ACE8205A

Dual N-Channel Enhancement Mode Field Effect Transistor

Description

The ACE8205A uses advanced trench technology to provide excellent $R_{DS(ON),}$ low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application. It is ESD protected.

ACE8205A is electrically identical.

- RoHS Compliant

Features

- V_{DS} (V) = 20V I_D = 6 A
  $R_{DS(ON)}$< 37mΩ (V_{GS} = 2.5V)
  $R_{DS(ON)}$< 27mΩ (V_{GS} = 4.5V)
- High power and current handing capability
- Lead free product is acquired
- Surface mount package

Applications

- Battery protection
- Load switch
- Power management

Absolute Maximum Ratings (T$_A$=25℃ unless otherwise noted)

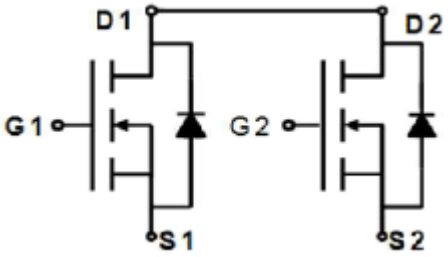
Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	±10	V
Drain Current-Continuous	I_D	6	A
Drain Current-Pulsed (Note 1)	I_{DM}	25	A
Maximum Power Dissipation	P_D	1.5	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃
Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	83	℃/W

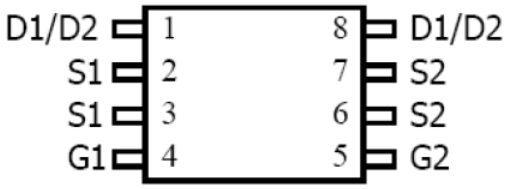
Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.

Packaging Type

TSSOP-8





Ordering information

ACE8205A XX + H

- H: Halogen - free
- XX: Pb - free
- TM:TSSOP-8

Electrical Characteristics (T_A=25 °C unless otherwise specified)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	20	21	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=19.5V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±10V,V_{DS}=0V	-	-	±100	nA
On Characteristics (Note 2)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	0.5	0.7	1.2	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=4.5A	-	21	27	mΩ
		V_{GS}=2.5V, I_D=3.5A	-	27	37	mΩ
Forward Transconductance	g_{FS}	V_{DS}=5V,I_D=4.5A	-	10	-	S
Dynamic Characteristics (Note3)						
Input Capacitance	C_{lss}	V_{DS}=8V,V_{GS}=0V, F=1.0MHz	-	600	-	PF
Output Capacitance	C_{oss}		-	330	-	PF
Reverse Transfer Capacitance	C_{rss}		-	140	-	PF
Switching Characteristics (Note 3)						
Turn-on Delay Time	td(on)	V_{DD}=10V,I_D=1.0A, V_{GS}=4.5V,R_{GEN}=6Ω	-	10	20	nS
Turn-on Rise Time	tr		-	11	25	nS
Turn-Off Delay Time	td(off)		-	35	75	nS
Turn-Off Fall Time	tf		-	30	60	nS
Total Gate Charge	Qg	V_{DS}=10V,I_D=6A, V_{GS}=4.5V	-	10	15	nC
Gate-Source Charge	Qgs		-	2.3	-	nC
Gate-Drain Charge	Qgd		-	1.5	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 2)	V_{SD}	V_{GS}=0V,I_S=1.7A	-	0.75	1.2	V
Diode Forward Current (Note 1)	I_S		-	-	1.7	A

Notes:

1. Surface Mounted on FR4 Board, t ≤ 10 sec.
2. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
3. Guaranteed by design, not subject to production.

