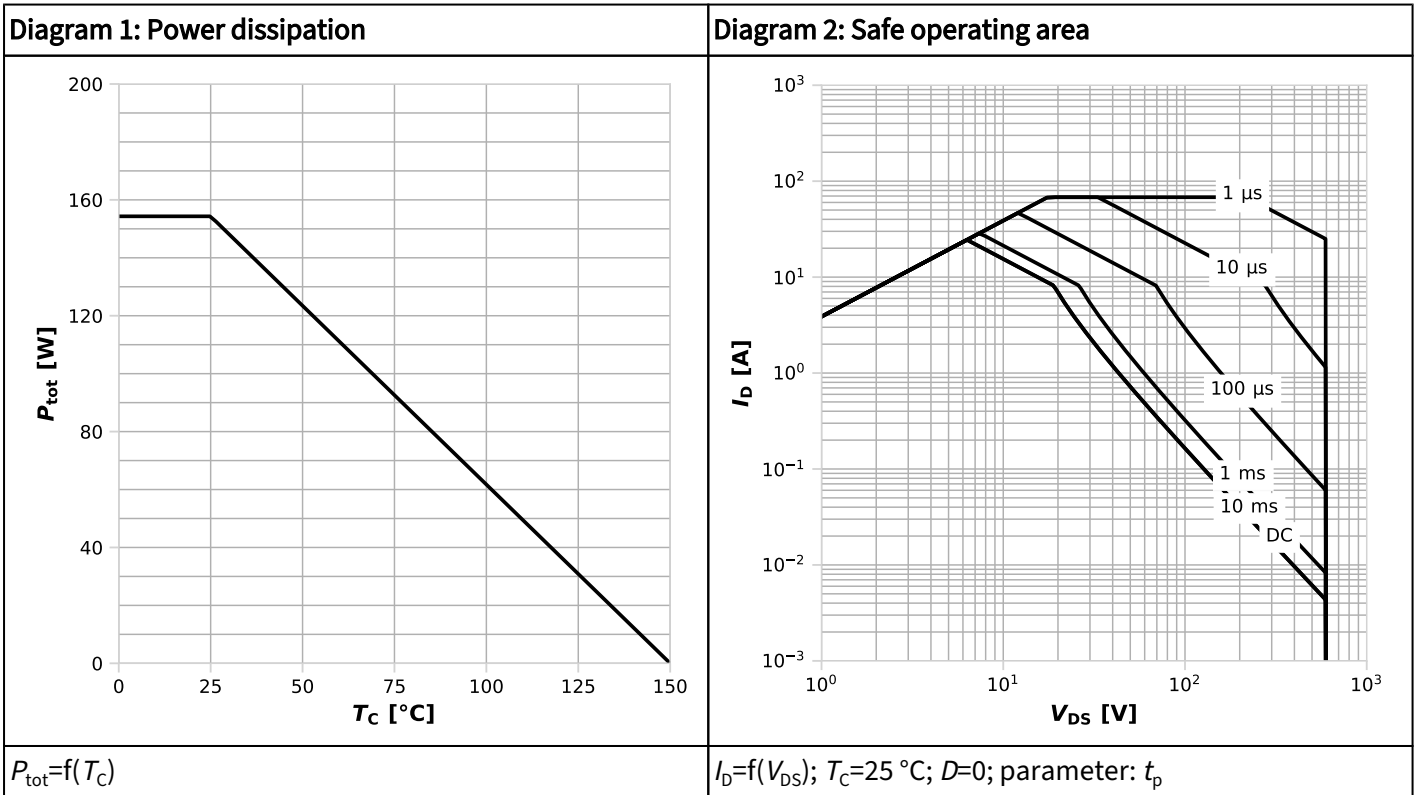
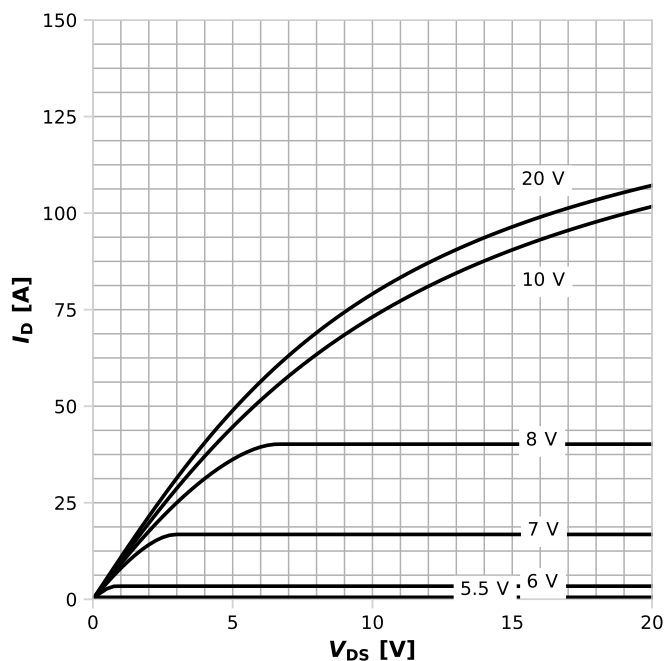
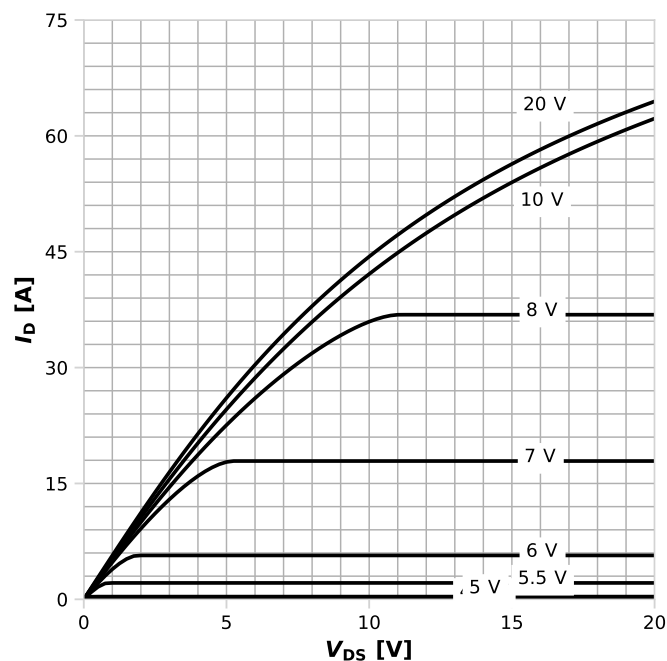


