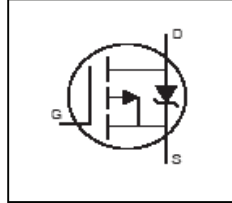
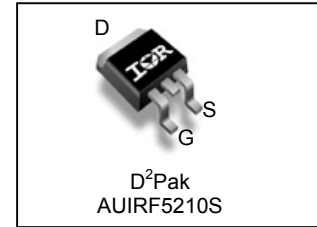


**Features**

- Advanced Process Technology
- P-Channel MOSFET
- Ultra Low On-Resistance
- Dynamic dv/dt Rating
- Fast Switching
- Fully Avalanche Rated
- Repetitive Avalanche Allowed up to Tjmax
- Lead-Free, RoHS Compliant
- Automotive Qualified \*



$V_{DSS}$		<b>-100V</b>
$R_{DS(on)}$	<b>max.</b>	<b>60mΩ</b>
$I_D$		<b>-38A</b>



<b>G</b>	<b>D</b>	<b>S</b>
Gate	Drain	Source

**Description**

Specifically designed for Automotive applications, this cellular design of HEXFET® Power MOSFETs utilizes the latest processing techniques to achieve 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 Automotive and a wide variety of other applications..

Base part number	Package Type	Standard Pack		Orderable Part Number
		Form	Quantity	
AUIRF5210S	D²-Pak	Tube	50	AUIRF5210S
		Tape and Reel Left	800	AUIRF5210STRL

**Absolute Maximum Ratings**

Stresses beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only; and functional operation of the device at these or any other condition beyond those indicated in the specifications is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability. The thermal resistance and power dissipation ratings are measured under board mounted and still air conditions. Ambient temperature (TA) is 25°C, unless otherwise specified.

Symbol	Parameter	Max.	Units
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ -10V$	-38	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ -10V$	-24	
$I_{DM}$	Pulsed Drain Current ①	-140	
$P_D @ T_A = 25^\circ C$	Maximum Power Dissipation	3.1	W
$P_D @ T_C = 25^\circ C$	Maximum Power Dissipation	170	
	Linear Derating Factor	1.3	W/°C
$V_{GS}$	Gate-to-Source Voltage	± 20	V
$E_{AS}$	Single Pulse Avalanche Energy (Thermally Limited) ②	120	mJ
$I_{AR}$	Avalanche Current ①	-23	A
$E_{AR}$	Repetitive Avalanche Energy ①	17	mJ
dv/dt	Peak Diode Recovery dv./dt ③	-7.4	V/ns
$T_J$	Operating Junction and	-55 to + 150	°C
$T_{STG}$	Storage Temperature Range		
	Soldering Temperature, for 10 seconds (1.6mm from case)	300	

**Thermal Resistance**

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case ⑥	—	0.75	°C/W
$R_{\theta JA}$	Junction-to-Ambient ( PCB Mount, steady state) ⑤		40	


HEXFET® is a registered trademark of Infineon.

\*Qualification standards can be found at [www.infineon.com](http://www.infineon.com)


**Static @ T<sub>J</sub> = 25°C (unless otherwise specified)**

	Parameter	Min.	Typ.	Max.	Units	Conditions
V <sub>(BR)DSS</sub>	Drain-to-Source Breakdown Voltage	-100	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA
ΔV <sub>(BR)DSS/ΔT<sub>J</sub></sub>	Breakdown Voltage Temp. Coefficient	—	-0.11	—	V/°C	Reference to 25°C, I <sub>D</sub> = -1mA
R <sub>DS(on)</sub>	Static Drain-to-Source On-Resistance	—	—	60	mΩ	V <sub>GS</sub> = -10V, I <sub>D</sub> = -38A ④
V <sub>GS(th)</sub>	Gate Threshold Voltage	-2.0	—	-4.0	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA
g <sub>fs</sub>	Forward Trans conductance	9.5	—	—	S	V <sub>DS</sub> = -50V, I <sub>D</sub> = -23A
I <sub>DSS</sub>	Drain-to-Source Leakage Current	—	—	-50	μA	V <sub>DS</sub> = -100V, V <sub>GS</sub> = 0V
		—	—	-250	μA	V <sub>DS</sub> = -80V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 125°C
I <sub>GSS</sub>	Gate-to-Source Forward Leakage	—	—	-100	nA	V <sub>GS</sub> = -20V
	Gate-to-Source Reverse Leakage	—	—	100	nA	V <sub>GS</sub> = 20V

