ACE633

60V Complementary Enhancement Mode Field Effect Transistor

Description

The ACE633 uses advanced trench technology MOSFETs to provide excellent $R_{DS(ON)}$ and low gate charge. The complementary MOSFETs may be used in H-bridge, Inverters and other applications.

Features

- N-Channel
  V_{DS}(V)=60V
  I_D=5A
  $R_{DS(ON)}$
  <35mΩ (V_{GS}=10V)
  <40mΩ (V_{GS}=4.5V)
- P-Channel
  V_{DS}(V)=-60V
  I_D=-3.5A
  $R_{DS(ON)}$
  <75mΩ (V_{GS}=-10V)
  <90mΩ (V_{GS}=-4.5V)

Absolute Maximum Ratings

(T_A=25℃ Unless otherwise noted)

Parameter		Symbol	Typical		Unit
			N-Channel	P-Channel	
Drain-Source Voltage		V_{DSS}	60	-60	V
Gate-Source Voltage		V_{GSS}	±20	±20	V
Continuous Drain Current (T_J=150℃) *AC	T_A=25℃	I_D	5	-3.5	A
	T_A=70℃		4	-2.8	
Drain Current (pulse) * B		I_{DM}	22	-22	A
Power Dissipation	T_A=25℃	P_D	2	2	W
	T_A=70℃		1.3	1.3	
Operating Junction Temperature		T_J	-55 to 150		°C
Storage Temperature Range		T_{STG}	-55 to 150		°C

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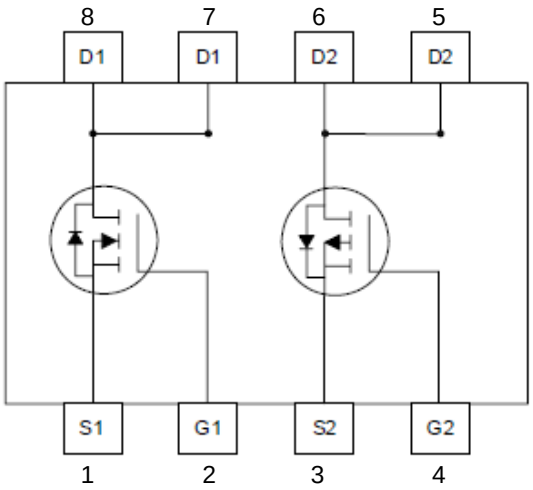
Packaging Type

SOP-8



Ordering information

ACE633 XX + H

- H: Halogen - free
- XX: Pb - free
- FM : SOP-8

Electrical Characteristics (N-Channel)

(T_A=25℃ Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=250uA	60			V
Drain-Source On Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=4.5A		27	35	mΩ
		V_{GS}=4.5V, I_D=3A		32	40	
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250uA	1	1.4	3	V
Gate Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±20V			100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=48V, V_{GS}=0V			1	uA
Forward Transconductance	g_{FS}	V_{DS}=15V, I_D =5.3V		24		S
Diode Forward Voltage	V_{SD}	I_{SD}=1A, V_{GS}=0V		0.73	1.0	V
Maximum Body-Diode Continuous Current	I_s				3.1	A

Switching						
Total Gate Charge	Q_g	V_{DS}=30V, V_{GS}=5V, I_D=5.3A		11.26	14.64	nC
Gate-Source Charge	Q_{gs}			3.77	4.9	
Gate-Drain Charge	Q_{gd}			4.08	5.3	
Turn-On Delay Time	$t_{d(on)}$	V_{GS}=4.5V, V_{DS}=30V, R_L=6.8Ω I_D=-0.5A, R_{GEN}=1Ω		18.12	36.24	ns
Turn-On Rise Time	t_r			17.68	35.36	
Turn-Off Delay Time	$t_{d(off)}$			25	50	
Turn- Off Rise Time	t_f			8.92	17.84	
Dynamic						
Input Capacitance	Ciss	V_{GS}=0V, V_{DS}=30V, f=1MHZ		1062.8		pF
Output Capacitance	Coss			157.26		
Reverse Transfer capacitance	Crss			56.56		

Note:

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°C. The value in any given application depends on the user's specific board design.

B: Repetitive rating, pulse width limited by junction temperature.

C: The current rating is based on the t≤ 10s junction to ambient thermal resistance rating.

