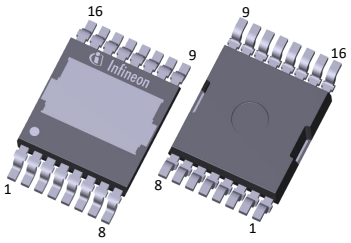
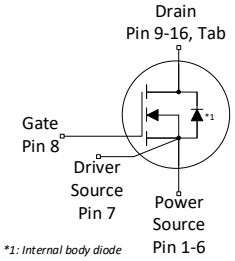
# MOSFET

## 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.

TOLT




## 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

Qualified according to relevant JEDEC tests.

*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 |
| $R_{DS(on),max}$ | 70 | mΩ |
| $Q_{g,typ}$ | 43 | nC |
| $I_{D,pulse}$ | 124 | A |
| $E_{oss}$ @ 400 V | 5.9 | µJ |
| Body diode $di_F/dt$ | 1300 | A/µs |
| ESD class (HBM) | 2 | |

| Part number | Package | Marking | Related links |
|---|---|---|---|
| IPLT60R070CM8 | PG-HDSOP-16 | 60R070C8 | see Appendix A |

# Table of contents

# 1 Maximum ratings

at $T_j$ = 25°C, unless otherwise specified

**Table 2 Maximum ratings**

| Parameter | Symbol | Values | | | Unit | Note / Test condition |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | | |
| Continuous drain current [1] | $I_D$ | - | - | 40 | A | $T_C$ = 25°C |
| Continuous drain current | $I_D$ | - | - | 25 | A | $T_C$ = 100°C |
| Pulsed drain current [2] | $I_{D,pulse}$ | - | - | 124 | A | $T_C$ = 25°C |
| Avalanche energy, single pulse | $E_{AS}$ | - | - | 73 | mJ | $I_D$ = 3.5 A; $V_{DD}$ = 50 V; see table 10 |
| Avalanche energy, repetitive | $E_{AR}$ | | | 0.36 | | |
| Avalanche current, single pulse | $I_{AS}$ | - | - | 3.5 | A | - |
| MOSFET dv/dt ruggedness | dv/dt | - | - | 120 | V/ns | $V_{DS}$ = 0...400 V |
| Gate source voltage (static) | $V_{GS}$ | -20 | - | 20 | V | static; |
| Gate source voltage (dynamic) | $V_{GS}$ | -30 | - | 30 | V | AC (f > 1 Hz) |
| Power dissipation | $P_{tot}$ | - | - | 245 | W | $T_C$ = 25°C |
| Storage temperature | $T_{stg}$ | -55 | - | 150 | °C | - |
| Operating junction temperature | $T_j$ | | | | | |
| Extended operating junction temperature | $T_j$ | 150 | - | 175 | °C | ≤ 50 h in the application lifetime |
| Mounting torque | - | - | - | - | Ncm | - |
| Continuous diode forward current | $I_S$ | - | - | 40 | A | $T_C$ = 25°C |
| Diode pulse current [2] | $I_{S,pulse}$ | | | 124 | | |
| Reverse diode dv/dt [3] | dv/dt | - | - | 70 | V/ns | $V_{DS}$ = 0...400 V, $I_{SD}$ ≤ 40 A, $T_j$ = 25°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°C, $t$ = 1 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 | $R_{thJC}$ | - | - | 0.51 | K/W | - |
| Thermal resistance, junction - ambient | $R_{thJA}$ | - | - | 62 | K/W | device on PCB, minimal footprint |
| Thermal resistance, junction - ambient for SMD version | $R_{thJA}$ | - | 45 | 55 | K/W | Device on 40 mm*40 mm*1.5 mm epoxy PCB FR4 with 6 $cm^2$ (one layer, 70 µm 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°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 | $V_{GS}$ = 0 V, $I_D$ = 1 mA |
| Gate threshold voltage | $V_{(GS)th}$ | 3.7 | 4.2 | 4.7 | V | $V_{DS}$ = $V_{GS}$, $I_D$ = 0.36 mA |
| Zero gate voltage drain current | $I_{DSS}$ | - | - | 1 | µA | $V_{DS}$ = 600 V, $V_{GS}$ = 0 V, $T_j$ = 25°C |
| | | | 45.1 | - | | $V_{DS}$ = 600 V, $V_{GS}$ = 0 V, $T_j$ = 150 °C |
| Gate-source leakage current | $I_{GSS}$ | - | - | 0.1 | µA | $V_{GS}$ = 20 V, $V_{DS}$ = 0 V |
| Drain-source on-state resistance | $R_{DS(on)}$ | - | 0.058 | 0.070 | Ω | $V_{GS}$ = 10 V, $I_D$ = 14.3 A, $T_j$ = 25°C |
| | | | 0.128 | - | | $V_{GS}$ = 10 V, $I_D$ = 14.3 A, $T_j$ = 150°C |
| Gate resistance | $R_G$ | - | 5.6 | - | Ω | $f$ = 1 MHz |

**Table 5 Dynamic characteristics**

| Parameter | Symbol | Values | | | Unit | Note / Test condition |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | | |
| Input capacitance | $C_{iss}$ | - | 1878 | - | pF | $V_{GS}$ = 0 V, $V_{DS}$ = 400 V, $f$ = 250 kHz |
| Output capacitance | $C_{oss}$ | | 25 | | | |
| Effective output capacitance, energy related [4] | $C_{o(er)}$ | - | 73 | - | pF | $V_{GS}$ = 0 V, $V_{DS}$ = 0...400 V |
| Effective output capacitance, time related [5] | $C_{o(tr)}$ | - | 750 | - | pF | $I_D$ = constant, $V_{GS}$ = 0 V, $V_{DS}$ = 0...400 V |
| Turn-on delay time | $t_{d(on)}$ | - | 18 | - | ns | $V_{DD}$ = 400 V, $V_{GS}$=13 V, $I_D$ = 7.3 A, $R_G$ = 5.3 Ω; see table 9 |
| Rise time | $t_r$ | | 6 | | | |
| Turn-off delay time | $t_{d(off)}$ | | 95 | | | |
| Fall time | $t_f$ | | 8 | | | |