Diagram 5: Typ. output characteristics



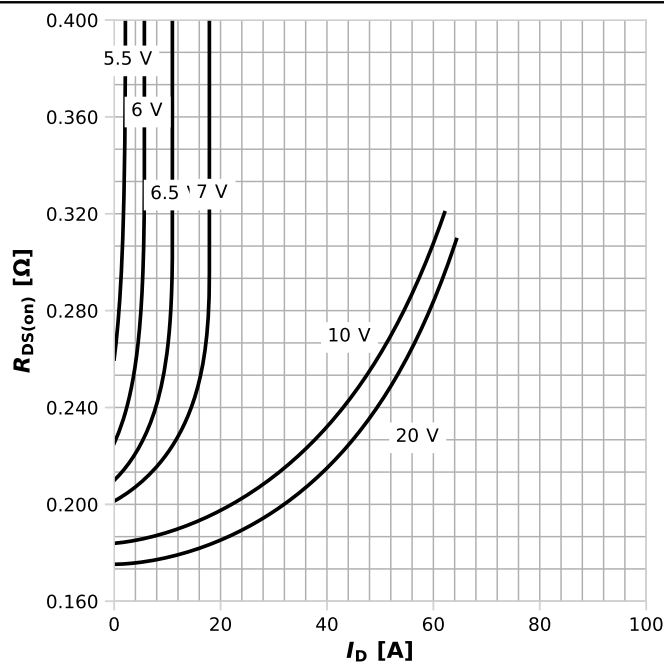
$I_D = f(V_{DS})$; $T_j = 25^\circ\text{C}$; parameter: V_{GS}

