

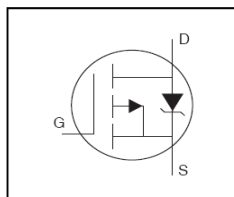


# THE DATASHEET OF AUIRF6215STRL



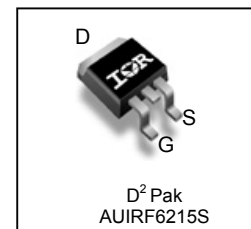
**Features**

- Advanced Planar Technology
- Low On-Resistance
- P-Channel MOSFET
- Dynamic dv/dt Rating
- 175°C Operating Temperature
- Fast Switching
- Fully Avalanche Rated
- Repetitive Avalanche Allowed up to Tjmax
- Lead-Free, RoHS Compliant
- Automotive Qualified \*



HEXFET® Power MOSFET

$V_{DSS}$	<b>-150V</b>
$R_{DS(on)}$ max.	<b>0.29Ω</b>
$I_D$	<b>-13A</b>


**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.

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

Base part number	Package Type	Standard Pack		Orderable Part Number
		Form	Quantity	
AUIRF6215S	D²-Pak	Tube	50	AUIRF6215S
		Tape and Reel Left	800	AUIRF6215STRL

**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
$I_D @ T_C = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ -10\text{V}$	-13	A
$I_D @ T_C = 100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ -10\text{V}$	-9.0	
$I_{DM}$	Pulsed Drain Current ①	-44	
$P_D @ T_A = 25^\circ\text{C}$	Maximum Power Dissipation	3.8	W
$P_D @ T_C = 25^\circ\text{C}$	Maximum Power Dissipation	110	
	Linear Derating Factor	0.71	W/°C
$V_{GS}$	Gate-to-Source Voltage	± 20	V
$E_{AS}$	Single Pulse Avalanche Energy (Thermally Limited) ②	310	mJ
$I_{AR}$	Avalanche Current ①	-6.6	A
$E_{AR}$	Repetitive Avalanche Energy ①	11	mJ
dv/dt	Peak Diode Recovery ③	-5.0	V/ns
$T_J$	Operating Junction and	-55 to + 175	°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-Case⑥	—	1.4	°C/W
$R_{\theta JA}$	Junction-to-Ambient ( PCB Mount, steady state) ⑤		40	


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

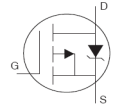
**Static @ T<sub>J</sub> = 25°C (unless otherwise specified)**

	Parameter	Min.	Typ.	Max.	Units	Conditions
V <sub>(BR)DSS</sub>	Drain-to-Source Breakdown Voltage	-150	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA
ΔV <sub>(BR)DSS</sub> /ΔT <sub>J</sub>	Breakdown Voltage Temp. Coefficient	—	-0.20	—	V/°C	Reference to 25°C, I <sub>D</sub> = -1mA
R <sub>DS(on)</sub>	Static Drain-to-Source On-Resistance	—	—	0.29	Ω	V <sub>GS</sub> = -10V, I <sub>D</sub> = -6.6A ④
		—	—	0.58		V <sub>GS</sub> = -10V, I <sub>D</sub> = -6.6A, T <sub>J</sub> = 150°C 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	3.6	—	—	S	V <sub>DS</sub> = -25V, I <sub>D</sub> = -6.6A
I <sub>DSS</sub>	Drain-to-Source Leakage Current	—	—	-25	μA	V <sub>DS</sub> = -150V, V <sub>GS</sub> = 0V
		—	—	-250		V <sub>DS</sub> = -120V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 150°C
I <sub>GSS</sub>	Gate-to-Source Forward Leakage	—	—	-100	nA	V <sub>GS</sub> = -20V
	Gate-to-Source Reverse Leakage	—	—	100		V <sub>GS</sub> = 20V