**Dynamic Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise specified)**

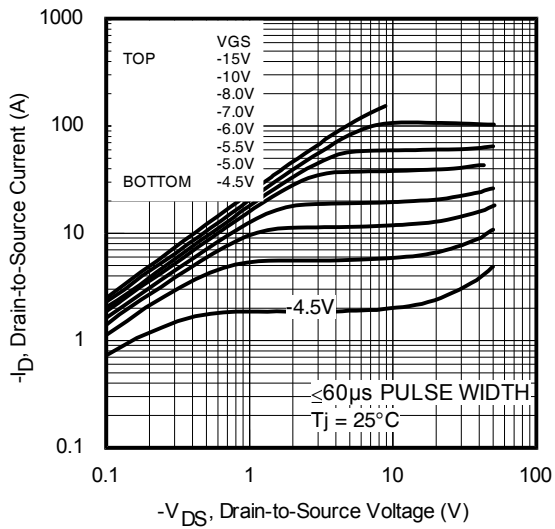
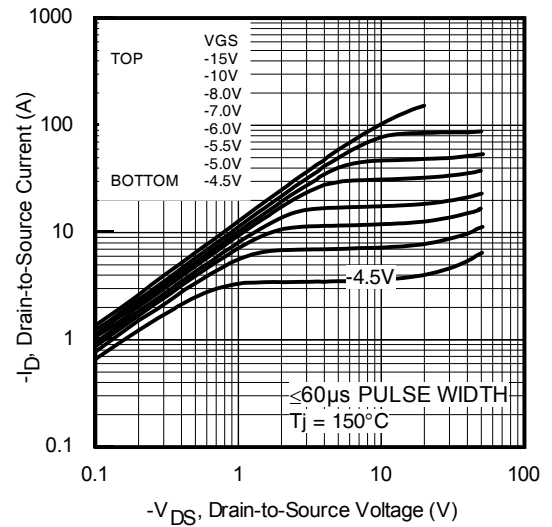
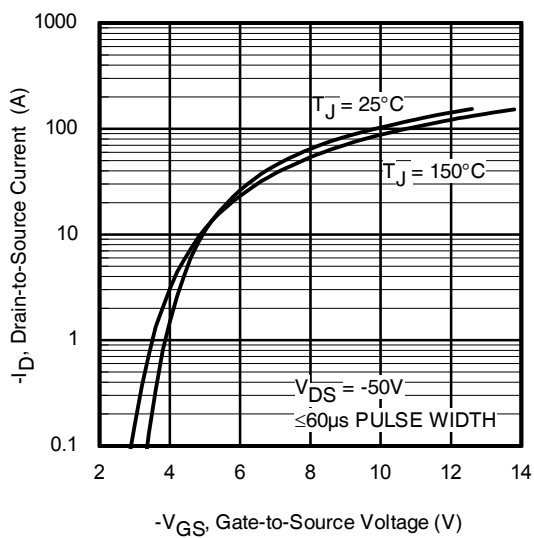
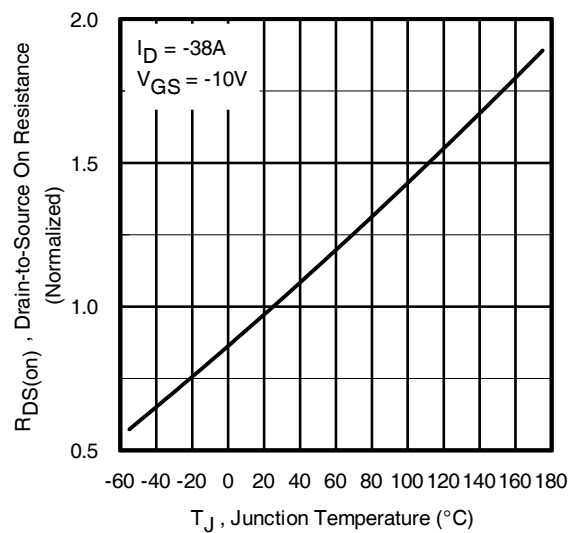
Q <sub>g</sub>	Total Gate Charge	—	150	230	nC	I <sub>D</sub> = -23A
Q <sub>gs</sub>	Gate-to-Source Charge	—	22	33		V <sub>DS</sub> = -80V
Q <sub>gd</sub>	Gate-to-Drain Charge	—	81	120		V <sub>GS</sub> = -10V ④
t <sub>d(on)</sub>	Turn-On Delay Time	—	14	—	ns	V <sub>DD</sub> = -50V
t <sub>r</sub>	Rise Time	—	63	—		I <sub>D</sub> = -23A
t <sub>d(off)</sub>	Turn-Off Delay Time	—	72	—		R <sub>G</sub> = 2.4Ω
t <sub>f</sub>	Fall Time	—	55	—		V <sub>GS</sub> = -10V ④
L <sub>D</sub>	Internal Drain Inductance	—	4.5	—	nH	Between lead, 6mm (0.25in.) from package and center of die contact
L <sub>S</sub>	Internal Source Inductance	—	7.5	—		
C <sub>iss</sub>	Input Capacitance	—	2780	—	pF	V <sub>GS</sub> = 0V
C <sub>oss</sub>	Output Capacitance	—	800	—		V <sub>DS</sub> = -25V
C <sub>rss</sub>	Reverse Transfer Capacitance	—	430	—		f = 1.0MHz, See Fig. 5

