

英飞凌80V 175°C N沟道

增强型OptiMOS™ -T2 功率晶体管



特点

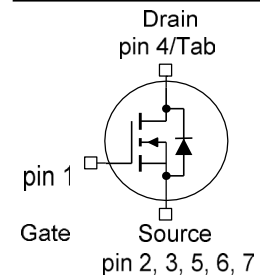
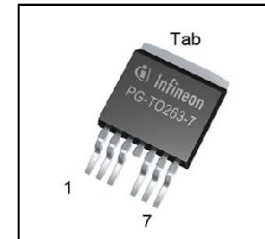
- N沟道-增强模式
- 通过 AEC-Q101 认证
- MSL1 回流焊峰值温度高达 260°C
- 工作温度 175°C
- 符合 RoHS 标准
- 100% 雪崩测试
- 超低 $R_{DS(on)}$
- 超高 I_D

Type	Package	Marking
IPB180N08S4-02	PG-T0263-7-3	4N0802

产品概述

V_{DS}	80	V
$R_{DS(on),max}$	2.2	mΩ
I_D	180	A

PG-T0263-7-3



除非另有规定，否则均为 $T_J=25^\circ\text{C}$ 的最大额定值。

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current ¹⁾	I_D	$T_C=25^\circ\text{C}, V_{GS}=10\text{V}$	180	A
		$T_C=100^\circ\text{C}, V_{GS}=10\text{V}^{(2)}$	180	
Pulsed drain current ²⁾	$I_{D,pulse}$	$T_C=25^\circ\text{C}$	720	
Avalanche energy, single pulse ²⁾	E_{AS}	$I_D=90\text{A}$	640	mJ
Avalanche current, single pulse	I_{AS}	-	175	A

本数据手册的原文使用英文撰写。为方便起见，英飞凌提供了译文；由于翻译过程中可能使用了自动化工具，英飞凌不保证译文的准确性。为确认准确性，请务必访问 infineon.com 参考最新的英文版本（控制文档）。

Gate source voltage	V_{GS}	-	± 20			V
Power dissipation	P_{tot}	$T_C=25^{\circ}\text{C}$	277			W
Operating and storage temperature	T_j, T_{stg}	-	-55 ... +175			$^{\circ}\text{C}$
Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

热特性²⁾

Thermal resistance, junction - case	R_{thJC}	-	-	-	0.54	K/W
SMD version, device on PCB	R_{thJA}	minimal footprint	-	-	62	
		6 cm ² cooling area ³⁾	-	-	40	

除非另有规定，否则均为 $T_j=25^{\circ}\text{C}$ 的电气特性。

静态参数特性

Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0\text{V}, I_D=1\text{mA}$	80	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=220\mu\text{A}$	2.0	3.0	4.0	
Zero gate voltage drain current	I_{DSS}	$V_{DS}=80\text{V}, V_{GS}=0\text{V}, T_j=25^{\circ}\text{C}$	-	0.03	1	μA
		$V_{DS}=80\text{V}, V_{GS}=0\text{V}, T_j=125^{\circ}\text{C}^{2)}$	-	10	200	
Gate-source leakage current	I_{GSS}	$V_{GS}=20\text{V}, V_{DS}=0\text{V}$	-	-	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=10\text{V}, I_D=100\text{A}$	-	1.8	2.2	m Ω

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

动态参数特性²⁾

Input capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=25V,$ $f=1MHz$	-	8884	11550	pF
Output capacitance	C_{oss}		-	3435	4465	
Reverse transfer capacitance	C_{rss}		-	177	354	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=40V, V_{GS}=10V,$ $I_D=180A, R_G=3.5W$	-	30	-	ns
Rise time	t_r		-	15	-	
Turn-off delay time	$t_{d(off)}$		-	50	-	
Fall time	t_f		-	50	-	

栅极电荷特性²⁾

Gate to source charge	Q_{gs}	$V_{DD}=64V, I_D=180A,$ $V_{GS}=0 \text{ to } 10V$	-	45	58	nC
Gate to drain charge	Q_{gd}		-	27	55	
Gate charge total	Q_g		-	128	167	
Gate plateau voltage	$V_{plateau}$		-	5.1	-	V

