

## MOSFET

PG-TO247-3

### 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

### 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
$R_{DS(on),max}$	99	mΩ
$Q_{g,typ}$	31	nC
$I_{D,pulse}$	87	A
$E_{oss} @ 400V$	4.2	μJ
Body diode $di_F/dt$	1300	A/μs
ESD class (HBM)	2	

Part number	Package	Marking	Related links
IPW60R099CM8	PG-TO247-3	60R099C8	see Appendix A

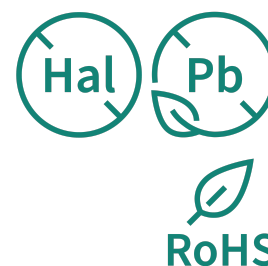
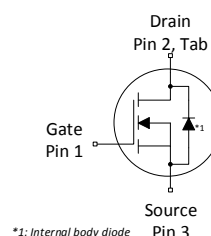
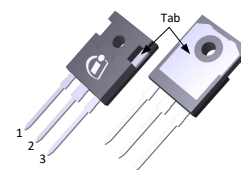




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# 1 Maximum ratings

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 <sup>1)</sup>	$I_D$	-	-	29	A	$T_C = 25^\circ\text{C}$
Continuous drain current	$I_D$	-	-	18	A	$T_C = 100^\circ\text{C}$
Pulsed drain current <sup>2)</sup>	$I_{D,pulse}$	-	-	87	A	$T_C = 25^\circ\text{C}$
Avalanche energy, single pulse	$E_{AS}$	-	-	51	mJ	$I_D = 2.7\text{A}$ ; $V_{DD} = 50\text{V}$ ; see table 10
Avalanche energy, repetitive	$E_{AR}$			0.26		
Avalanche current, single pulse	$I_{AS}$	-	-	2.7	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	$P_{tot}$	-	-	176	W	$T_C = 25^\circ\text{C}$
Storage temperature	$T_{stg}$	-55	-	150	$^\circ\text{C}$	-
Operating junction temperature	$T_j$					
Extended operating junction temperature	$T_j$	150	-	175	$^\circ\text{C}$	$\leq 50\text{ h}$ in the application lifetime
Mounting torque	-	-	-	60	Ncm	M3 and M3.5 screws
Continuous diode forward current	$I_S$	-	-	29	A	$T_C = 25^\circ\text{C}$
Diode pulse current <sup>2)</sup>	$I_{S,pulse}$			87		
Reverse diode dv/dt <sup>3)</sup>	dv/dt	-	-	70	V/ns	$V_{DS} = 0 \dots 400\text{V}$ , $I_{SD} \leq 29\text{A}$ , $T_j = 25^\circ\text{C}$ see table 8
Maximum diode commutation speed	di <sub>F</sub> /dt			1300	A/ $\mu\text{s}$	
Insulation withstand voltage	$V_{ISO}$	-	-	n.a.	V	$V_{rms}$ , $T_C = 25^\circ\text{C}$ , $t = 1\text{min}$

<sup>1)</sup> Limited by  $T_{j,max}$ .

<sup>2)</sup> Pulse width  $t_p$  limited by  $T_{j,max}$ .

<sup>3)</sup> 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	$R_{thJC}$	-	-	0.71	K/W	-
Thermal resistance, junction - ambient	$R_{thJA}$	-	-	62	K/W	leaded
Thermal resistance, junction - ambient for SMD version	$R_{thJA}$	-	-	-	K/W	-
Soldering temperature, wavesoldering only allowed at leads	$T_{sold}$	-	-	260	°C	1.6mm (0.063 in.) from case for 10s

### 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	$V_{DS}=V_{GS}$ , $I_D=0.26mA$
Zero gate voltage drain current	$I_{DSS}$	-	-	1	$\mu A$	$V_{DS}=600V$ , $V_{GS}=0V$ , $T_j=25^\circ\text{C}$
			35.5	-		$V_{DS}=600V$ , $V_{GS}=0V$ , $T_j=150^\circ\text{C}$
Gate-source leakage current	$I_{GSS}$	-	-	2	$\mu A$	$V_{GS}=20V$ , $V_{DS}=0V$
Drain-source on-state resistance	$R_{DS(on)}$	-	0.083	0.099	$\Omega$	$V_{GS}=10V$ , $I_D=10.1A$ , $T_j=25^\circ\text{C}$
			0.183	-		$V_{GS}=10V$ , $I_D=10.1A$ , $T_j=150^\circ\text{C}$
Gate resistance	$R_G$	-	8.9	-	$\Omega$	$f=1MHz$

**Table 5 Dynamic characteristics**

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Input capacitance	$C_{iss}$	-	1330	-	pF	$V_{GS}=0V$ , $V_{DS}=400V$ , $f=250kHz$
Output capacitance	$C_{oss}$		18			
Effective output capacitance, energy related <sup>4)</sup>	$C_{o(er)}$	-	53	-	pF	$V_{GS}=0V$ , $V_{DS}=0...400V$
Effective output capacitance, time related <sup>5)</sup>	$C_{o(tr)}$	-	533	-	pF	$I_D=\text{constant}$ , $V_{GS}=0V$ , $V_{DS}=0...400V$
Turn-on delay time	$t_{d(on)}$	-	20.7	-	ns	$V_{DD}=400V$ , $V_{GS}=13V$ , $I_D=5.1A$ , $R_G=5.3\Omega$ ; see table 9
Rise time	$t_r$		6.9			
Turn-off delay time	$t_{d(off)}$		93.2			
Fall time	$t_f$		10.2			