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

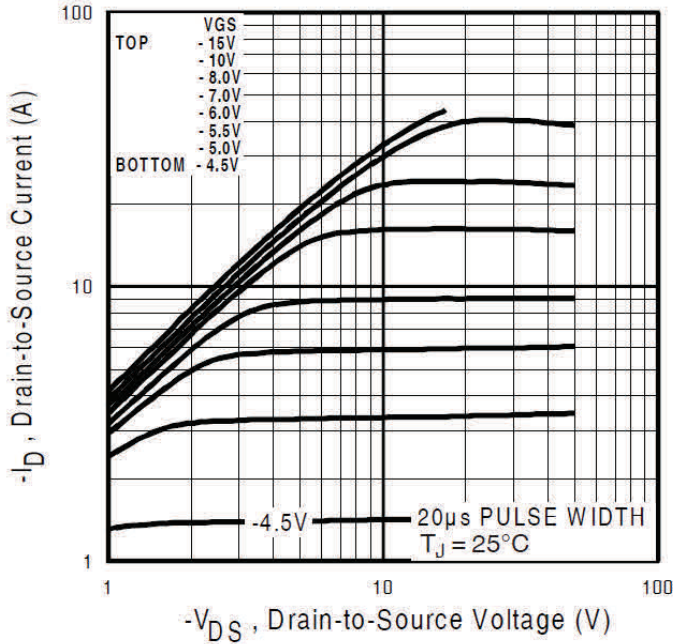
Q <sub>g</sub>	Total Gate Charge	—	—	66	nC	I <sub>D</sub> = -6.6A V <sub>DS</sub> = -120V V <sub>GS</sub> = -10V ④
Q <sub>gs</sub>	Gate-to-Source Charge	—	—	8.1		
Q <sub>gd</sub>	Gate-to-Drain Charge	—	—	35		
t <sub>d(on)</sub>	Turn-On Delay Time	—	14	—	ns	V <sub>DD</sub> = -75V I <sub>D</sub> = -6.6A R <sub>G</sub> = 6.8Ω, R <sub>D</sub> = 12Ω ④
t <sub>r</sub>	Rise Time	—	36	—		
t <sub>d(off)</sub>	Turn-Off Delay Time	—	53	—		
t <sub>f</sub>	Fall Time	—	37	—		
L <sub>S</sub>	Internal Source Inductance	—	7.5	—	nH	Between lead, 6mm (0.25in.) from package and center of die contact 
C <sub>iss</sub>	Input Capacitance	—	860	—	pF	V <sub>GS</sub> = 0V V <sub>DS</sub> = -25V f = 1.0MHz, See Fig.5
C <sub>oss</sub>	Output Capacitance	—	220	—		
C <sub>rss</sub>	Reverse Transfer Capacitance	—	130	—		

**Diode Characteristics**

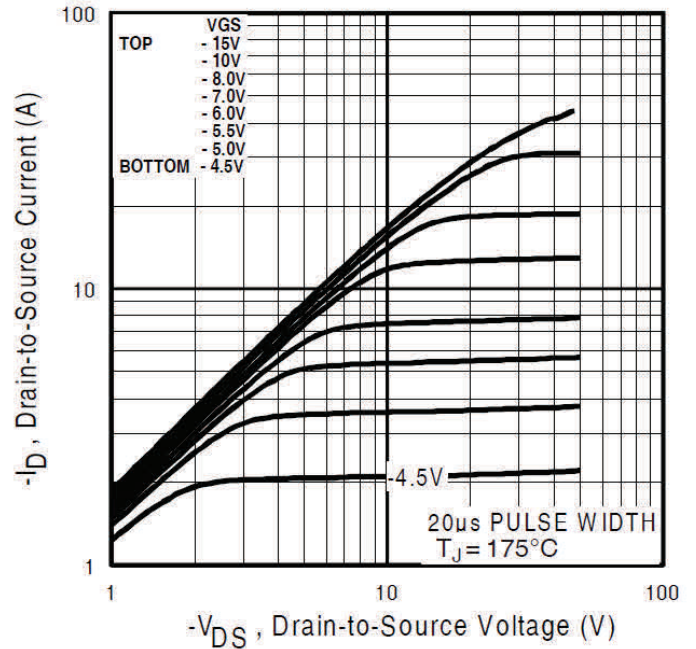
	Parameter	Min.	Typ.	Max.	Units	Conditions
I <sub>S</sub>	Continuous Source Current (Body Diode)	—	—	-11	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I <sub>SM</sub>	Pulsed Source Current (Body Diode) ①	—	—	-44		
V <sub>SD</sub>	Diode Forward Voltage	—	—	-1.6	V	T <sub>J</sub> = 25°C, I <sub>S</sub> = -6.6A, V <sub>GS</sub> = 0V ④
t <sub>rr</sub>	Reverse Recovery Time	—	160	240	ns	T <sub>J</sub> = 25°C, I <sub>F</sub> = -6.6A
Q <sub>rr</sub>	Reverse Recovery Charge	—	1.2	1.7	μC	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:**

