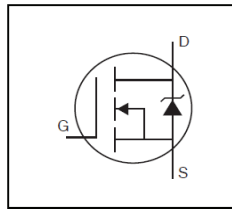
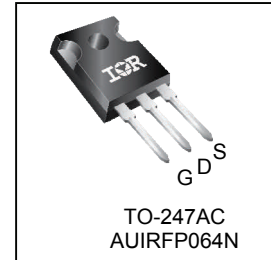


**Features**

- Advanced Planar Technology
- Ultra Low On-Resistance
- 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 \*



$V_{(BR)DSS}$	<b>55V</b>
$R_{DS(on)}$ max.	<b>0.008Ω</b>
$I_D$	<b>110A<sup>Ⓞ</sup></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	
AUIRFP064N	TO-247AC	Tube	25	AUIRFP064N

**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, $V_{GS} @ 10V$	110 <sup>Ⓞ</sup>	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	80 <sup>Ⓞ</sup>	
$I_{DM}$	Pulsed Drain Current <sup>①</sup>	390	
$P_D @ T_C = 25^\circ C$	Maximum Power Dissipation	200	W
	Linear Derating Factor	1.3	W/°C
$V_{GS}$	Gate-to-Source Voltage	± 20	V
$E_{AS}$	Single Pulse Avalanche Energy <sup>②</sup>	480	mJ
$I_{AR}$	Avalanche Current <sup>①</sup>	59	A
$E_{AR}$	Repetitive Avalanche Energy <sup>①</sup>	20	mJ
dv/dt	Peak Diode Recovery dv/dt <sup>③</sup>	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)		
	Mounting torque, 6-32 or M3 screw	10 lbf•in (1.1N•m)	

**Thermal Resistance**

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	—	0.75	°C/W
$R_{\theta CS}$	Case-to-Sink, Flat, Greased Surface	0.24	—	
$R_{\theta JA}$	Junction-to-Ambient	—	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	55	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA
ΔV <sub>(BR)DSS</sub> /ΔT <sub>J</sub>	Breakdown Voltage Temp. Coefficient	—	0.057	—	V/°C	Reference to 25°C, I <sub>D</sub> = 1mA
R <sub>DS(on)</sub>	Static Drain-to-Source On-Resistance	—	—	0.008	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 59A 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	42	—	—	S	V <sub>DS</sub> = 25V, I <sub>D</sub> = 59A④
I <sub>DSS</sub>	Drain-to-Source Leakage Current	—	—	25	μA	V <sub>DS</sub> = 55V, V <sub>GS</sub> = 0V
		—	—	250		V <sub>DS</sub> = 44V, 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)**