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

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

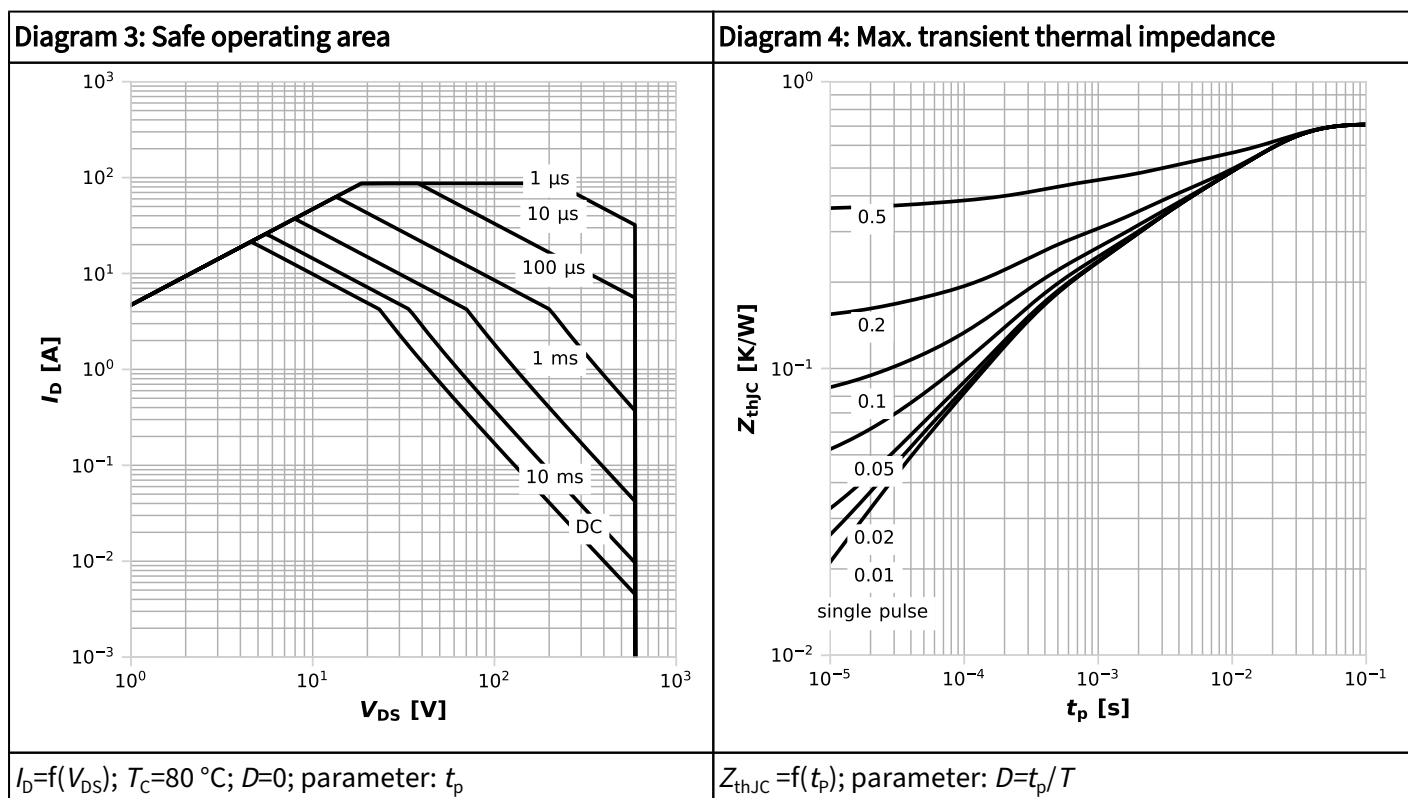
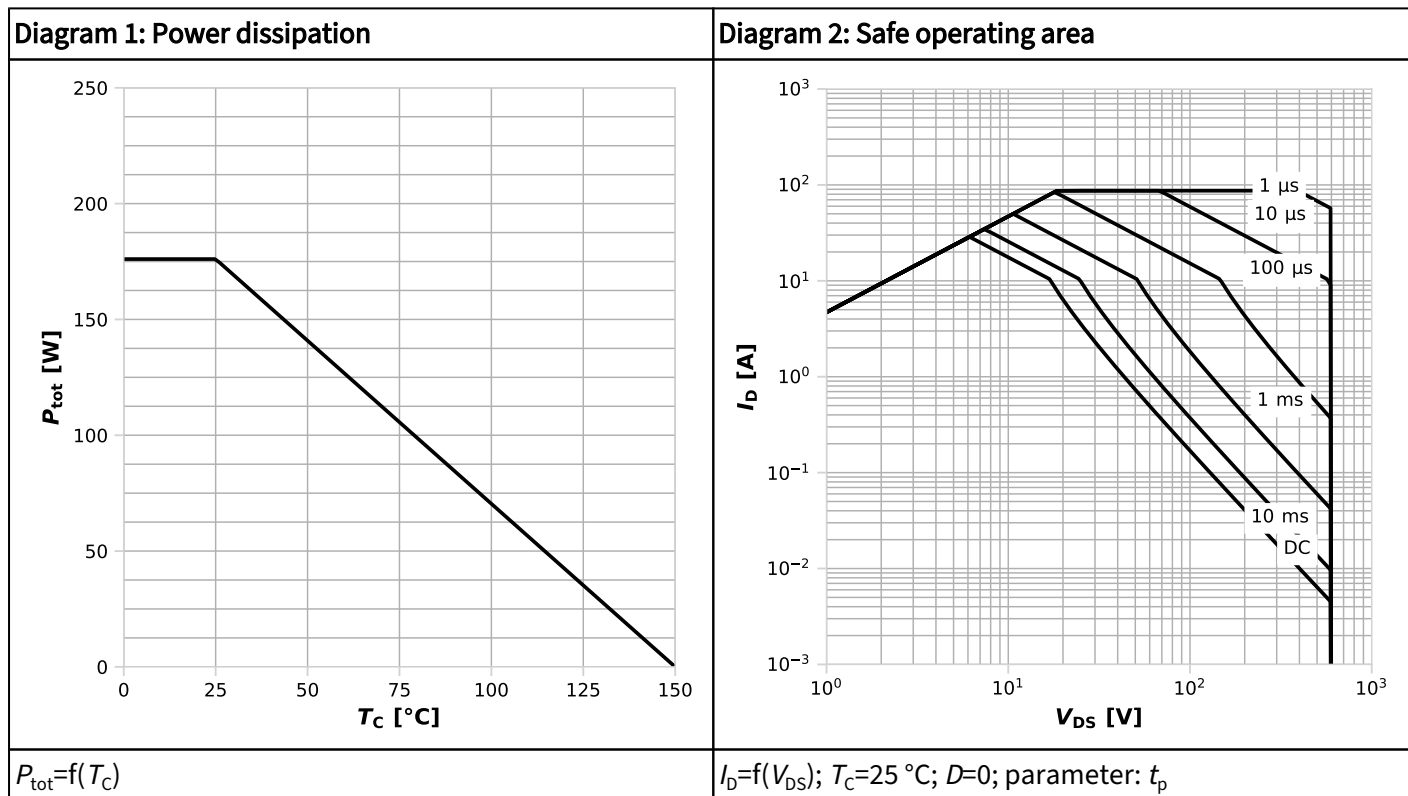
**Table 6 Gate charge characteristics**