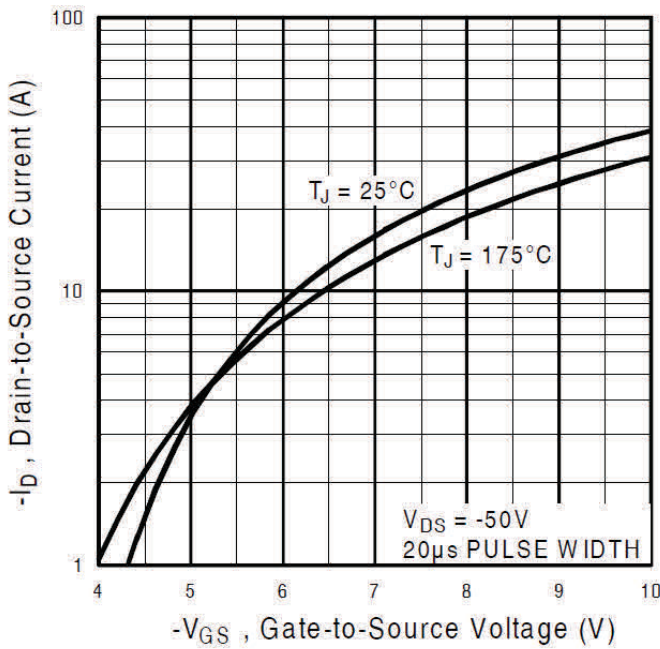
- ① Repetitive rating; pulse width limited by max. junction temperature. (See fig.11)
- ② Limited by T<sub>Jmax</sub>, starting T<sub>J</sub> = 25°C, L = 14mH, R<sub>G</sub> = 25Ω, I<sub>AS</sub> = -6.6A. (See fig.12)
- ③ I<sub>SD</sub> ≤ -6.6A, di/dt ≤ 620A/μs, V<sub>DD</sub> ≤ V<sub>(BR)DSS</sub>, T<sub>J</sub> ≤ 175°C.
- ④ Pulse width ≤ 300μs; duty cycle ≤ 2%.
- ⑤ 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



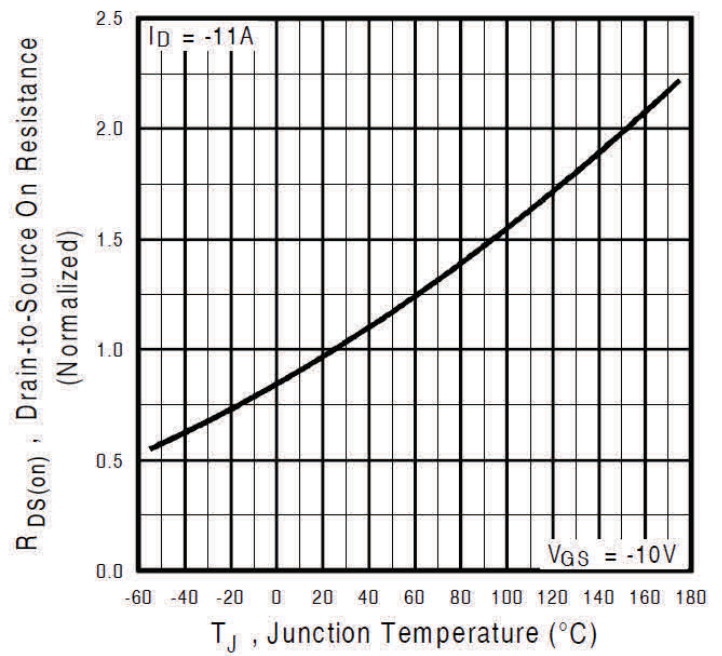
**Fig. 1** Typical Output Characteristics



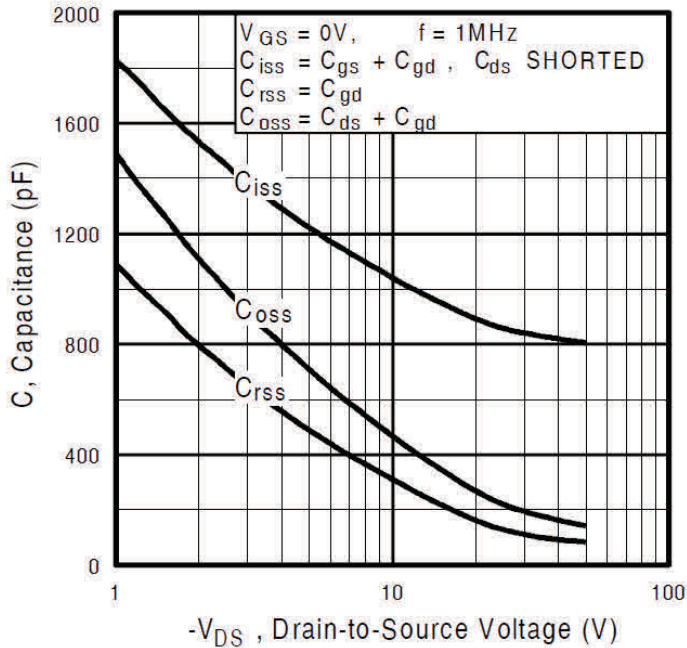
**Fig. 2** Typical Output Characteristics