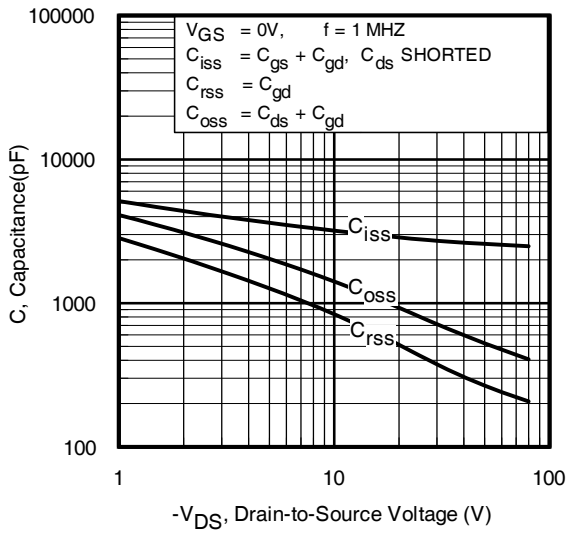
**Diode Characteristics**

	Parameter	Min.	Typ.	Max.	Units	Conditions
I <sub>S</sub>	Continuous Source Current (Body Diode)	—	—	-38	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I <sub>SM</sub>	Pulsed Source Current (Body Diode) ①	—	—	-140		
V <sub>SD</sub>	Diode Forward Voltage	—	—	-1.6	V	T <sub>J</sub> = 25°C, I <sub>S</sub> = -23A, V <sub>GS</sub> = 0V ④
t <sub>rr</sub>	Reverse Recovery Time	—	170	260	ns	T <sub>J</sub> = 25°C, I <sub>F</sub> = -23A, V <sub>DD</sub> = -25V
Q <sub>rr</sub>	Reverse Recovery Charge	—	1180	1770	nC	di/dt = -100A/μs ④
t <sub>on</sub>	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by L <sub>S</sub> +L <sub>D</sub> )				