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Gate to source charge	$Q_{gs}$	-	8	-	nC	$V_{DD}=400V$ , $I_D=5.1A$ , $V_{GS}=0$ to $10V$
Gate to drain charge	$Q_{gd}$		11		nC	
Gate charge total	$Q_g$		31		nC	
Gate plateau voltage	$V_{plateau}$		6.0		V	

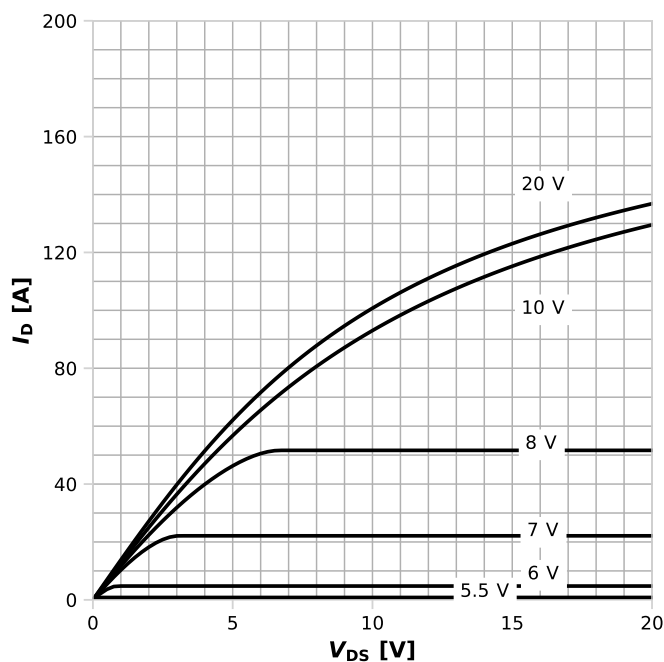
**Table 7 Reverse diode characteristics**

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Diode forward voltage	$V_{SD}$	-	0.9	-	V	$V_{GS}=0V$ , $I_F=5.1A$ , $T_j=25^\circ C$
Reverse recovery time	$t_{rr}$	-	77.3	96.6	ns	$V_R=400V$ , $I_F=5.1A$ , $di_F/dt=100A/\mu s$ ; see table 8
Reverse recovery charge	$Q_{rr}$		0.30	0.45	$\mu C$	
Peak reverse recovery current	$I_{rrm}$		7.8	-	A	

