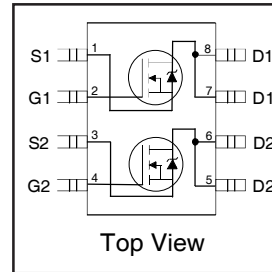


IRF7313PbF

HEXFET® Power MOSFET

- Generation V Technology
- Ultra Low On-Resistance
- Dual N-Channel MOSFET
- Surface Mount
- Fully Avalanche Rated
- Lead-Free

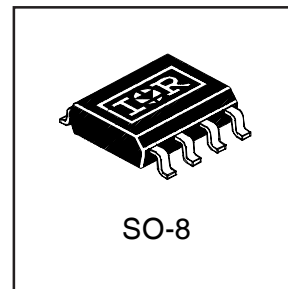


$V_{DS} = 30V$
$R_{DS(on)} = 0.029\Omega$

Description

Fifth Generation HEXFETs from International Rectifier utilize advanced processing techniques to achieve extremely low on-resistance per silicon area. This benefit, combined with the fast switching speed and ruggedized device design that HEXFET Power MOSFETs are well known for, provides the designer with an extremely efficient and reliable device for use in a wide variety of applications.

The SO-8 has been modified through a customized leadframe for enhanced thermal characteristics and multiple-die capability making it ideal in a variety of power applications. With these improvements, multiple devices can be used in an application with dramatically reduced board space. The package is designed for vapor phase, infra red, or wave soldering techniques.



SO-8

Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$ Unless Otherwise Noted)

		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current ⑤	$T_A = 25^\circ\text{C}$	I_D	6.5	A
	$T_A = 70^\circ\text{C}$		5.2	
Pulsed Drain Current		I_{DM}	30	
Continuous Source Current (Diode Conduction)		I_S	2.5	
Maximum Power Dissipation ⑤	$T_A = 25^\circ\text{C}$	P_D	2.0	W
	$T_A = 70^\circ\text{C}$		1.3	
Single Pulse Avalanche Energy ②		E_{AS}	82	mJ
Avalanche Current		I_{AR}	4.0	A
Repetitive Avalanche Energy		E_{AR}	0.20	mJ
Peak Diode Recovery dv/dt ③		dv/dt	5.8	V/ ns
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to + 150	$^\circ\text{C}$

Thermal Resistance Ratings

Parameter	Symbol	Limit	Units
Maximum Junction-to-Ambient ⑤	$R_{\theta JA}$	62.5	$^\circ\text{C/W}$

IRF7313PbF

International
Rectifier

Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	30	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.022	—	V/ $^\circ\text{C}$	Reference to 25°C , $I_D = 1\text{mA}$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	0.023	0.029	Ω	$V_{GS} = 10V, I_D = 5.8A$ ④
		—	0.032	0.046		$V_{GS} = 4.5V, I_D = 4.7A$ ④
$V_{GS(th)}$	Gate Threshold Voltage	1.0	—	—	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
g_{fs}	Forward Transconductance	—	14	—	S	$V_{DS} = 15V, I_D = 5.8A$
I_{DSS}	Drain-to-Source Leakage Current	—	—	1.0	μA	$V_{DS} = 24V, V_{GS} = 0V$
		—	—	25		$V_{DS} = 24V, V_{GS} = 0V, T_J = 55^\circ\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage	—	—	100	nA	$V_{GS} = 20V$
	Gate-to-Source Reverse Leakage	—	—	-100		$V_{GS} = -20V$
Q_g	Total Gate Charge	—	22	33	nC	$I_D = 5.8A$
Q_{gs}	Gate-to-Source Charge	—	2.6	3.9		$V_{DS} = 15V$
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	6.4	9.6		$V_{GS} = 10V$, See Fig. 10 ④
$t_{d(on)}$	Turn-On Delay Time	—	8.1	12	ns	$V_{DD} = 15V$
t_r	Rise Time	—	8.9	13		$I_D = 1.0A$
$t_{d(off)}$	Turn-Off Delay Time	—	26	39		$R_G = 6.0\Omega$
t_f	Fall Time	—	17	26		$R_D = 15\Omega$ ④
C_{iss}	Input Capacitance	—	650	—	pF	$V_{GS} = 0V$
C_{oss}	Output Capacitance	—	320	—		$V_{DS} = 25V$
C_{rss}	Reverse Transfer Capacitance	—	130	—		$f = 1.0\text{MHz}$, See Fig. 9