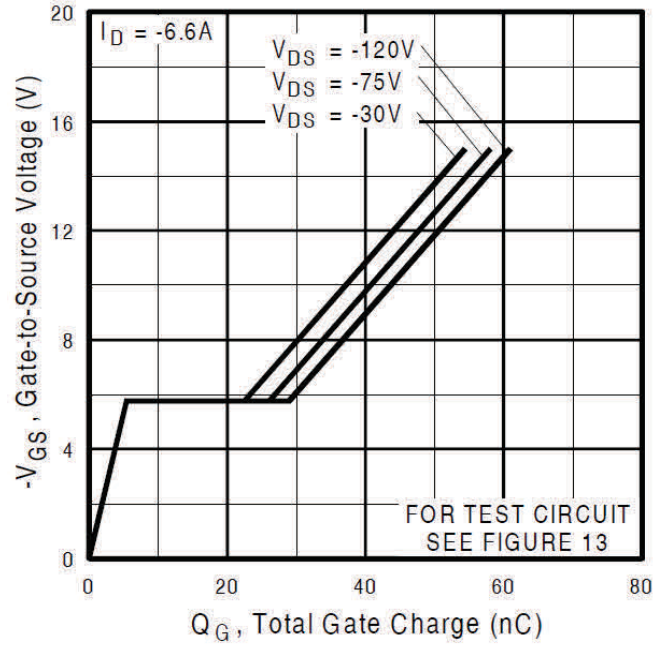
**Fig. 3** Typical Transfer Characteristics



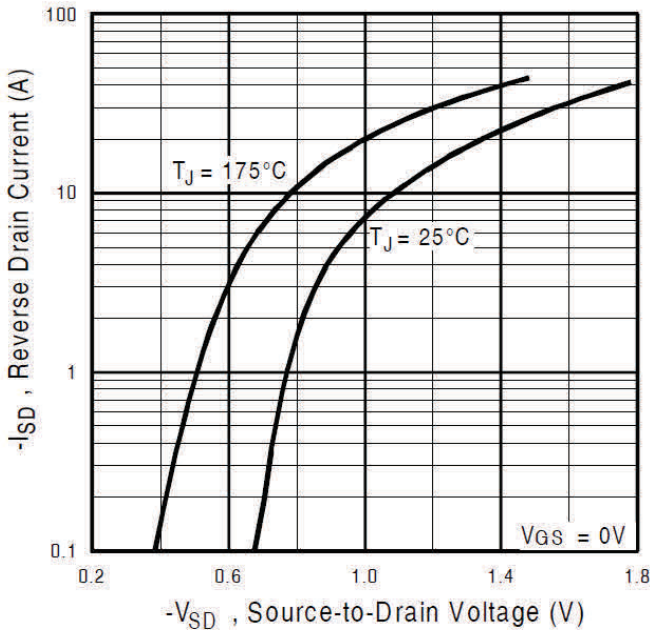
**Fig. 4** Normalized On-Resistance vs. Temperature



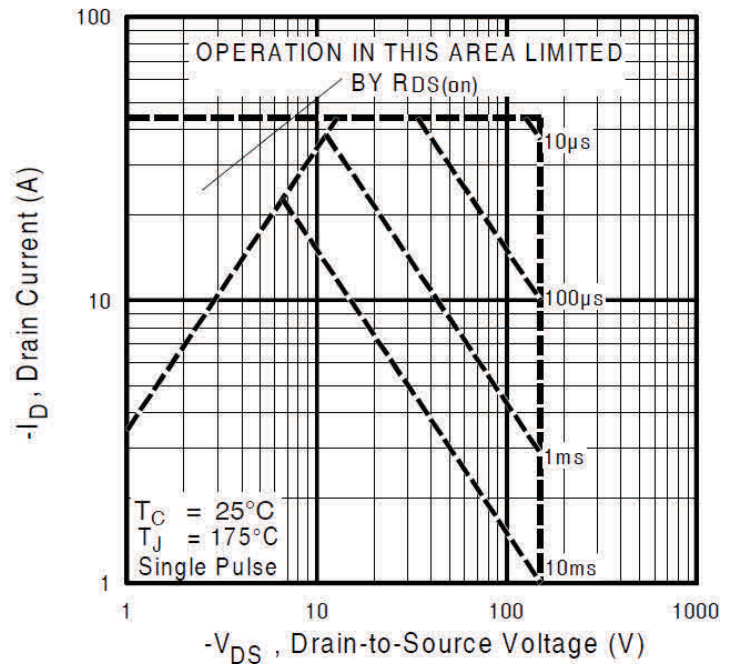
**Fig 5.** Typical Capacitance vs. Drain-to-Source Voltage