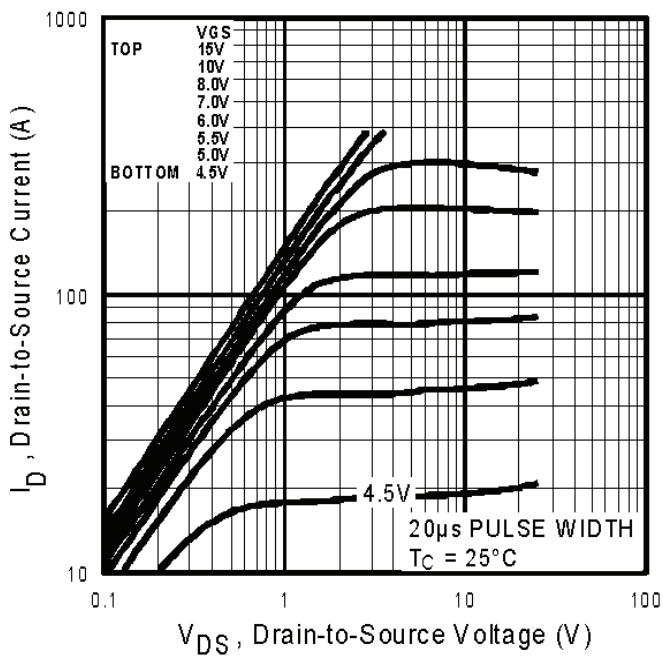
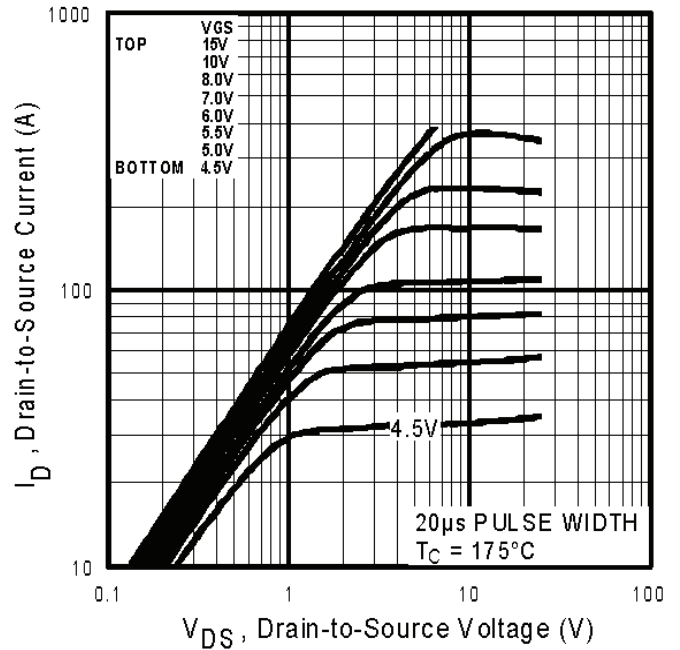
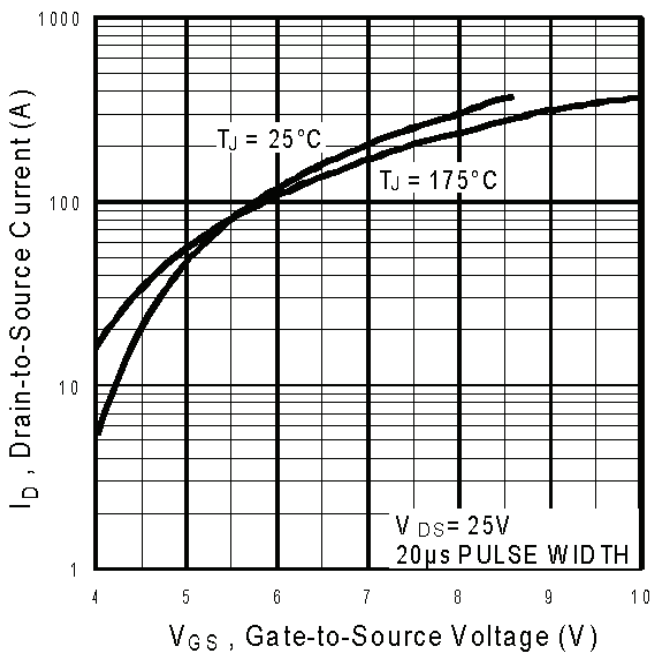
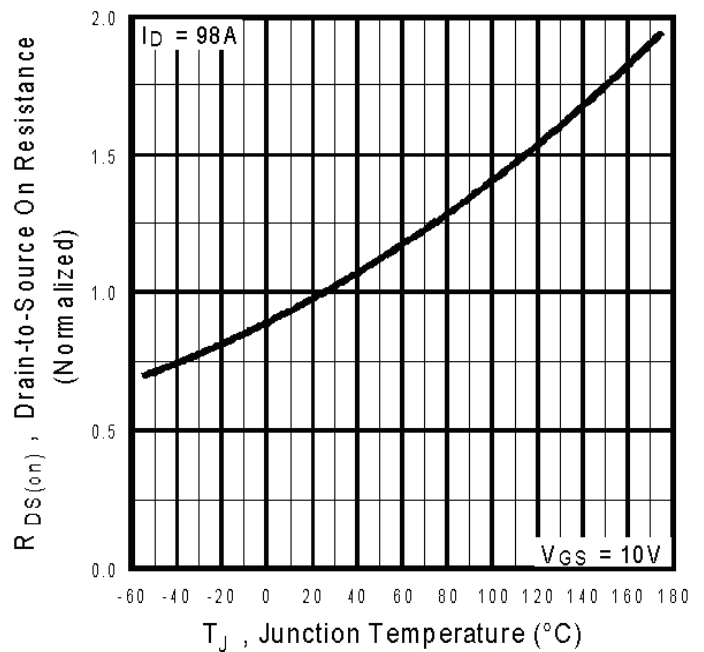
Q <sub>g</sub>	Total Gate Charge	—	—	170	nC	I <sub>D</sub> = 59A	
Q <sub>gs</sub>	Gate-to-Source Charge	—	—	32		V <sub>DS</sub> = 44V	
Q <sub>gd</sub>	Gate-to-Drain Charge	—	—	74		V <sub>GS</sub> = 10V, See Fig.6 and 13 ④	
t <sub>d(on)</sub>	Turn-On Delay Time	—	14	—	ns	V <sub>DD</sub> = 28V	
t <sub>r</sub>	Rise Time	—	100	—		I <sub>D</sub> = 59A	
t <sub>d(off)</sub>	Turn-Off Delay Time	—	43	—		R <sub>G</sub> = 2.5Ω	
t <sub>f</sub>	Fall Time	—	70	—		R <sub>D</sub> = 0.39Ω, See Fig.10④	
L <sub>D</sub>	Internal Drain Inductance	—	5.0	—	pF	Between lead, 6mm (0.25in.) from package and center of die contact	
L <sub>S</sub>	Internal Source Inductance	—	13	—			
C <sub>iss</sub>	Input Capacitance	—	4000	—			V <sub>GS</sub> = 0V
C <sub>oss</sub>	Output Capacitance	—	1300	—			V <sub>DS</sub> = 25V
C <sub>rss</sub>	Reverse Transfer Capacitance	—	480	—			f = 1.0MHz, See Fig.5

