ACE4606TB

30V Complementary Enhancement Mode Field Effect Transistor

Description

The ACE4606TB uses advanced trench technology MOSFETs to provide excellent $R_{DS(ON)}$ and low gate charge. The complementary MOSFETs may be used in inverter and other applications.

Features

N-channel

- V_{DS}=30V
- I_D=7A
- $R_{DS(ON)}$ < 26mΩ (V_{GS}=10V)
- $R_{DS(ON)}$ < 45mΩ (V_{GS}=4.5V)

P-channel

- V_{DS}=-30V
- I_D=-4A
- $R_{DS(ON)}$ < 58mΩ (V_{GS}=-10V)
- $R_{DS(ON)}$ < 80mΩ (V_{GS}=-4.5V)

Absolute Maximum Ratings

Parameter		Symbol	N-channel	P-channel	Unit
Drain-Source Voltage		V_{DSS}	30	-30	V
Gate-Source Voltage		V_{GSS}	±20	±20	V
Drain Current (Continuous)*AC	T_A=25°C	I_D	7	-4	A
	T_A=70°C		6	-3	
Drain Current (Pulse) *B		I_{DM}	28	-16	
Power Dissipation	T_A=25°C	P_D	2		W
	T_A=70°C		0.8		
Operating Temperature/ Storage Temperature		T_J, T_{STG}	-55 to 150		°C

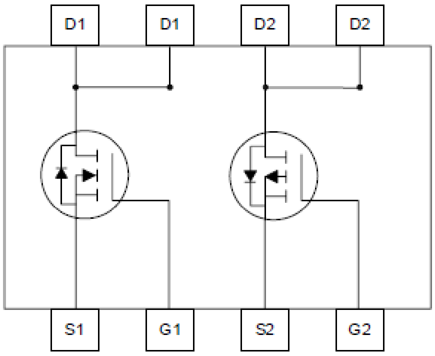
A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The value in any given application depends on the user's specific board design.

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.

Packaging Type

SOP-8



Ordering information

ACE4606TB XX + H

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

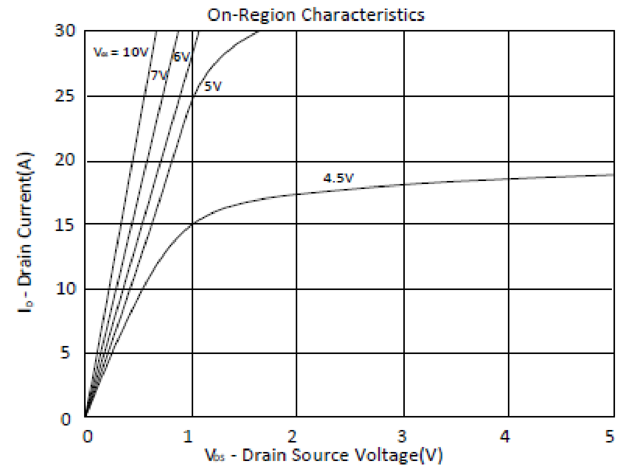
N-channel Electrical Characteristics T_A=25 ^{o}C unless otherwise noted

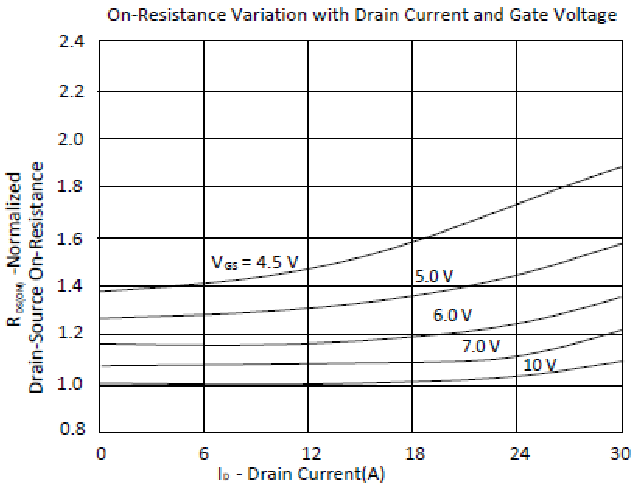
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=250uA	30			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=24V, V_{GS}=0V			1	uA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_{DS}=250uA	1	1.5	3	V
Gate Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V			±100	nA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=5A		23	26	mΩ
		V_{GS}=4.5V, I_D=5A		34	45	
Forward Transconductance	g_{FS}	V_{DS}=5V, I_D=7A		14		S
Diode Forward Voltage	V_{SD}	I_S=1A, V_{GS}=0V			1.2	V
Maximum Body-Diode Continuous Current	I_S				7	A
Switching						
Total Gate Charge	Q_g	V_{GS}=10V, V_{DS}=15V, I_D=7A		11.5		nC
Gate-Source Charge	Q_{gs}			1.6		
Gate-Drain Charge	Q_{gd}			2.8		
Turn-on Delay Time	$t_{d\ (on)}$	V_{GS}=10V , V_{DS}=10V I_D=1A, R_{GS}=6Ω		11		ns
Turn-on Rise Time	t_r			16		
Turn-off Delay Time	$t_{d(off)}$			36		
Turn-off Fall Time	t_f			20		
Dynamic						
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=15V f=1MHz		520		pF
Output Capacitance	C_{oss}			88		
Reverse Transfer Capacitance	C_{rss}			62		