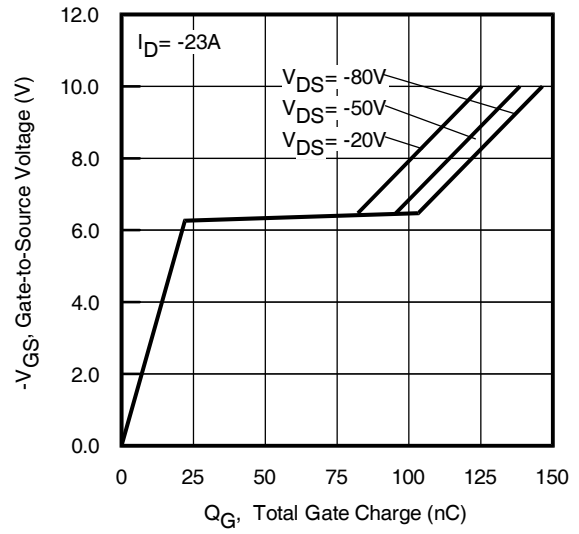
**Notes:**

- ① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 11)
- ② Limited by T<sub>Jmax</sub>, starting T<sub>J</sub> = 25°C, L = 0.46mH, R<sub>G</sub> = 25Ω, I<sub>AS</sub> = -23A. (See Fig. 12)
- ③ I<sub>SD</sub> ≤ -23A, di/dt ≤ -650A/μs, V<sub>DD</sub> ≤ V<sub>(BR)DSS</sub>, T<sub>J</sub> ≤ 150°C.
- ④ Pulse width ≤ 300μs; duty cycle ≤ 2%.
- ⑤ This is applied to D<sup>2</sup>Pak When mounted on 1" square PCB (FR-4 or G-10 Material). For recommended footprint and soldering techniques refer to application note #AN-994
- ⑥ R<sub>θ</sub> is measured at T<sub>J</sub> of approximately 90°C.

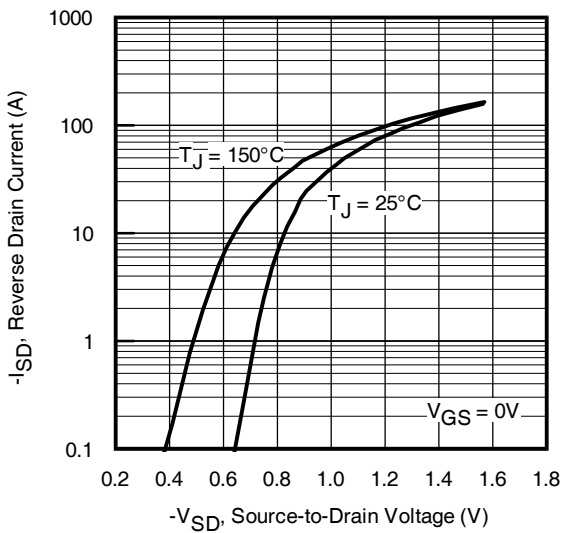

**Fig. 1** Typical Output Characteristics

**Fig. 2** Typical Output Characteristics

**Fig. 3** Typical Transfer Characteristics

**Fig. 4** Normalized On-Resistance vs. Temperature



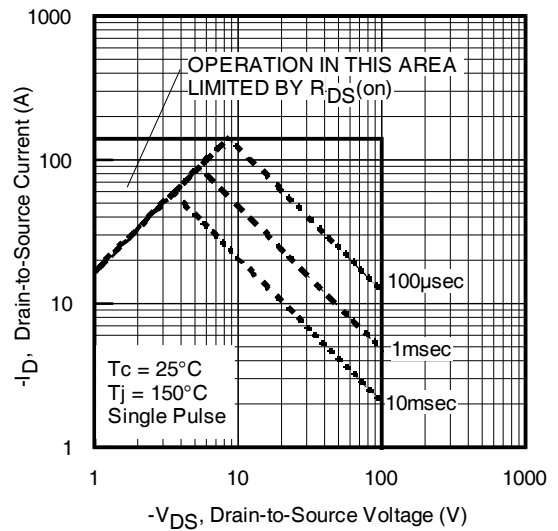
**Fig 5.** Typical Capacitance vs. Drain-to-Source Voltage



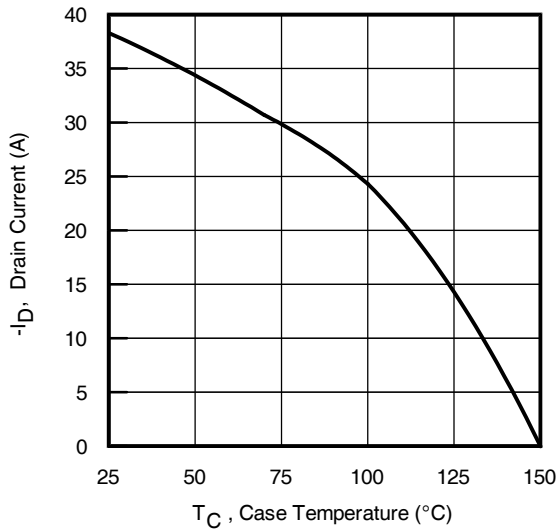
**Fig 6.** Typical Gate Charge vs. Gate-to-Source Voltage