## 4 Electrical characteristics diagrams

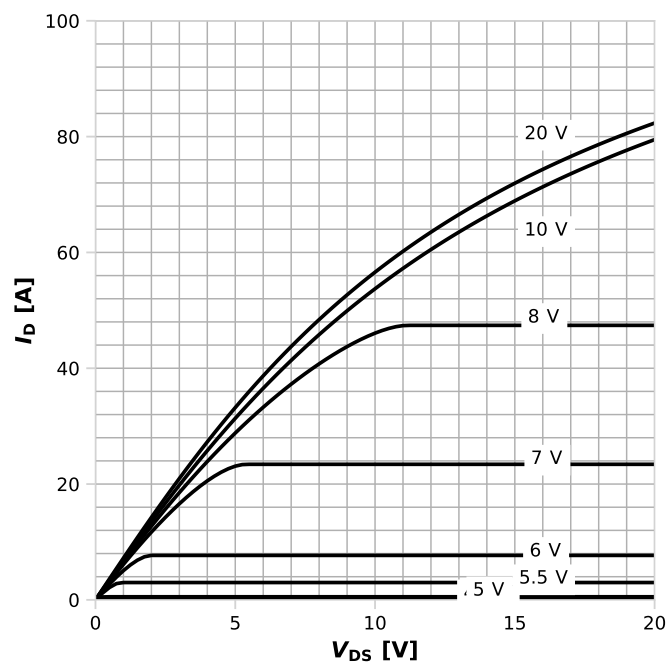


**Diagram 5: Typ. output characteristics**



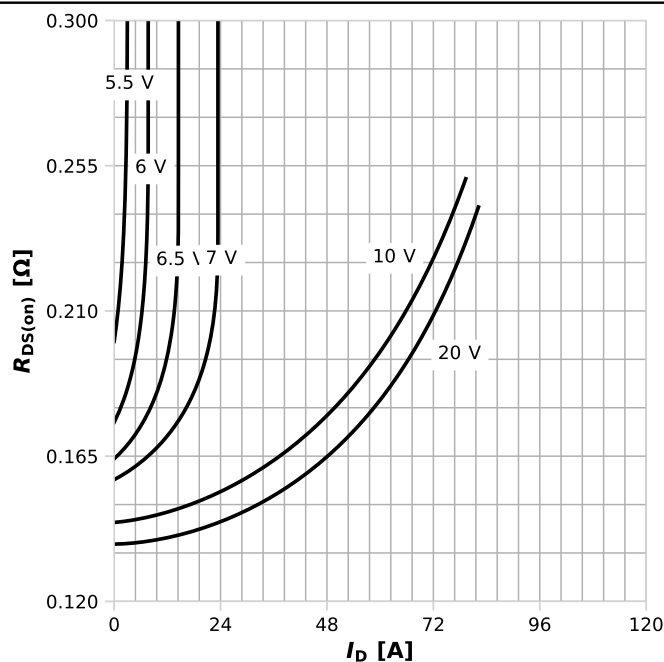
$I_D = f(V_{DS}); T_j = 25^\circ\text{C}; \text{parameter: } V_{GS}$

**Diagram 6: Typ. output characteristics**



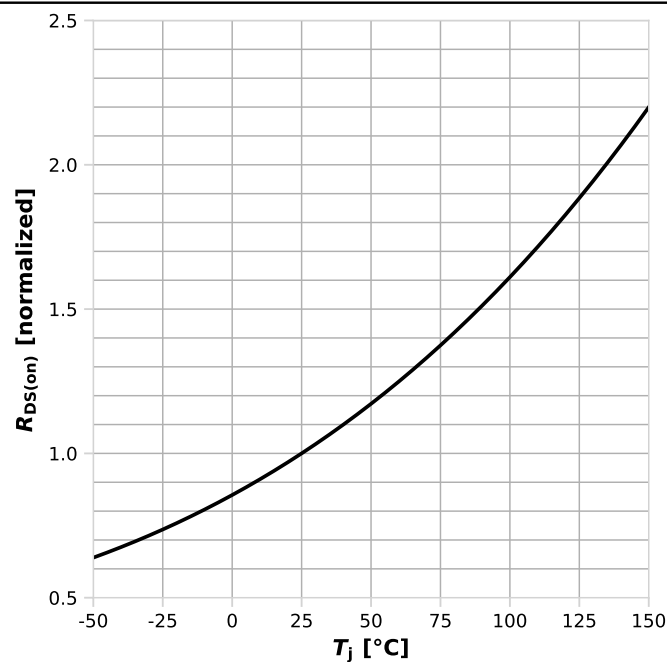
$I_D = f(V_{DS}); T_j = 125^\circ\text{C}; \text{parameter: } V_{GS}$

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



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

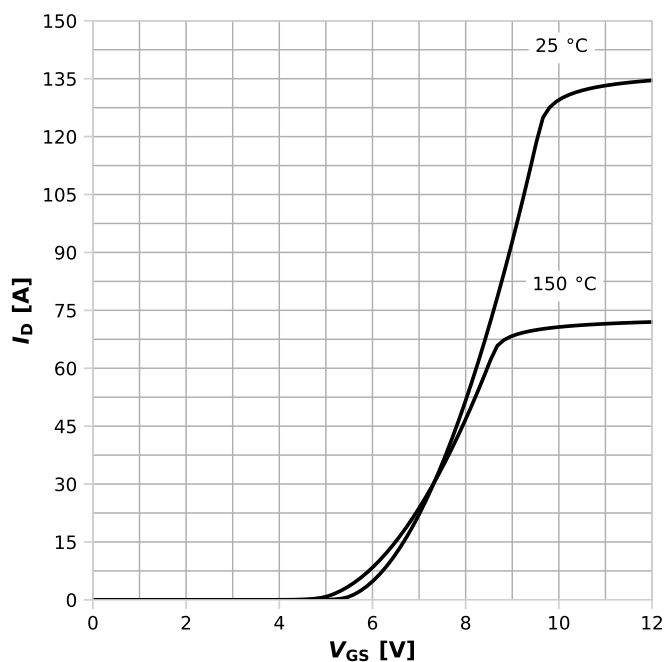
**Diagram 8: Drain-source on-state resistance**