[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 400 V

[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**

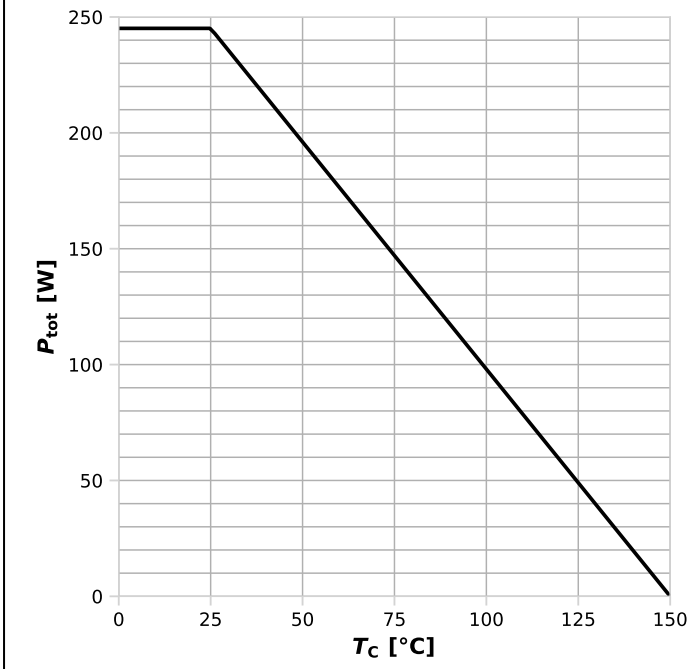
| Parameter | Symbol | Values | | | Unit | Note / Test condition |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | | |
| Gate to source charge | $Q_{gs}$ | - | 11 | - | nC | $V_{DD}$ = 400 V, $I_D$ = 7.3 A, $V_{GS}$ = 0 to 10 V |
| Gate to drain charge | $Q_{gd}$ | | 15 | | nC | |
| Gate charge total | $Q_g$ | | 43 | | 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 | $V_{GS}$ = 0 V, $I_F$ = 7.3 A, $T_j$ = 25°C |
| Reverse recovery time | $t_{rr}$ | - | 90 | 113 | ns | $V_R$ = 400 V, $I_F$ = 7.3 A, $di_F/dt$ = 100 A/µs; see table 8 |
| Reverse recovery charge | $Q_{rr}$ | | 0.41 | 0.61 | µC | |
| Peak reverse recovery current | $I_{rrm}$ | | 9.34 | - | A | |