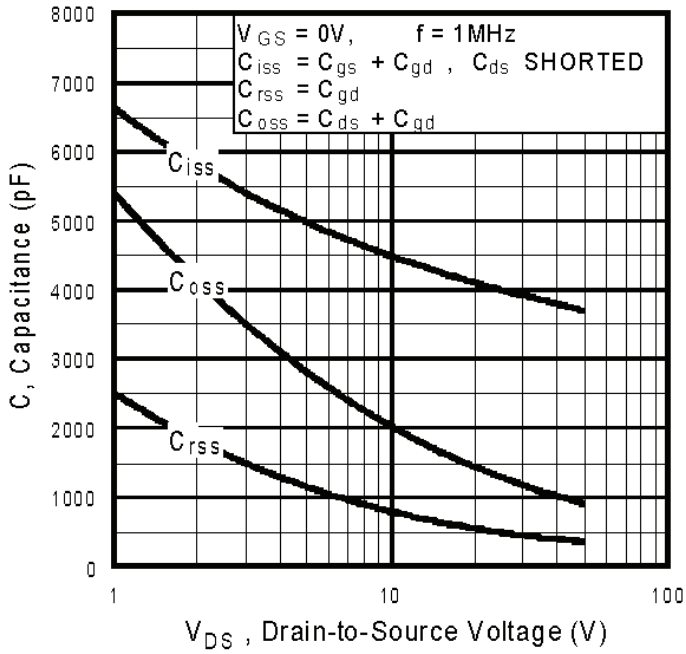
**Diode Characteristics**

	Parameter	Min.	Typ.	Max.	Units	Conditions
I <sub>S</sub>	Continuous Source Current (Body Diode)	—	—	110⑤	A	MOSFET symbol showing the integral reverse p-n junction diode.
I <sub>SM</sub>	Pulsed Source Current (Body Diode) ①	—	—	390		
V <sub>SD</sub>	Diode Forward Voltage	—	—	1.3	V	T <sub>J</sub> = 25°C, I <sub>S</sub> = 59A, V <sub>GS</sub> = 0V ④
t <sub>rr</sub>	Reverse Recovery Time	—	110	170	ns	T <sub>J</sub> = 25°C, I <sub>F</sub> = 59A
Q <sub>rr</sub>	Reverse Recovery Charge	—	450	680	nC	di/dt = 100A/μs ④

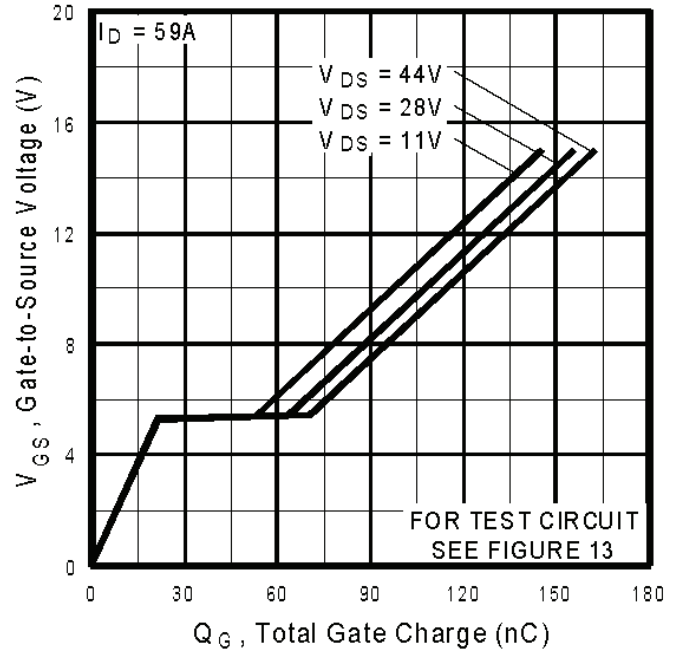
**Notes:**

- ① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 11).
- ② V<sub>DD</sub> = 25V, T<sub>J</sub> = 25°C, L = 190μH, R<sub>G</sub> = 25Ω, I<sub>AS</sub> = 59A. (See fig. 12).
- ③ I<sub>SD</sub> ≤ 59A, di/dt ≤ 290A/μs, V<sub>DD</sub> ≤ V<sub>(BR)DSS</sub>, T<sub>J</sub> ≤ 175°C.
- ④ Pulse width ≤ 300μs; duty cycle ≤ 2%.
- ⑤ Calculated continuous current based on maximum allowable junction temperature; for recommended current-handling of the package refer to Design Tip # 93-4