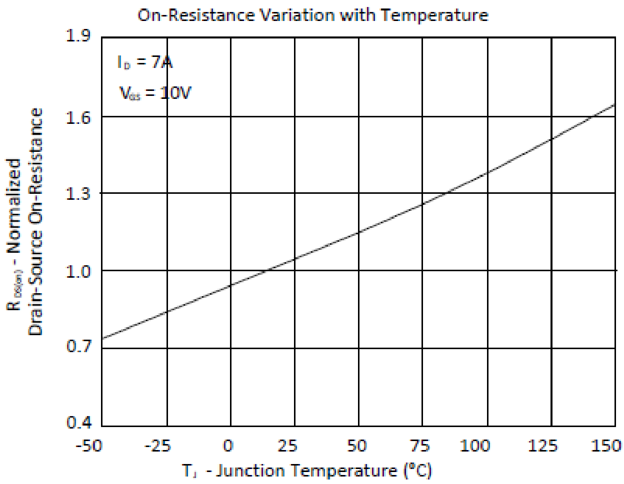
P-channel Electrical Characteristics T_A=25 °C unless otherwise noted

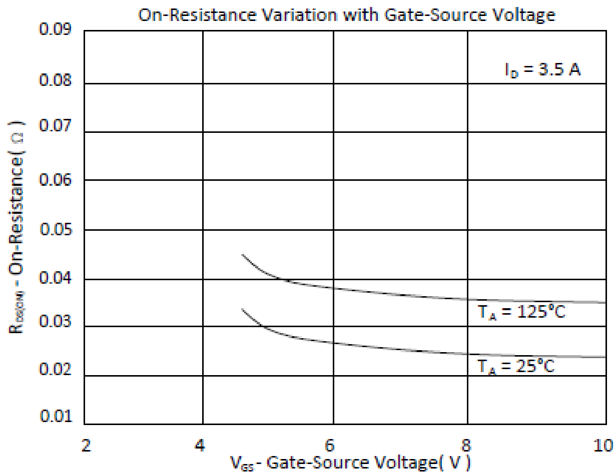
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=-250uA	-30			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-24V, V_{GS}=0V			-1	uA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_{DS}=-250uA	-1	-1.5	-3	V
Gate Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V			±100	nA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-4A		52	58	mΩ
		V_{GS}=-4.5V, I_D=-3A		67	80	
Forward Transconductance	g_{FS}	V_{DS}=-5V, I_D=-4A		10		S
Diode Forward Voltage	V_{SD}	I_S=-1A, V_{GS}=0V			-1.1	V
Maximum Body-Diode Continuous Current	I_S				-4	A
Switching						
Total Gate Charge	Q_g	V_{GS}=-10V, V_{DS}=-15V, I_D=-4A		11.5		nC
Gate-Source Charge	Q_{gs}			2.5		
Gate-Drain Charge	Q_{gd}			2.2		
Turn-on Delay Time	$t_{d\ (on)}$	V_{GS}=-10V , V_{DS}=-15V I_D=1A, R_{GS}=6Ω		10		ns
Turn-on Rise Time	t_r			10		
Turn-off Delay Time	$t_{d(off)}$			18		
Turn-off Fall Time	t_f			15		
Dynamic						
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=-15V f=1MHz		726		pF
Output Capacitance	C_{oss}			90		
Reverse Transfer Capacitance	C_{rss}			76		