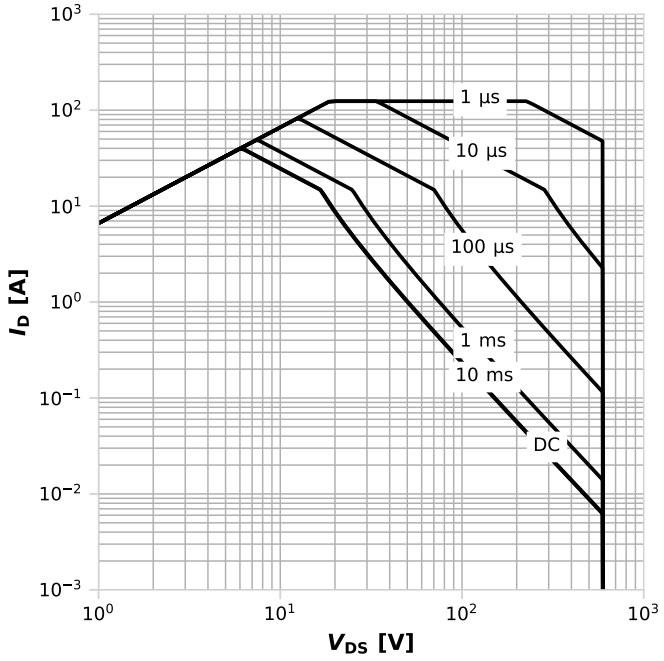
# 4 Electrical characteristics diagrams

**Diagram 1: Power dissipation**



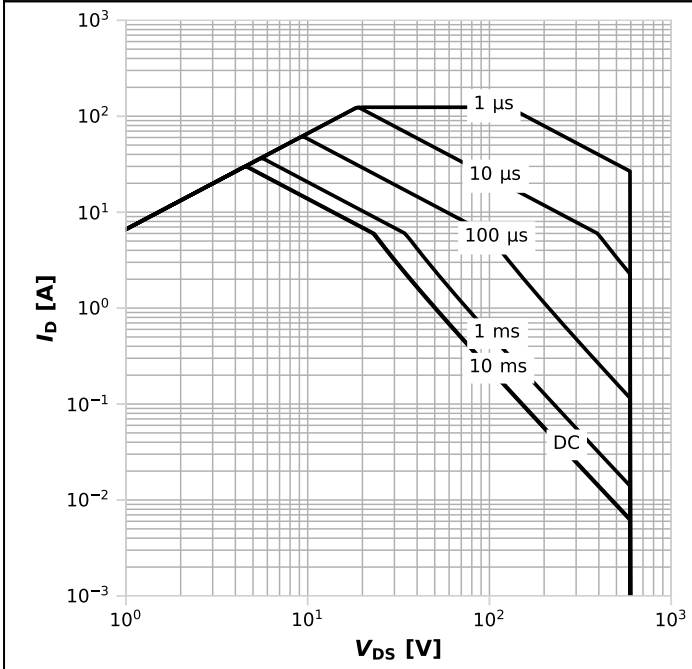

$P_{tot} = f(T_C)$

**Diagram 2: Safe operating area**



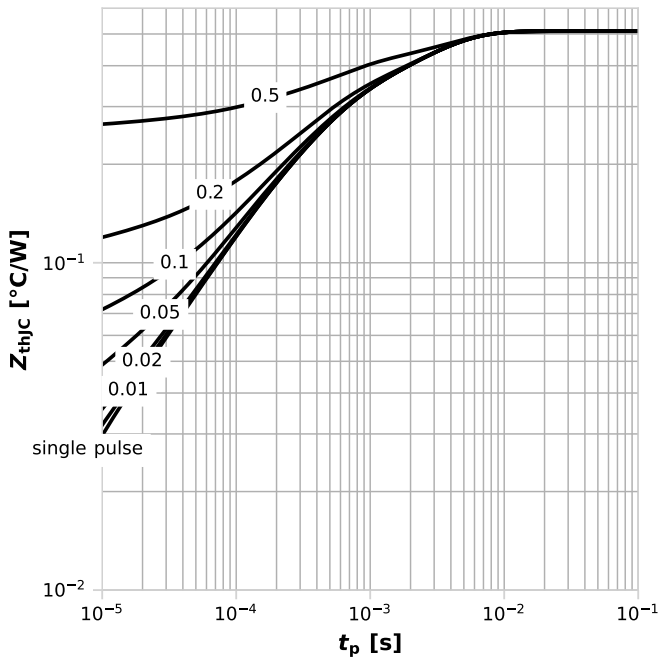

$I_D = f(V_{DS})$; $T_C = 25°C$; $D = 0$; parameter: $t_p$

**Diagram 3: Safe operating area**

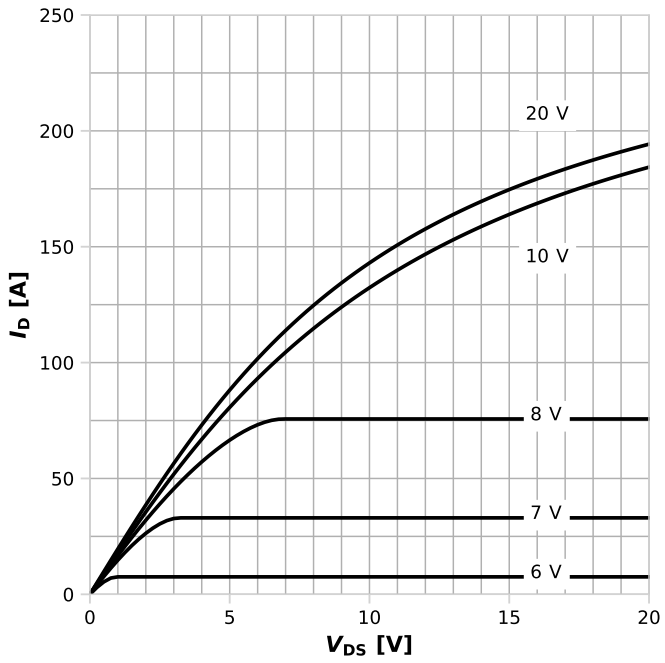
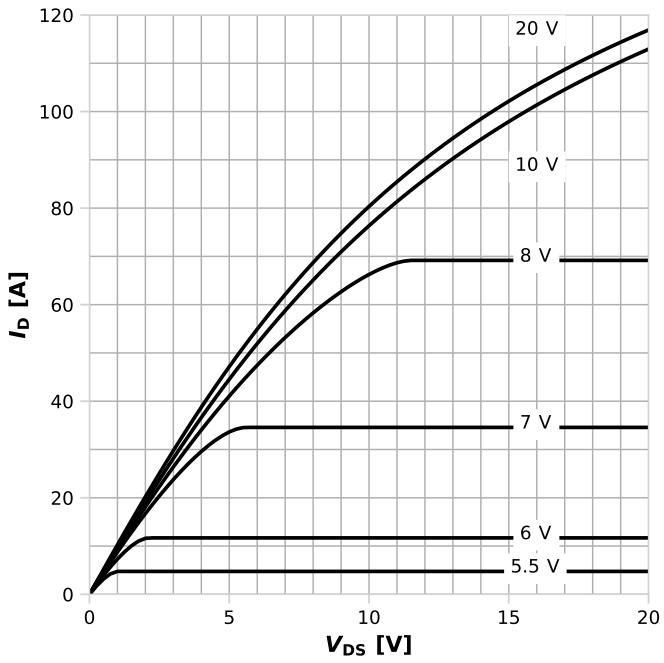



$I_D = f(V_{DS})$; $T_C = 80°C$; $D = 0$; parameter: $t_p$

**Diagram 4: Max. transient thermal impedance**




$Z_{thJC} = f(t_p)$; parameter: $D=t_p/T$

| Diagram 5: Typ. output characteristics | Diagram 6: Typ. output characteristics |
|---|---|
|  |  |
| $I_D = f(V_{DS})$; $T_j = 25°C$; parameter: $V_{GS}$ | $I_D = f(V_{DS})$; $T_j = 125°C$; parameter: $V_{GS}$ |