反向二极管

Diode continuous forward current ²⁾	I_S	$T_C=25^\circ C$	-	-	180	A
Diode pulse current ²⁾	$I_{S,pulse}$		-	-	720	
Diode forward voltage	V_{SD}	$V_{GS}=0V, I_F=100A,$ $T_J=25^\circ C$	-	1	1.2	V
Reverse recovery time ²⁾	t_{rr}	$V_R=40V, I_F=50A,$ $di_F/dt=100A/\mu s$	-	80	-	ns
Reverse recovery charge ²⁾	Q_{rr}		-	160	-	nC

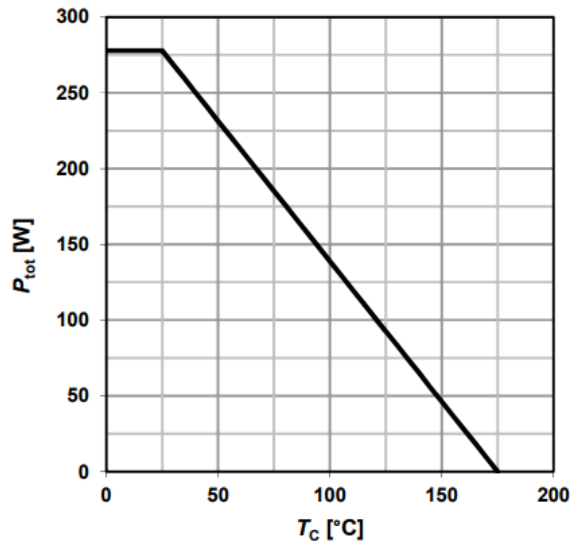
¹⁾ 电流受封装限制；当 $R_{thJC} = 0.54 \text{ K/W}$ 时，该芯片在 $25^\circ C$ 时能够承载 237 A。

²⁾ 由设计标定，不受限于生产测试。

³⁾ 器件安装在 $40 \text{ mm} \times 40 \text{ mm} \times 1.5 \text{ mm}$ 环氧树脂印刷电路板 FR4 上，漏极连接用铜面积为 6 cm^2 （一层， $70 \mu\text{m}$ 厚）。印刷电路板垂直放置在静止空气中。

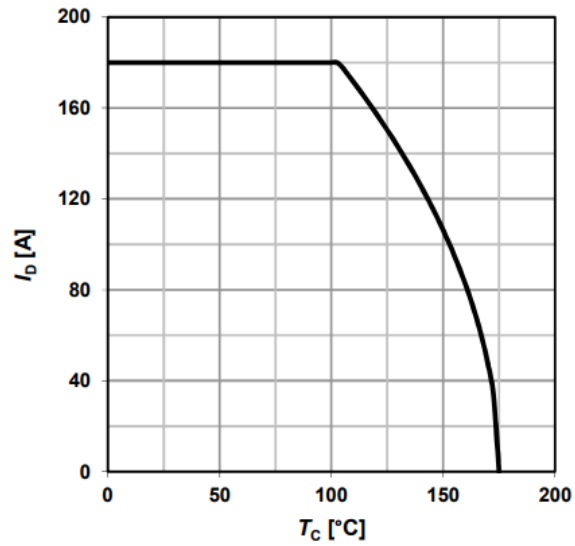
1 功率耗散

$$P_{\text{tot}} = f(T_C); V_{\text{GS}} \geq 6 \text{ V}$$



2 漏极电流

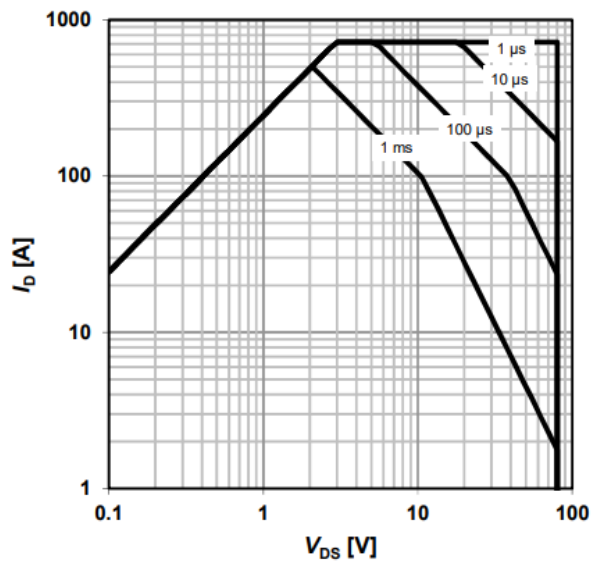
$$I_D = f(T_C); V_{\text{GS}} \geq 6 \text{ V}; \text{SMD}$$