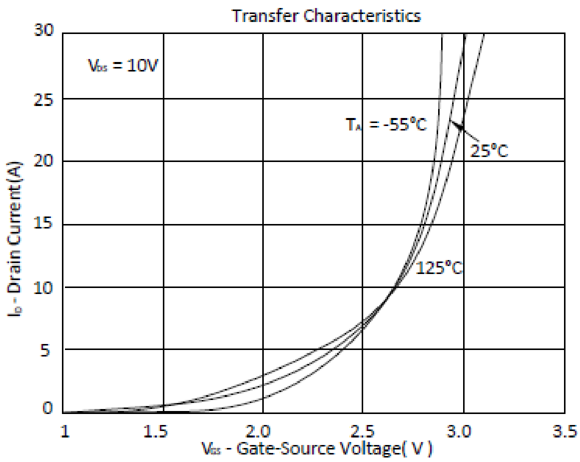
N-channel Typical Performance Characteristics

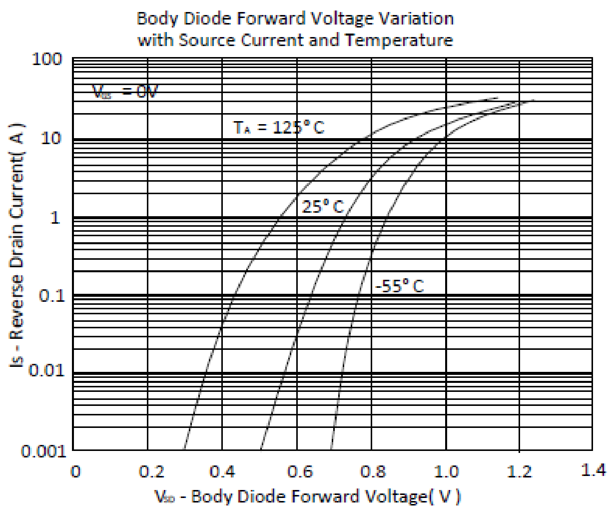


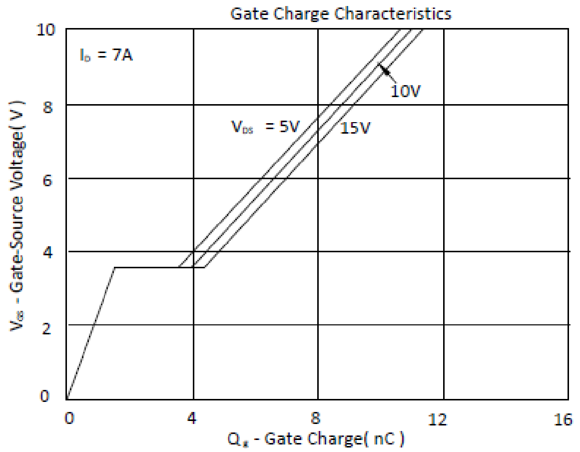




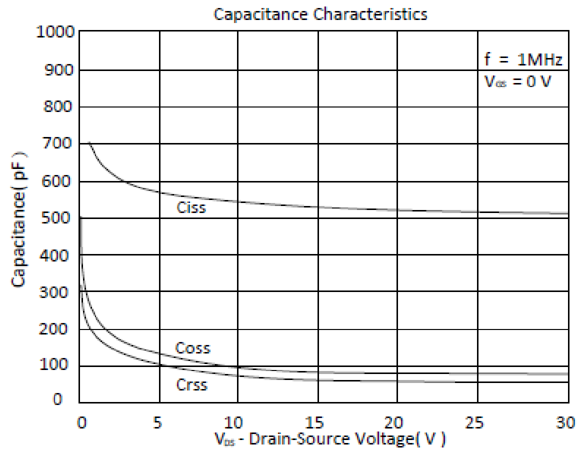




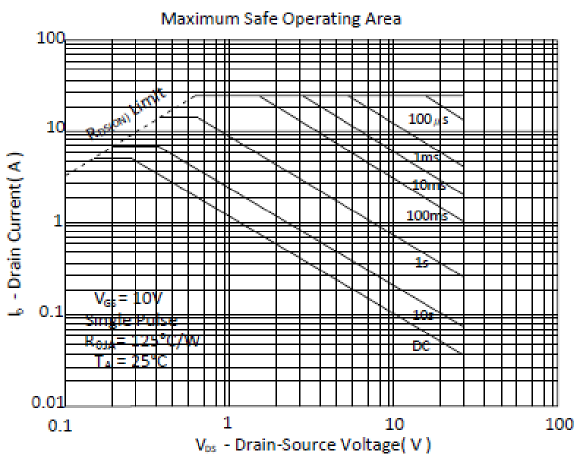




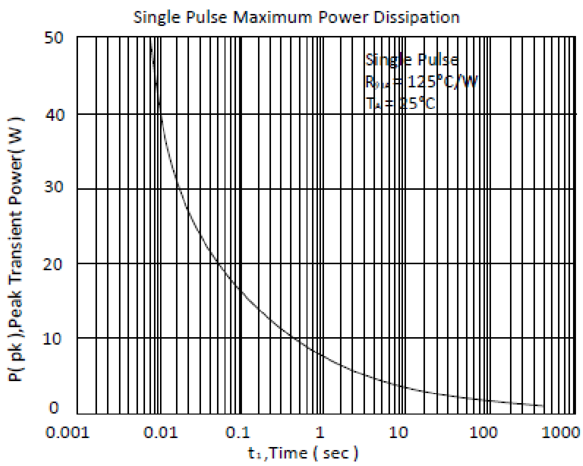
Gate Charge Characteristics
I_D = 7A
V_{DS} = 5V
10V
15V
V_{GS} - Gate-Source Voltage(V)
Q_g - Gate Charge(nC)
0
2
4
6
8
10
12