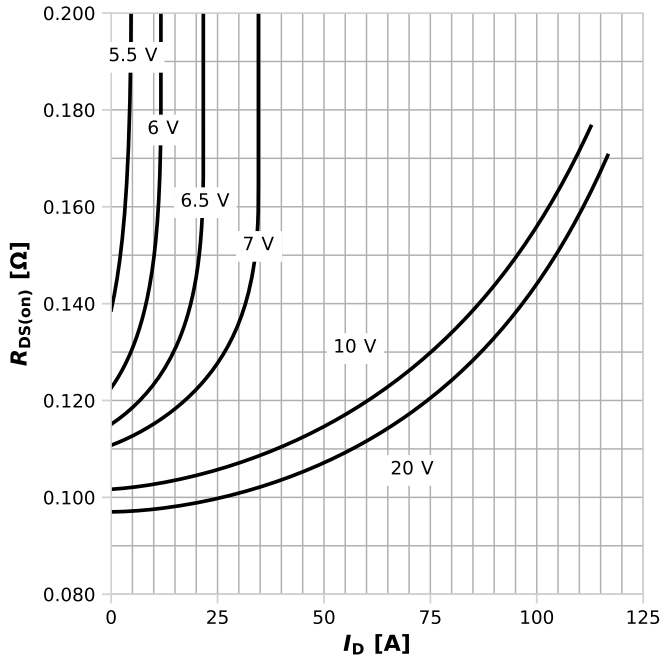
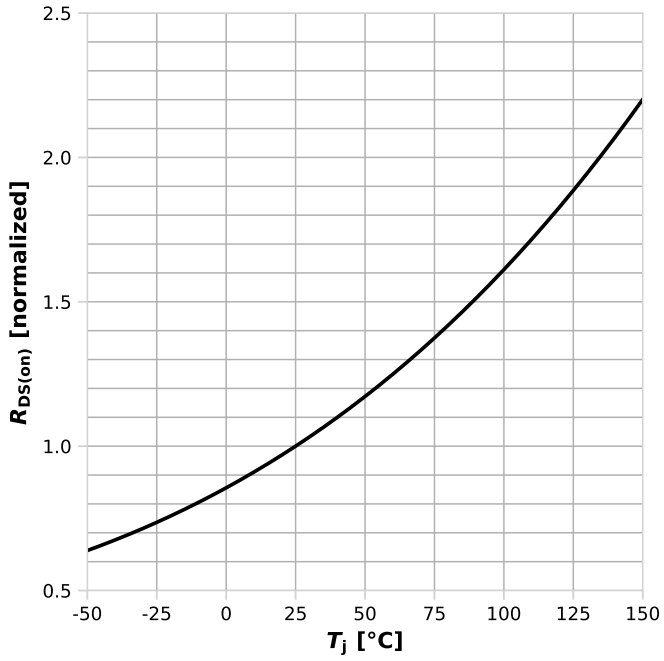
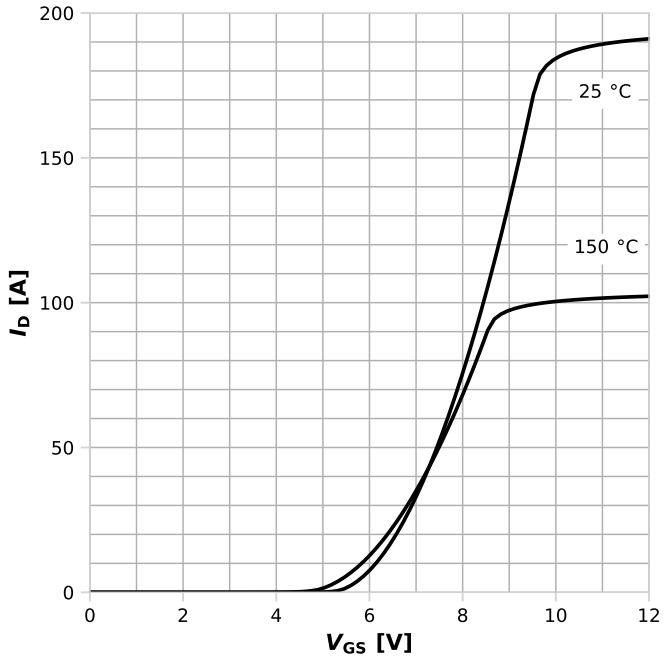
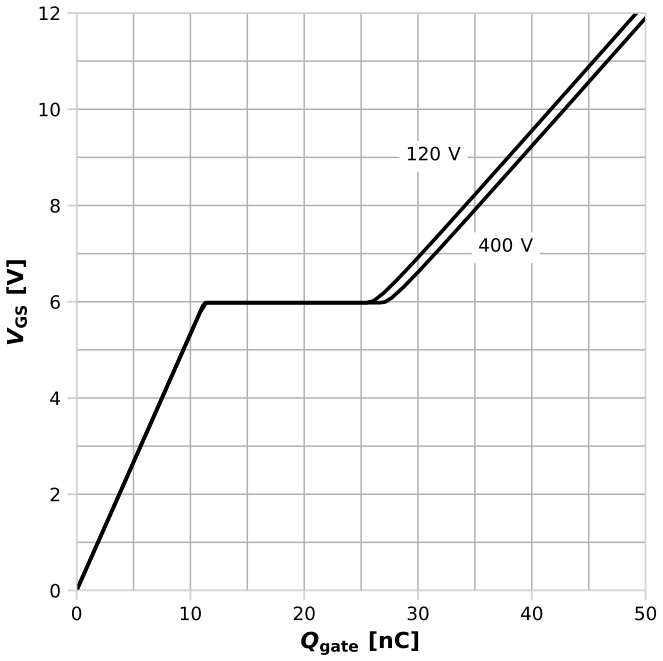
| Diagram 7: Typ. drain-source on-state resistance | Diagram 8: Drain-source on-state resistance |
|---|---|
|  |  |
| $R_{DS(on)} = f(I_D)$; $T_j = 125°C$; parameter: $V_{GS}$ | $R_{DS(on)} = f(T_j)$; $I_D = 14.3$ A; $V_{GS} = 10$ V |

