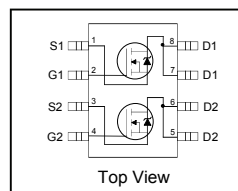


Features

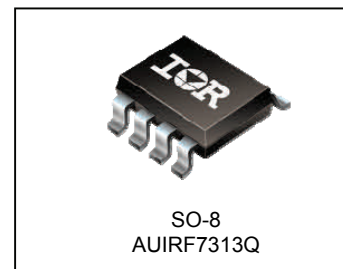
- Advanced Planar Technology
- Dual N Channel MOSFET
- Low On-Resistance
- Logic Level Gate Drive
- Dynamic dv/dt Rating
- 175°C Operating Temperature
- Fast Switching
- Lead-Free, RoHS Compliant
- Automotive Qualified *



V_{DS}	30V
$R_{DS(on)}$ typ.	23mΩ
max.	29mΩ
I_D	6.9A

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.



G	D	S
Gate	Drain	Source

Base part number	Package Type	Standard Pack		Orderable Part Number
		Form	Quantity	
AUIRF7313Q	SO-8	Tape and Reel	4000	AUIRF7313QTR

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
V_{DS}	Drain-Source Voltage	30	V
$I_D @ T_A = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$	6.9	A
$I_D @ T_A = 70^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$	5.8	
I_{DM}	Pulsed Drain Current ①	58	
$P_D @ T_A = 25^\circ\text{C}$	Maximum Power Dissipation	2.4	W
	Linear Derating Factor	0.02	W/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy (Thermally Limited) ②	450	mJ
dv/dt	Peak Diode Recovery dv/dt ③	3.6	V/ns
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 175	°C

Thermal Resistance

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JL}$	Junction-to-Drain Lead	—	20	°C/W
$R_{\theta JA}$	Junction-to-Ambient ⑤⑥	—	62.5	

HEXFET® is a registered trademark of Infineon.

*Qualification standards can be found at www.infineon.com

Static @ $T_J = 25^\circ\text{C}$ (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	—	0.03	—	V/ $^\circ\text{C}$	Reference to 25°C , $I_D = 1\text{mA}$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	23	29	$m\Omega$	$V_{GS} = 10V, I_D = 6.9A$ ④
		—	32	46		$V_{GS} = 4.5V, I_D = 5.5A$ ④
$V_{GS(th)}$	Gate Threshold Voltage	1.0	—	3.0	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
g_{fs}	Forward Trans conductance	7.5	—	—	S	$V_{DS} = 15V, I_D = 3.5A$
I_{DSS}	Drain-to-Source Leakage Current	—	—	1.0	μA	$V_{DS} = 24V, V_{GS} = 0V$
		—	—	25		$V_{DS} = 24V, V_{GS} = 0V, T_J = 125^\circ\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage	—	—	100	nA	$V_{GS} = 20V$
	Gate-to-Source Reverse Leakage	—	—	-100		$V_{GS} = -20V$