16



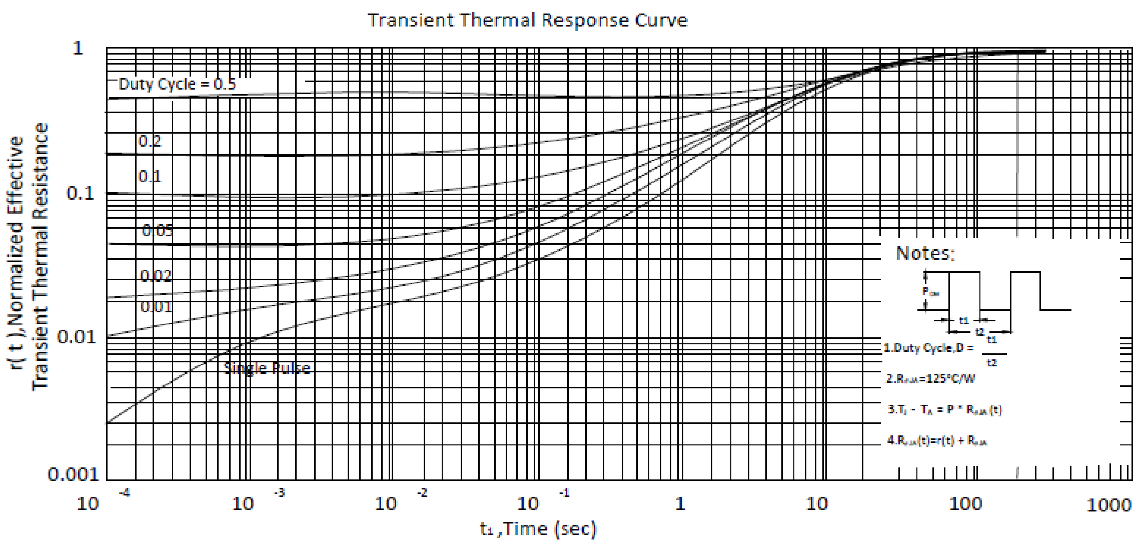
Capacitance Characteristics
f = 1MHz
V_{GS} = 0 V
Ciss
Coss
Crss
Capacitance(pF)
V_{DS} - Drain-Source Voltage(V)
0
100
200
300
400
500
600
700
800
900
1000
5
10
15
20
25
30



Maximum Safe Operating Area
$R_{DS(ON)}$ Limit
100μs
1ms
10ms
100ms
1s
10s
DC
V_{GS} = 10V
Single Pulse
$R_{θJA}$ = 125°C/W
T_A = 25°C
I_D - Drain Current(A)
V_{DS} - Drain-Source Voltage(V)
0.01
0.1
1
10
100