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	2.5	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	30		
V_{SD}	Diode Forward Voltage	—	0.78	1.0	V	$T_J = 25^\circ\text{C}$, $I_S = 1.7A$, $V_{GS} = 0V$ ③
t_{rr}	Reverse Recovery Time	—	45	68	ns	$T_J = 25^\circ\text{C}$, $I_F = 1.7A$
Q_{rr}	Reverse Recovery Charge	—	58	87	nC	$di/dt = 100A/\mu s$ ③

Notes:

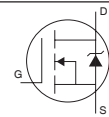
① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 11)

② Starting $T_J = 25^\circ\text{C}$, $L = 10\text{mH}$
 $R_G = 25\Omega$, $I_{AS} = 4.0A$.

③ $I_{SD} \leq 4.0A$, $di/dt \leq 74A/\mu s$, $V_{DD} \leq V_{(BR)DSS}$,
 $T_J \leq 150^\circ\text{C}$

④ Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.

⑤ Surface mounted on FR-4 board, $t \leq 10\text{sec}$.



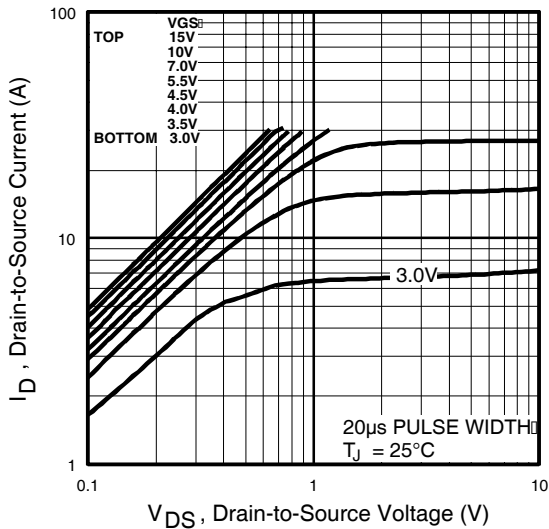


Fig 1. Typical Output Characteristics

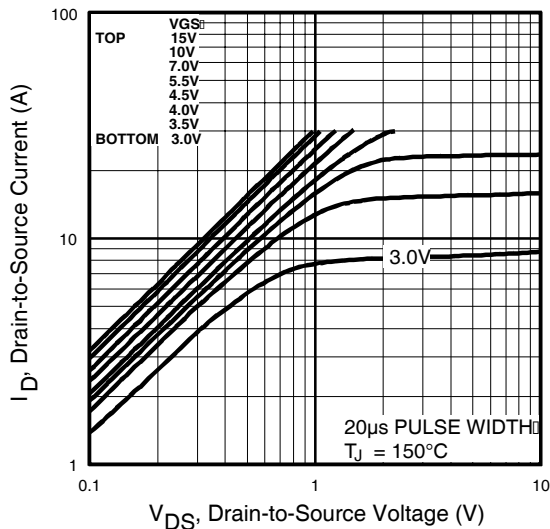


Fig 2. Typical Output Characteristics