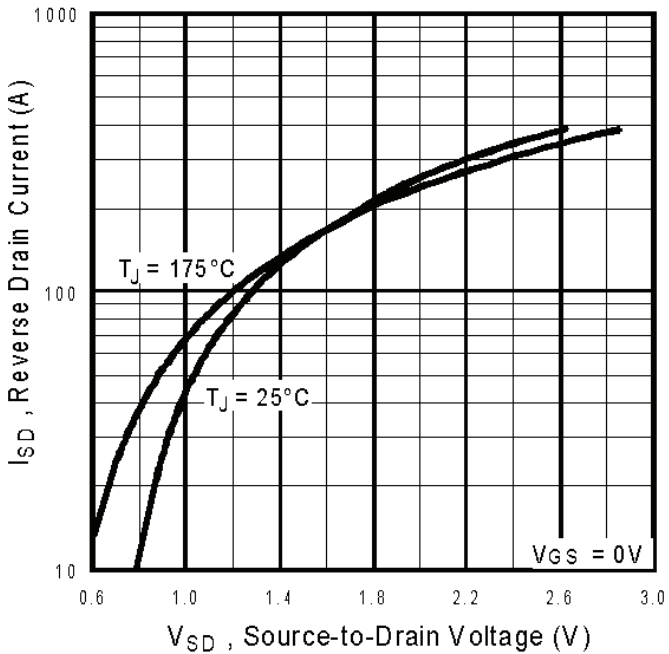

**Fig. 1 Typical Output Characteristics**

**Fig. 2 Typical Output Characteristics**

**Fig. 3 Typical Transfer Characteristics**

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



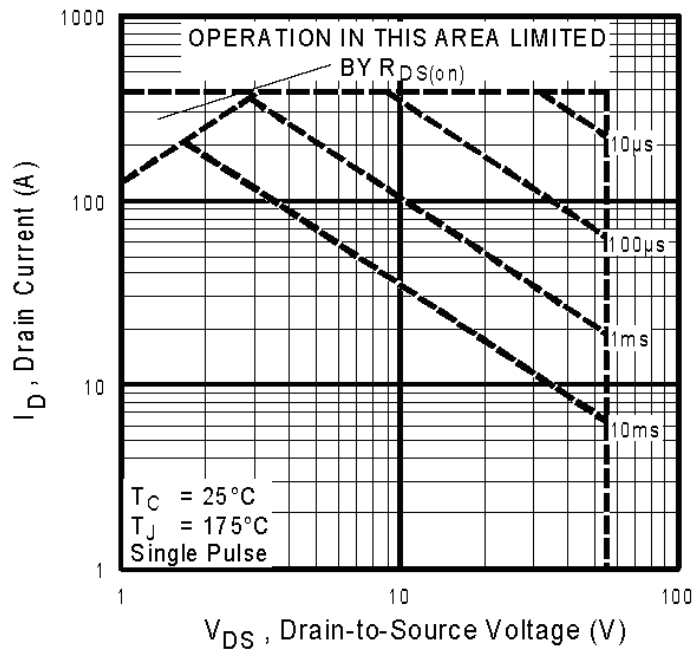
**Fig 5.** Typical Capacitance vs. Drain-to-Source Voltage



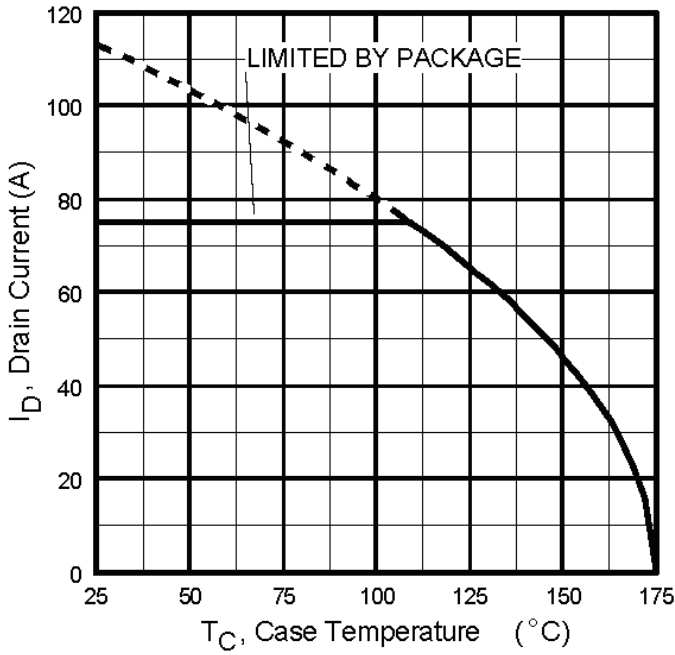
**Fig 6.** Typical Gate Charge vs. Gate-to-Source Voltage