Typical Characteristics (N-Channel)

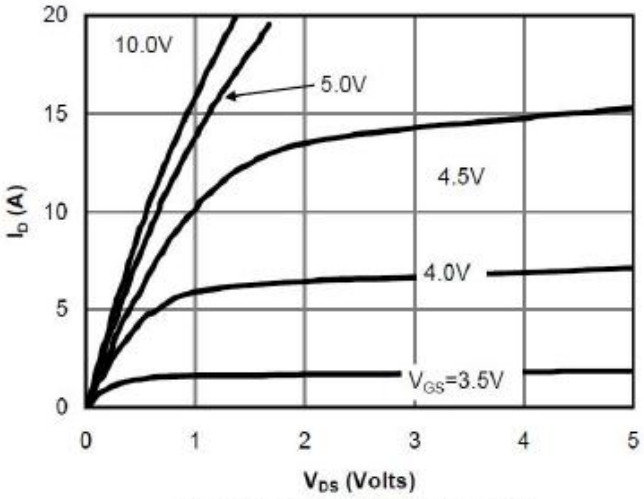


Fig 1: On-Region Characteristics

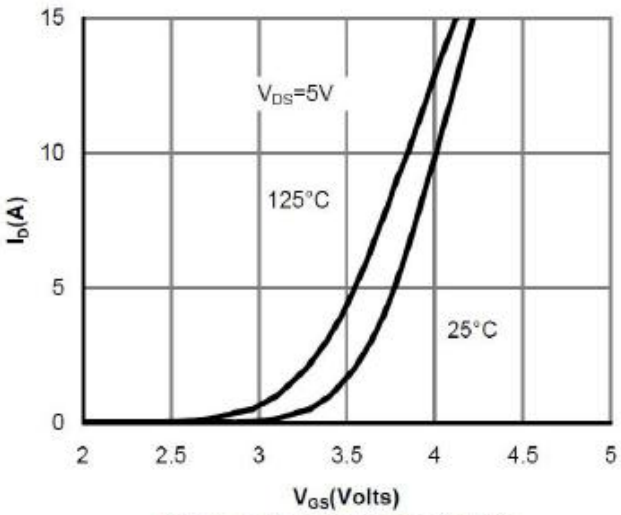


Figure 2: Transfer Characteristics

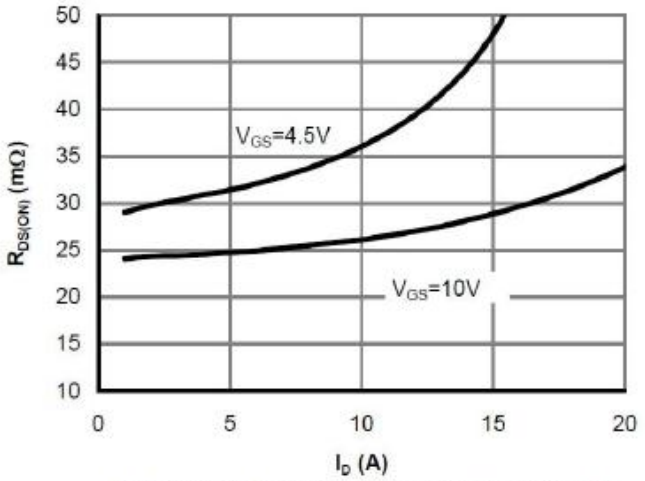


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

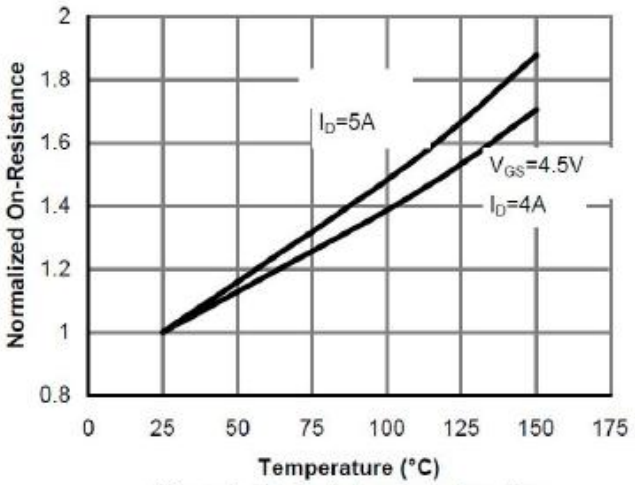