3 安全工作区

$$I_D = f(V_{\text{DS}}); T_C = 25^\circ\text{C}; D = 0; \text{SMD}$$

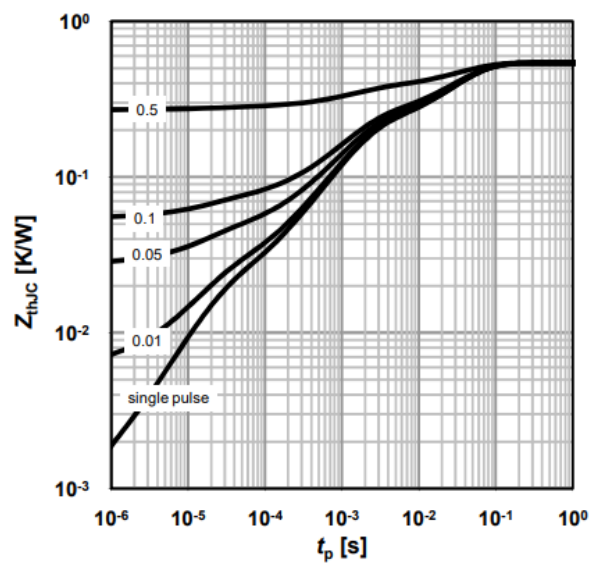
parameter: t_p



4 最大瞬态热阻抗

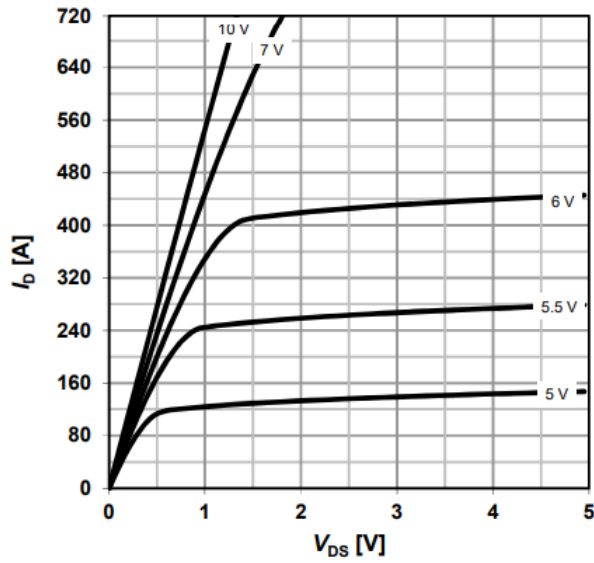
$$Z_{\text{thJC}} = f(t_p)$$

parameter: $D = t_p/T$



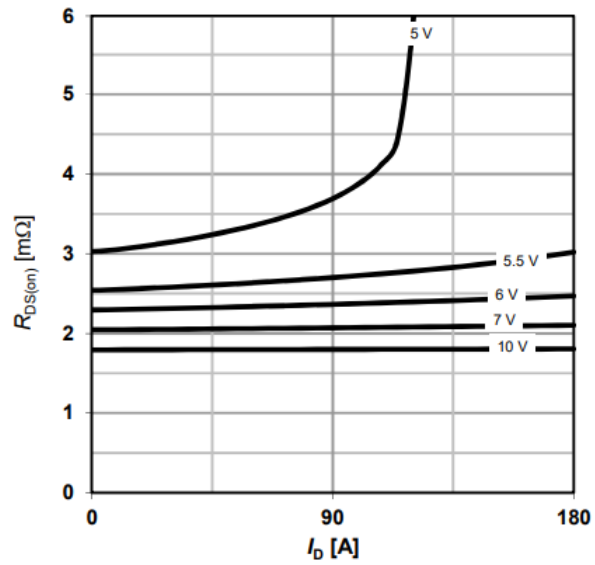
5 典型输出特性

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

parameter: V_{GS}