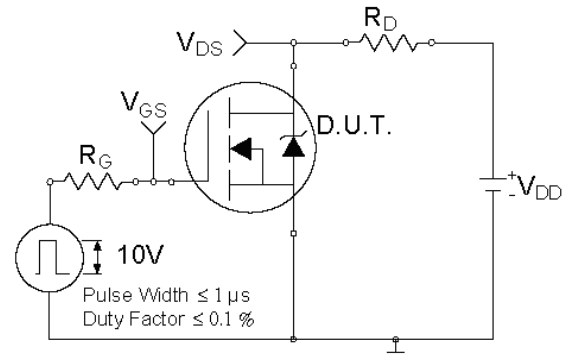
**Fig. 7** Typical Source-to-Drain Diode Forward Voltage



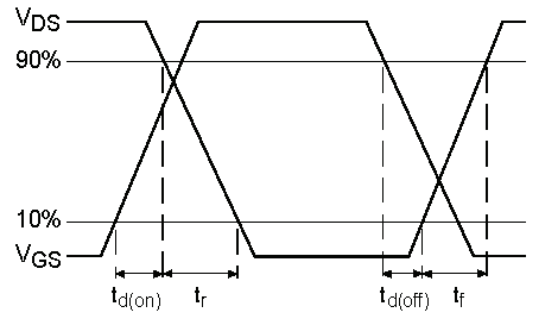
**Fig 8.** Maximum Safe Operating Area



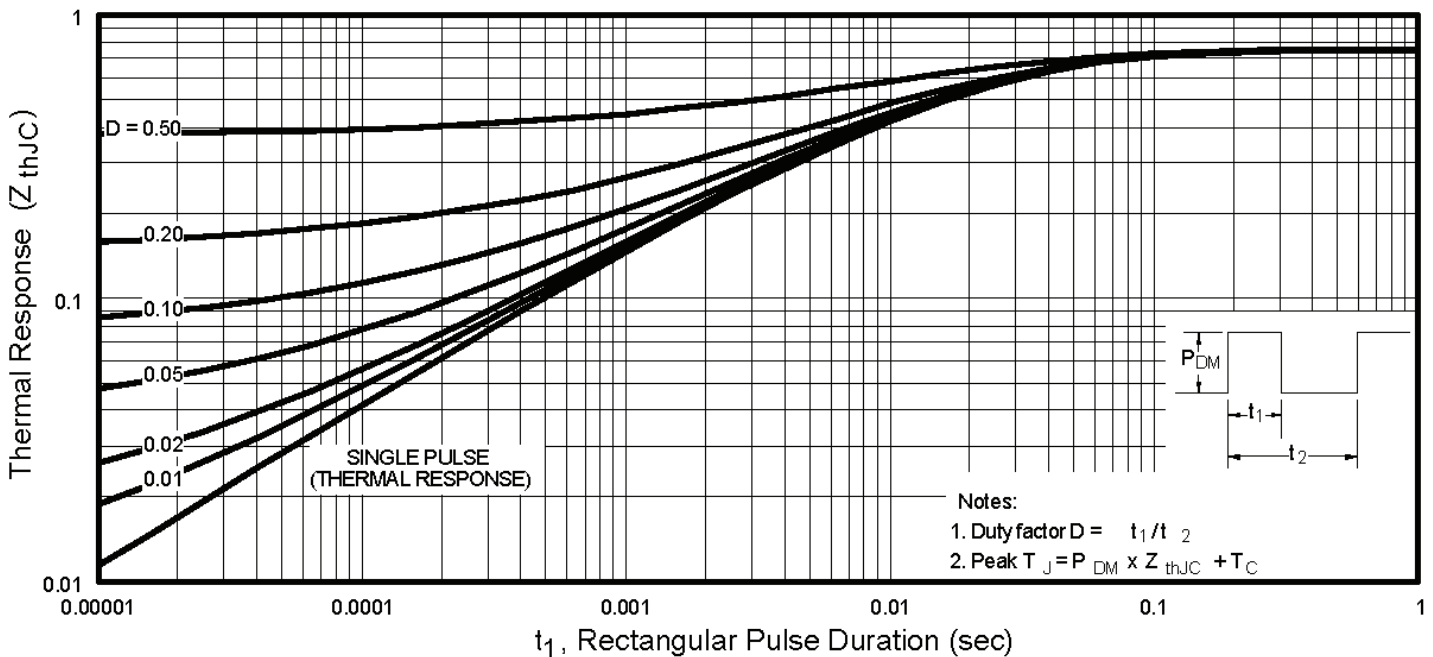
**Fig 9.** Maximum Drain Current vs. Case Temperature