Figure 4: On-Resistance vs. Junction Temperature

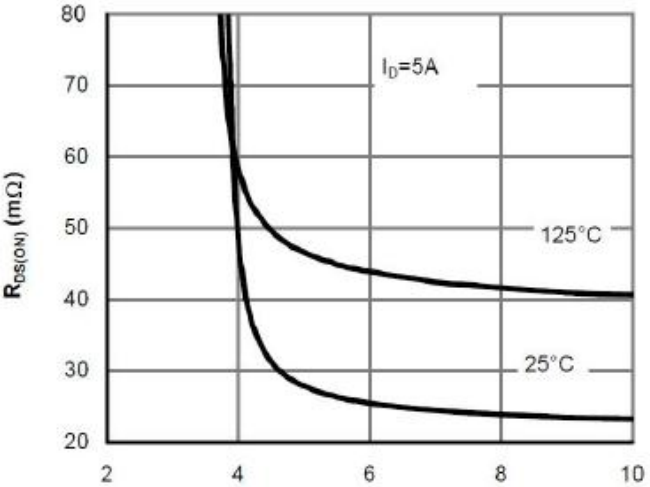


Figure 5: On-Resistance vs. Gate-Source Voltage

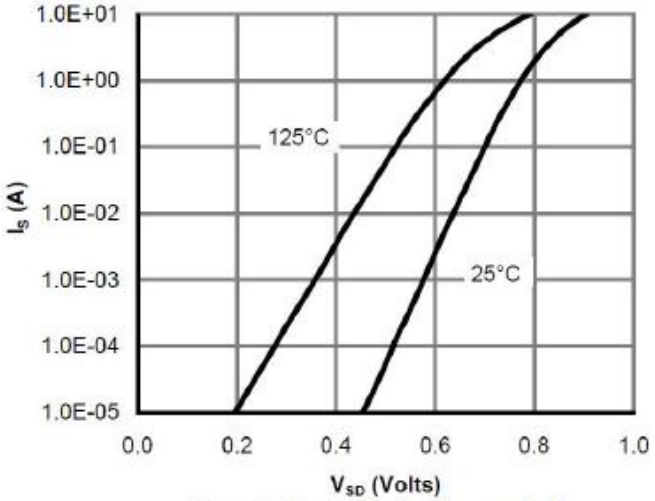


Figure 6: Body-Diode Characteristics

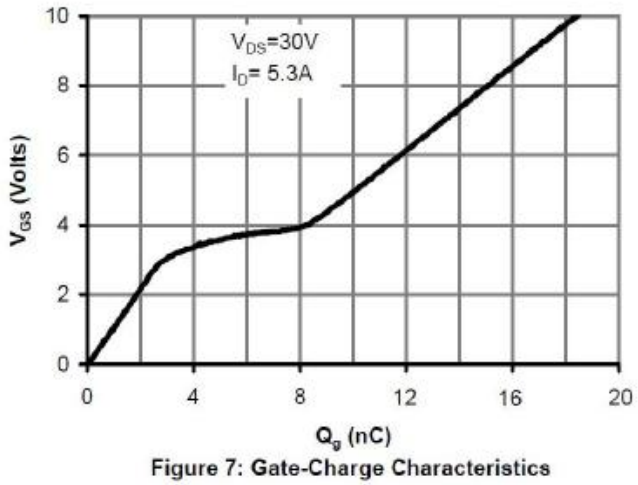


Figure 7: Gate-Charge Characteristics

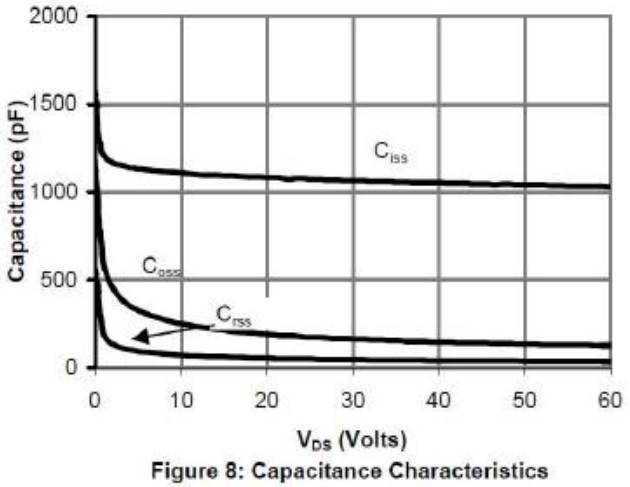


Figure 8: Capacitance Characteristics

