

1. Description

The AO4616 uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. This complementary N and P channel MOSFET configuration is ideal for low Input Voltage inverter applications

2.2 Features

- $V_{DS(V)} = -30V$
- $I_D = -7A$

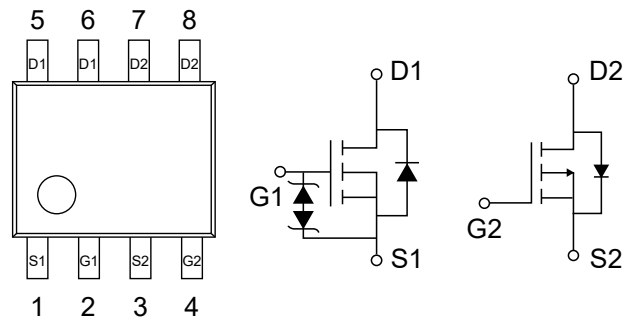
2.1 Features

- $V_{DS(V)} = 30V$
- $I_D = 8A$
- $R_{DS(ON)} < 20m\Omega (V_{GS} = 10V)$
- $R_{DS(ON)} < 28m\Omega (V_{GS} = 4.5V)$

3. Pinning information

Pin	Symbol	Description
2,4	G1, G2	GATE
1,3	S1, S2	SOURCE
5,6,7,8	D1, D2	DRAIN

SOP-8



4. Absolute Maximum Ratings $T_A = 25^\circ C$

Parameter	Symbol	Max n-channel	Max p-channel	Units
Drain-Source Voltage	V_{DS}	30	-30	V
Gate-Source Voltage	V_{GS}	± 20	± 20	V
Continuous Drain Current	I_D	$T_A = 25^\circ C$	8	-7
		$T_A = 70^\circ C$	6.5	-6
Pulsed Drain Current ^C	I_{DM}	40	-40	A
Avalanche Current ^C	I_{AS}, I_{AR}	19	27	
Repetitive avalanche energy $L = 0.1mH$ ^C	E_{AS}, E_{AR}	18	36	mJ
Power Dissipation ^B	P_D	$T_A = 25^\circ C$	2	W
		$T_A = 70^\circ C$	1.3	W
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150		$^\circ C$



5. Thermal Characteristics

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^A	$t \leq 10s$	$R_{\theta JA}$	48	62.5	°C/W
Maximum Junction-to-Ambient ^{AD}	Steady-State		74	90	°C/W
Maximum Junction-to-Lead	Steady-State	$R_{\theta JL}$	32	40	°C/W