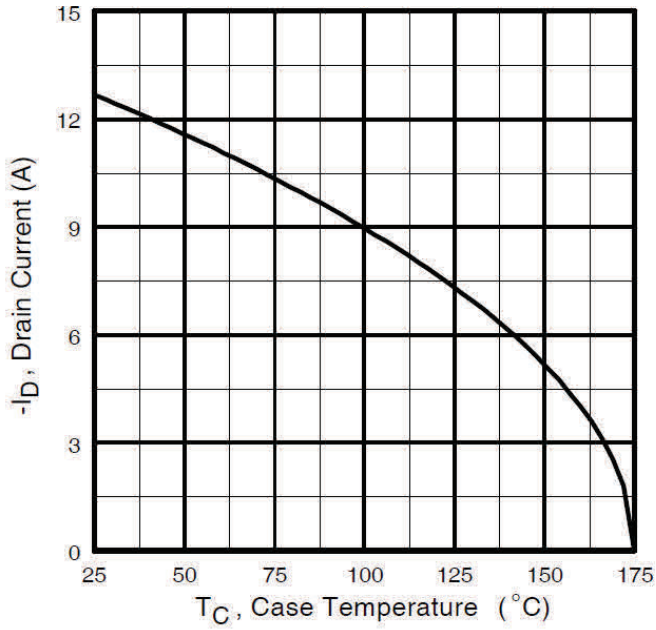
**Fig 6.** Typical Gate Charge vs. Gate-to-Source Voltage



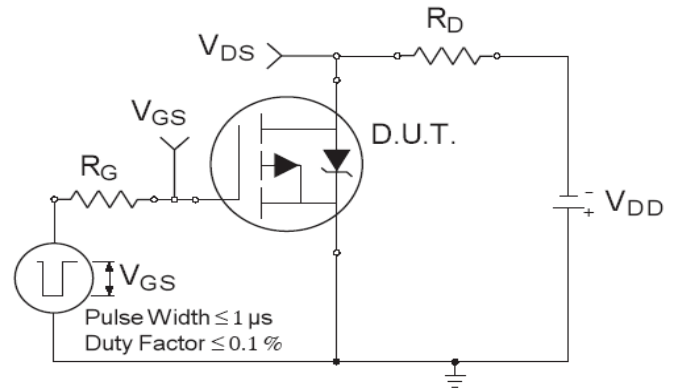
**Fig. 7** Typical Source-to-Drain Diode Forward Voltage