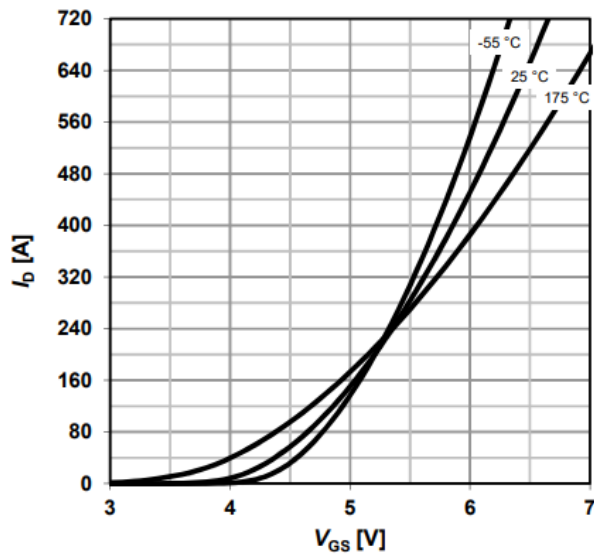
6 典型漏源导通电阻

 $R_{DS(on)} = f(I_D); T_j = 25^\circ\text{C}; \text{SMD}$

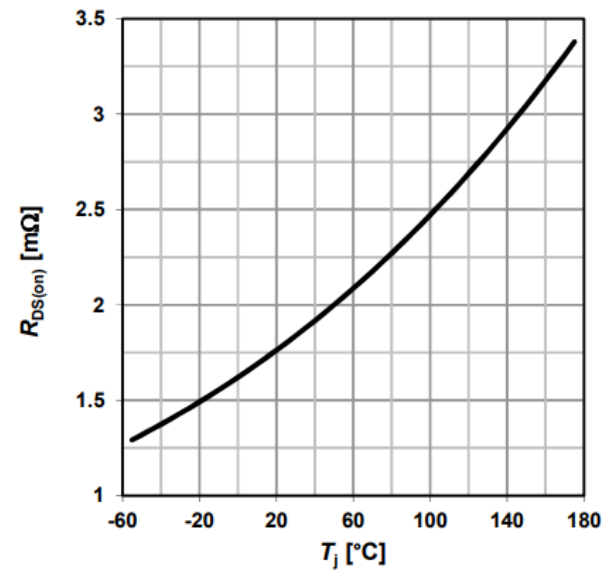
parameter: V_{GS}


7 典型转移特性

 $I_D = f(V_{GS}); V_{DS} = 6\text{ V}$

parameter: T_j


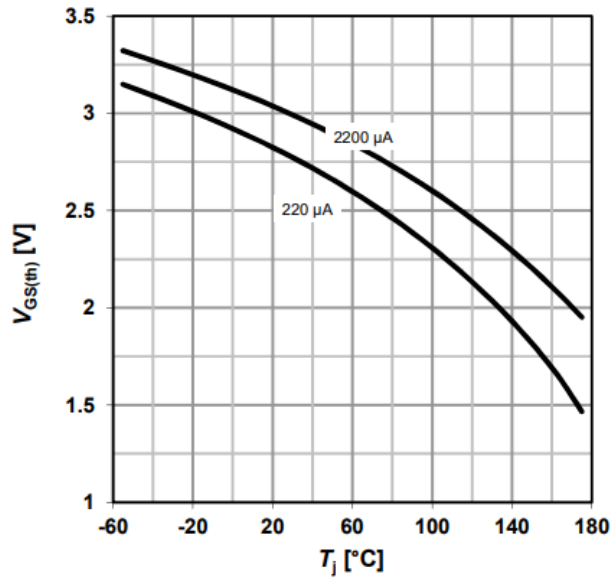
8 典型漏源导通电阻

 $R_{DS(on)} = f(T_j); I_D = 100\text{ A}; V_{GS} = 10\text{ V}; \text{SMD}$
 $\alpha = 0.4$