V_{DS}

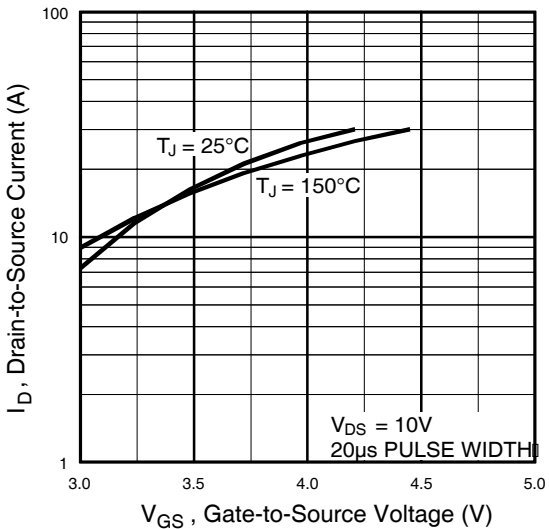


Fig 3. Typical Transfer Characteristics

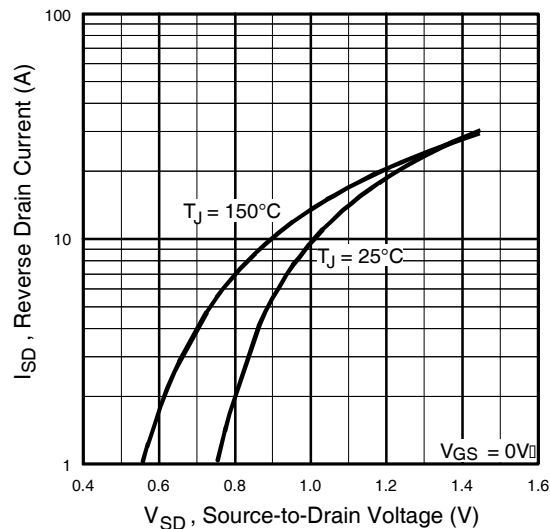


Fig 4. Typical Source-Drain Diode Forward Voltage

IRF7313PbF

International
IR Rectifier

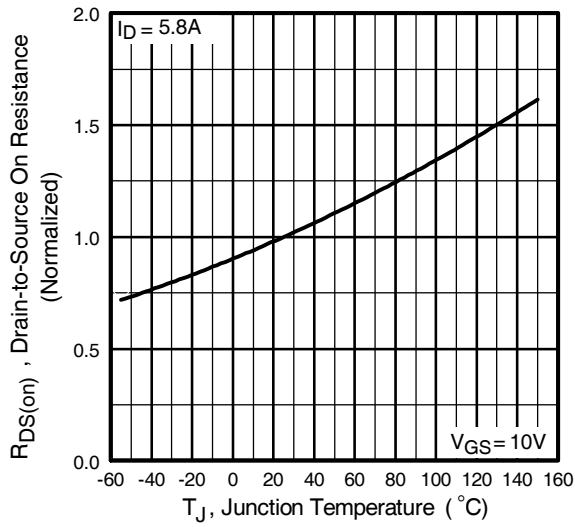


Fig 5. Normalized On-Resistance Vs. Temperature

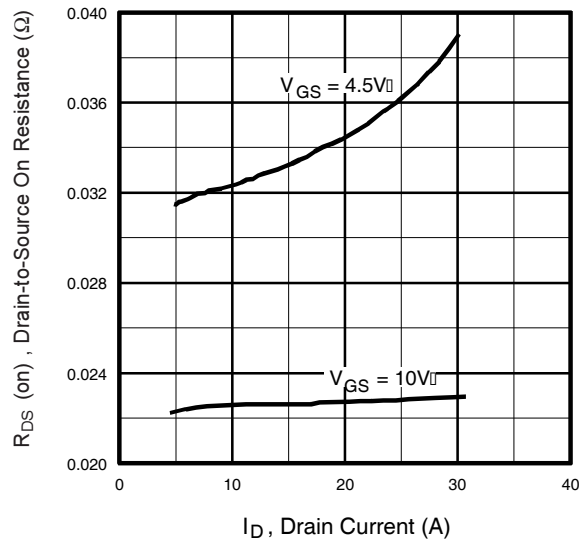


Fig 6. Typical On-Resistance Vs. Drain Current

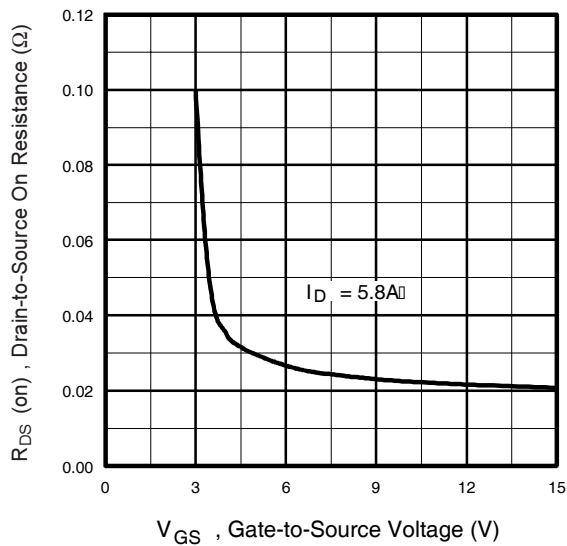