$R_{DS(on)} = f(T_j); I_D = 10.1\text{ A}; V_{GS} = 10\text{ V}$

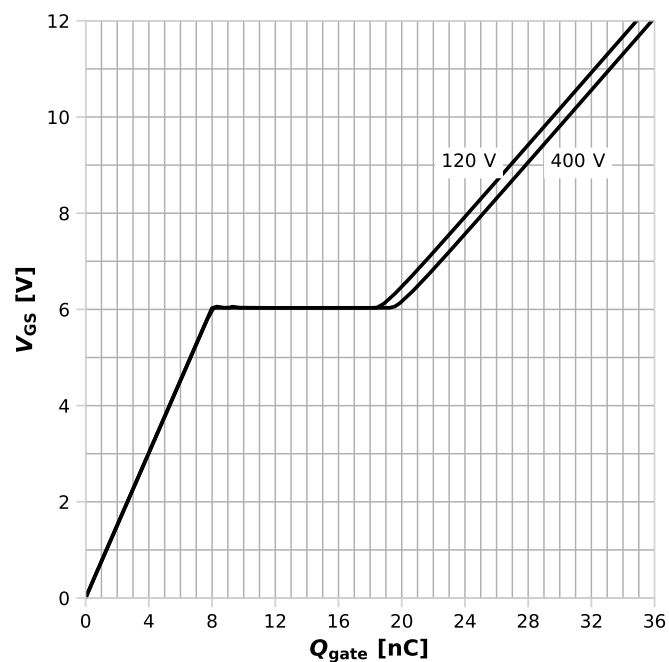


**Diagram 9: Typ. transfer characteristics**



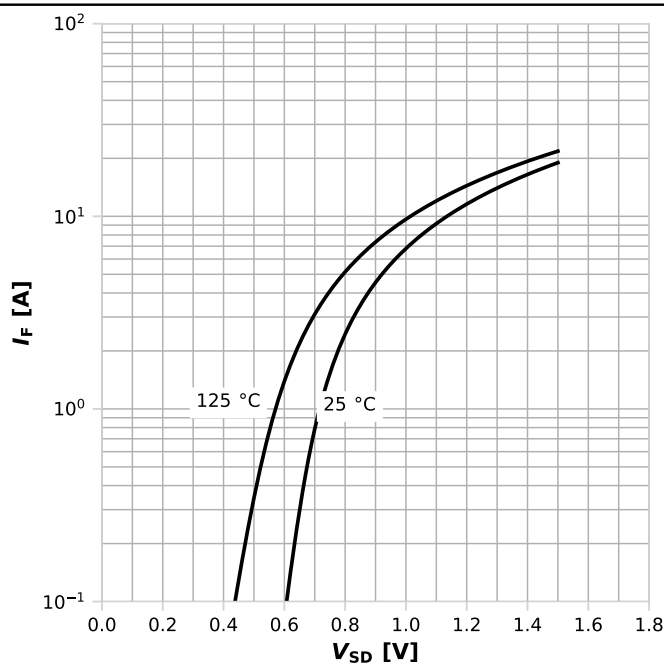
$I_D = f(V_{GS})$ ;  $V_{DS} = 20V$ ; parameter:  $T_j$

**Diagram 10: Typ. gate charge**



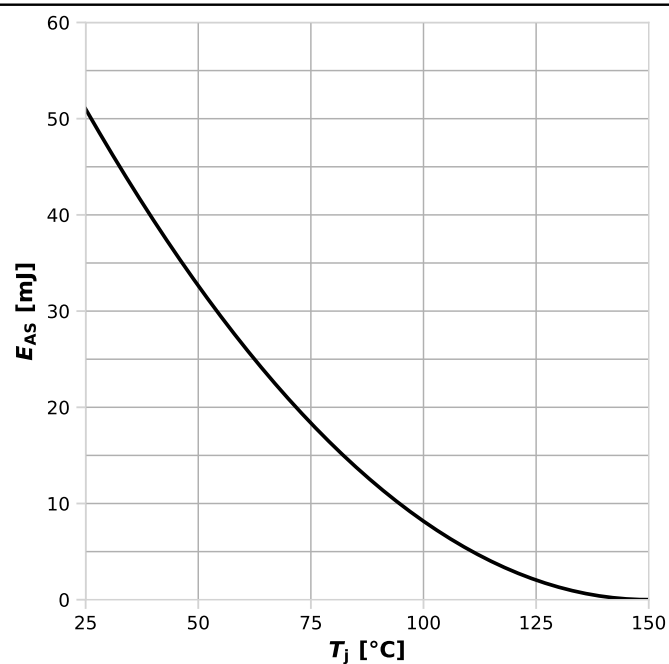
$V_{GS} = f(Q_{gate})$ ;  $I_D = 5.1$  A pulsed; parameter:  $V_{DD}$