Typical Electrical and Thermal Characteristics

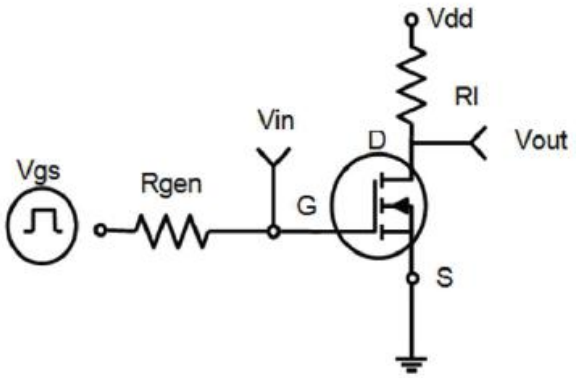


Figure 1:Switching Test Circuit

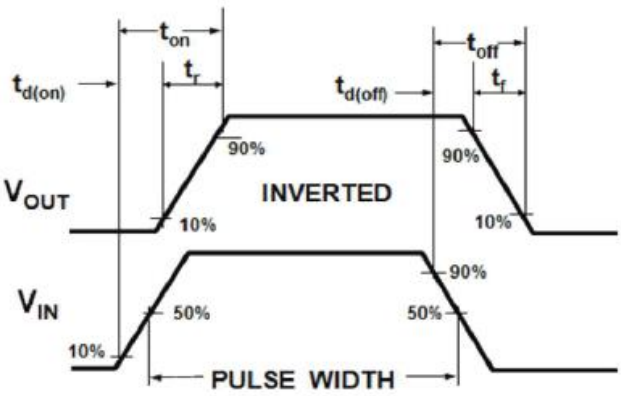


Figure 2:Switching Waveforms

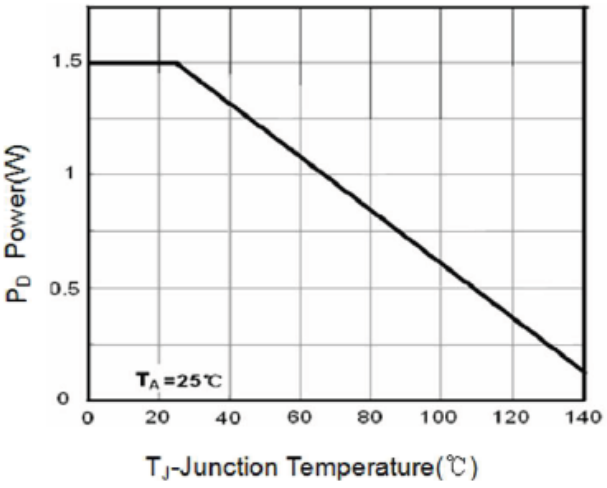


Figure 3 Power Dissipation

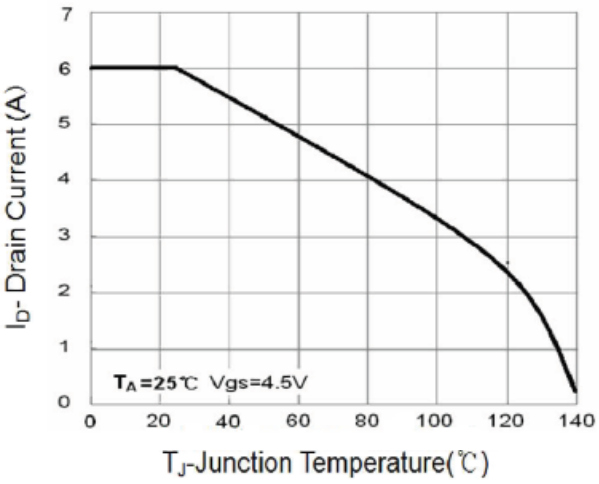


Figure 4 Drain Current

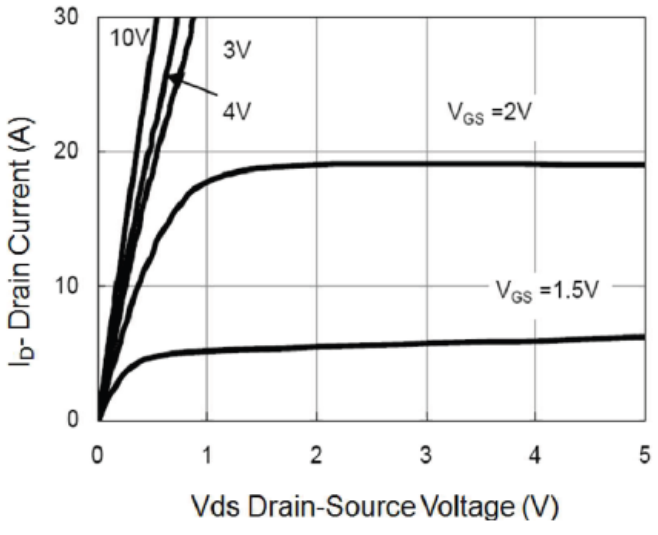