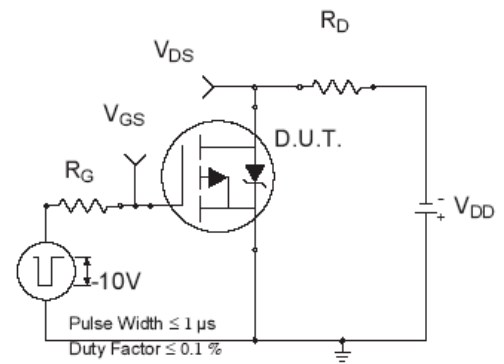
**Fig. 7** Typical Source-to-Drain Diode Forward Voltage



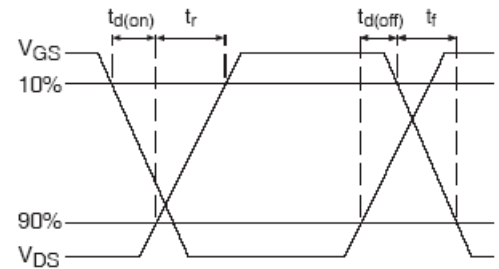
**Fig 8.** Maximum Safe Operating Area



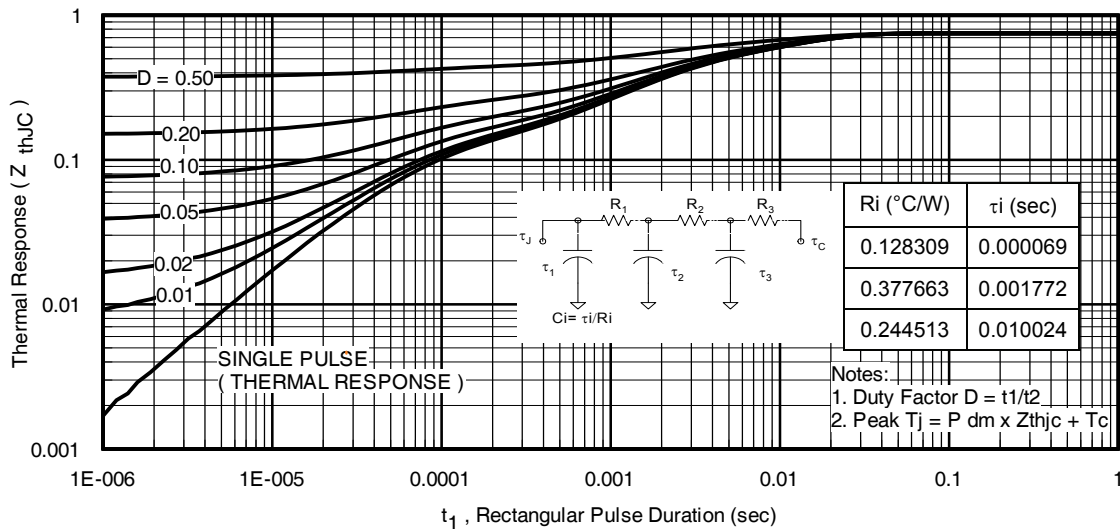
**Fig 9.** Maximum Drain Current vs. Case Temperature