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

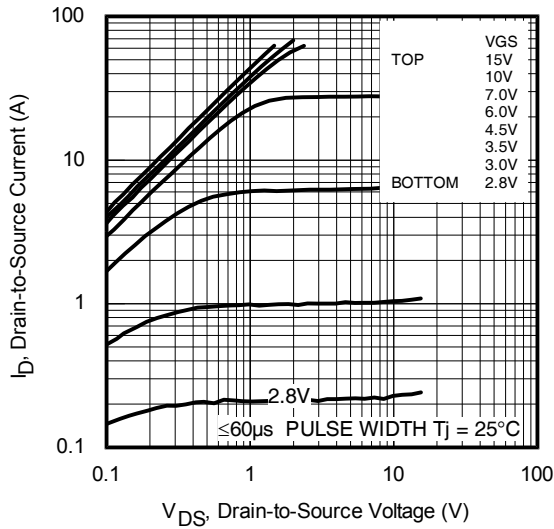
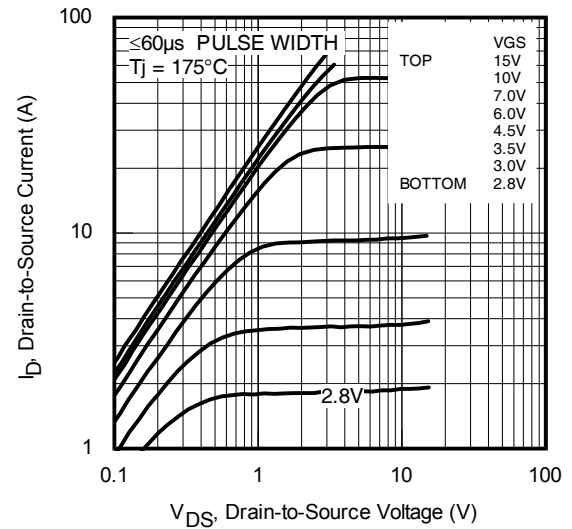
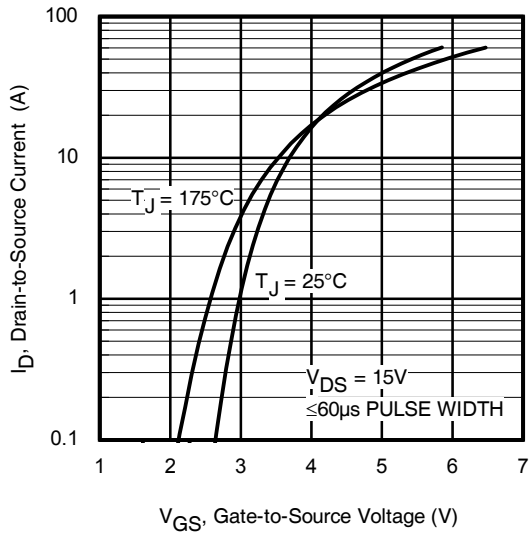
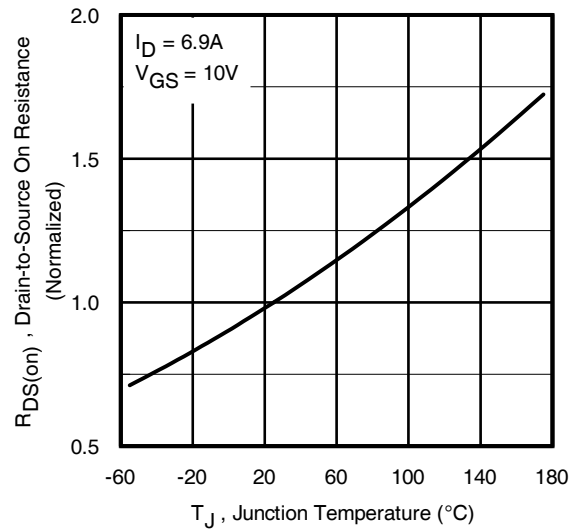
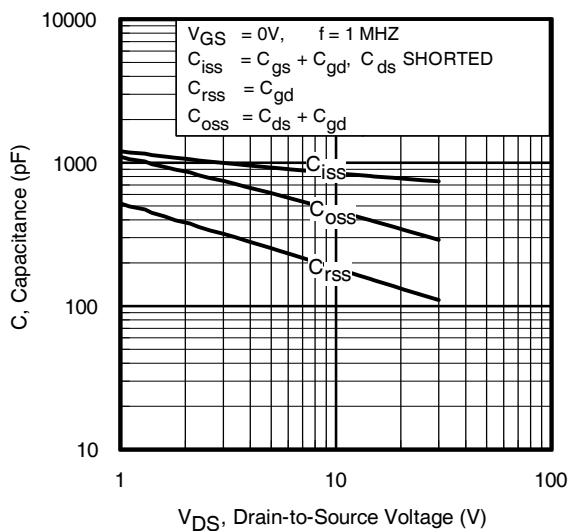
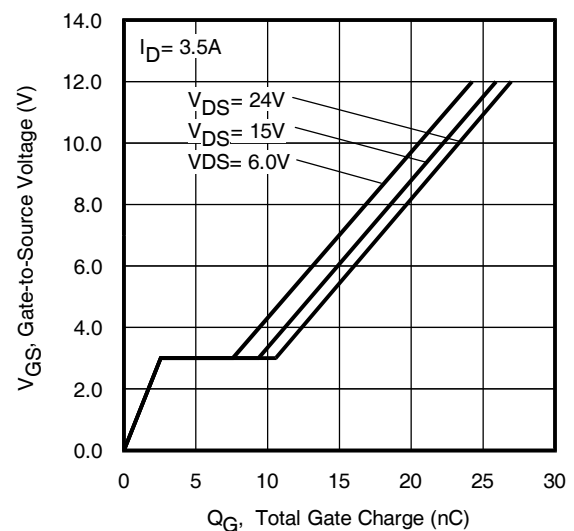
Q_g	Total Gate Charge	—	22	33	nC	$I_D = 3.5A$
Q_{gs}	Gate-to-Source Charge	—	2.6	3.9		$V_{DS} = 15V$
Q_{gd}	Gate-to-Drain Charge	—	6.8	10		$V_{GS} = 10V$ ④
$t_{d(on)}$	Turn-On Delay Time	—	3.7	—	ns	$V_{DD} = 15V$
t_r	Rise Time	—	7.3	—		$I_D = 3.5A$
$t_{d(off)}$	Turn-Off Delay Time	—	21	—		$R_G = 6.8\Omega$
t_f	Fall Time	—	11	—		$V_{GS} = 10V$ ④
C_{iss}	Input Capacitance	—	755	—	pF	$V_{GS} = 0V$
C_{oss}	Output Capacitance	—	310	—		$V_{DS} = 25V$
C_{rss}	Reverse Transfer Capacitance	—	120	—		$f = 1.0\text{MHz}$