Figure 5 Output Characteristics

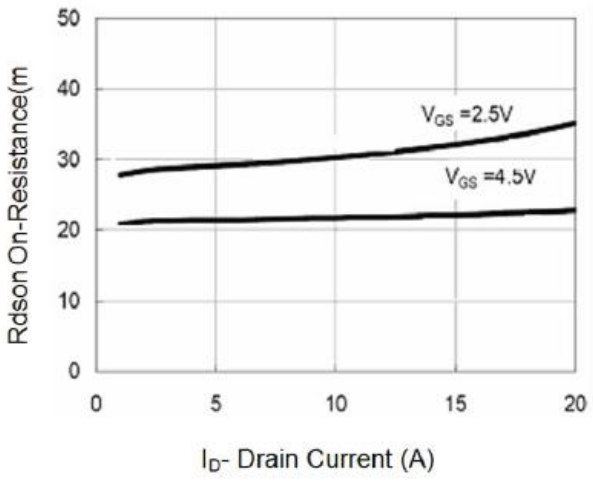


Figure 6 Drain-Source On-Resistance

Typical Electrical and Thermal Characteristics

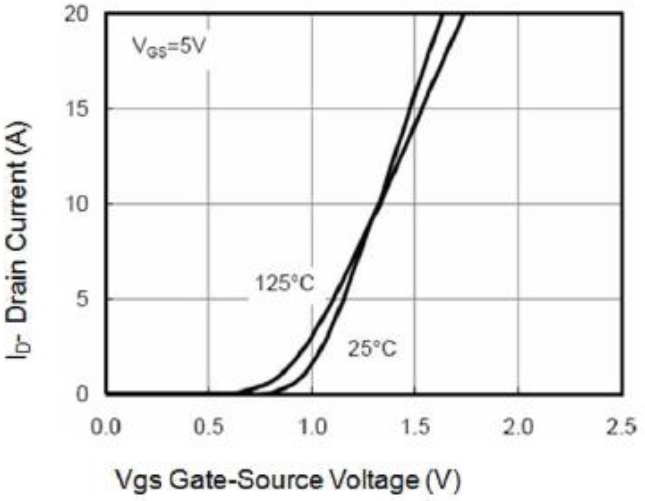


Figure 7 Transfer Characteristics

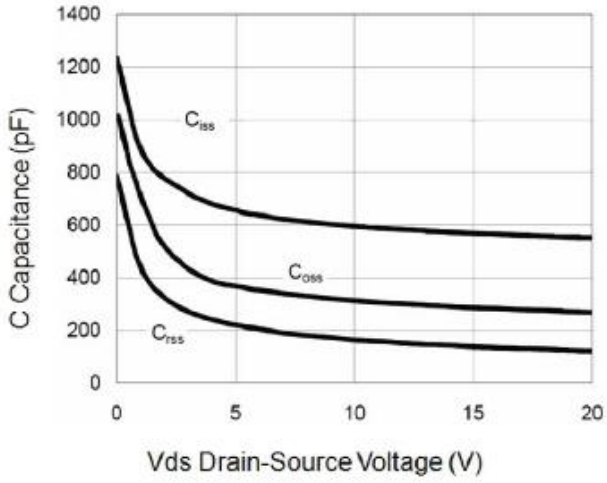


Figure 8 Capacitance vs Vds

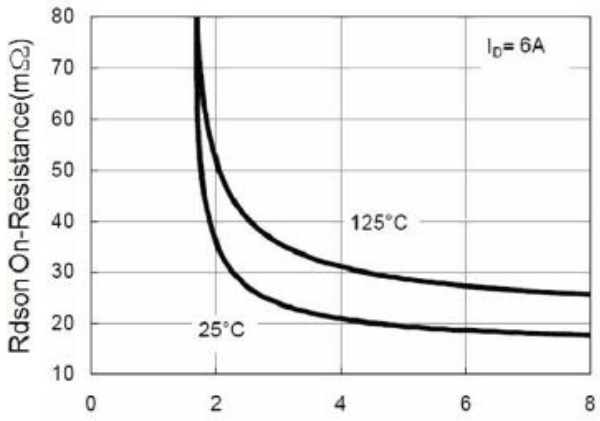


Figure 9 Rdson vs Vgs