**Diagram 11: Forward characteristics of reverse diode**



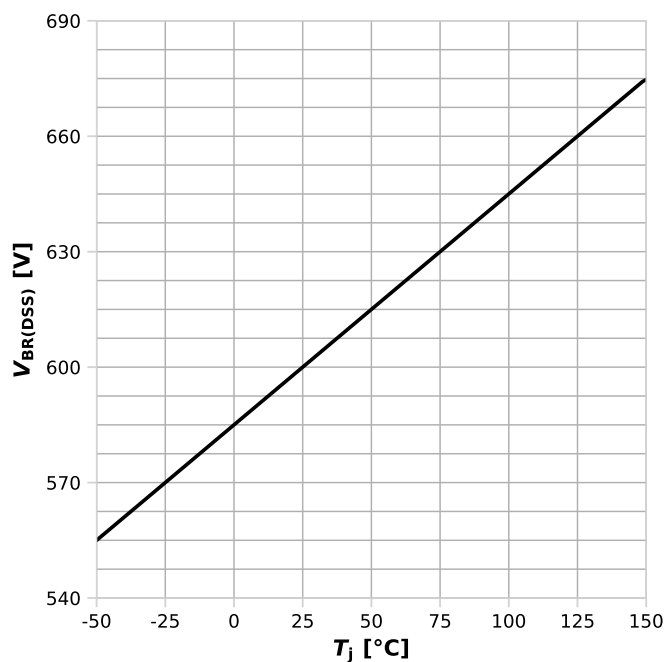
$I_F = f(V_{SD})$ ; parameter:  $T_j$

**Diagram 12: Avalanche energy**



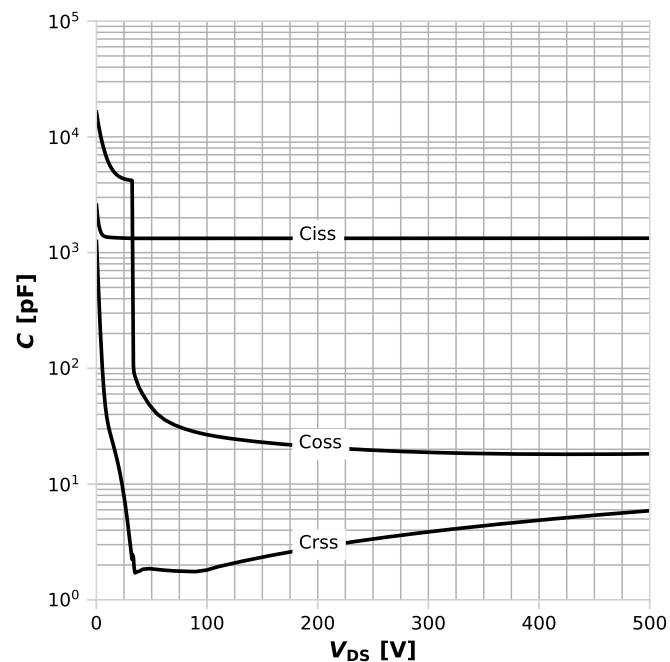
$E_{AS} = f(T_j)$ ;  $I_D = 2.7$  A;  $V_{DD} = 50$  V

**Diagram 13: Drain-source breakdown voltage**



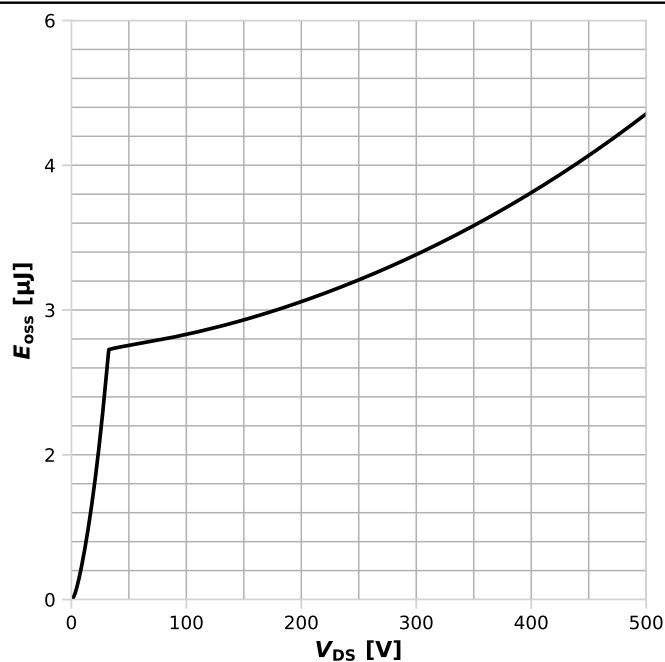
$$V_{BR(DSS)} = f(T_j); I_D = 1 \text{ mA}$$