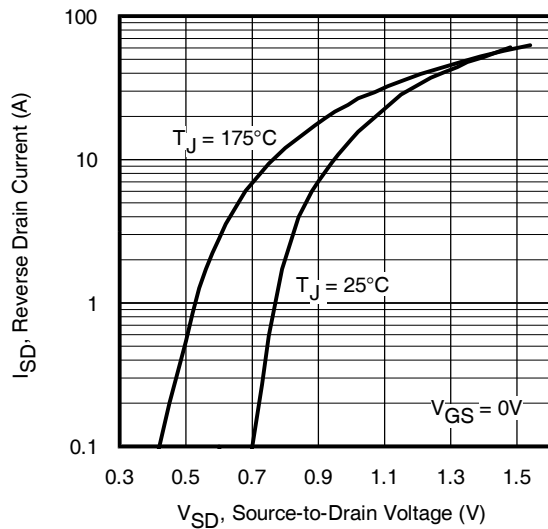
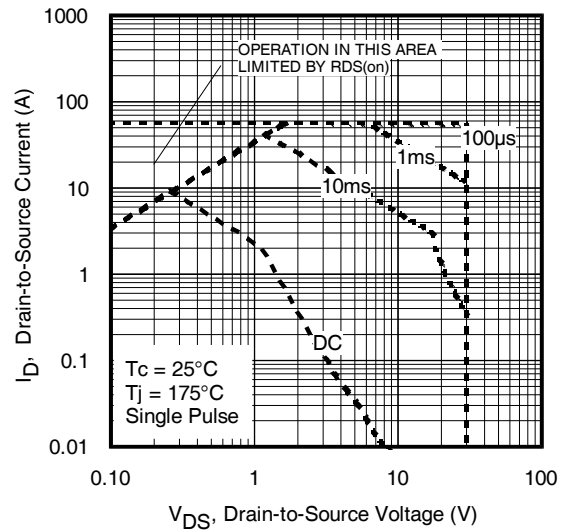
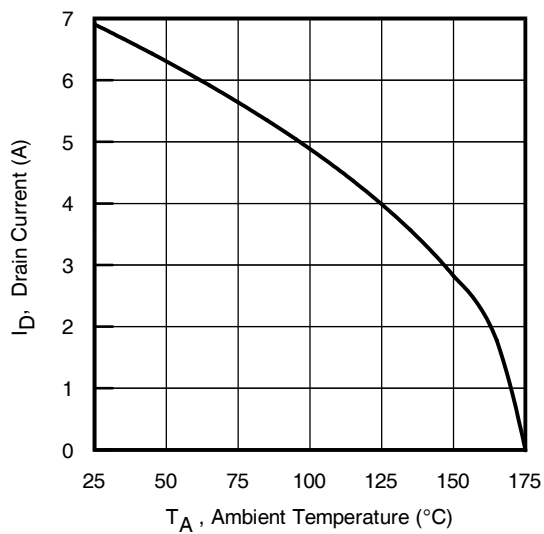
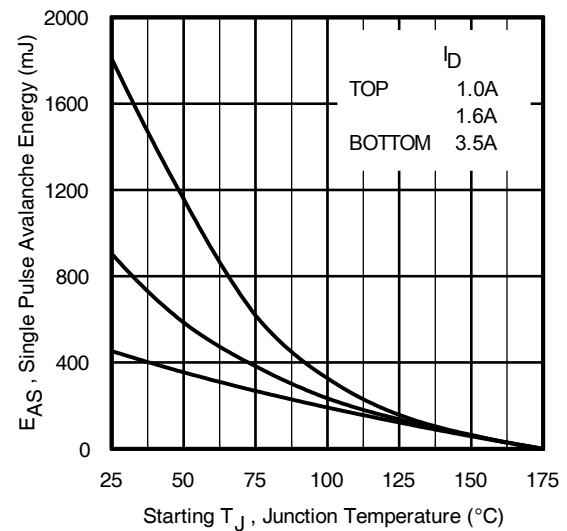
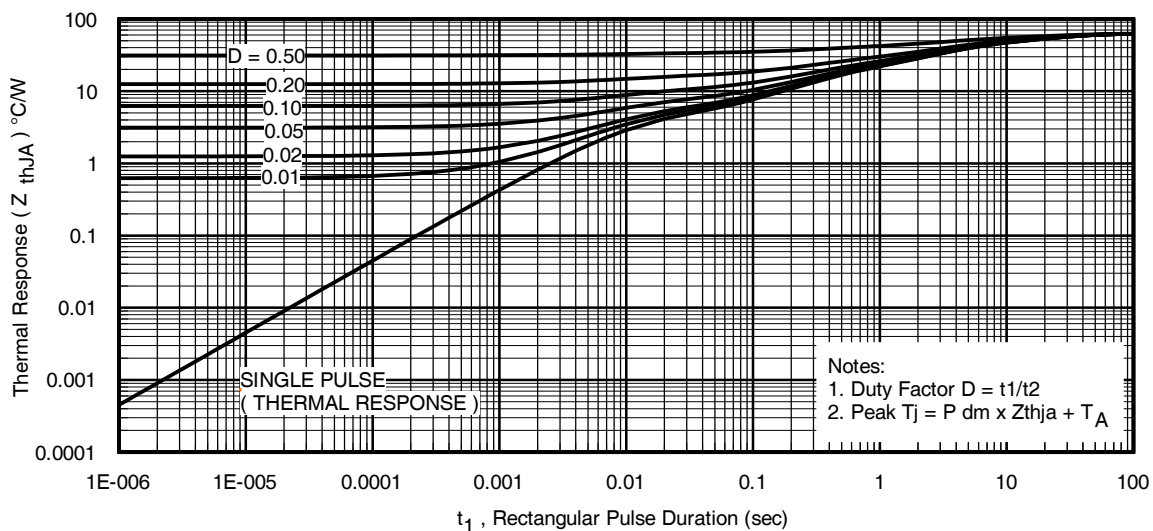
Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	3.0	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	58		
V_{SD}	Diode Forward Voltage	—	—	1.0	V	$T_J = 25^\circ\text{C}, I_S = 3.5A, V_{GS} = 0V$ ④
t_{rr}	Reverse Recovery Time	—	27	40	ns	$T_J = 25^\circ\text{C}, I_F = 3.5A,$
Q_{rr}	Reverse Recovery Charge	—	43	65	nC	$di/dt = 100A/\mu s$ ④

Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Limited by T_{Jmax} , Starting $T_J = 25^\circ\text{C}$, $L = 76\text{mH}$, $R_G = 50\Omega$, $I_{AS} = 3.5A$, $V_{GS} = 10V$. Part not recommended for use above this value.
- ③ $I_{SD} \leq 3.5A$, $di/dt \leq 590A/\mu s$, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq 175^\circ\text{C}$.
- ④ Pulse width $\leq 400\mu s$; duty cycle $\leq 2\%$.
- ⑤ When mounted on 1 inch square copper board.
- ⑥ R_θ is measured at T_J 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 10. Maximum Avalanche Energy vs. Drain Current

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

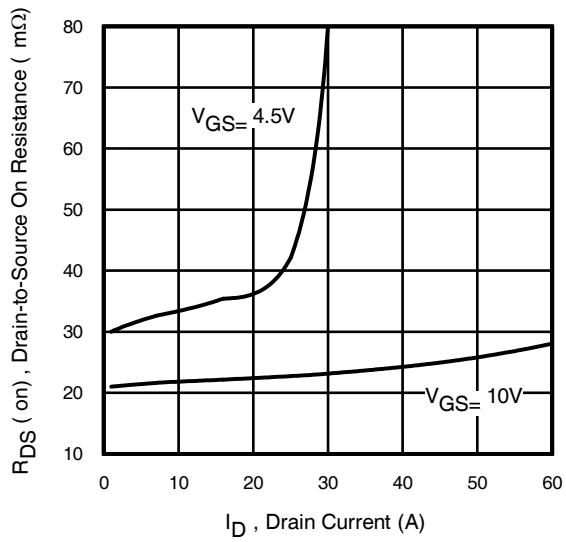


Fig 12. Typical On-Resistance Vs. Drain Current

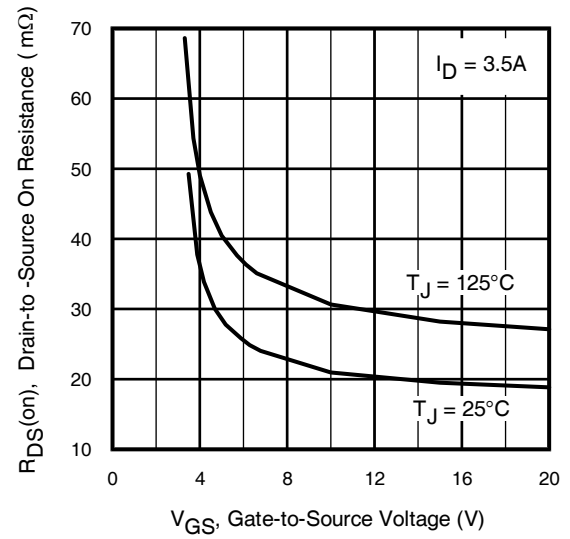


Fig 13. Typical On-Resistance Vs. Gate Voltage

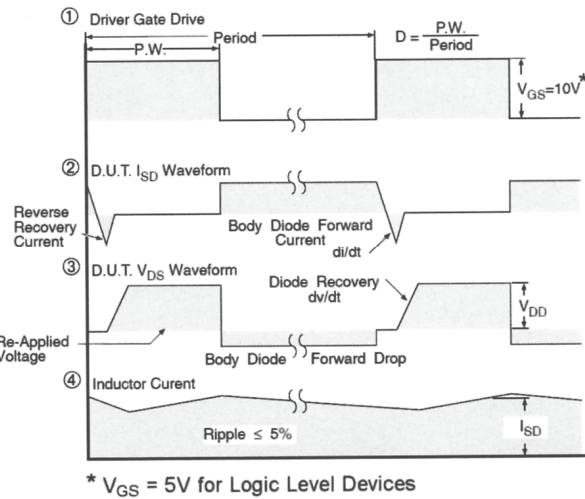
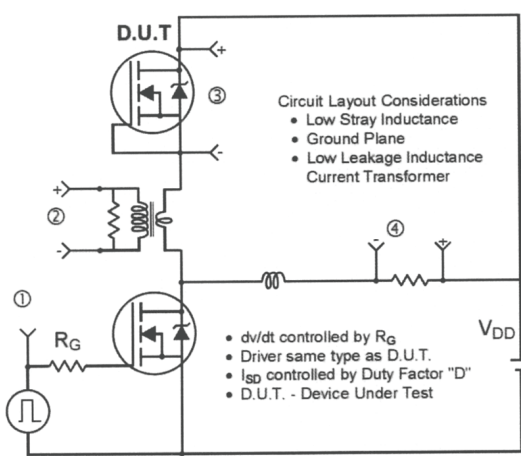