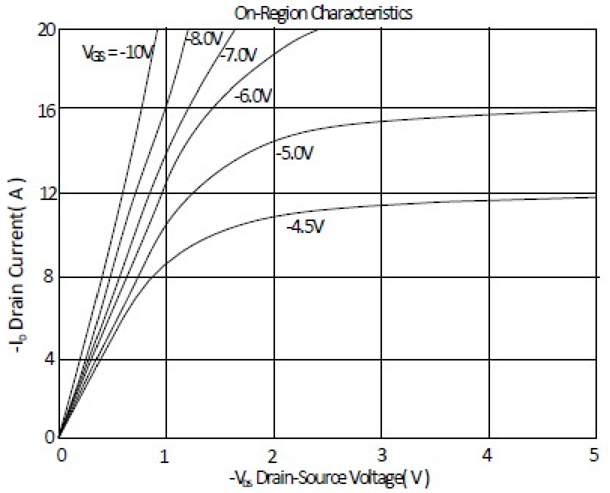


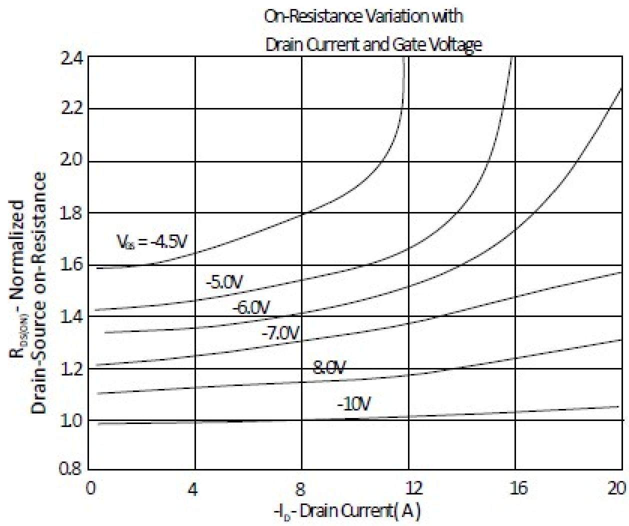
Single Pulse Maximum Power Dissipation
Single Pulse
$R_{θJA}$ = 125°C/W
T_A = 25°C
P(pk),Peak Transient Power(W)
t_1,Time (sec)
0
10
20
30
40
50
0.001
0.01
0.1
1
100
1000

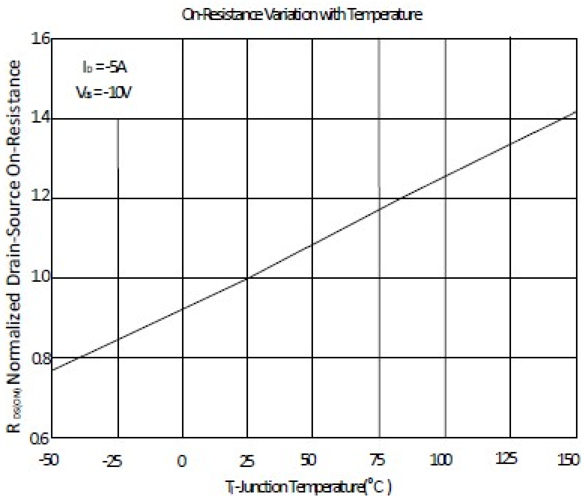


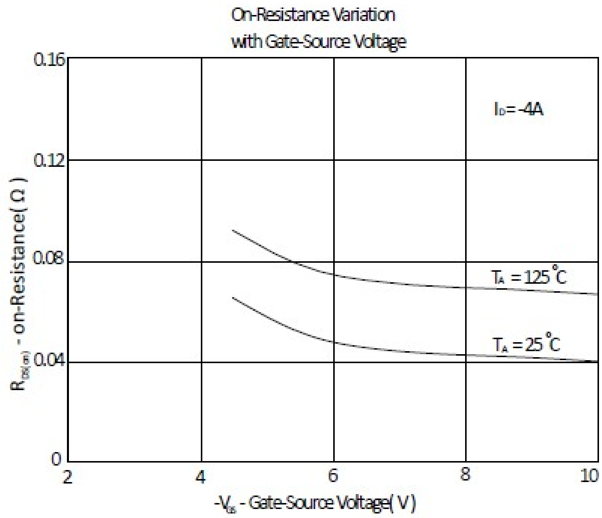
Transient Thermal Response Curve
Duty Cycle = 0.5
0.2
0.1
0.05
0.02
0.01
Single Pulse
Notes:
P_{DM}
t1
t2
1.Duty Cycle,D = t1/t2
2.$R_{θJA}$=125°C/W
3.T_J - T_A = P * $R_{θJA}$(t)
4.$R_{θJA}$(t)=r(t) + $R_{θJA}$
r(t),Normalized Effective Transient Thermal Resistance
t_1,Time (sec)
0.001
0.01
0.1
1
10^{-4}
10^{-3}
10^{-2}
10^{-1}
10
100
1000