9 典型栅极阈值电压

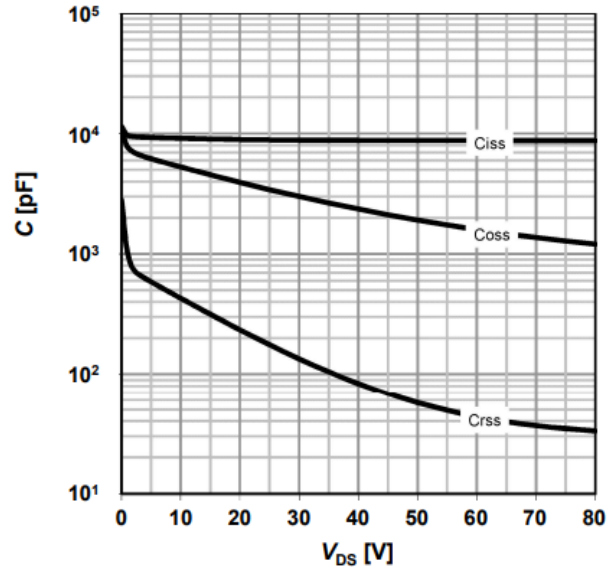
$$V_{GS(th)} = f(T_j); V_{GS} = V_{DS}$$

parameter: I_D



10 典型电容值

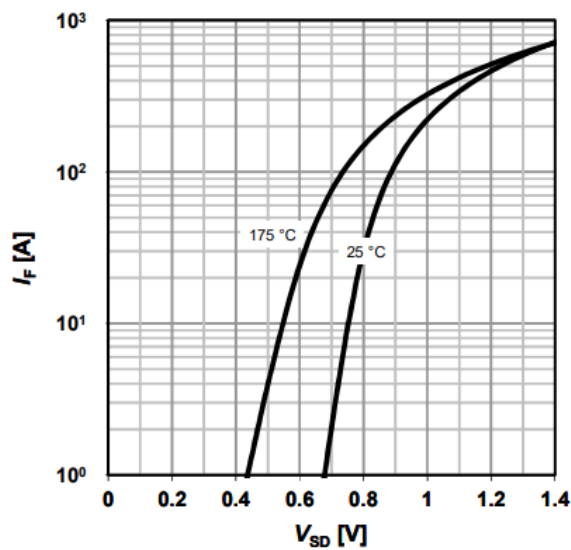
$$C = f(V_{DS}); V_{GS} = 0 V; f = 1 \text{ MHz}$$