**Diagram 14: Typ. capacitances**



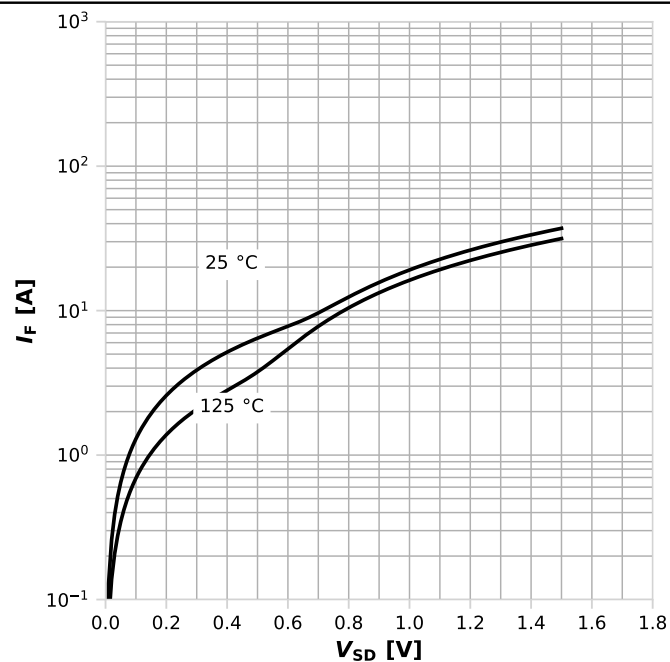
$$C = f(V_{DS}); V_{GS} = 0 \text{ V}; f = 250 \text{ kHz}$$

**Diagram 15: Typ. Coss stored energy**



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

**Diagram 16: Forward characteristics of reverse diode**



$$I_F = f(V_{SD}); V_{GS} = 10 \text{ V}; \text{parameter: } T_j$$

5 Test circuits

Table 8 Diode characteristics

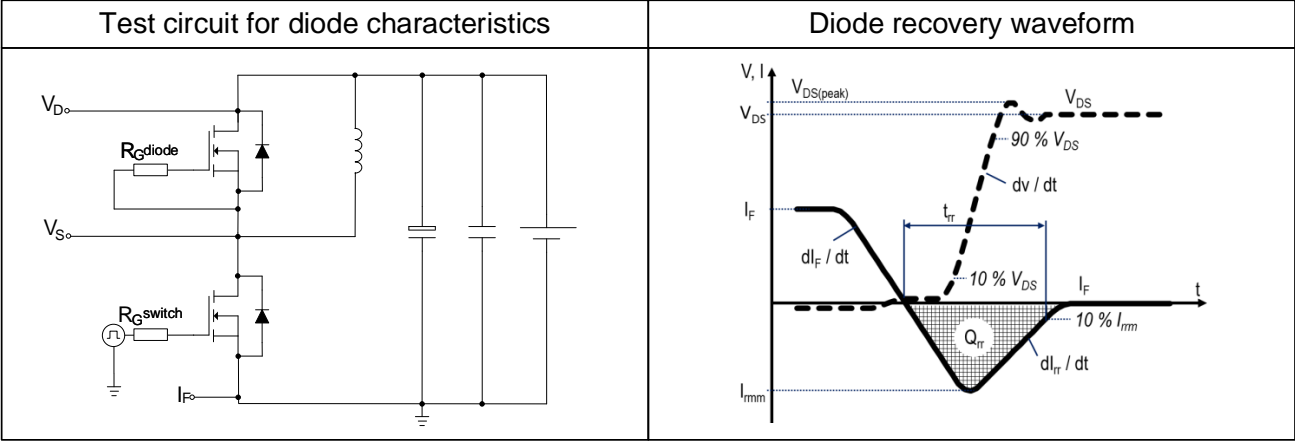


Table 9 Switching times

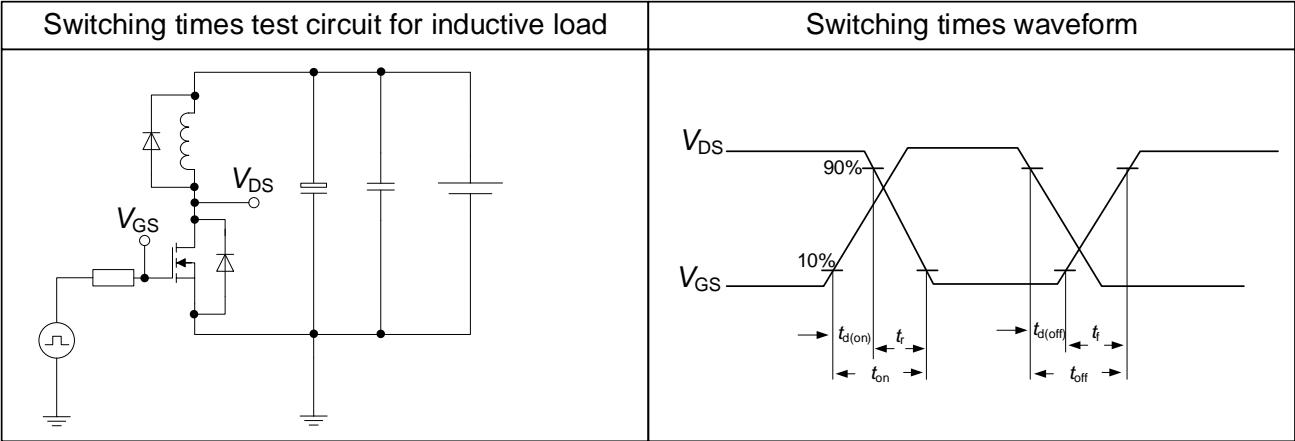
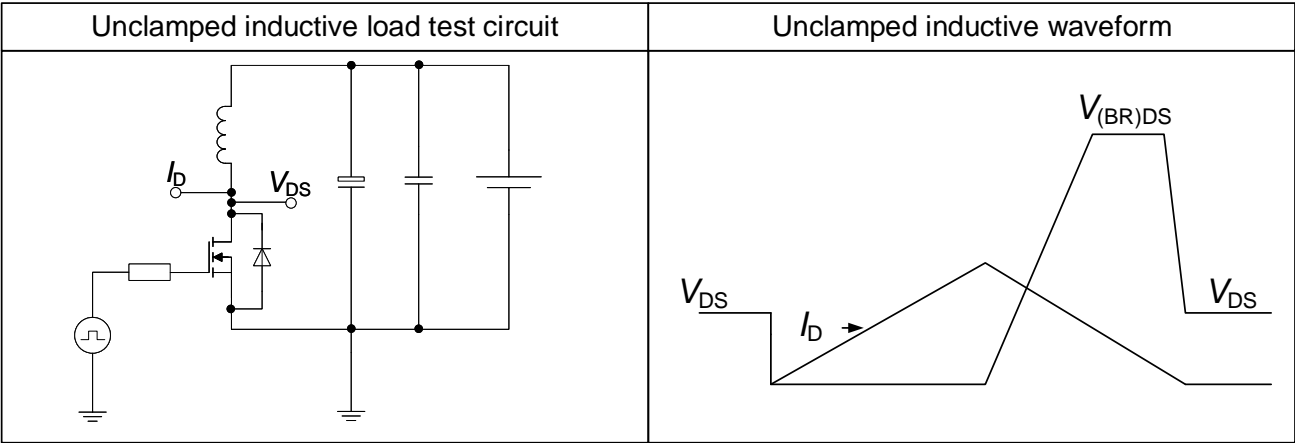