Fig 7. Typical On-Resistance Vs. Gate Voltage

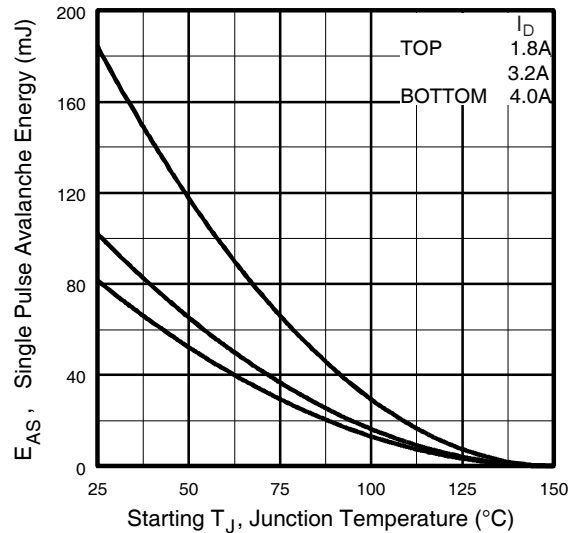


Fig 8. Maximum Avalanche Energy Vs. Drain Current

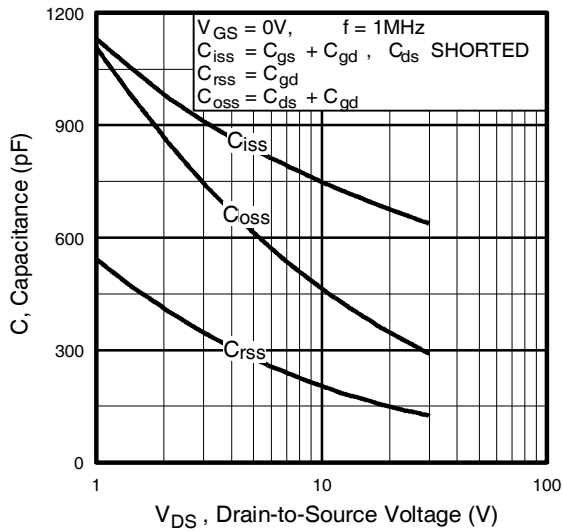


Fig 9. Typical Capacitance Vs. Drain-to-Source Voltage

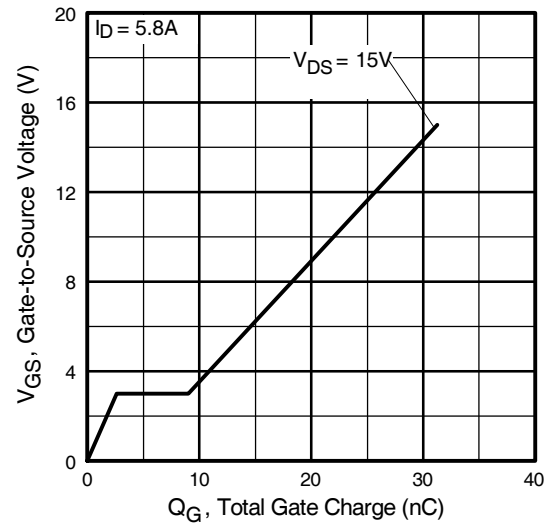


Fig 10. Typical Gate Charge Vs. Gate-to-Source Voltage

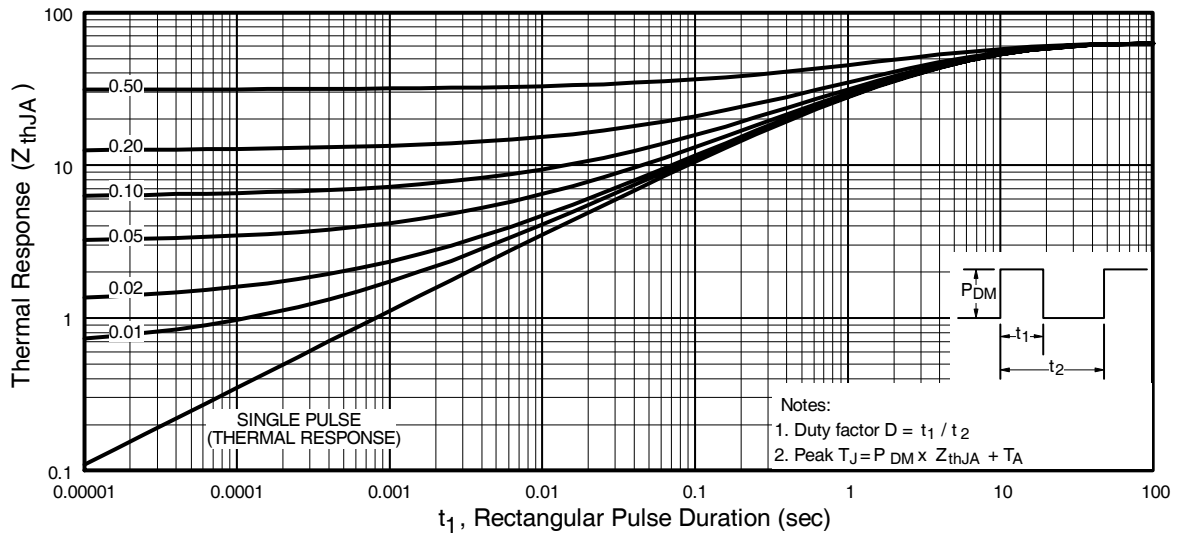


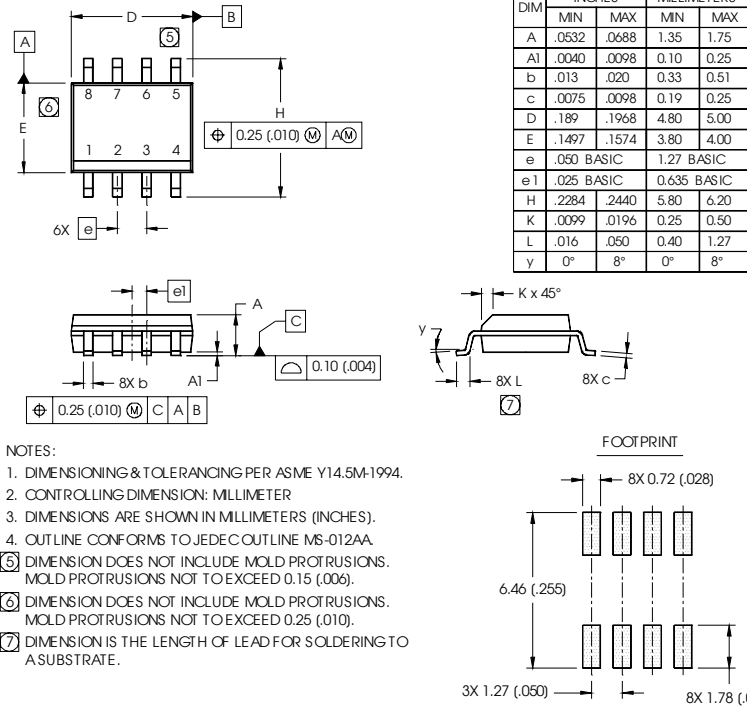
Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