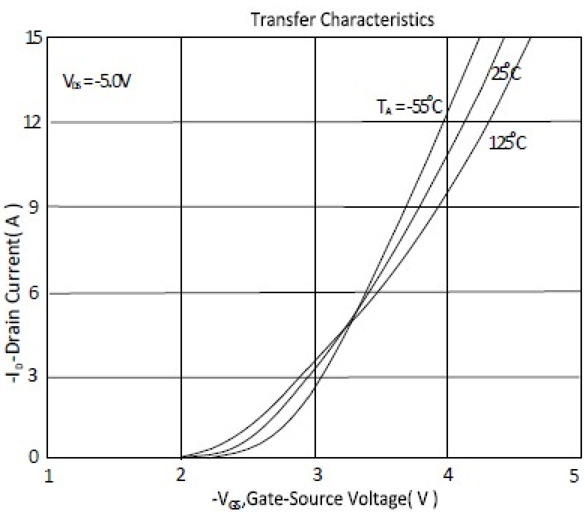
P-channel Typical Performance Characteristics

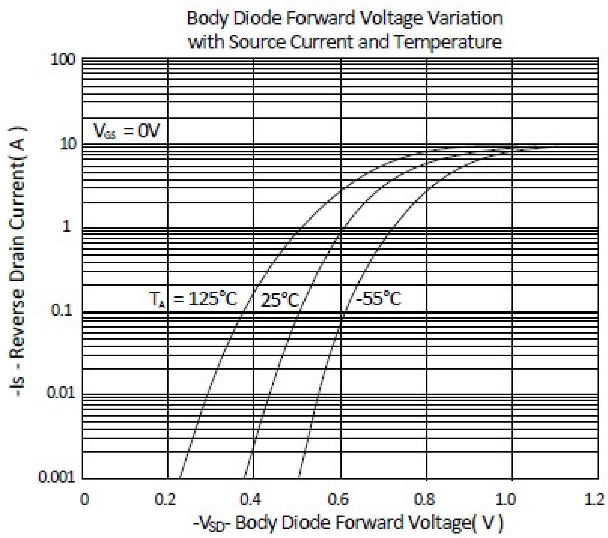


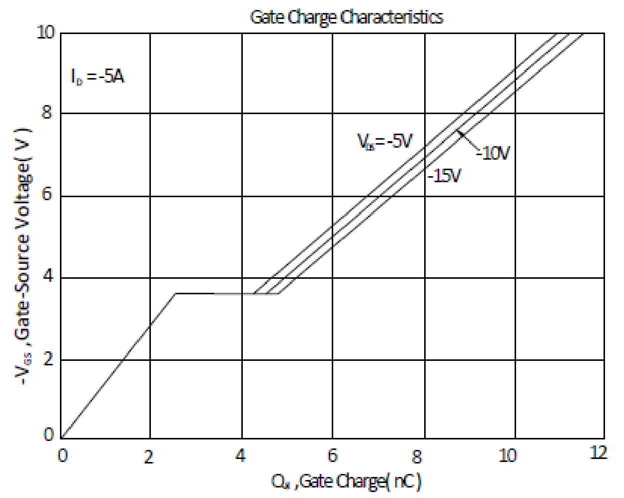




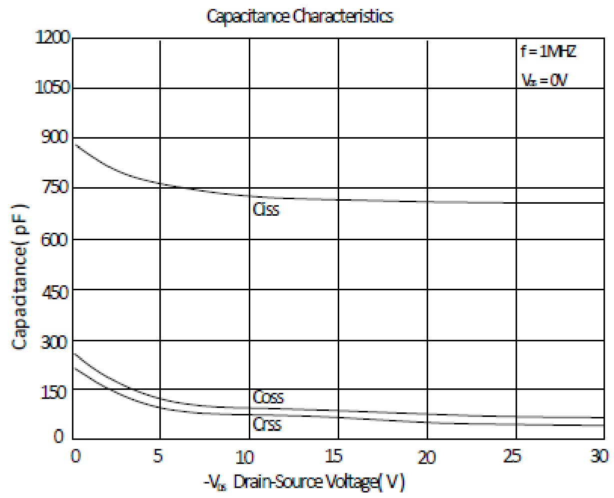




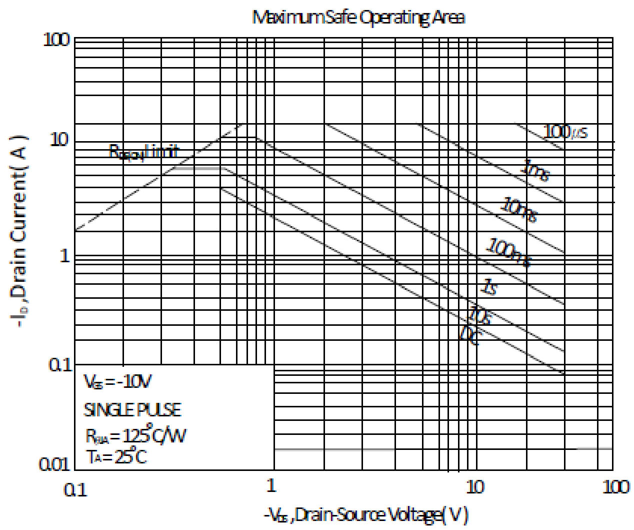




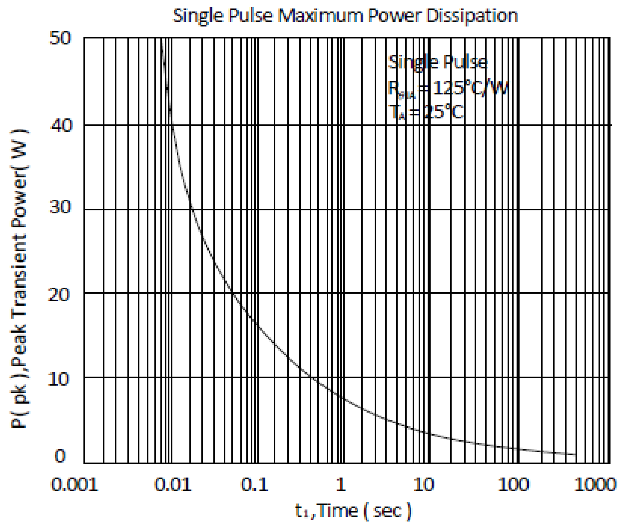
Gate Charge Characteristics
I_D = -5A
V_{DS} = -5V
-10V
-15V
$-V_{GS}$,Gate-Source Voltage(V)
Q_g ,Gate Charge(nC)
0
2
4
6
8
10
12