**Diagram 9: Typ. transfer characteristics**



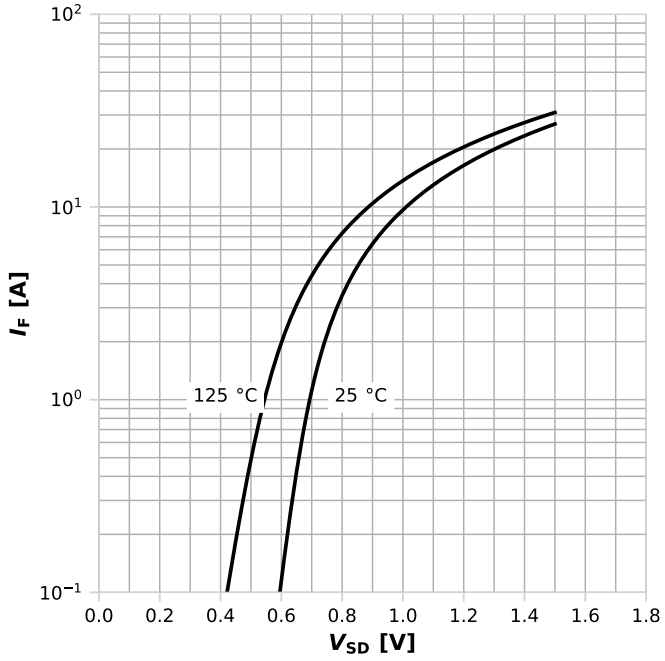

$I_D = f(V_{GS})$; $V_{DS} = 20$ V; parameter: $T_j$

**Diagram 10: Typ. gate charge**



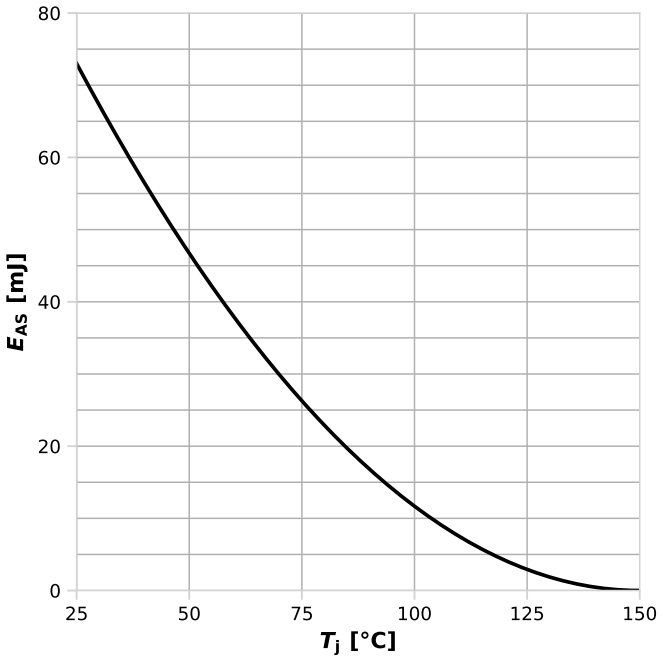

$V_{GS} = f(Q_{gate})$; $I_D = 7.3$ A pulsed; parameter: $V_{DD}$

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

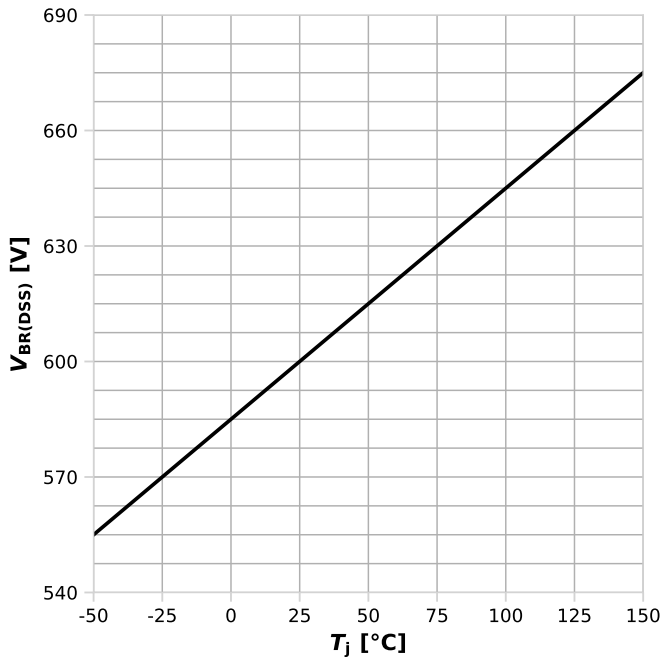
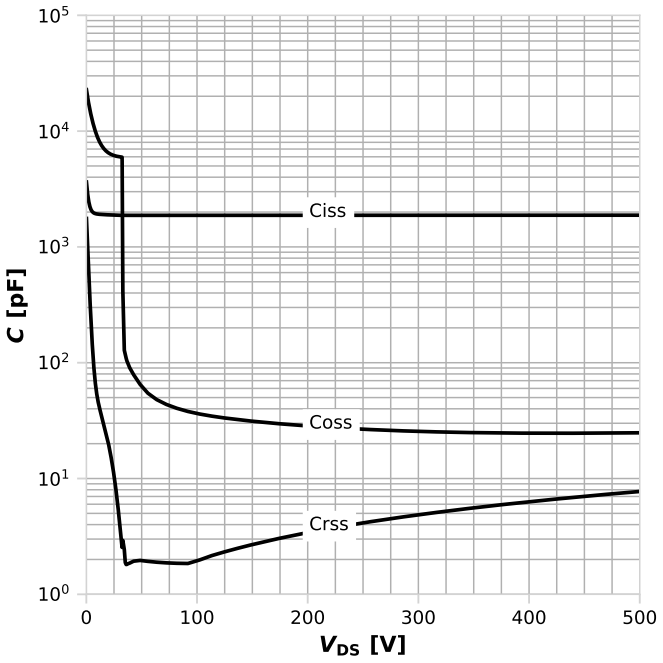