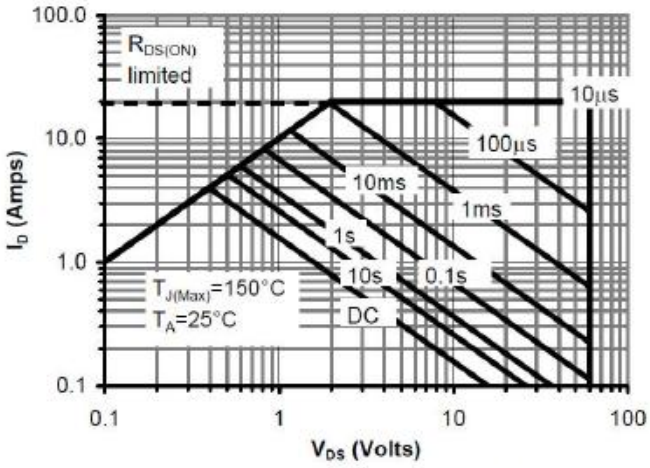


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

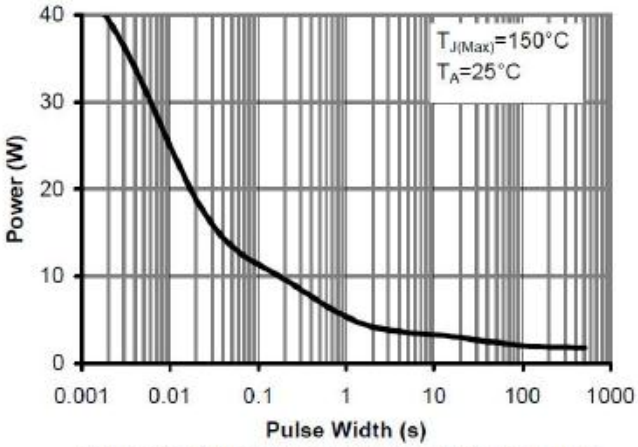


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

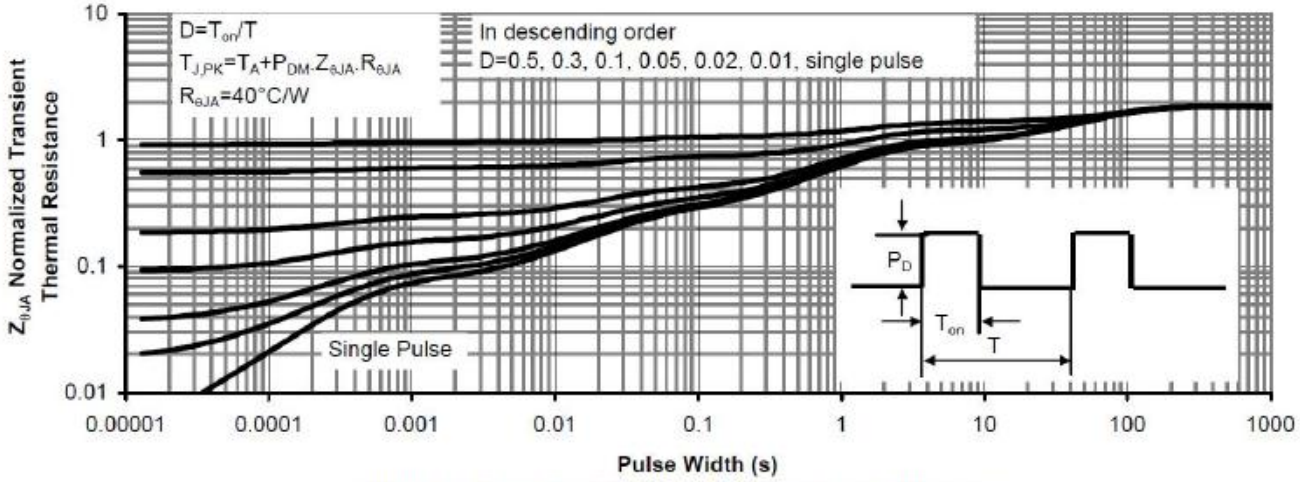


Figure 11: Normalized Maximum Transient Thermal Impedance

Electrical Characteristics (P-Channel)