Fig 14. Peak Diode Recovery dv/dt Test Circuit for N-Channel HEXFET® Power MOSFETs

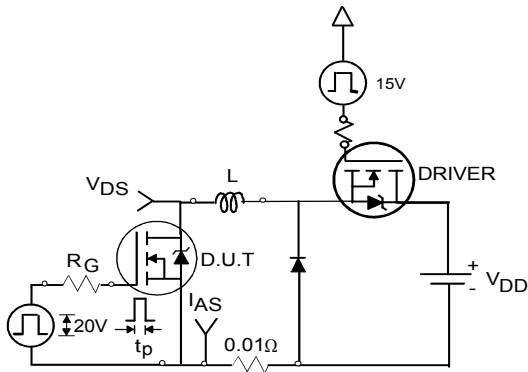


Fig 15a. Unclamped Inductive Test Circuit

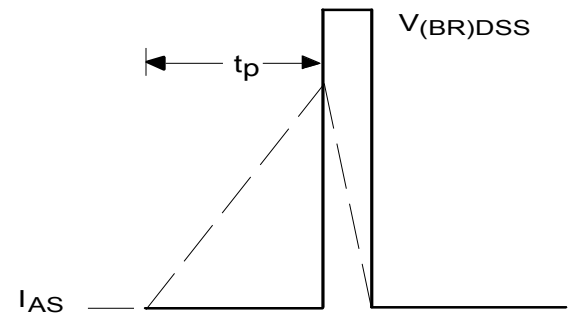


Fig 15b. Unclamped Inductive Waveforms

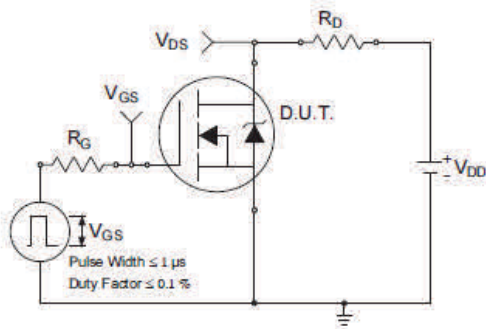


Fig 16a. Switching Time Test Circuit

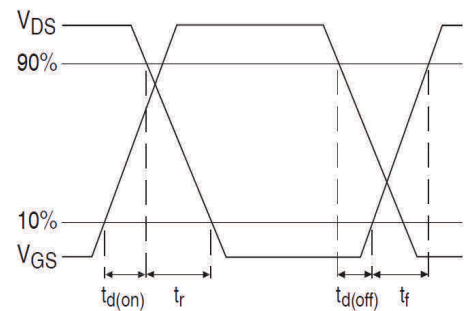


Fig 16b. Switching Time Waveforms

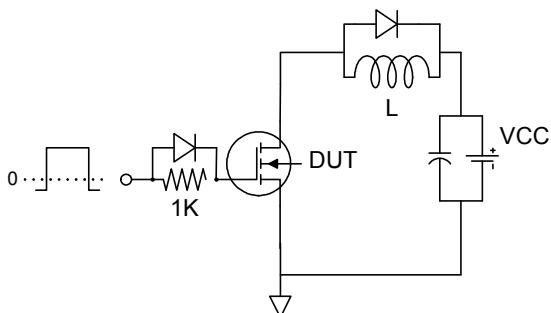


Fig 17a. Gate Charge Test Circuit

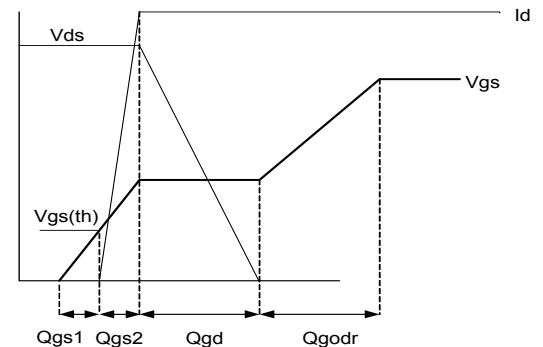
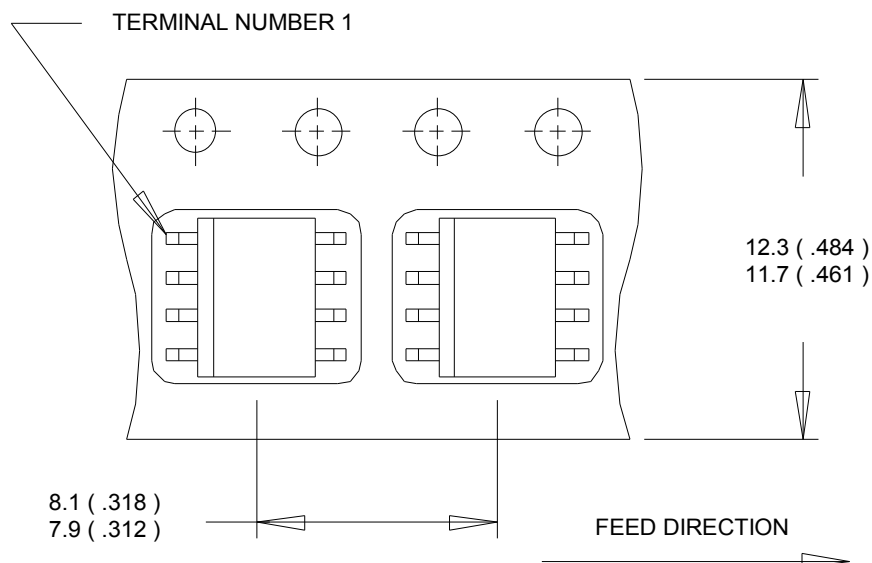
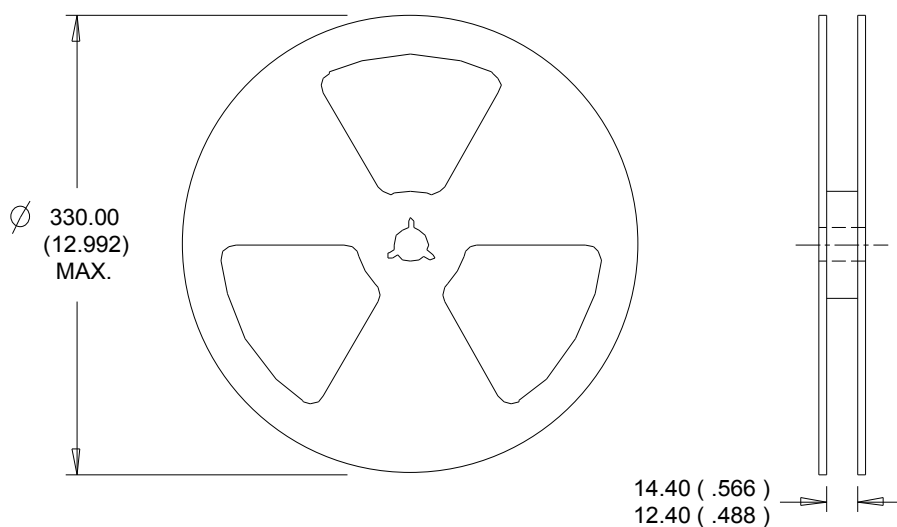


Fig 17b. Gate Charge Waveform

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.

Qualification Information

Qualification Level		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.	
Moisture Sensitivity Level		SO-8	MSL1
ESD	Machine Model	Class M1B (+/- 100V) [†] AEC-Q101-002	
	Human Body Model	Class H1A (+/- 500V) [†] AEC-Q101-001	
	Charged Device Model	Class C5 (+/- 2000V) [†] AEC-Q101-005	
RoHS Compliant		Yes	

† Highest passing voltage.

Revision History

Date	Comments
3/27/2014	- Added "Logic Level Gate Drive" bullet in the features section on page 1 - Updated part marking on page 7. - Updated data sheet with new IR corporate template
9/30/2015	- Updated datasheet with corporate template - Corrected ordering table on page 1.

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