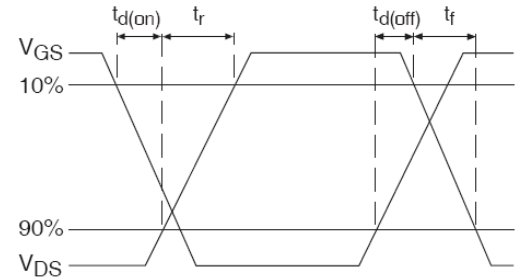
**Fig 8.** Maximum Safe Operating Area



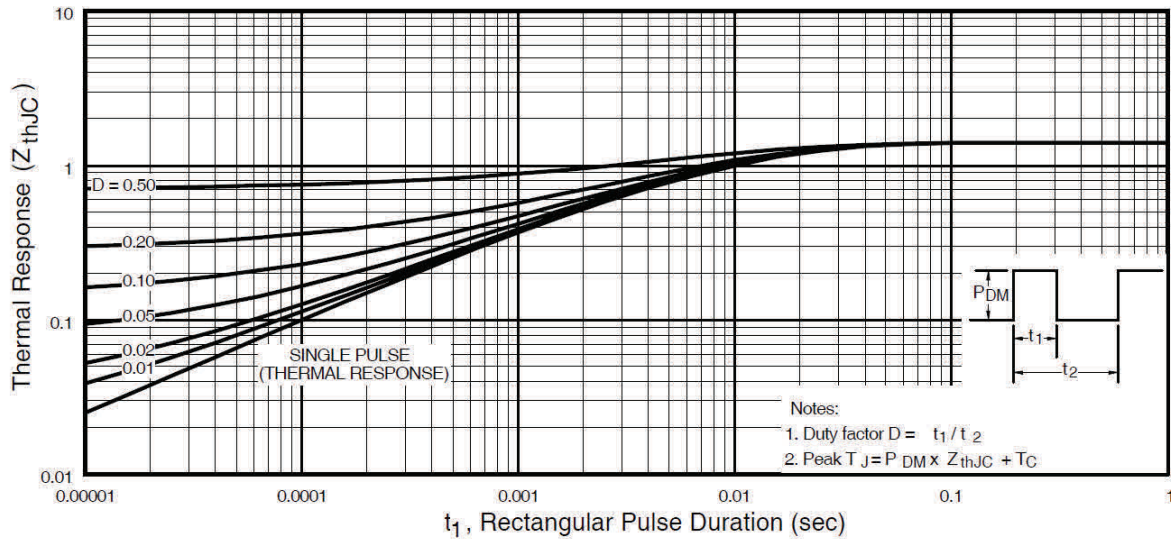
**Fig 9.** Maximum Drain Current vs. Case Temperature



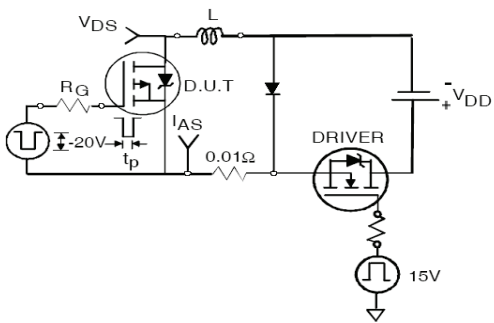
**Fig 10a.** Switching Time Test Circuit



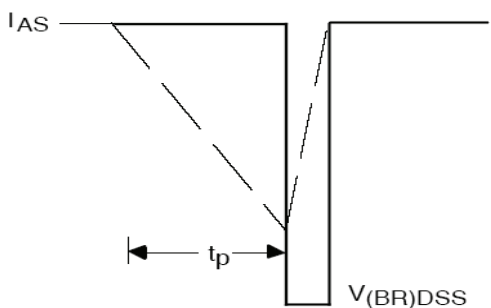
**Fig 10b.** Switching Time Waveforms



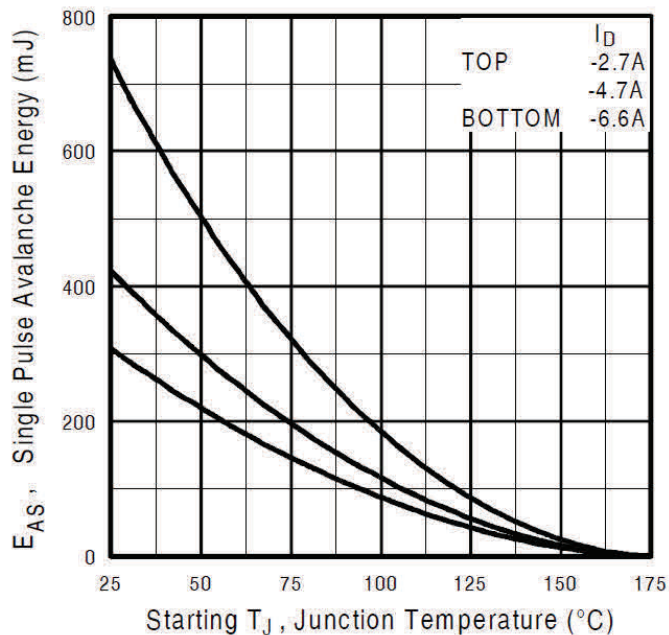
**Fig 11.** Maximum Effective Transient Thermal Impedance, Junction-to-Case



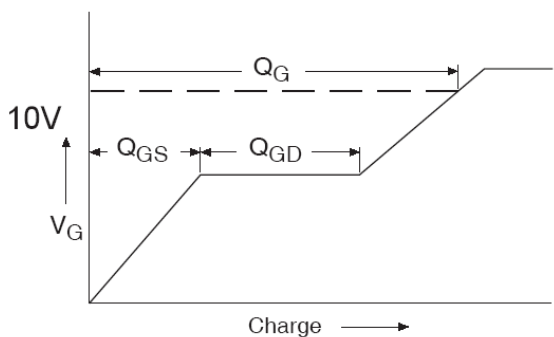
**Fig 12a.** Unclamped Inductive Test Circuit