Table 10 Unclamped inductive load



6 Package outlines

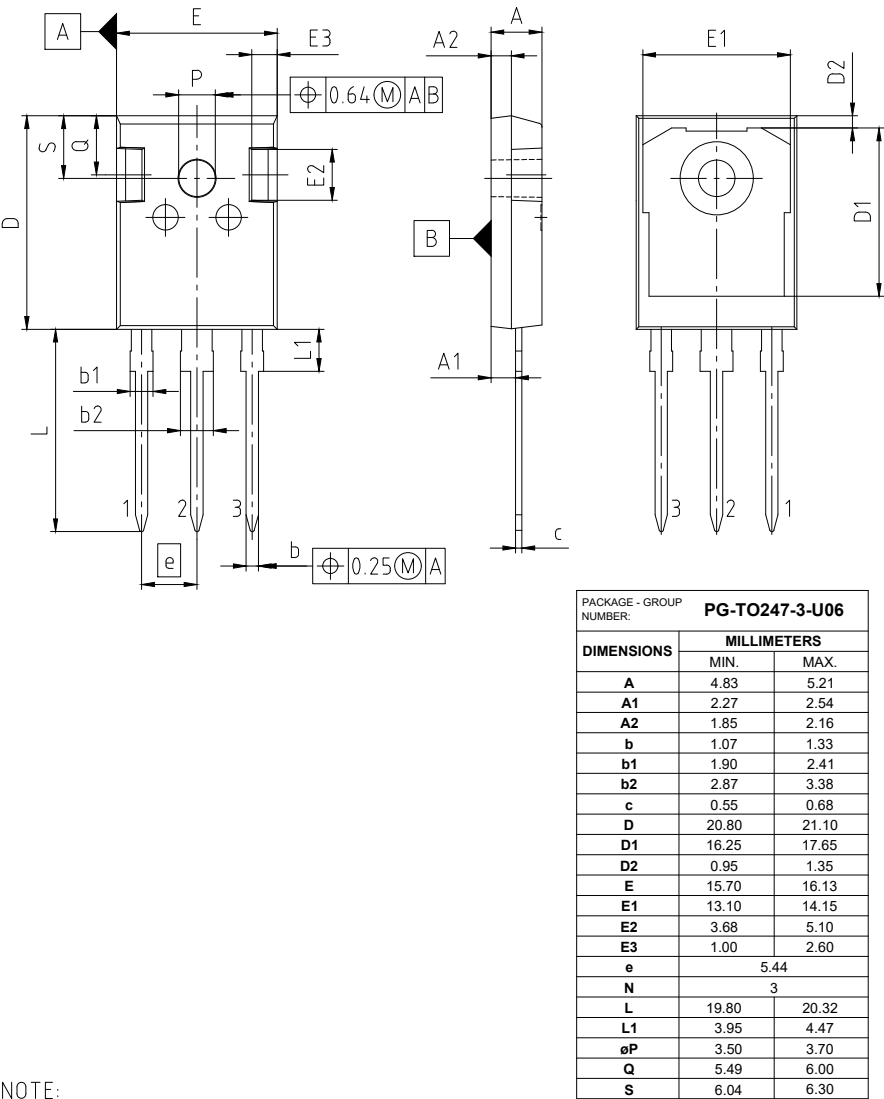


Figure 1 Outline PG-T0247-3, dimensions in mm

## 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**

IPW60R099CM8

**Revision 2025-03-20, Rev. 2.2**

Previous revisions

Revision	Date	Subjects (major changes since last revision)
2.0	2024-10-30	Change of SOA diagram scaling
2.1	2025-01-14	Added ESD Classification
2.2	2025-03-20	Update of maximum transient thermal impedance and SOA

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