$I_F = f(V_{SD})$; parameter: $T_j$

**Diagram 12: Avalanche energy**

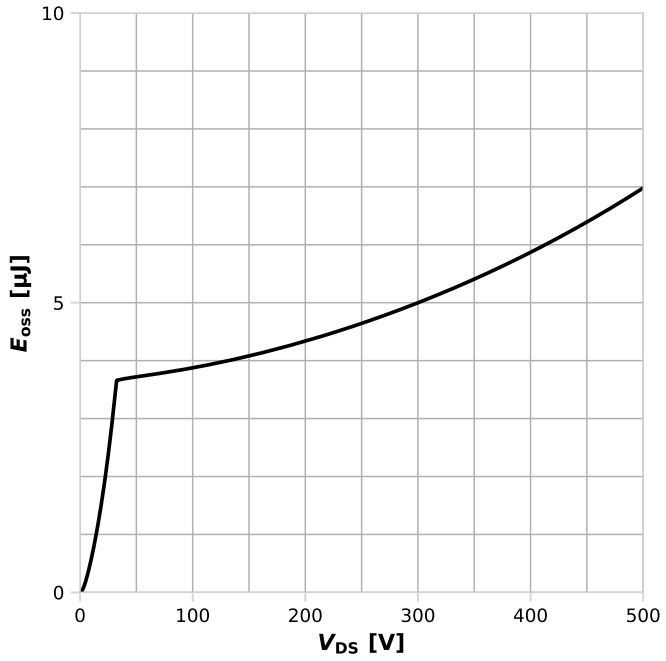



$E_{AS} = f(T_j)$; $I_D = 3.5$ A; $V_{DD} = 50$ V

| Diagram 13: Drain-source breakdown voltage | Diagram 14: Typ. capacitances |
|---|---|
|  |  |
| $V_{BR(DSS)} = f(T_j)$; $I_D = 1$ mA | $C = f(V_{DS})$; $V_{GS} = 0$ V; $f = 250$ kHz |





| Diagram 15: Typ. Coss stored energy |
|---|
|  |
| $E_{oss} = f(V_{DS})$ |

# 5 Test circuits

**Table 8 Diode characteristics**

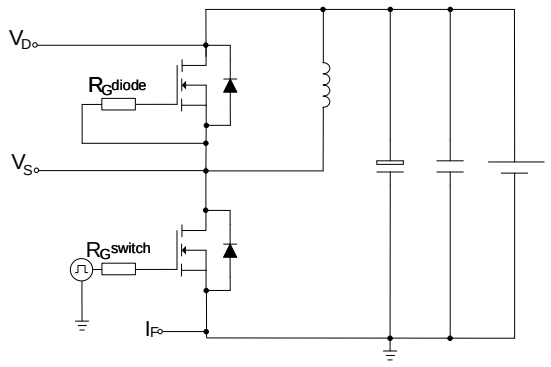
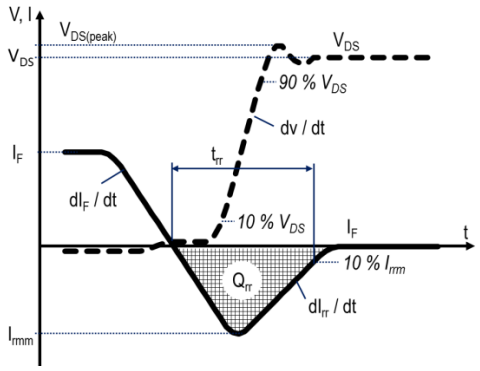
| Test circuit for diode characteristics | Diode recovery waveform |
|---|---|
|  |  |





**Table 9 Switching times (ss)**

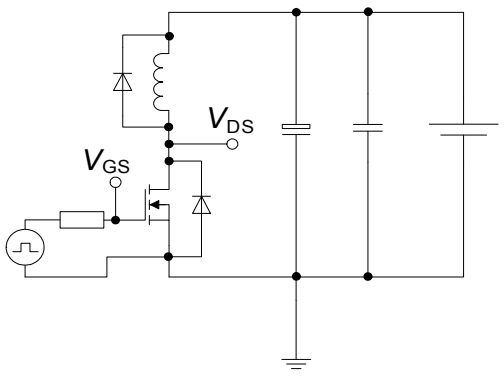
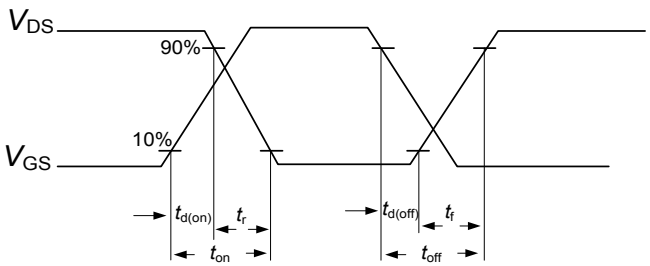
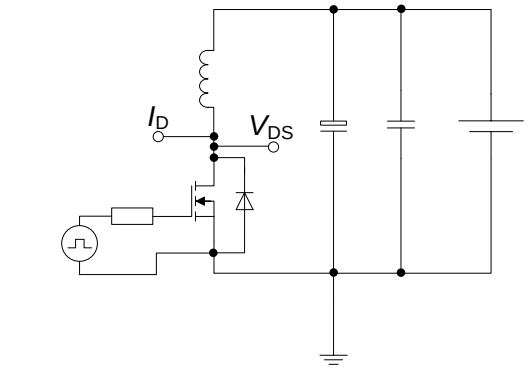
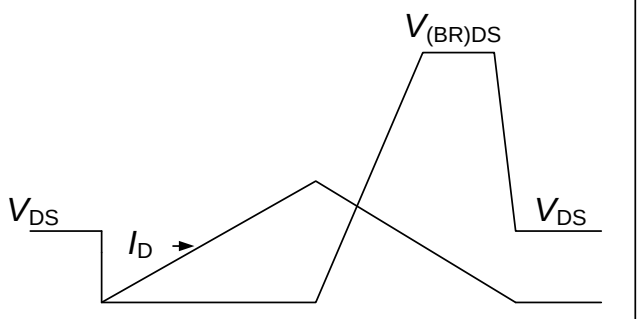
| Switching times test circuit for inductive load | Switching times waveform |
|---|---|
|  |  |