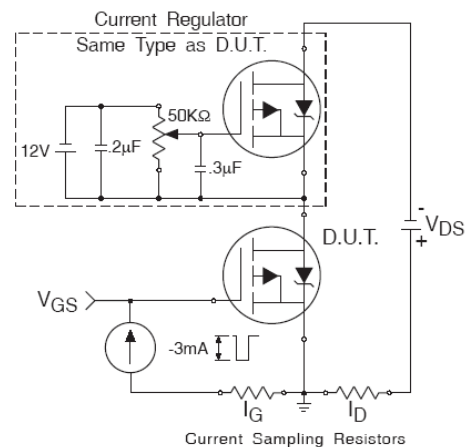
**Fig 12b.** Unclamped Inductive Waveforms



**Fig 12c.** Maximum Avalanche Energy vs. Drain Current

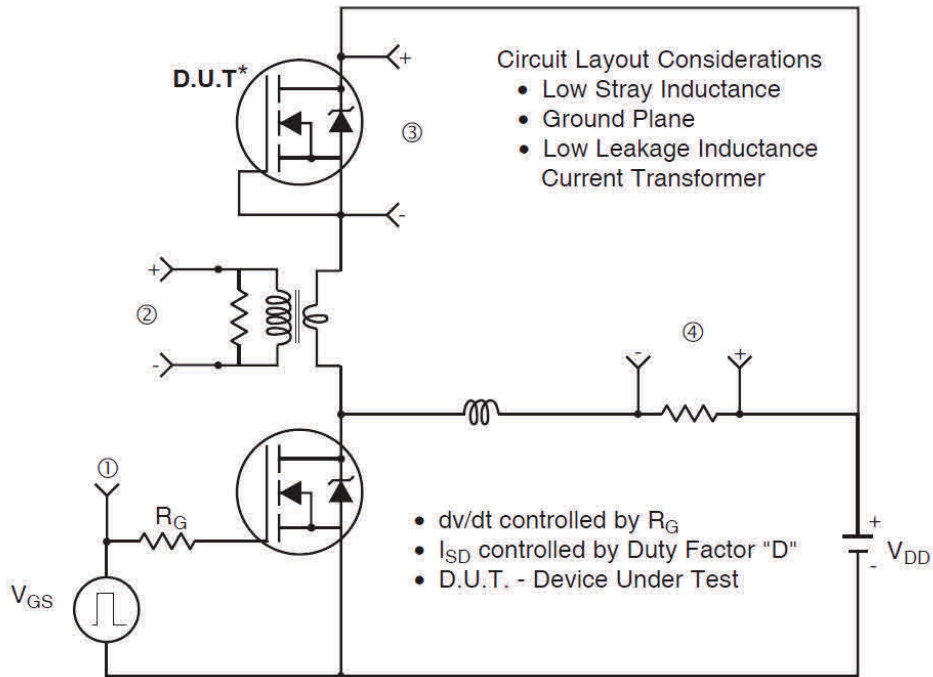


**Fig 13a.** Gate Charge Waveform

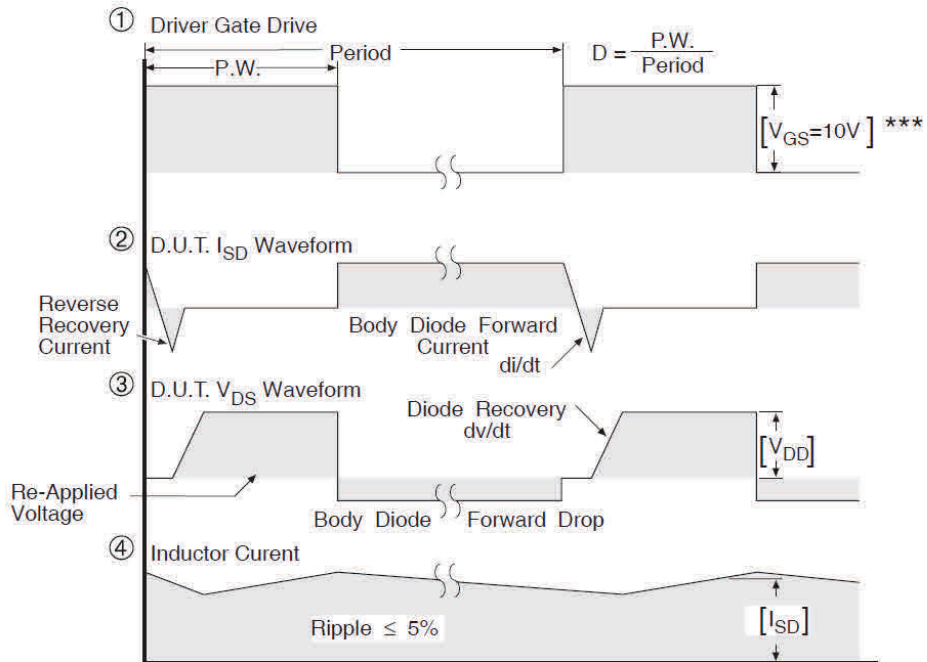


**Fig 13b.** Gate Charge Test Circuit

### Peak Diode Recovery dv/dt Test Circuit



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

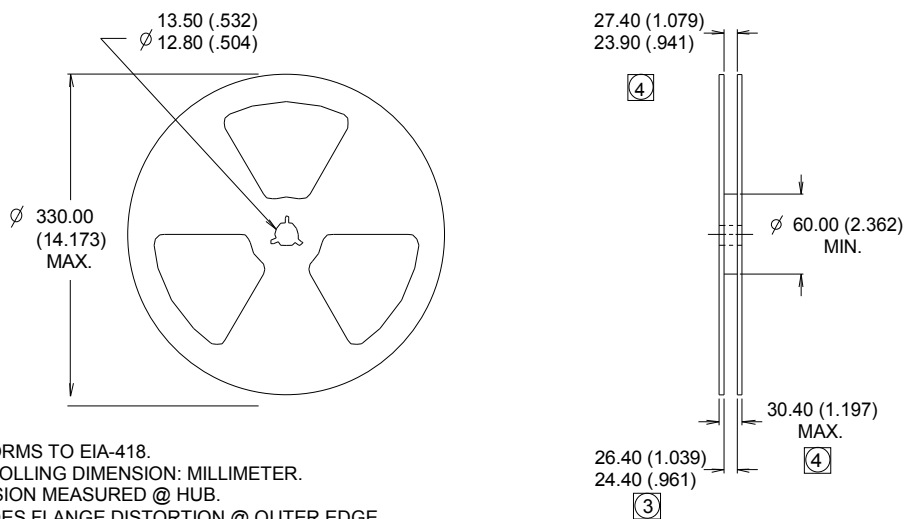
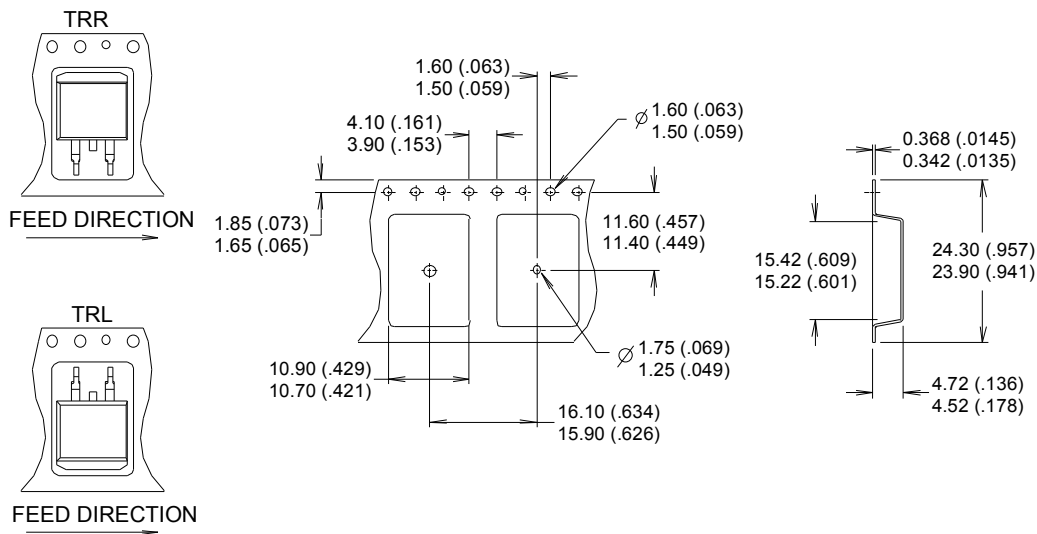


\*\*\*  $V_{GS} = 5.0V$  for Logic Level and 3V Drive Devices

**Fig 14.** 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 M3 (+/- 400V) <sup>†</sup> AEC-Q101-002	
	Human Body Model	Class H1B (+/- 1000V) <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
11/13/2015	<ul style="list-style-type: none"> <li>Updated datasheet with corporate template</li> <li>Corrected ordering table on page 1.</li> </ul>
10/10/2017	<ul style="list-style-type: none"> <li>Corrected typo error on part marking on page 8.</li> </ul>

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