(T_A=25℃ Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=250uA	-60			V
Drain-Source On Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-4.5A		64	75	mΩ
		V_{GS}=-4.5V, I_D=-3A		79	90	
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250uA	-1	-1.7	-2.5	V
Gate Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±20V			100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-48V, V_{GS}=0V			-1	uA
Forward Transconductance	g_{FS}	V_{DS}=-10V, I_D =-7V		9		S
Diode Forward Voltage	V_{SD}	I_{SD}=-1A, V_{GS}=0V		-0.76	-1.0	V
Maximum Body-Diode Continuous Current	I_s				-3	A
Switching						
Total Gate Charge	Q_g	V_{DS}=-30V, V_{GS}=-10V, I_D=-7A		15	19	nC
Gate-Source Charge	Q_{gs}			2.5		
Gate-Drain Charge	Q_{gd}			3		
Turn-On Delay Time	$t_{d(on)}$	V_{GS}=-10V, V_{DS}=-30V, R_L=10Ω, R_{GEN}=3Ω		8	16	ns
Turn-On Rise Time	t_r			3.8	7.6	
Turn-Off Delay Time	$t_{d(off)}$			31.5	63	
Turn- Off Rise Time	t_f			7.5	15	
Dynamic						
Input Capacitance	Ciss	V_{GS}=0V, V_{DS}=-30V, f=1MHZ		760		pF
Output Capacitance	Coss			90		
Reverse Transfer capacitance	Crss			40		

Note:

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°C. The value in any given application depends on the user's specific board design.

B: Repetitive rating, pulse width limited by junction temperature.

C: The current rating is based on the t≤ 10s junction to ambient thermal resistance rating.

Typical Characteristics (P-Channel)