Diagram 6: Typ. output characteristics



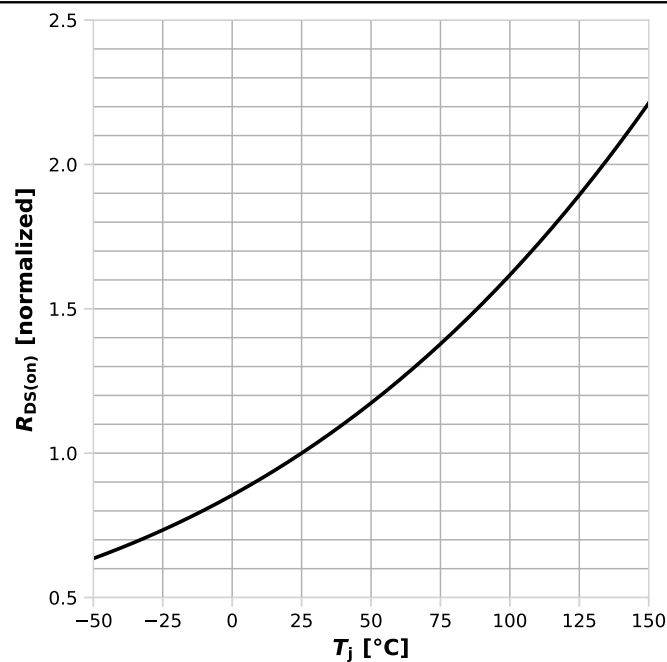
$I_D = f(V_{DS})$; $T_j = 125^\circ\text{C}$; parameter: V_{GS}

Diagram 7: Typ. drain-source on-state resistance



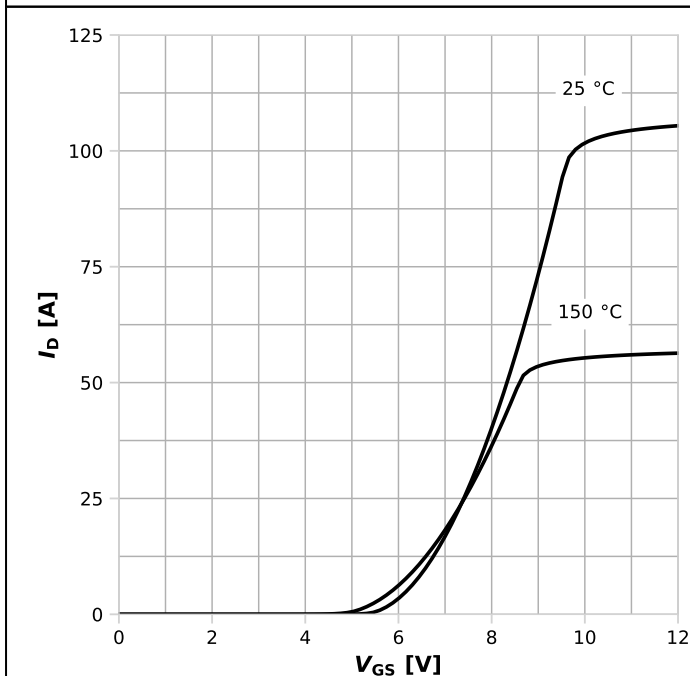
$R_{DS(on)} = f(I_D)$; $T_j = 125^\circ\text{C}$; parameter: V_{GS}

Diagram 8: Drain-source on-state resistance



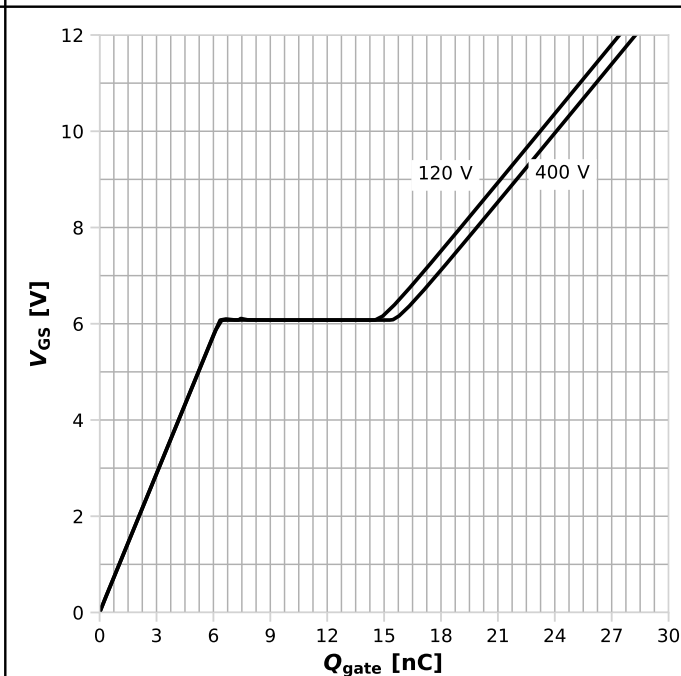
$R_{DS(on)} = f(T_j)$; $I_D = 8.3\text{ A}$; $V_{GS} = 10\text{ V}$