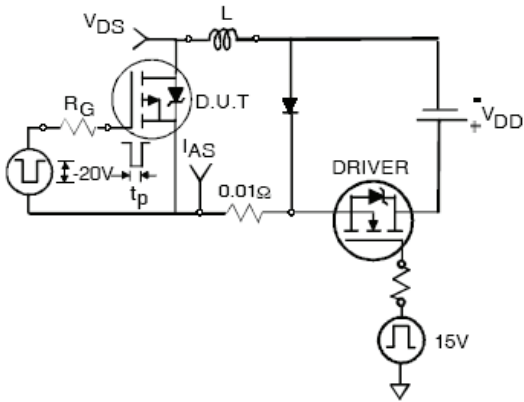
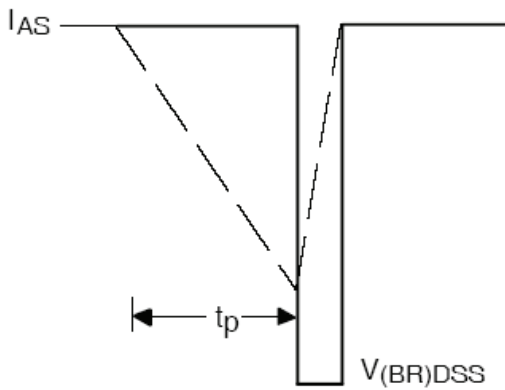
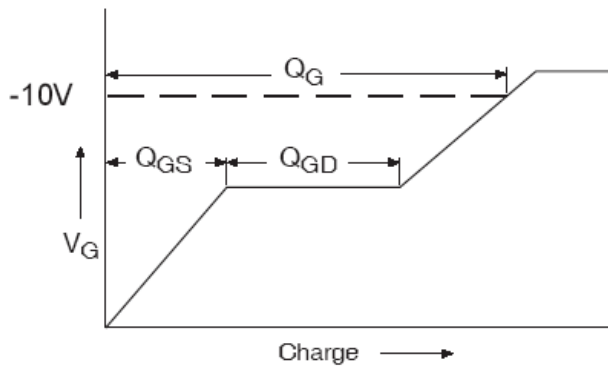
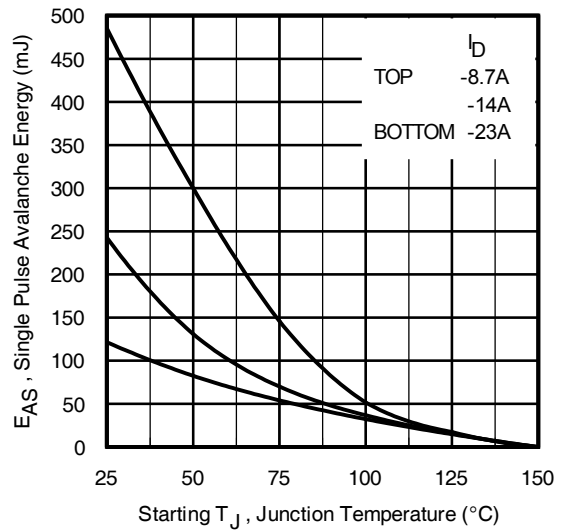
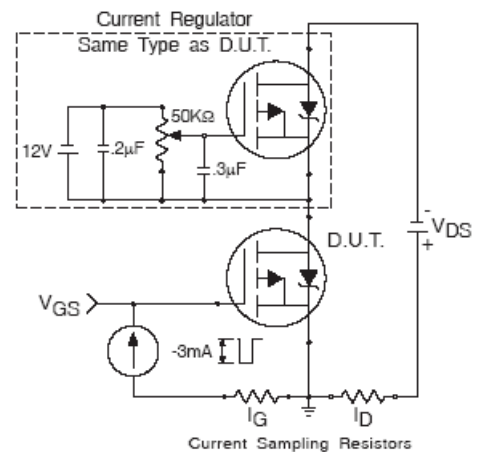
**Fig 10a.** Switching Time Test Circuit