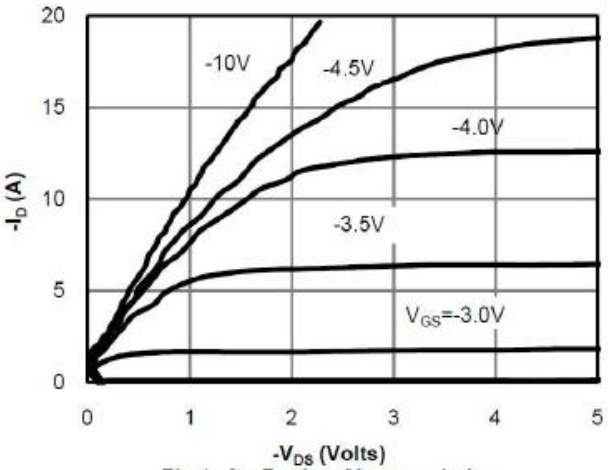


Fig 1: On-Region Characteristics

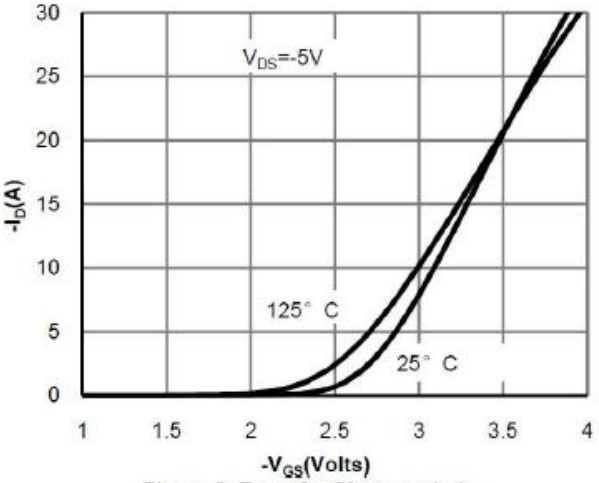


Figure 2: Transfer Characteristics

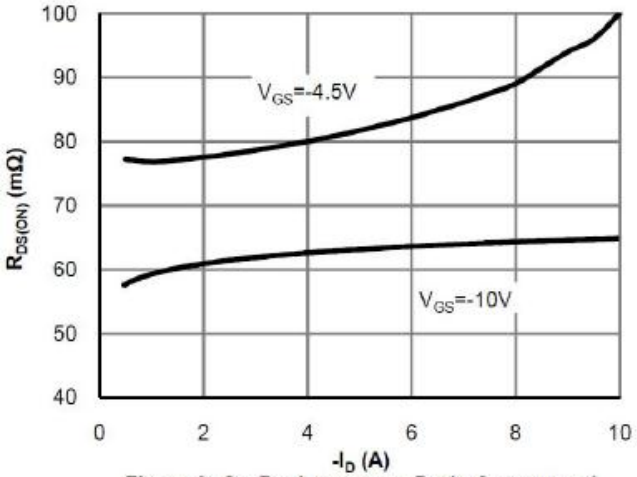


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

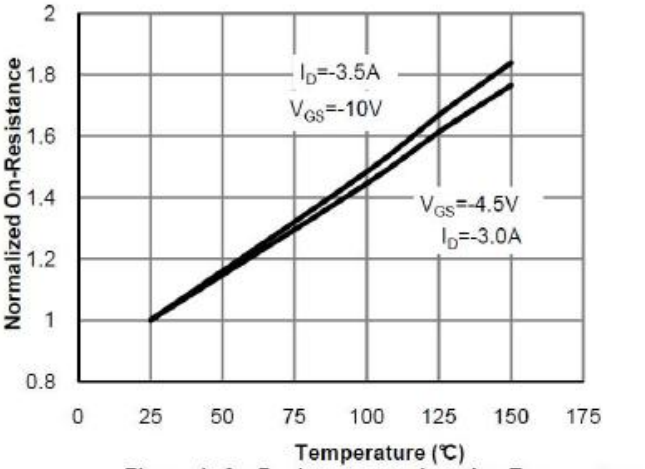


Figure 4: On-Resistance vs. Junction Temperature

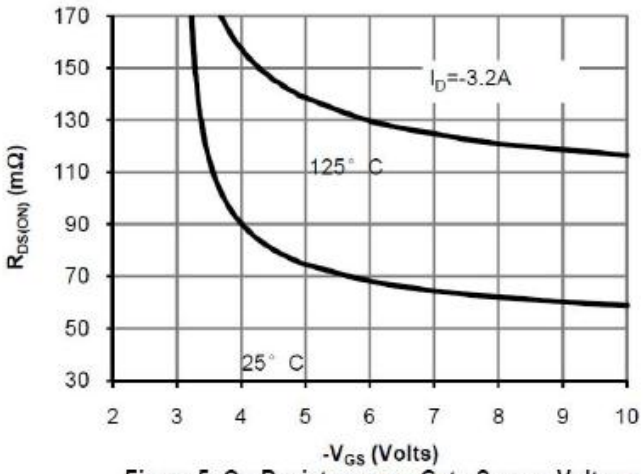


Figure 5: On-Resistance vs. Gate-Source Voltage

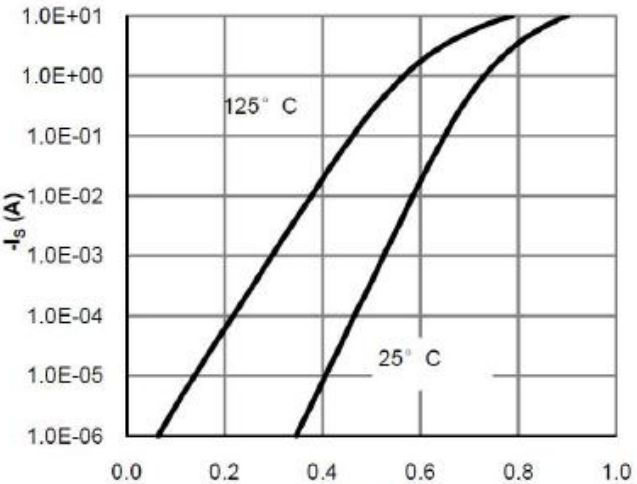