Diagram 9: Typ. transfer characteristics



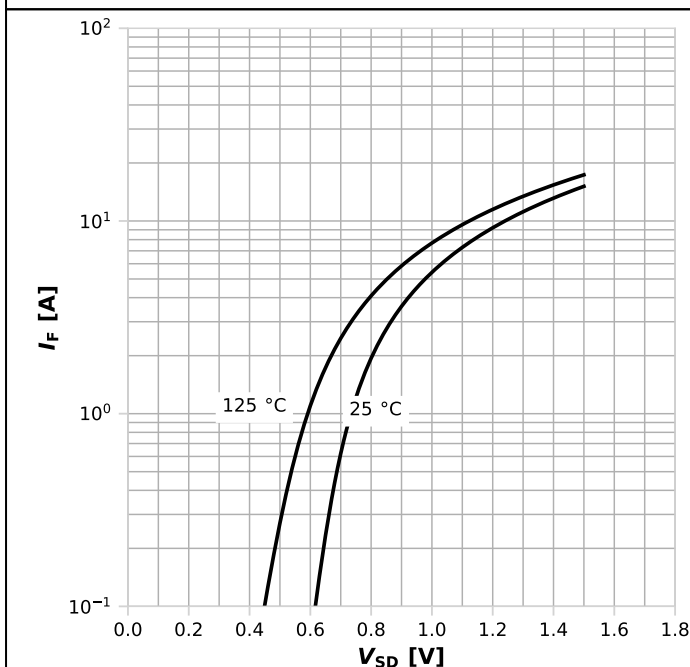
$I_D = f(V_{GS})$; $V_{DS} = 20V$; parameter: T_j

Diagram 10: Typ. gate charge



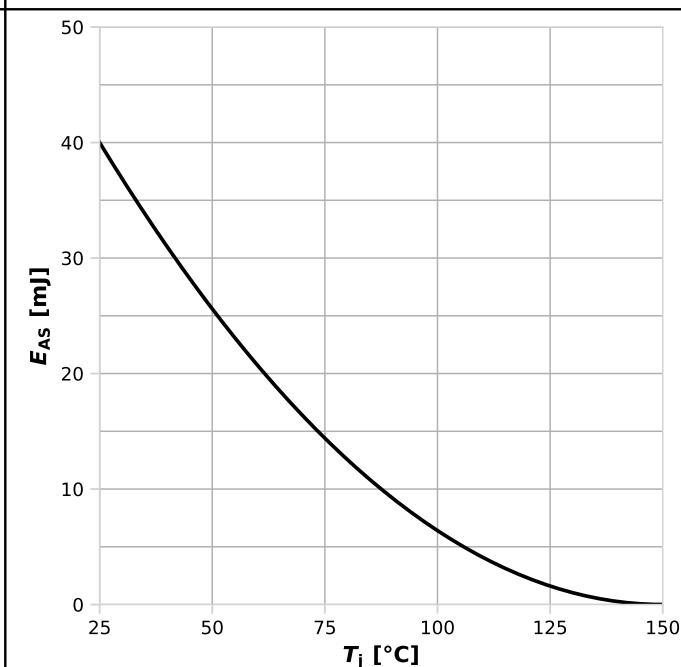
$V_{GS} = f(Q_{gate})$; $I_D = 4.0$ A pulsed; parameter: V_{DD}