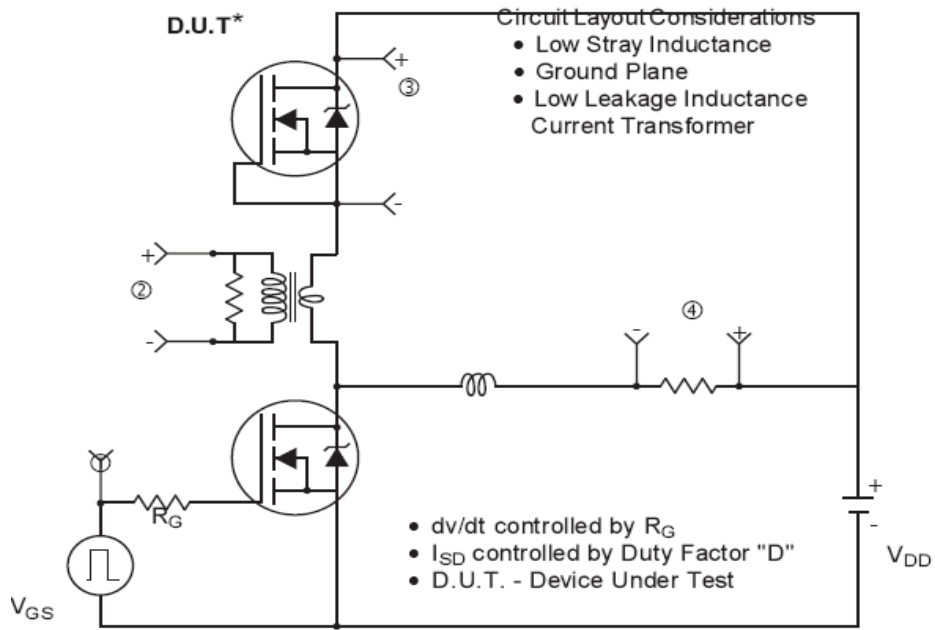


**Fig 10b.** Switching Time Waveforms

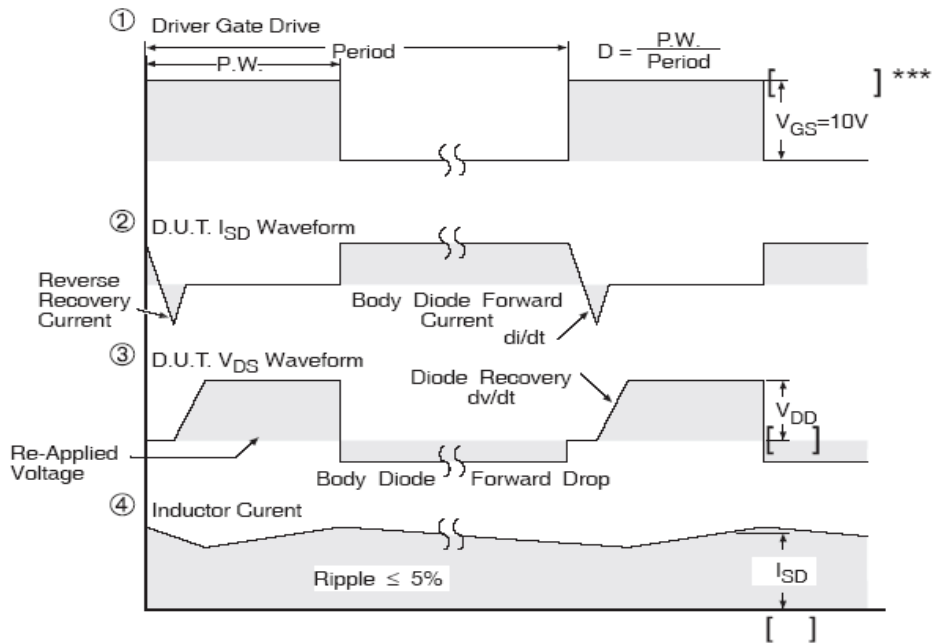


**Fig 11.** Maximum Effective Transient Thermal Impedance, Junction-to-Case


**Fig 12a.** Unclamped Inductive Test Circuit

**Fig 12b.** Unclamped Inductive Waveforms

**Fig 14a.** Gate Charge Waveform

**Fig 13.** Maximum Avalanche Energy vs. Drain Current

**Fig 14b.** Gate Charge Test Circuit



\* Reverse Polarity of D.U.T for P-Channel

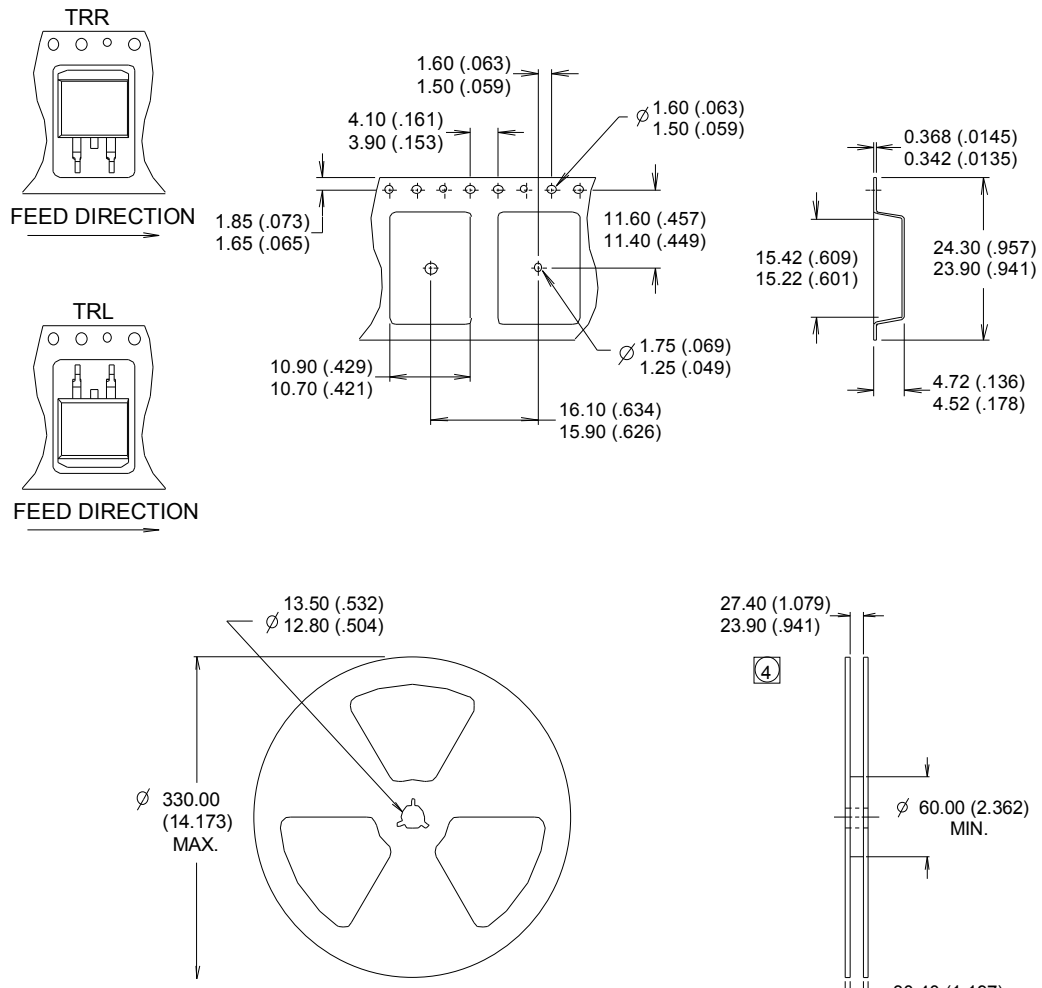


\*\*\*  $V_{GS} = 5.0V$  for Logic Level and 3V Drive Devices

**Fig 15.** Peak Diode Recovery  $dv/dt$  Test Circuit for P-Channel HEXFET® Power MOSFETs





**D<sup>2</sup>Pak (TO-263AB) Tape & Reel Information (Dimensions are shown in millimeters (inches))**


- NOTES :
1. COMFORMS TO EIA-418.
  2. CONTROLLING DIMENSION: MILLIMETER.
  - ③ DIMENSION MEASURED @ HUB.
  - ④ INCLUDES FLANGE DISTORTION @ OUTER EDGE.

**Qualification Information**

<b>Qualification Level</b>		Automotive (per AEC-Q101)	
		Comments: This part number(s) passed Automotive qualification. Infineon's Industrial and Consumer qualification level is granted by extension of the higher Automotive level.	
<b>Moisture Sensitivity Level</b>		D <sup>2</sup> -Pak	MSL1
<b>ESD</b>	Machine Model	Class M4 (+/-425V) <sup>†</sup> AEC-Q101-002	
	Human Body Model	Class H2 (/ -4000V) <sup>†</sup> AEC-Q101-001	
	Charged Device Model	Class C5 (/ -1125V) <sup>†</sup> AEC-Q101-005	
<b>RoHS Compliant</b>		Yes	

† Highest passing voltage.

**Revision History**

Date	Comments
9/30/2015	<ul style="list-style-type: none"> <li>Updated datasheet with corporate template</li> <li>Corrected ordering table on page 1.</li> </ul>

**Published by**  
**Infineon Technologies AG**  
**81726 München, Germany**  
 © Infineon Technologies AG 2015  
 All Rights Reserved.

**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](http://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.