6.1 Electrical Characteristic (T_J=25°C unless otherwise noted)

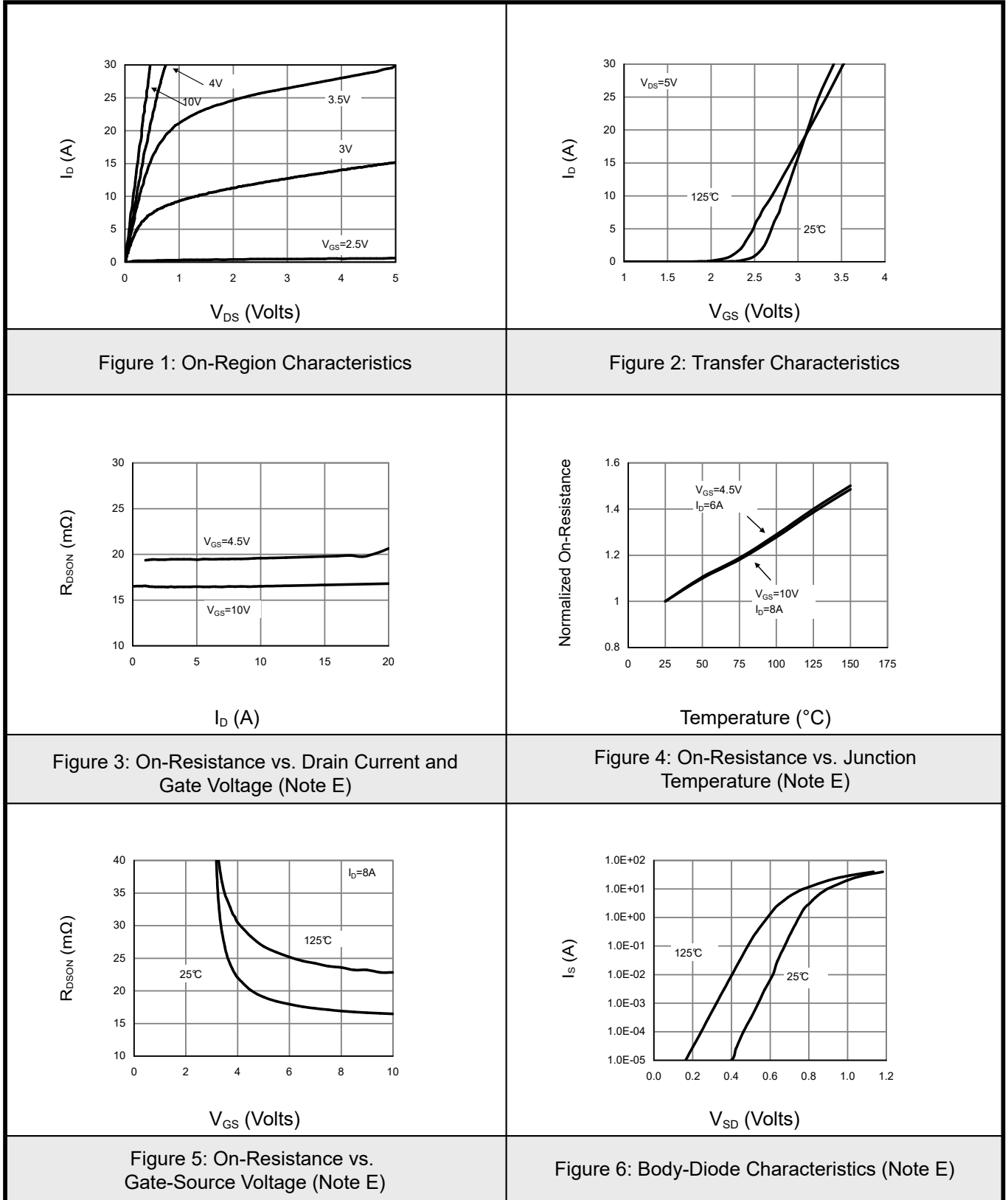
Parameter	Symbol	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
Drain-Source Breakdown Voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V	30			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =30V, V _{GS} =0V T _J =55°C			1	μA
					5	
Gate-Body leakage current	I _{GSS}	V _{DS} =0V, V _{GS} =±16V			±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1.2	1.8	2.4	V
On state drain current	I _{D(ON)}	V _{GS} =10V, V _{DS} =5V	40			A
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =8A		14.5	20	mΩ
		V _{GS} =4.5V, I _D =6A		19.5	28	mΩ
Forward Transconductance	g _{FS}	V _{DS} =5V, I _D =8A		30		S
Diode Forward Voltage	V _{SD}	I _S =1A, V _{GS} =0V		0.75	1	V
Maximum Body-Diode Continuous Current	I _S				2.5	A
DYNAMIC PARAMETERS						
Input Capacitance	C _{iss}	V _{GS} =0V, V _{DS} =15V, f=1MHz	600	740	888	pF
Output Capacitance	C _{oss}		77	110	145	pF
Reverse Transfer Capacitance	C _{rss}		50	82	115	pF
Gate resistance	R _g	V _{GS} =0V, V _{DS} =0V, f=1MHz	0.5	1.1	1.7	Ω
SWITCHING PARAMETERS						
Total Gate Charge	Q _g (10V)	V _{GS} =10V, V _{DS} =15V I _D =8A	12	15	18	nC
Total Gate Charge	Q _g (4.5V)		6	7.5	9	nC
Gate Source Charge	Q _{gs}		2.5			nC
Gate Drain Charge	Q _{gd}		3			nC
Turn-On DelayTime	t _{D(on)}	V _{GS} =10V, V _{DS} =15V R _L =1.8Ω, R _{GEN} =3Ω		5		ns
Turn-On Rise Time	t _r			3.5		ns
Turn-Off DelayTime	t _{D(off)}			19		ns
Turn-Off Fall Time	t _f			3.5		ns
Body Diode Reverse Recovery Time	t _{rr}	I _F =8A, dI/dt=500A/μs	6	8	10	ns
Body Diode Reverse Recovery Charge	Q _{rr}	I _F =8A, dI/dt=500A/μs	14	18	22	nC