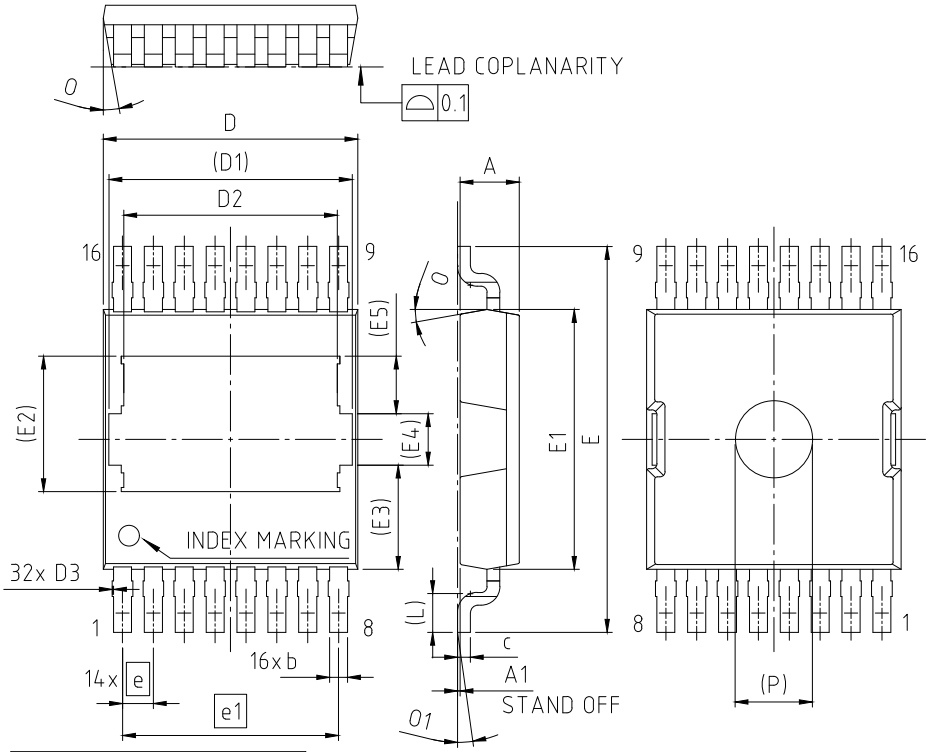




**Table 10 Unclamped inductive load (ss)**

| Unclamped inductive load test circuit | Unclamped inductive waveform |
|---|---|
|  |  |

# 6 Package outlines




| PACKAGE - GROUP NUMBER: | PG-HDSOP-16-U02 | | | | |
|---|---|---|---|---|---|
| DIMENSIONS | MILLIMETERS | | DIMENSIONS | MILLIMETERS | |
| | MIN. | MAX. | | MIN. | MAX. |
| A | 2.25 | 2.35 | e | 1.20 | |
| A1 | 0.00 | 0.15 | e1 | 8.40 | |
| b | 0.60 | 0.80 | L | 1.50 | |
| c | 0.40 | 0.60 | P | 3.00 | |
| D | 9.70 | 10.10 | O | 10° | |
| D1 | 9.46 | | O1 | 0.00° | 8° |
| D2 | 8.20 | 8.40 | | | |
| D3 | 0.15 | | | | |
| E | 14.80 | 15.20 | | | |
| E1 | 10.00 | 10.30 | | | |
| E2 | 5.27 | | | | |
| E3 | 4.05 | | | | |
| E4 | 2.00 | | | | |
| E5 | 2.24 | | | | |