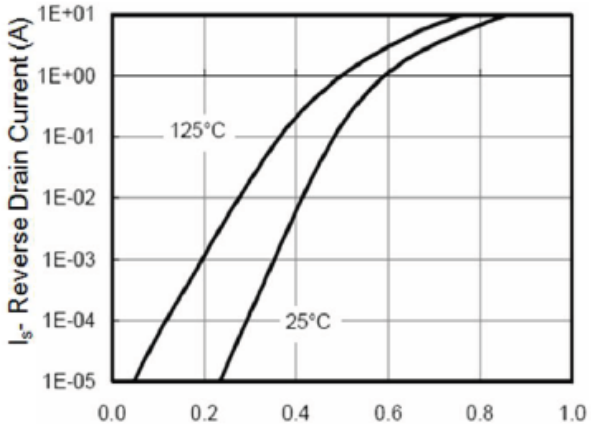


Figure 10 Source- Drain Diode Forward

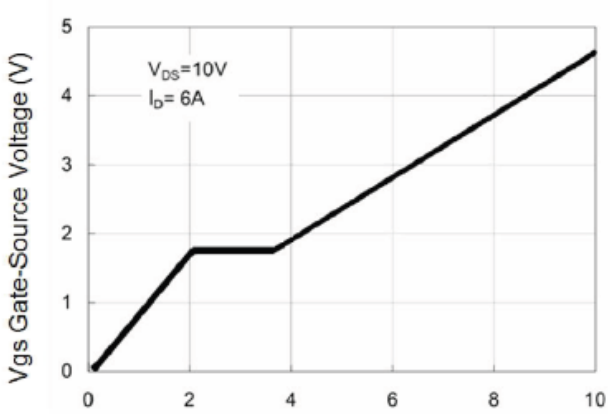


Figure 11 Gate Charge

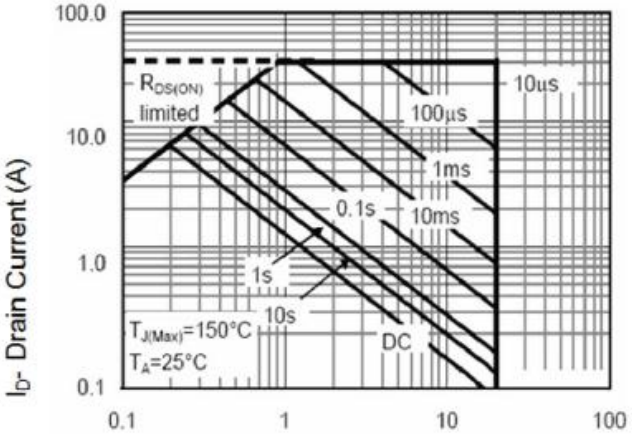


Figure 12 Safe Operation Area

Typical Electrical and Thermal Characteristics

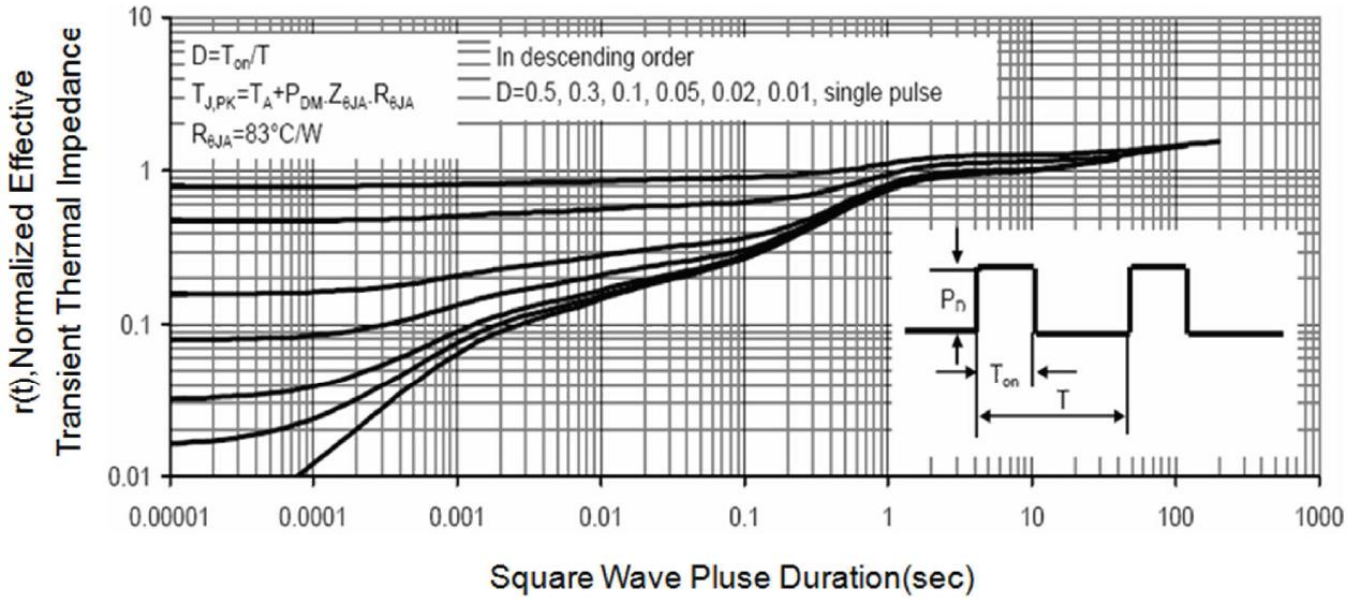
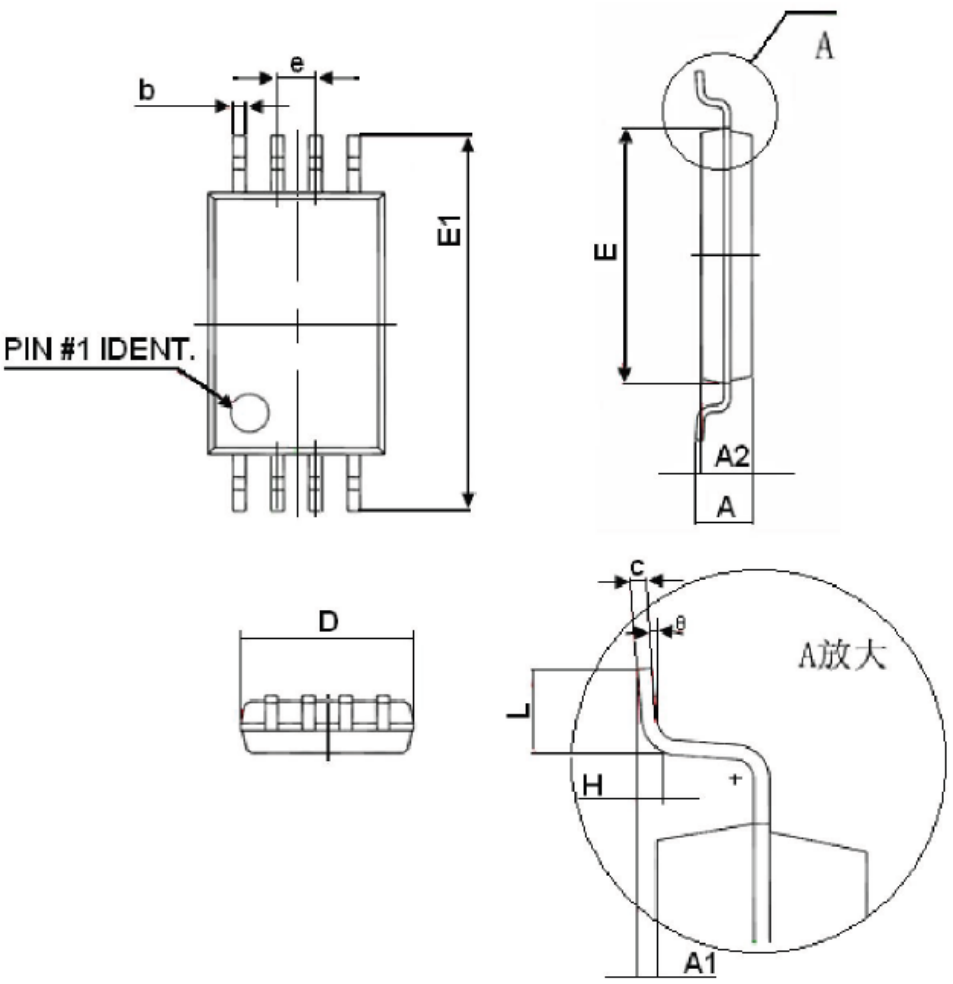


Figure 13 Normalized Maximum Transient Thermal Impedance

TSSOP-8 Package Information



Symbol	Dimensions In Millimeters	
	Mi	Ma
D	2.900	3.100
E	4.300	4.500
b	0.190	0.300
c	0.090	0.200
E1	6.250	6.550
A		1.100
A2	0.800	1.000
A1	0.020	0.150
e	0.65(BSC	
L	0.500	0.700
H	0.25(TYP	
Θ	1°	7°

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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