- A. The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with $T_A = 25^\circ\text{C}$. The value in any given application depends on the user's specific board design.
- B. The power dissipation P_D is based on $T_{J(\text{MAX})} = 150^\circ\text{C}$, using $\leq 10\text{s}$ junction-to-ambient thermal resistance.
- C. Repetitive rating, pulse width limited by junction temperature $T_{J(\text{MAX})} = 150^\circ\text{C}$. Ratings are based on low frequency and duty cycles to keep initial $T_J = 25^\circ\text{C}$.
- D. The $R_{\theta JA}$ is the sum of the thermal impedance from junction to lead $R_{\theta JL}$ and lead to ambient.
- E. The static characteristics in Figures 1 to 6 are obtained using $< 300\mu\text{s}$ pulses, duty cycle 0.5% max.
- F. These curves are based on the junction-to-ambient thermal impedance which is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, assuming a maximum junction temperature of $T_{J(\text{MAX})} = 150^\circ\text{C}$. The SOA curve provides a single pulse rating.

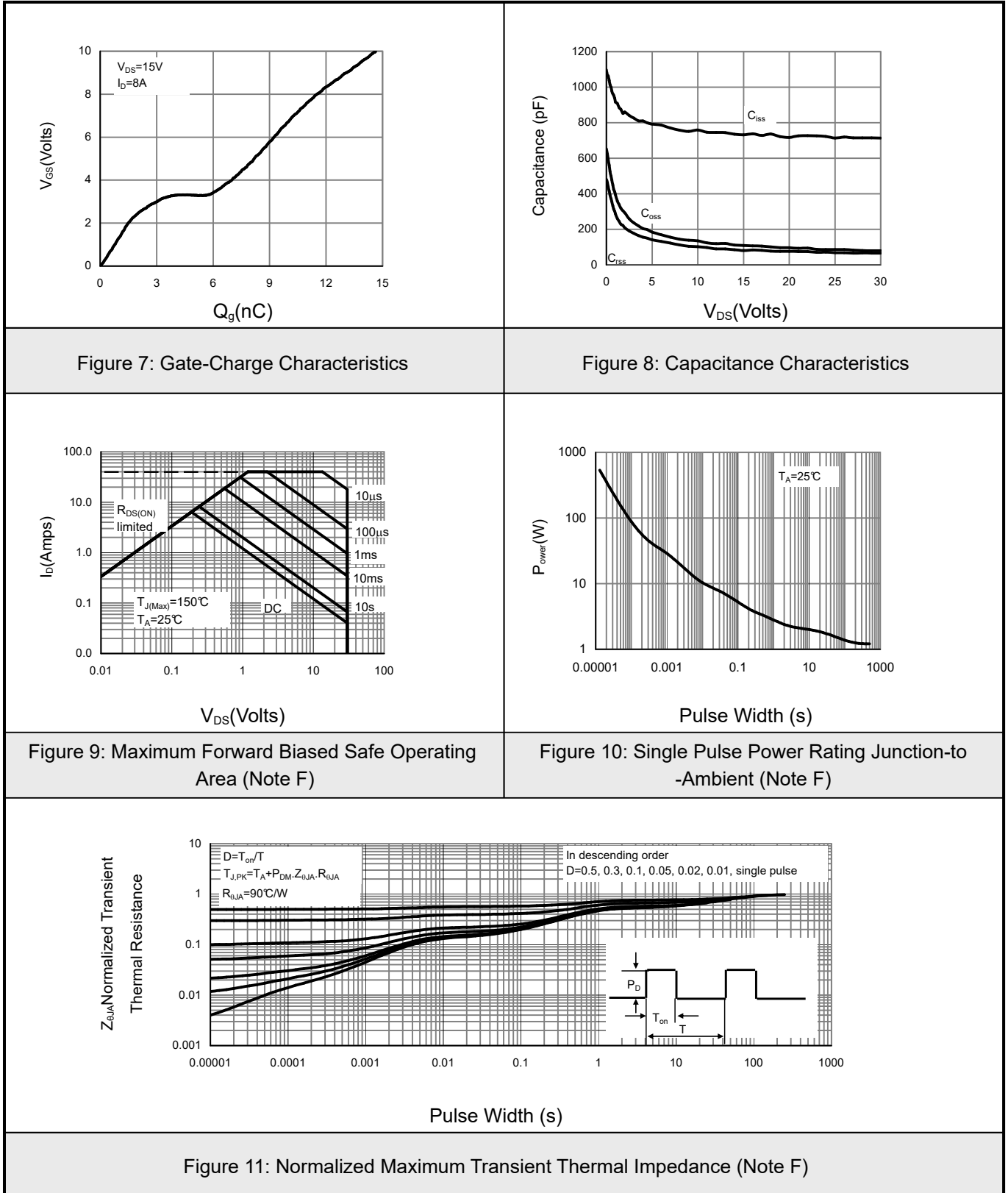


6.2 Typical characteristic



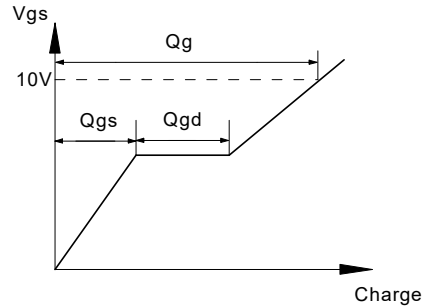
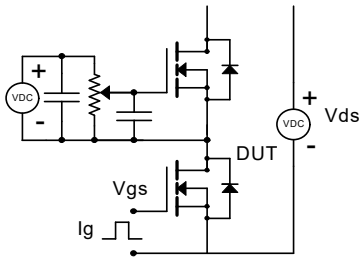


6.3 Typical characteristic

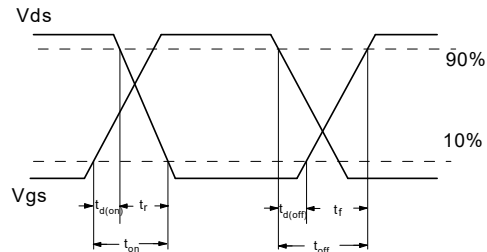
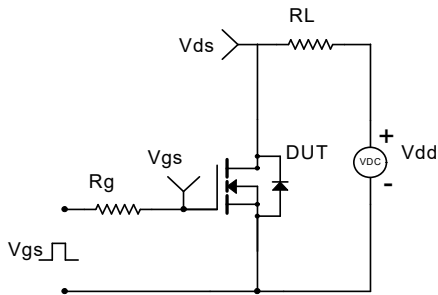




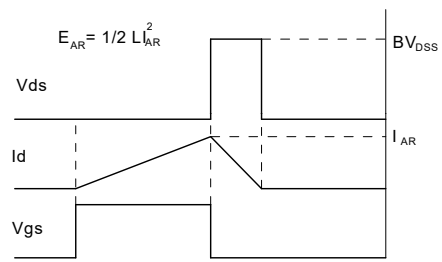
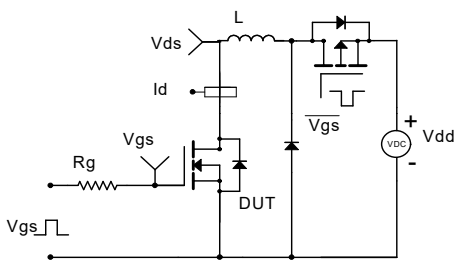
Gate Charge Test Circuit & Waveform



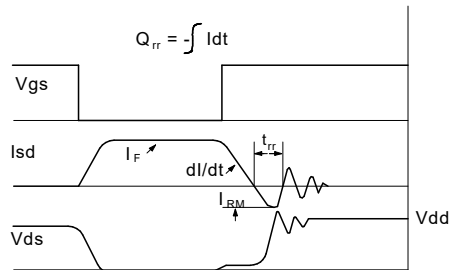
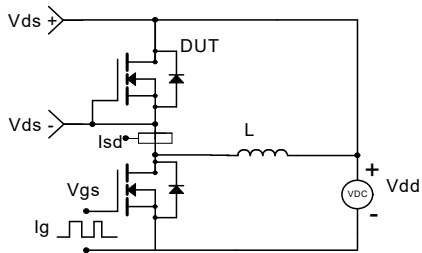
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms





6.4 Electrical Characteristic (T_J=25°C unless otherwise noted)

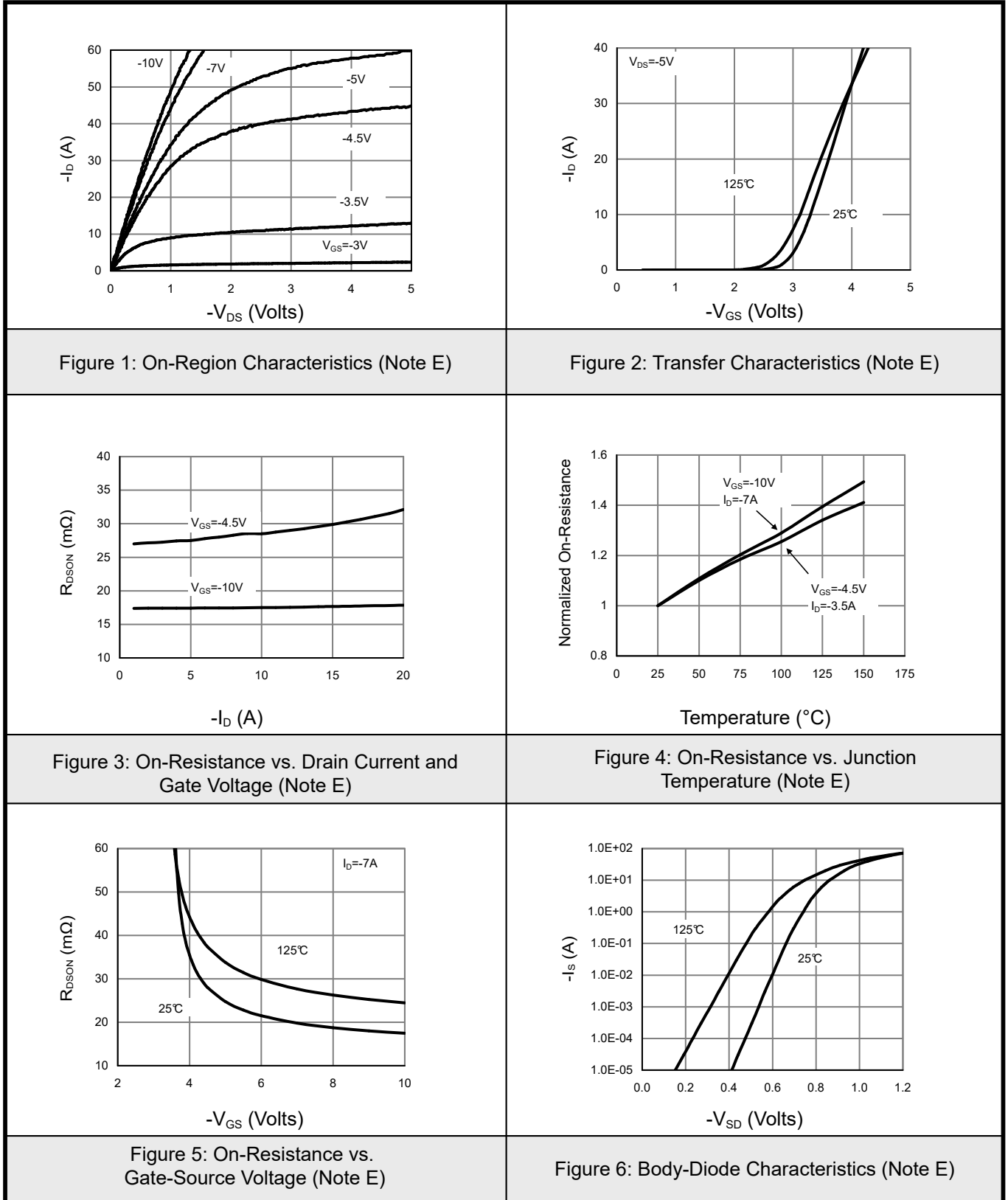
Parameter	Symbol	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
Drain-Source Breakdown Voltage	BV _{DSS}	I _D =-250μA, V _{GS} =0V	-30			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-30V, V _{GS} =0V			-1	μA
		T _J =55°C			-5	
Gate-Body leakage current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =-250μA	-1.4	-2	-2.5	V
On state drain current	I _{D(ON)}	V _{GS} =-10V, V _{DS} =-5V	-40			A
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =-10V, I _D =-7A		17.5	22	mΩ
		V _{GS} =-4.5V, I _D =-3.5A		27.5	40	mΩ
Forward Transconductance	g _{FS}	V _{DS} =-5V, I _D =-7A		24		S
Diode Forward Voltage	V _{SD}	I _S =-1A, V _{GS} =0V		-0.75	-1	V
Maximum Body-Diode Continuous Current	I _S				-2.5	A
DYNAMIC PARAMETERS						
Input Capacitance	C _{iss}	V _{GS} =0V, V _{DS} =-15V, f=1MHz	830	1040	1250	pF
Output Capacitance	C _{oss}		125	180	235	pF
Reverse Transfer Capacitance	C _{rss}		75	125	175	pF
Gate resistance	R _g	V _{GS} =0V, V _{DS} =0V, f=1MHz	2	4	6	Ω
SWITCHING PARAMETERS						
Total Gate Charge	Q _g (-10V)	V _{GS} =-10V, V _{DS} =-15V I _D =-7A	15	19	23	nC
Total Gate Charge	Q _g (-4.5V)		7.5	9.6	12	nC
Gate Source Charge	Q _{gs}		3.6			nC
Gate Drain Charge	Q _{gd}		4.6			nC
Turn-On DelayTime	t _{D(on)}	V _{GS} =-10V, V _{DS} =-15V R _L =2.2Ω, R _{GEN} =3Ω		10		ns
Turn-On Rise Time	t _r		5.5			ns
Turn-Off DelayTime	t _{D(off)}		26			ns
Turn-Off Fall Time	t _f		9			ns
Body Diode Reverse Recovery Time	t _{rr}	I _F =-7A, di/dt=500A/μs		11.5	15	ns
Body Diode Reverse Recovery Charge	Q _{rr}	I _F =-7A, di/dt=500A/μs		25	32.5	nC