NOTES:
ALL METAL SURFACES TIN PLATED EXCEPT AREA OF CUT
DIMENSIONS DO NOT INCLUDE MOLD FLASH,
PROTRUSION OR GATE BURRS

**Figure 1 Outline PG-HDSOP-16, dimensions in mm**

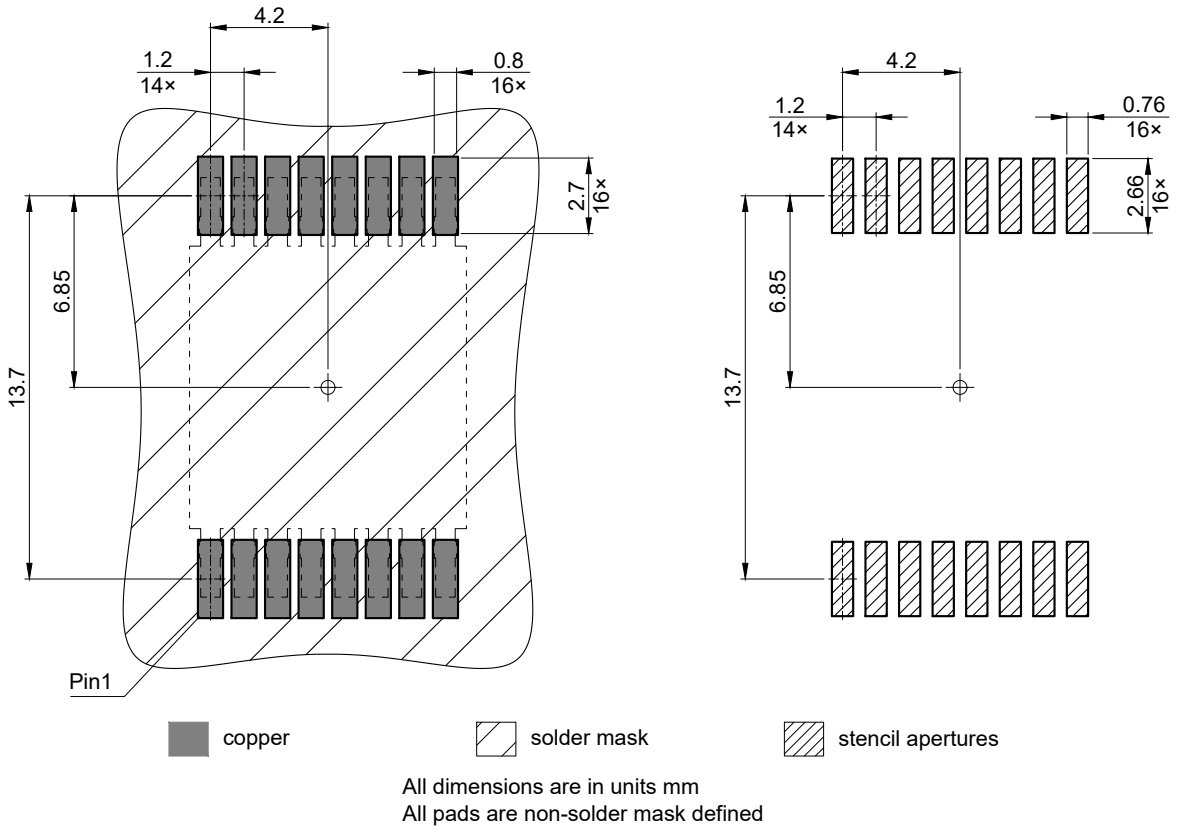



**Figure 2 Footprint drawing PG-HDSOP-16, dimensions in mm**

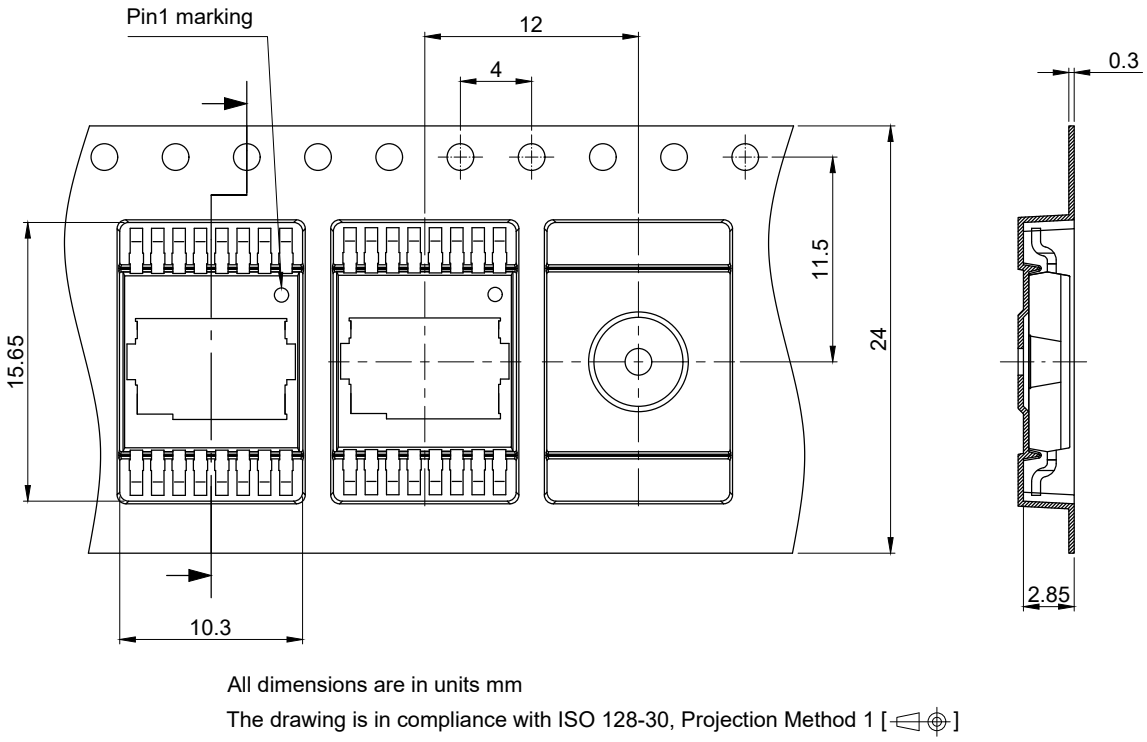



**Figure 3 Packaging variant PG-HDSOP-16, dimensions in mm**

# 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

IPLT60R070CM8

### Revision 2025-11-18, Rev. 2.0

Previous revisions

| Revision | Date | Subjects (major changes since last revision) |
|---|---|---|
| 2.0 | 2025-11-18 | Release of final version |

# X-ON Electronics

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***Click to view products by*** Infineon ***manufacturer:***

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