Diagram 11: Forward characteristics of reverse diode



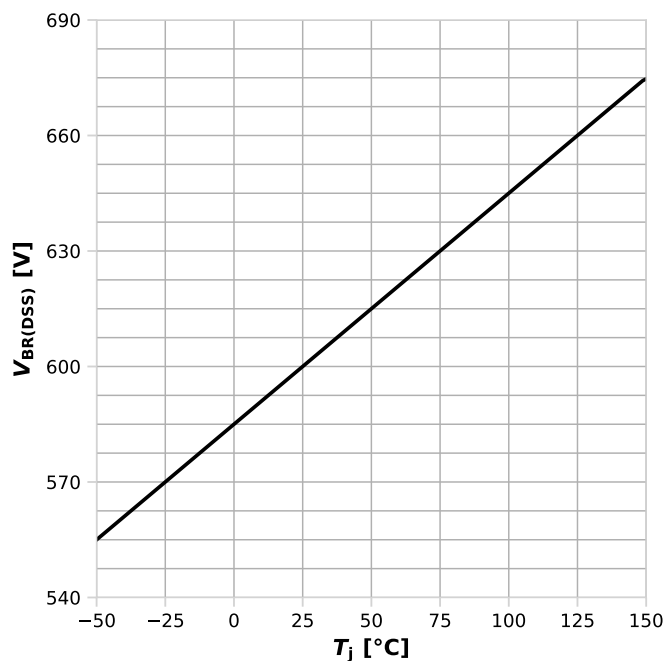
$I_F = f(V_{SD})$; parameter: T_j

Diagram 12: Avalanche energy



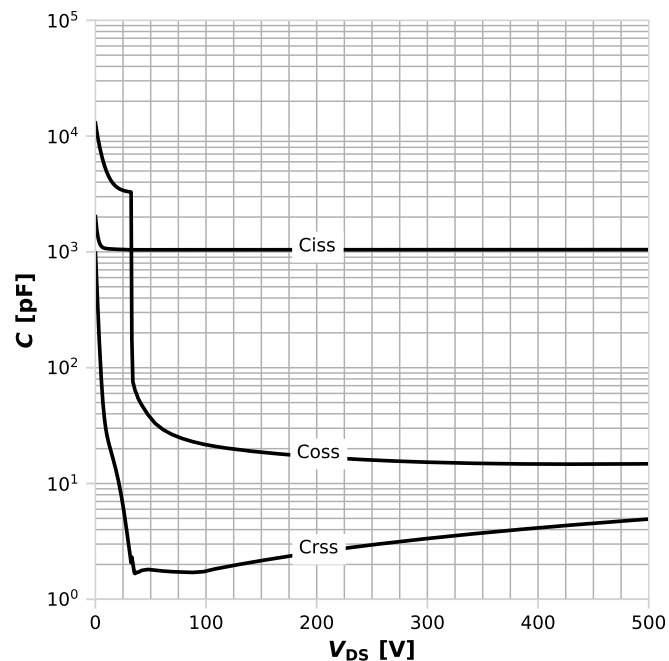
$E_{AS} = f(T_j)$; $I_D = 2.2$ A; $V_{DD} = 50$ V

Diagram 13: Drain-source breakdown voltage



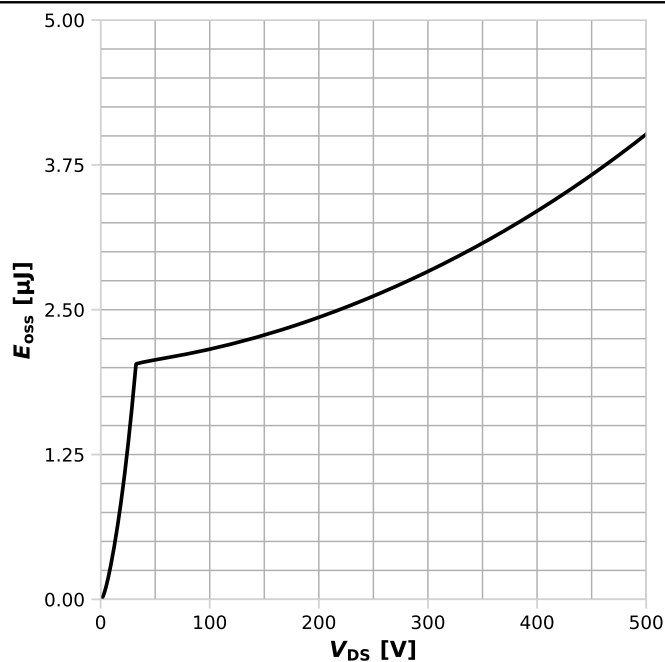
$$V_{BR(DSS)} = f(T_j); I_D = 1 \text{ mA}$$