- A. The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with $T_A = 25^\circ\text{C}$. The value in any given application depends on the user's specific board design.
- B. The power dissipation P_D is based on $T_{J(\text{MAX})} = 150^\circ\text{C}$, using $\leq 10\text{s}$ junction-to-ambient thermal resistance.
- C. Repetitive rating, pulse width limited by junction temperature $T_{J(\text{MAX})} = 150^\circ\text{C}$. Ratings are based on low frequency and duty cycles to keep initial $T_J = 25^\circ\text{C}$.
- D. The $R_{\theta JA}$ is the sum of the thermal impedance from junction to lead $R_{\theta JL}$ and lead to ambient.
- E. The static characteristics in Figures 1 to 6 are obtained using $< 300\mu\text{s}$ pulses, duty cycle 0.5% max.
- F. These curves are based on the junction-to-ambient thermal impedance which is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, assuming a maximum junction temperature of $T_{J(\text{MAX})} = 150^\circ\text{C}$. The SOA curve provides a single pulse rating.

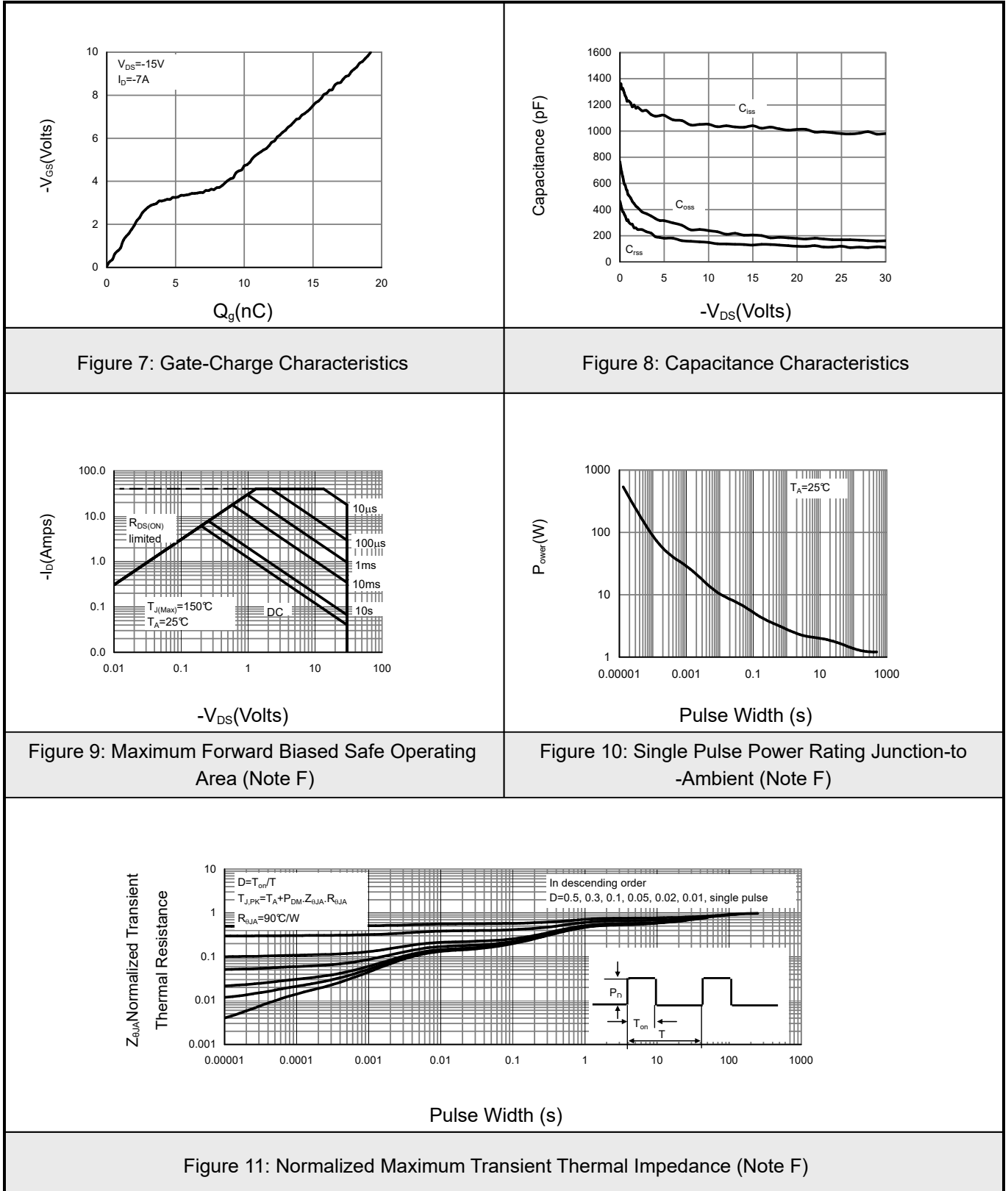


6.5 Typical characteristic



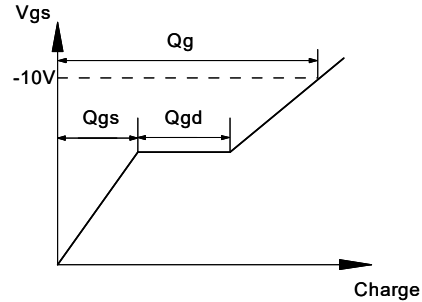
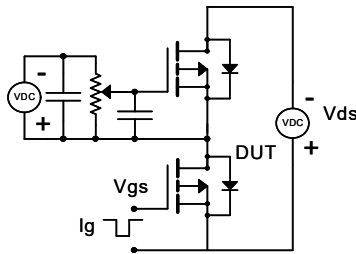


6.6 Typical characteristic

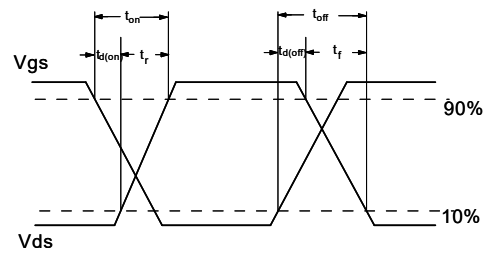
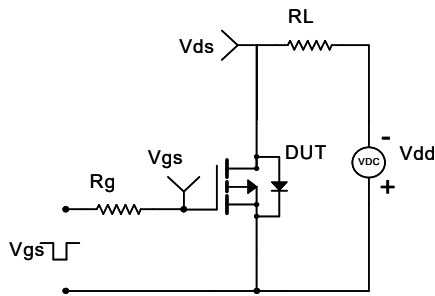