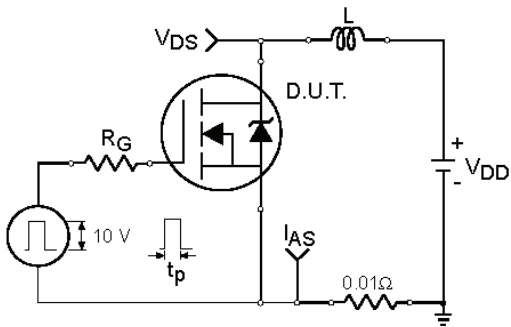
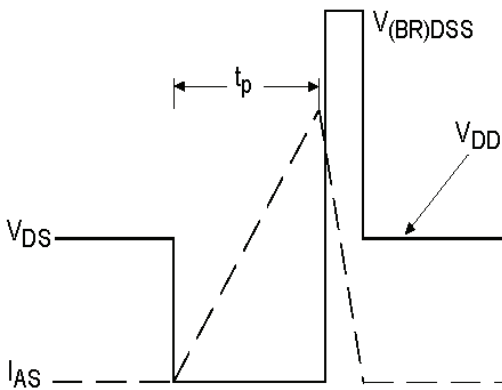
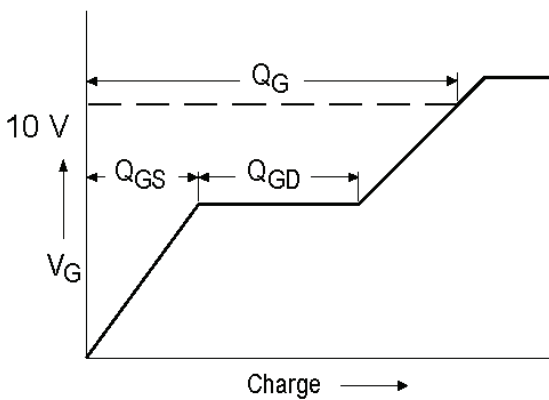
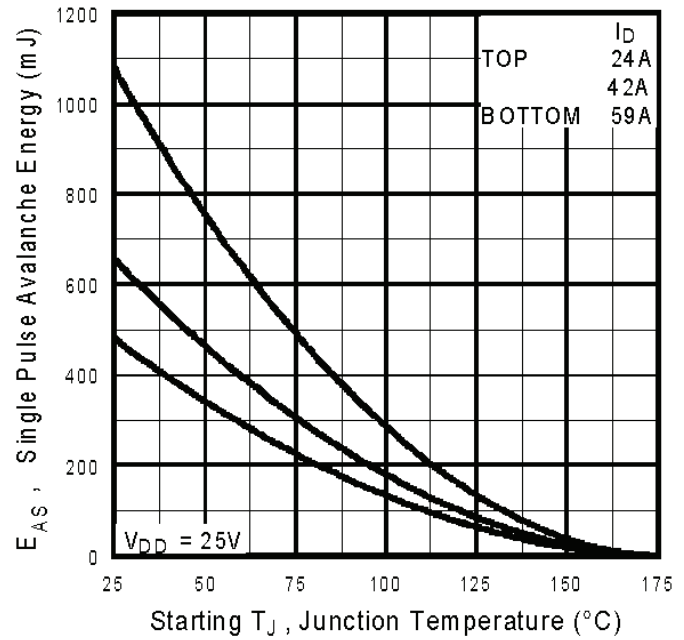
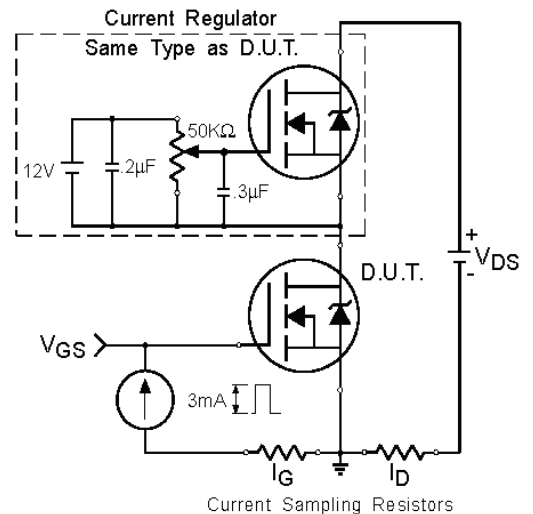
**Fig 10a.** Switching Time Test Circuit