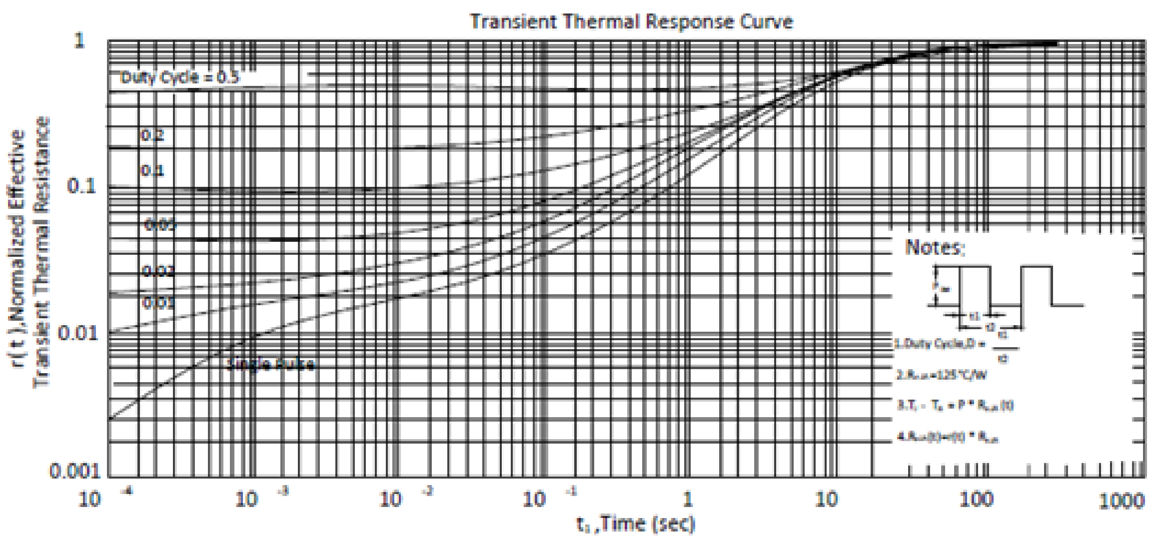
Capacitance Characteristics
f = 1MHZ
V_{GS} = 0V
Ciss
Coss
Crss
Capacitance(pF)
1200
1050
900
750
600
450
300
150
0
0
5
10
15
20
25
30
$-V_{DS}$ Drain-Source Voltage(V)



Maximum Safe Operating Area
$R_{DS(ON)}$ Limit
100μS
1ms
10ms
100ms
1s
10s
DC
V_{GS} = -10V
SINGLE PULSE
$R_{θJA}$ = 125°C/W
TA = 25°C
$-I_D$,Drain Current(A)
100
10
1
0.1
0.01
0.1
1
10
100
$-V_{DS}$,Drain-Source Voltage(V)