11 典型二极管正向导通特性

$$I_F = f(V_{SD})$$

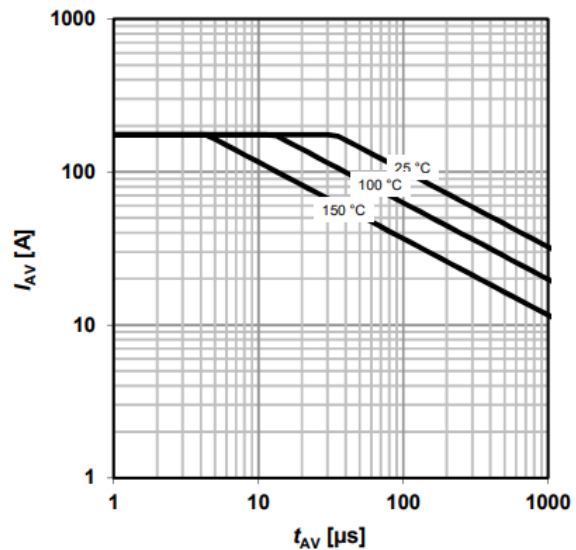
parameter: T_j



12 典型雪崩特性

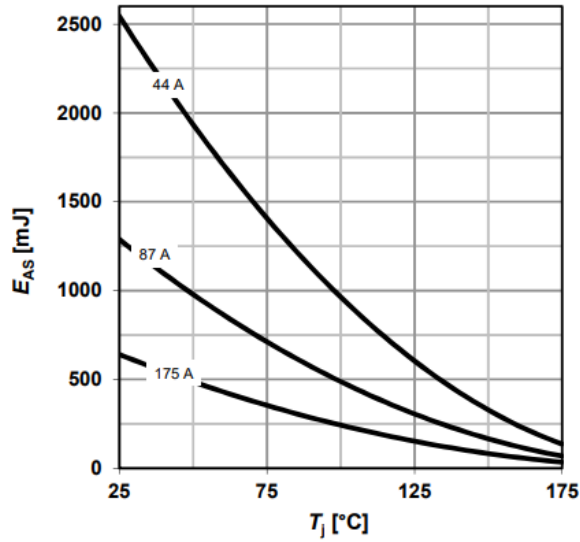
$$I_{AS} = f(t_{AV})$$

parameter: $T_{j(start)}$



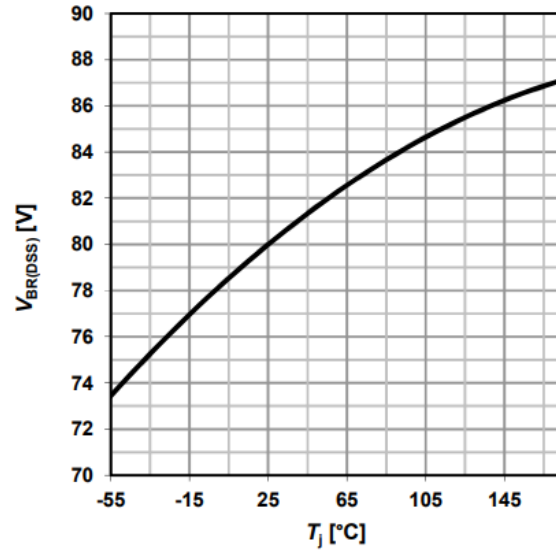
13 典型雪崩能量

$$E_{AS} = f(T_J); I_D = 90 \text{ A}$$



14 漏源击穿电压

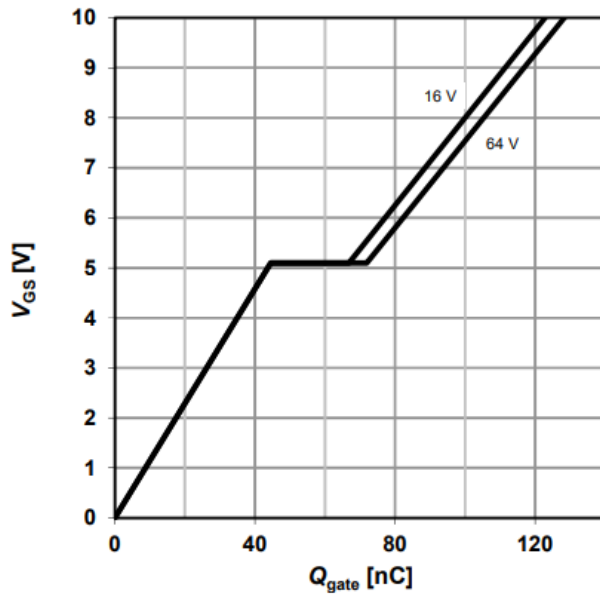
$$V_{BR(DSS)} = f(T_J); I_D = 1 \text{ mA}$$



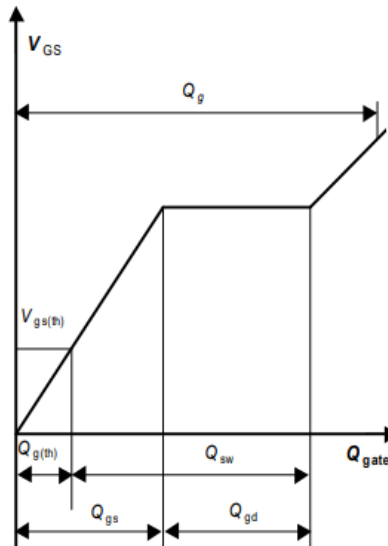
15 典型栅极电荷

$$V_{GS} = f(Q_{gate}); I_D = 180 \text{ A pulsed}$$

parameter: V_{DD}



16 栅极充电波形



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修订记录

Version	Date	Changes
Revision 1.0	2014-06-20	Final data sheet
Revision 1.1	2022-08-24	Diagram 8 Typ. drain-source on-state resistance: used α value clarified



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Edition 2025-04-17

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