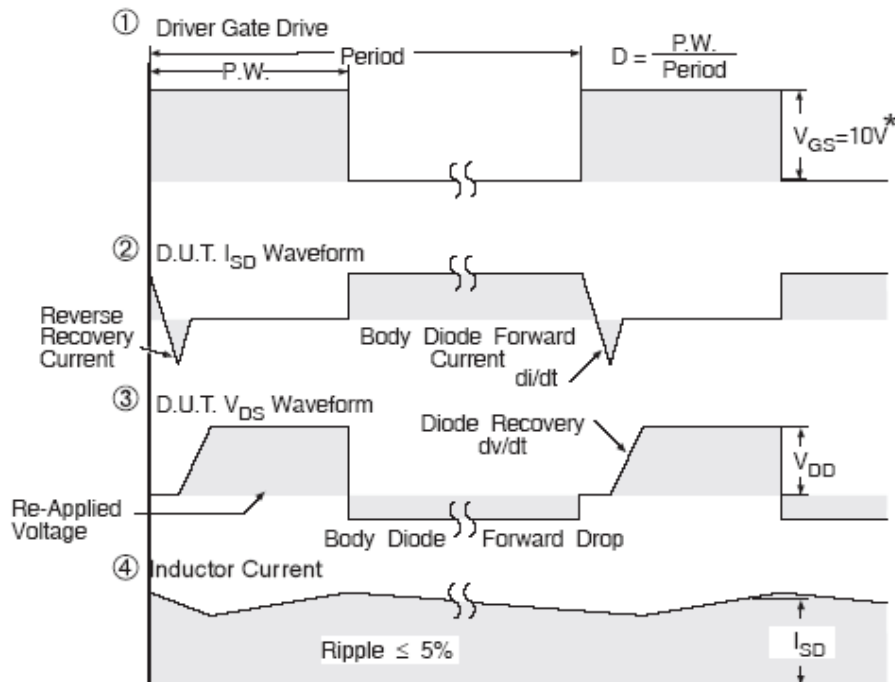
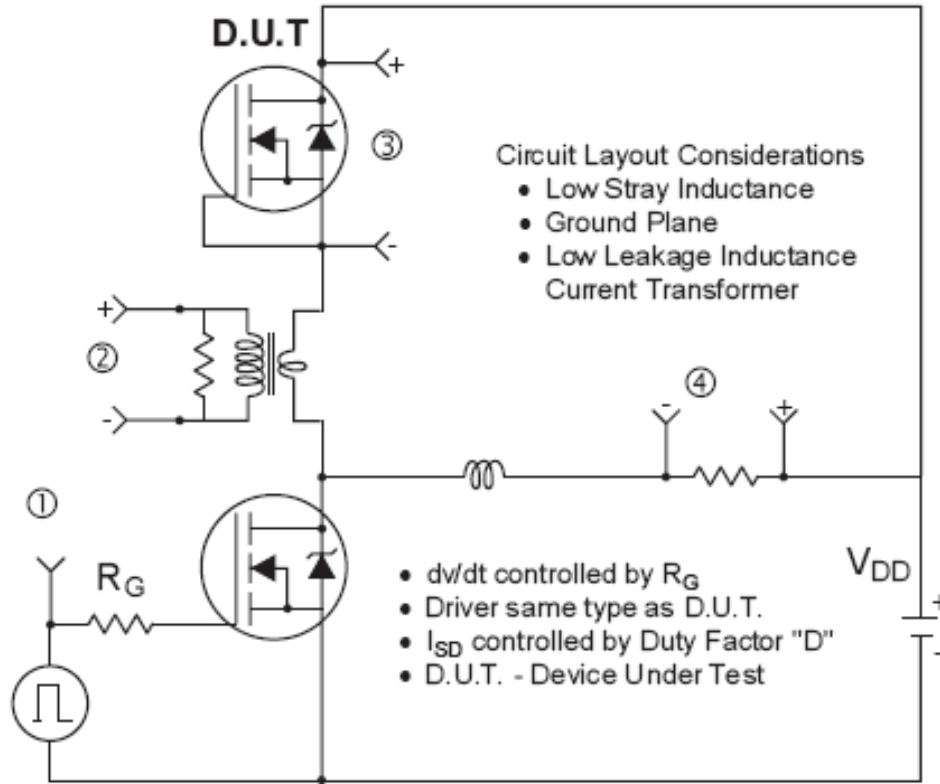


**Fig 10a.** Switching Time Waveforms



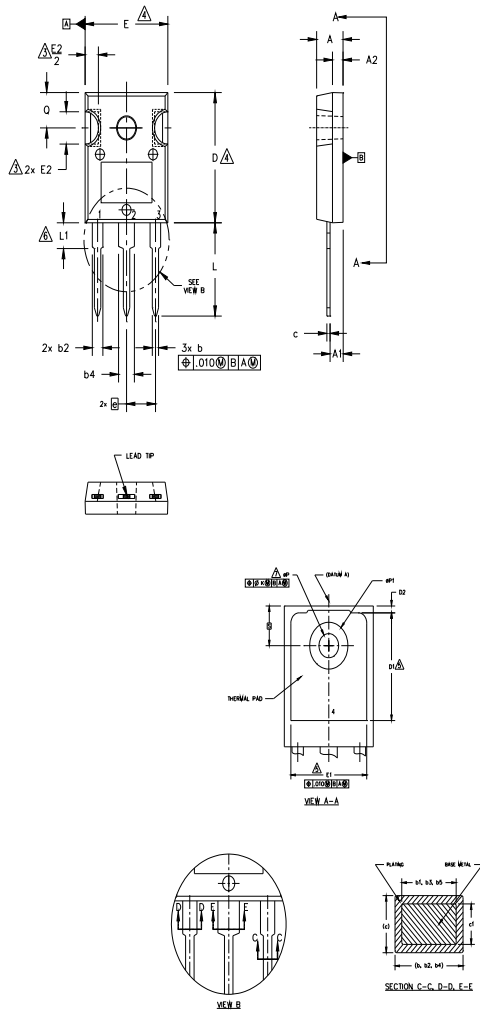
**Fig 11.** Maximum Effective Transient Thermal Impedance, Junction-to-Case