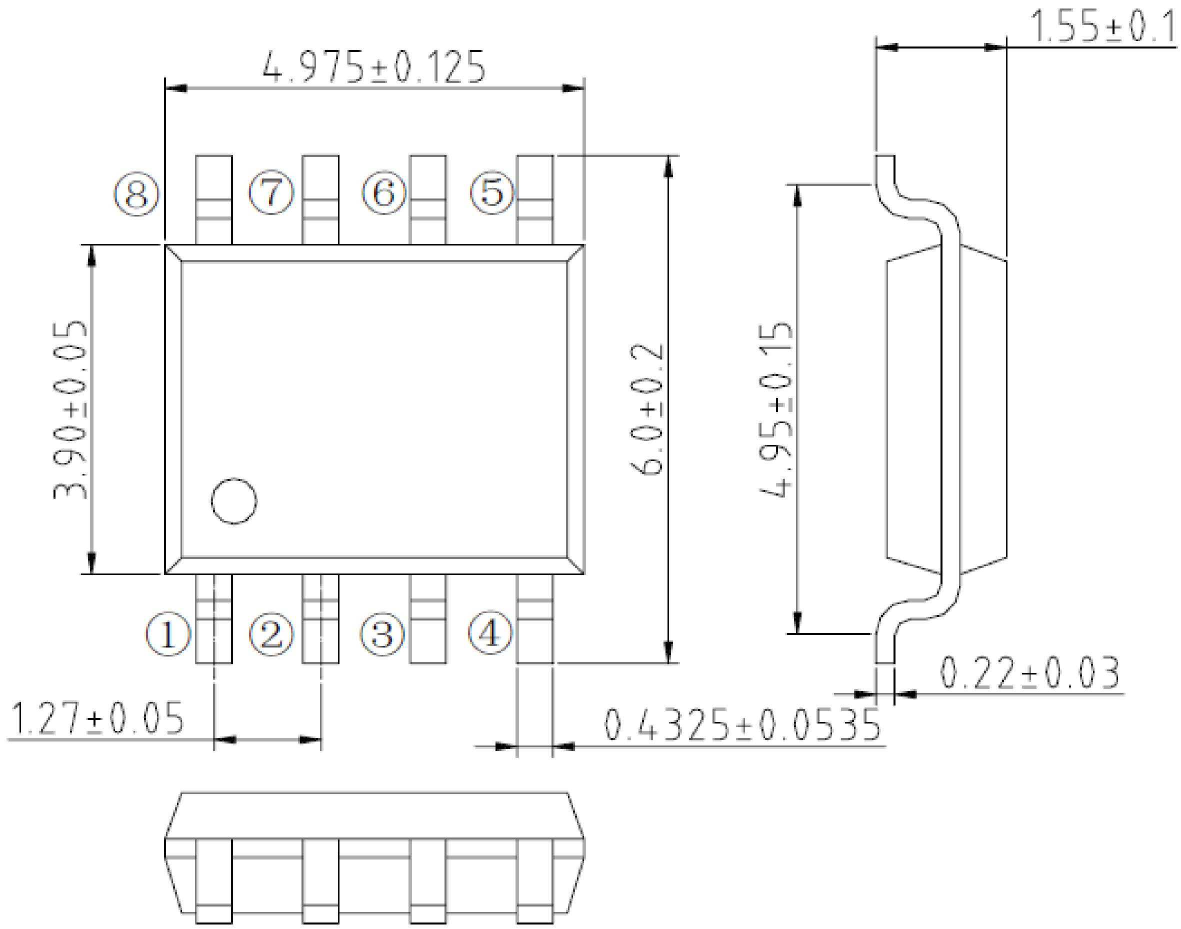
Single Pulse Maximum Power Dissipation
Single Pulse
$R_{θJA}$ = 125°C/W
T_A = 25°C
P(pk),Peak Transient Power(W)
50
40
30
20
10
0
0.001
0.01
0.1
1
10
100
1000
t_1 ,Time (sec)



Transient Thermal Response Curve
Duty Cycle = 0.5
0.2
0.1
0.05
0.02
0.01
Single Pulse
Notes:
1.Duty Cycle,D = t1/t2
2.$R_{θJA}$=125°C/W
3.T_J - T_A = P * $R_{θJA}$(t)
4.$R_{θJA}$(t)=r(t) * $R_{θJA}$
r(t),Normalized Effective Transient Thermal Resistance
1
0.1
0.01
0.001
10^{-4}
10^{-3}
10^{-2}
10^{-1}
1
10
100
1000
t_1 ,Time (sec)

Packing Information

SOP-8



Units: mm

Notes

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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.