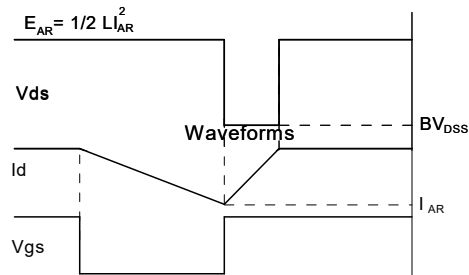
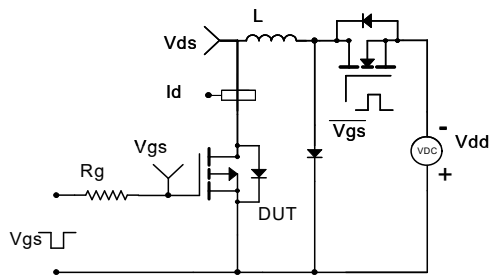
Gate Charge Test Circuit & Waveform



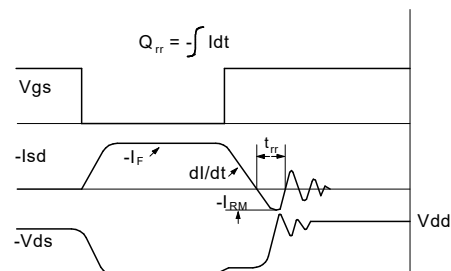
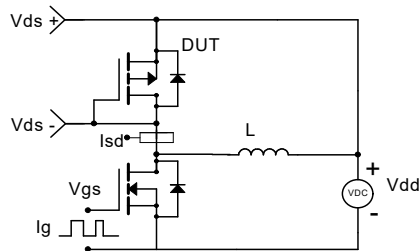
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

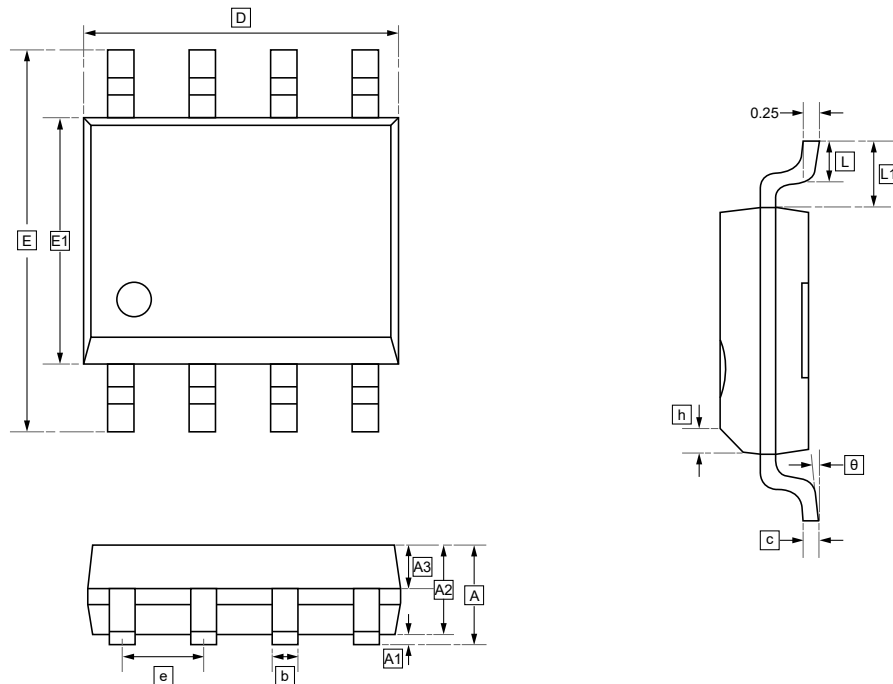


Diode Recovery Test Circuit & Waveforms





7.SOP-8 Package Outline Dimensions



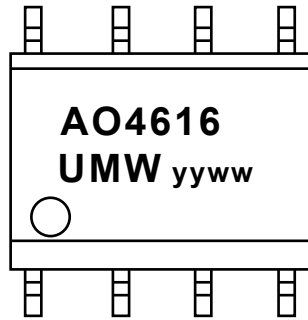
DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	A3	b	c	D	E	E1	e	h	L
Min	-	0.05	1.30	0.60	0.39	0.20	4.80	5.80	3.80	1.24	0.30	0.50
Max	1.75	0.20	1.50	0.70	0.47	0.24	5.00	6.20	4.00	1.30	0.50	0.80

Symbol	L1	θ
Min	1.00	0°
Max	1.10	8°



8. Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW AO4616	SOP-8	3000	Tape and reel



9.Disclaimer

UMW reserves the right to make changes to all products, specifications. Customers should obtain the latest version of product documentation and verify the completeness and currency of the information before placing an order.

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