Diagram 14: Typ. capacitances



$$C = f(V_{DS}); V_{GS} = 0 \text{ V}; f = 250 \text{ kHz}$$

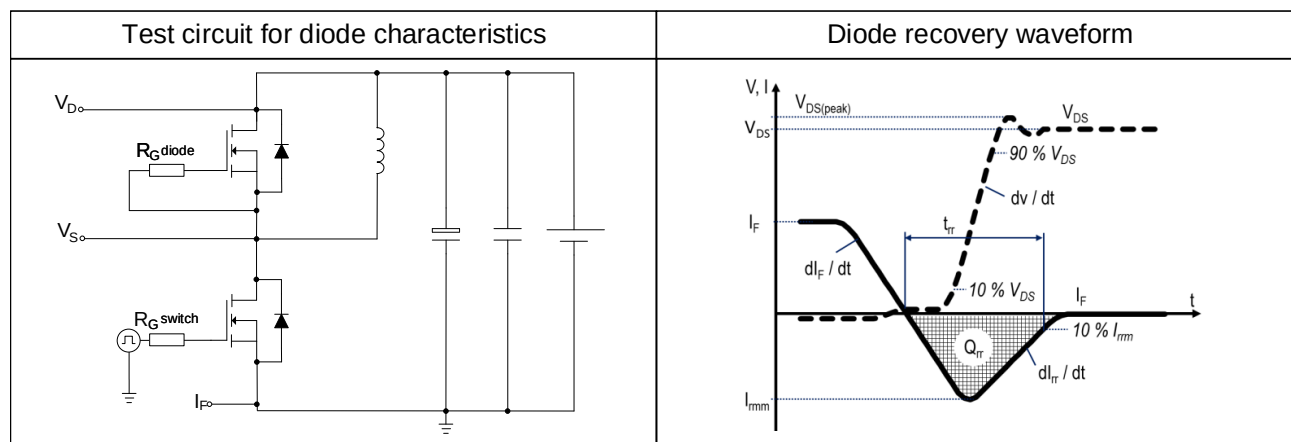
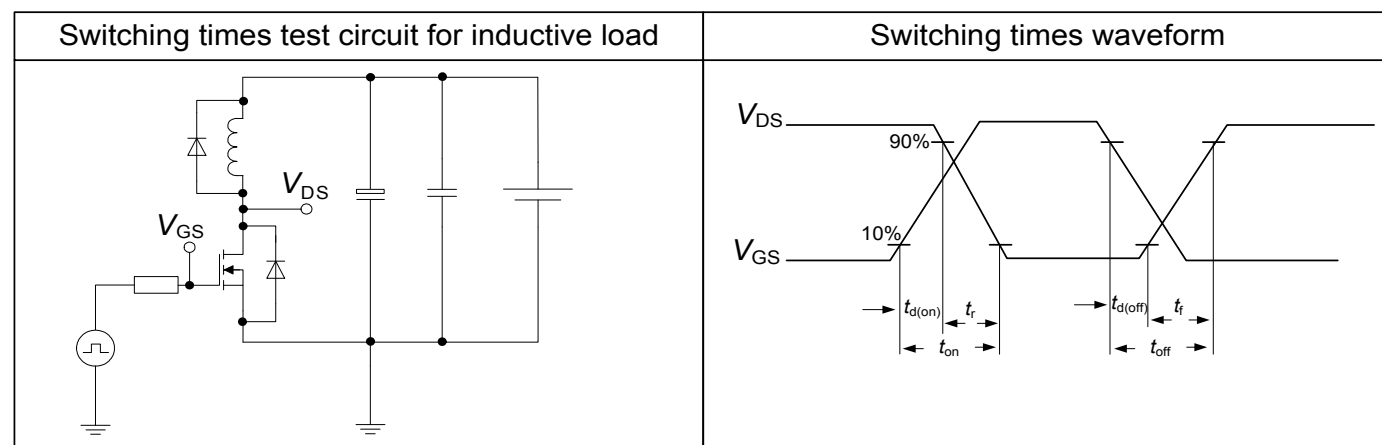
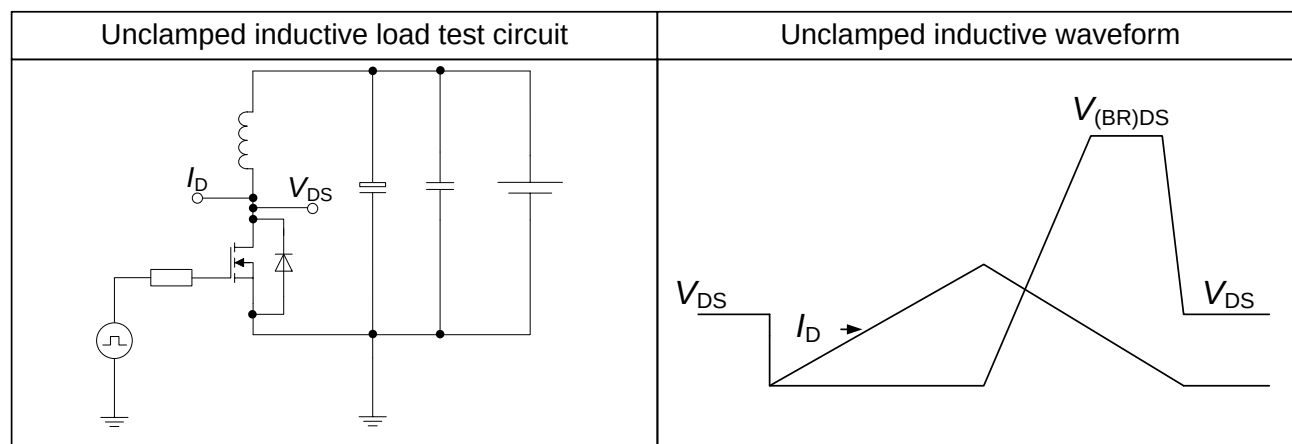
Diagram 15: Typ. Coss stored energy