Figure 6: Body-Diode Characteristics

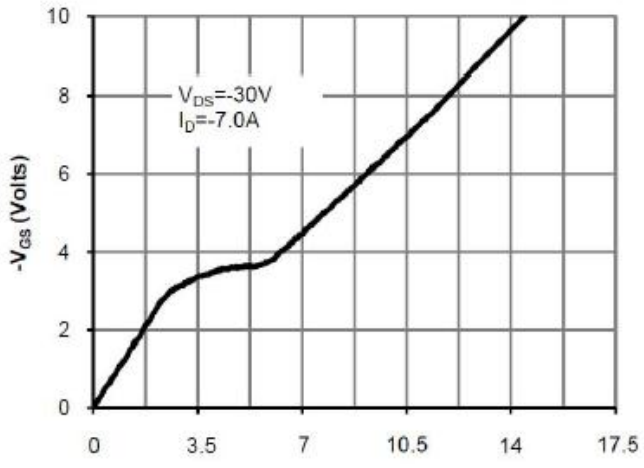


Figure 7: Gate-Charge Characteristics

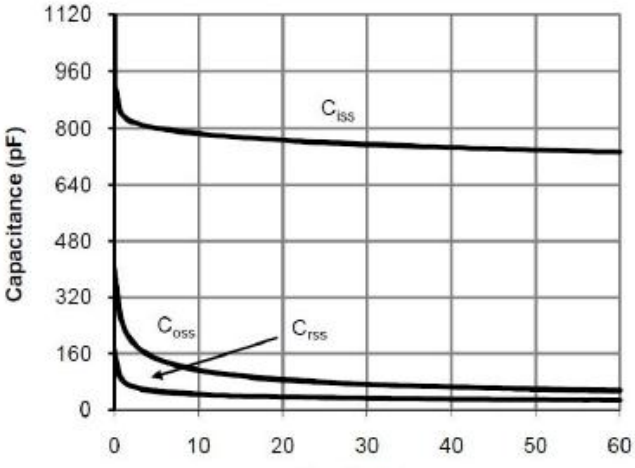


Figure 8: Capacitance Characteristics

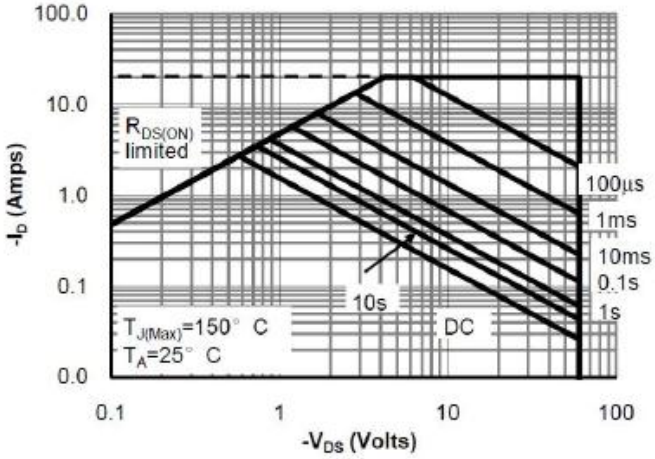


Figure 9: Maximum Forward Biased Safe Operating Area

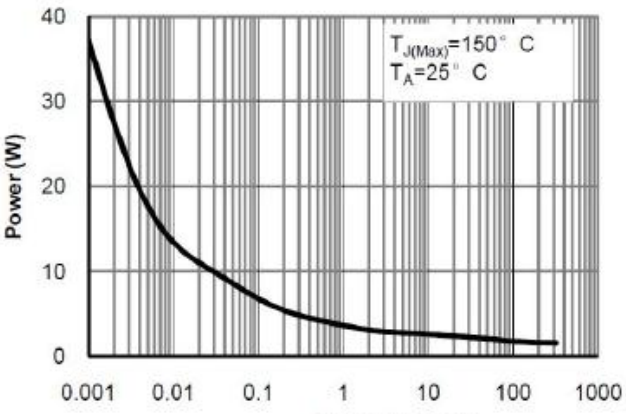


Figure 10: Single Pulse Power Rating Junction-to-Ambient

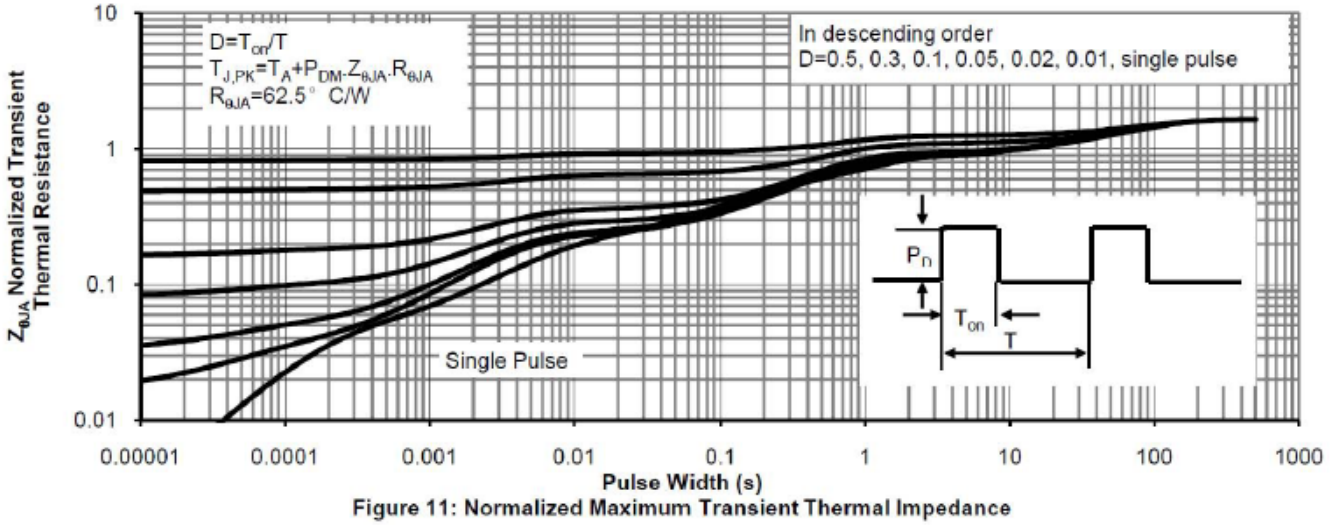
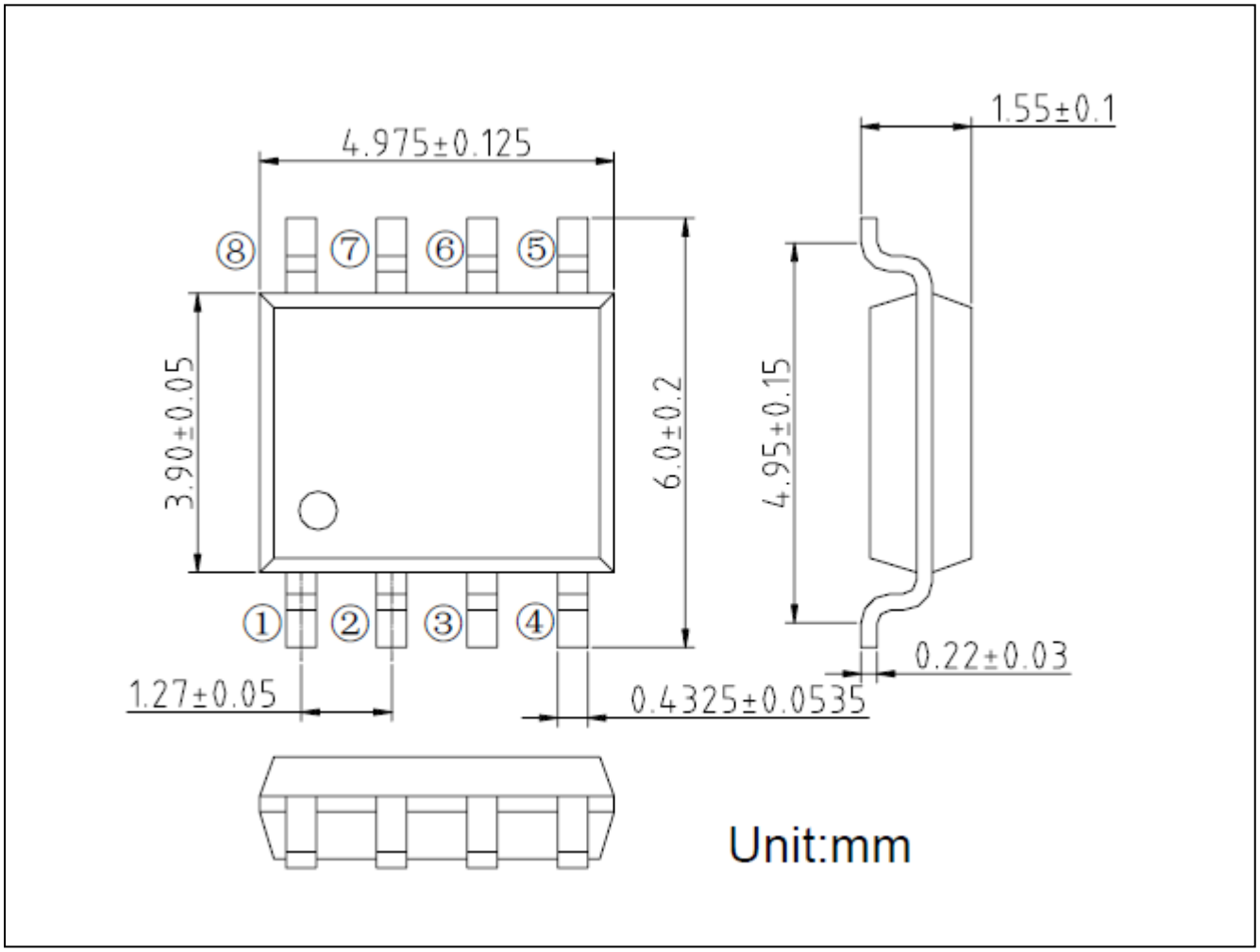


Figure 11: Normalized Maximum Transient Thermal Impedance

Packing Information

SOP-8



Notes

ACE does not assume any responsibility for use as critical components in life support devices or systems without the express written approval of the president and general counsel of ACE Electronics Co., LTD. As sued herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and shoes failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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