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

**Fig. 12b.** Unclamped Inductive Waveforms

**Fig 13a.** Basic Gate Charge Waveform

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

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



\*  $V_{GS} = 5V$  for Logic Level Devices

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

**TO-247AC Package Outline (Dimensions are**

**NOTES:**

1. DIMENSIONING AND TOLERANCING AS PER ASME Y14.5M 1994.
2. DIMENSIONS ARE SHOWN IN INCHES.
3. CONTOUR OF SLOT OPTIONAL.
4. DIMENSION D & E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED .005" (0.127) PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY.
5. THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSIONS D1 & E1.
6. LEAD FINISH UNCONTROLLED IN L1.
7. ØP TO HAVE A MAXIMUM DRAFT ANGLE OF 1.5 ° TO THE TOP OF THE PART WITH A MAXIMUM HOLE DIAMETER OF .154 INCH.
8. OUTLINE CONFORMS TO JEDEC OUTLINE TO-247AC .

SYMBOL	DIMENSIONS				NOTES
	INCHES		MILLIMETERS		
	MIN.	MAX.	MIN.	MAX.	
A	.183	.209	4.65	5.31	
A1	.087	.102	2.21	2.59	
A2	.059	.098	1.50	2.49	
b	.039	.055	0.99	1.40	
b1	.039	.053	0.99	1.35	
b2	.065	.094	1.65	2.39	
b3	.065	.092	1.65	2.34	
b4	.102	.135	2.59	3.43	
b5	.102	.133	2.59	3.38	
c	.015	.035	0.38	0.89	
c1	.015	.033	0.38	0.84	
D	.776	.815	19.71	20.70	4
D1	.515	-	13.08	-	5
D2	.020	.053	0.51	1.35	
E	.602	.625	15.29	15.87	4
E1	.530	-	13.46	-	
E2	.178	.216	4.52	5.49	
e	.215 BSC		5.46 BSC		
Øk	.010		0.25		
L	.559	.634	14.20	16.10	
L1	.146	.169	3.71	4.29	
ØP	.140	.144	3.56	3.66	
ØP1	-	.291	-	7.39	
Q	.209	.224	5.31	5.69	
S	.217 BSC		5.51 BSC		

**LEAD ASSIGNMENTS**
**HEXFET**

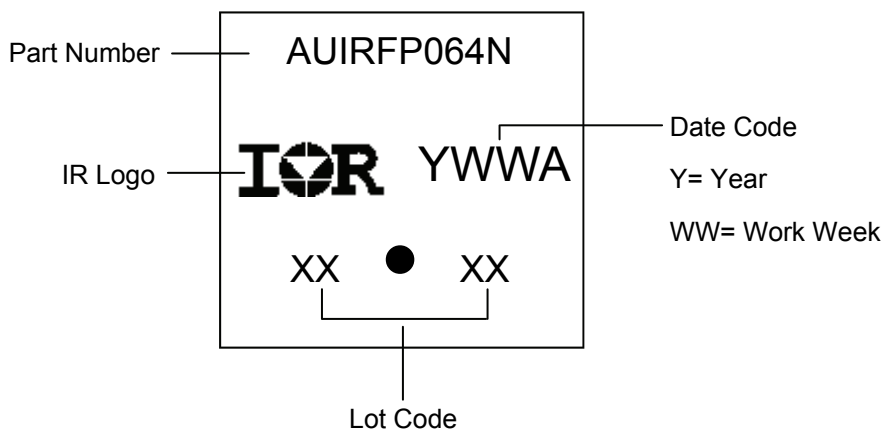
- 1.- GATE
- 2.- DRAIN
- 3.- SOURCE
- 4.- DRAIN

**IGBTs, CoPACK**

- 1.- GATE
- 2.- COLLECTOR
- 3.- EMITTER
- 4.- COLLECTOR

**DIODES**

- 1.- ANODE/OPEN
- 2.- CATHODE
- 3.- ANODE

**TO-247AC Part Marking Information**




**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>		3L-TO-247AC	N/A
<b>ESD</b>	Machine Model	Class M4 (+/- 800V) <sup>†</sup> AEC-Q101-002	
	Human Body Model	Class H1B (+/- 4000V) <sup>†</sup> AEC-Q101-001	
	Charged Device Model	Class C5 (+/- 2000V) <sup>†</sup> AEC-Q101-005	
<b>RoHS Compliant</b>		Yes	

† Highest passing voltage.

**Revision History**

Date	Comments
09/15/2017	<ul style="list-style-type: none"> <li>Updated datasheet with corporate template</li> <li>Corrected typo error on part marking on page 8.</li> </ul>

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