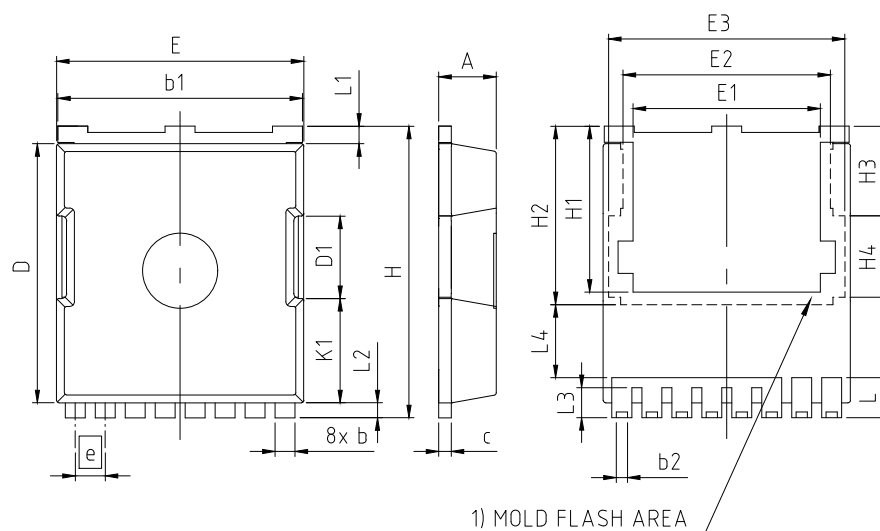
$$E_{oss} = f(V_{DS})$$

5 Test circuits

Table 8 Diode characteristics

**Table 9 Switching times****Table 10 Unclamped inductive load**

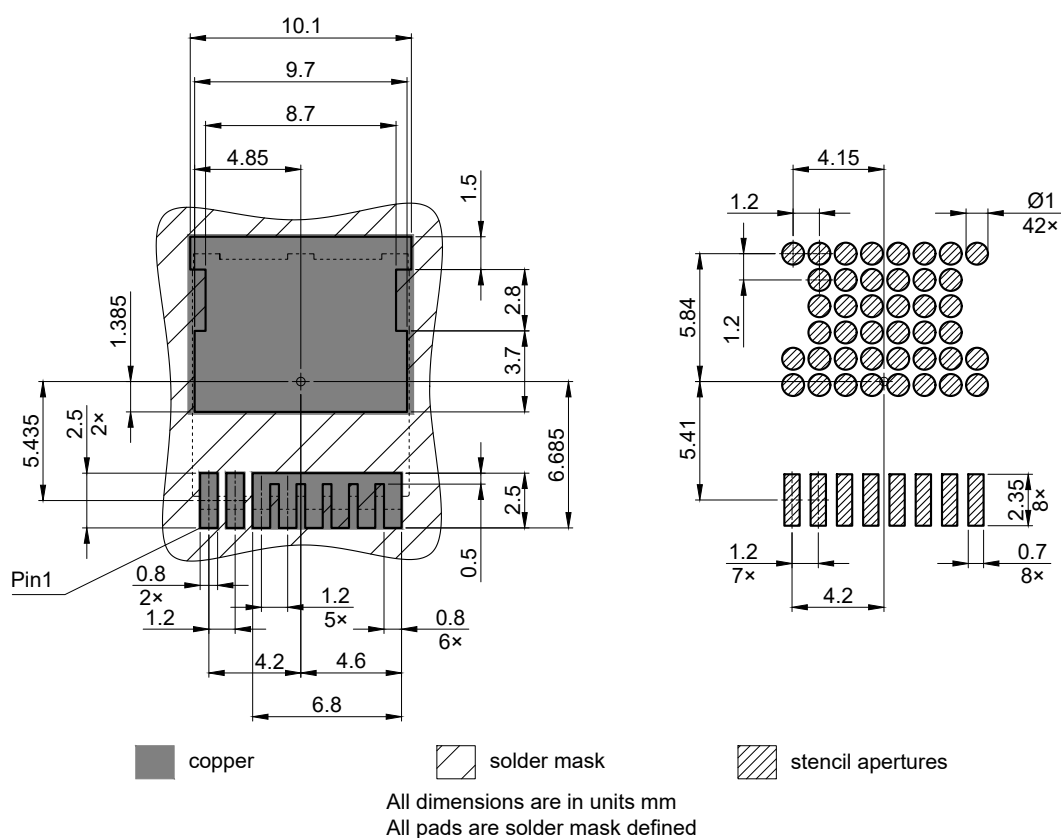
6 Package outlines

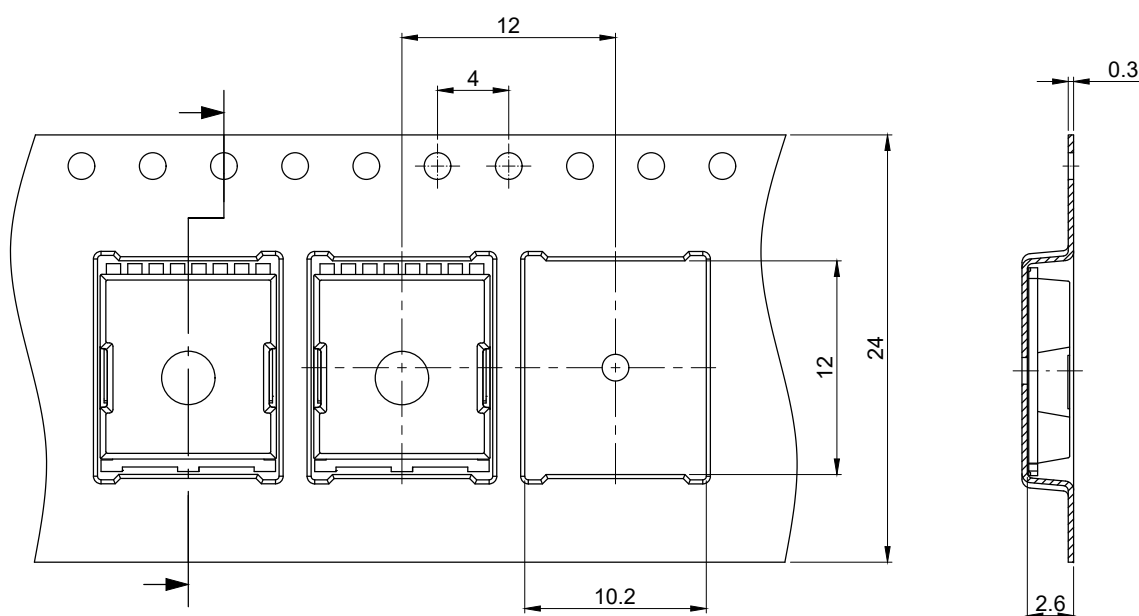


PACKAGE - GROUP NUMBER: PG-HSOF-8-U02		
DIMENSIONS	MILLIMETERS	
	MIN.	MAX.
A	2.20	2.40
b	0.70	0.90
b1	9.70	9.90
b2	0.42	0.50
c	0.40	0.60
D	10.28	10.58
D1	3.30	
E	9.70	10.10
E1	7.50	
E2	8.50	
E3	9.46	
e	1.20 (BSC)	
H	11.48	11.88
H1	6.55	6.95
H2	7.15	
H3	3.59	
H4	3.26	
N	8	
K1	4.18	
L	1.40	1.80
L1	0.50	0.90
L2	0.50	0.70
L3	1.00	1.30
L4	2.62	2.81

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

7 Appendix A

Table 11 **Related links**

- [IFX CoolMOS CM8 Webpage](#)
- [IFX CoolMOS CM8 application note](#)
- [IFX CoolMOS CM8 simulation model](#)
- [IFX Design tools](#)

Revision history

IPT60R120CM8

Revision 2024-12-19, Rev. 2.0

Previous revisions

Revision	Date	Subjects (major changes since last revision)
2.0	2024-12-19	Release of final version

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