IRF7313PbF

International
IR Rectifier

SO-8 Package Outline

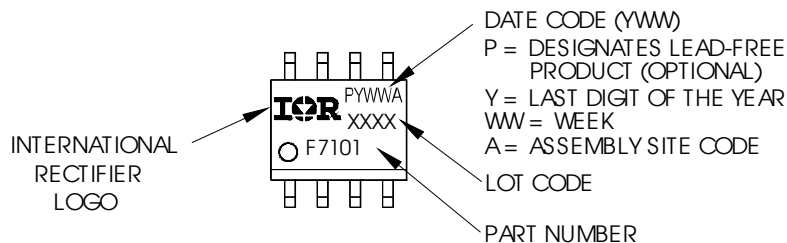
Dimensions are shown in millimeters (inches)



- NOTES:
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
 2. CONTROLLING DIMENSION: MILLIMETER
 3. DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).
 4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.
 5. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 (.006).
 6. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.25 (.010).
 7. DIMENSION IS THE LENGTH OF LEAD FOR SOLDERING TO A SUBSTRATE.

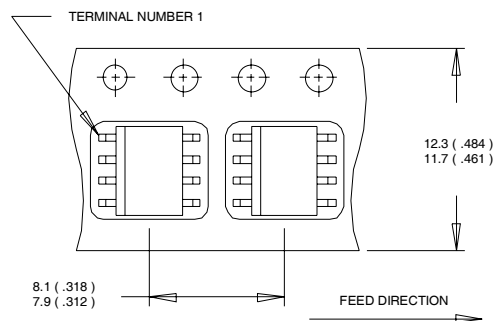
SO-8 Part Marking Information (Lead-Free)

EXAMPLE: THIS IS AN IRF7101 (MOSFET)



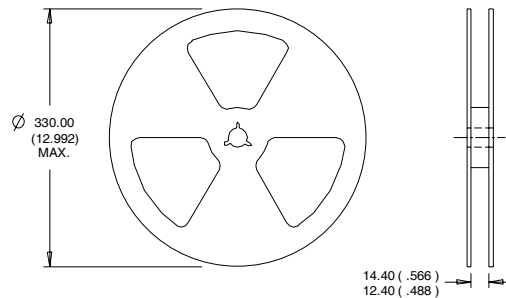
SO-8 Tape and Reel

Dimensions are shown in millimeters (inches)



NOTES:

1. CONTROLLING DIMENSION : MILLIMETER.
2. ALL DIMENSIONS ARE SHOWN IN MILLIMETERS(INCHES).
3. OUTLINE CONFORMS TO EIA-481 & EIA-541.



NOTES :

1. CONTROLLING DIMENSION : MILLIMETER.
2. OUTLINE CONFORMS TO EIA-481 & EIA-541.

Data and specifications subject to change without notice.
This product has been designed and qualified for the Consumer market.
Qualifications Standards can be found on IR's Web site.

International
IR Rectifier

IR WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105
TAC Fax: (310) 252-7903

Visit us at www.irf.com for sales contact information.10/04

IMPORTANT NOTICE

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics ("Beschaffenhheitsgarantie").

With respect to any examples, hints or any typical values stated herein and/or any information regarding the application of the product, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

In addition, any information given in this document is subject to customer's compliance with its obligations stated in this document and any applicable legal requirements, norms and standards concerning customer's products and any use of the product of Infineon Technologies in customer's applications.

The data contained in this document is exclusively intended for technically trained staff. It is the responsibility of customer's technical departments to evaluate the suitability of the product for the intended application and the completeness of the product information given in this document with respect to such application.

For further information on the product, technology, delivery terms and conditions and prices please contact your nearest Infineon Technologies office (www.infineon.com).

WARNINGS

Due to technical requirements products may contain dangerous substances. For information on the types in question please contact your nearest Infineon Technologies office.

Except as otherwise explicitly approved by Infineon Technologies in a written document signed by authorized representatives of Infineon Technologies, Infineon Technologies' products may not be used in any applications where a failure of the product or any consequences of the use thereof can reasonably be expected to result in personal injury.