



ACE12300B

N-Channel Enhancement Mode Field Effect Transistor

Description

Load switch for Portable Applications.
DC/DC Converters.

Features

- $V_{DS}=20V$
- $I_D=5.5A$
- $R_{DS(ON)} @ V_{GS}=10V, TYP 25m\Omega$
- $R_{DS(ON)} @ V_{GS}=4.5V, TYP 27m\Omega$
- $R_{DS(ON)} @ V_{GS}=2.5V, TYP 34m\Omega$

Absolute Maximum Ratings

Parameter		Symbol	Max	Unit
Drain-Source Voltage		V_{DSS}	20	V
Gate-Source Voltage		V_{GSS}	± 12	V
Drain Current (Continuous)*AC	$T_A=25^\circ C$	I_D	5.5	A
	$T_A=70^\circ C$		4	
Drain Current (Pulsed)*B		I_{DM}	13.5	A
Power Dissipation	$T_A=25^\circ C$	P_D	1.25	W
Operating temperature / storage temperature		T_J/T_{STG}	-55~150	$^\circ C$

Note :

- 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 $T_A=25^\circ C$. The value in any given application depends on the user's specific board design.
- Repetitive rating, pulse width limited by junction temperature.
- The current rating is based on the $t \leq 10s$ junction to ambient thermal resistance rating.

Thermal Resistance Ratings

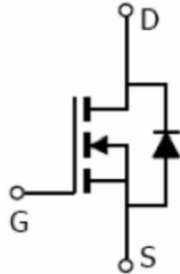
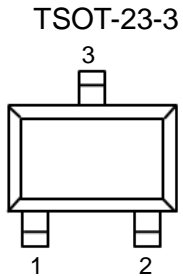
Parameter		Symbol	Typical	Max	Unit
Maximum Junction-to-Ambient a, e	$t \leq 5s$	R_{thJA}	80	100	$^\circ C/W$



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Packaging Type

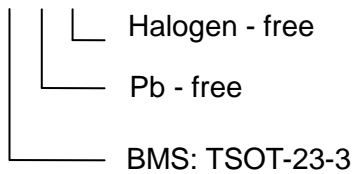


Pin Configuration

TSOT-23-3	Description	Function
1	G	Gate
2	S	Source
3	D	Drain

Ordering information

ACE12300B XX + H





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Electrical Characteristics

T_A=25°C, unless otherwise specified.

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Drain-source breakdown voltage	V _{(BR)DSS}	V _{GS} =0V, I _D =250μA	20			V
Zero gate voltage drain current	I _{DSS}	V _{DS} =20V, V _{GS} =0V			1	μA
Gate threshold voltage	V _{GS(th)}	V _{GS} =V _{DS} , I _{DS} =250μA	0.4	0.66	1.2	V
Gate leakage current	I _{GSS}	V _{GS} =±12V, V _{DS} =0V			±100	nA
Drain-source on-state resistance	R _{DS(ON)}	V _{GS} =10V, I _D =5A		25	30	mΩ
		V _{GS} =4.5V, I _D =4.5A		27	33	
		V _{GS} =2.5V, I _D =4A		34	42	
Forward trans conductance	g _{FS}	V _{DS} =10V, I _D =5A		10		S
Diode forward voltage	V _{SD}	I _{SD} =1A, V _{GS} =0V			1.2	V
Diode forward current	I _S	TC =25°C			2	A
Switching						
Total gate charge	Qg	V _{GS} =4.5V, V _{DS} =10V, I _D =5A		10		nC
Gate-source charge	Qgs			2.3		
Gate-drain charge	Qgd			2.9		
Turn-on delay time	t _{d(on)}	V _{DD} =10V, I _D =1A R _G =6Ω, V _{GS} =4.5V		18		ns
Turn-on rise time	Tr			11		
Turn-off delay time	t _{d(off)}			36.7		
Turn-off fall time	Tf			48		
Dynamic						
Input capacitance	Ciss	V _{GS} =0V, V _{DS} =8V, f=1.0MHz		500		pF
Output capacitance	Coss			300		
Reverse transfer capacitance	Crss			140		



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Typical Performance Characteristics

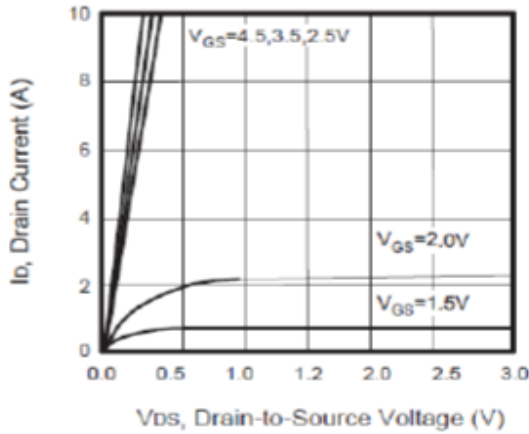


Figure 1. Output Characteristics

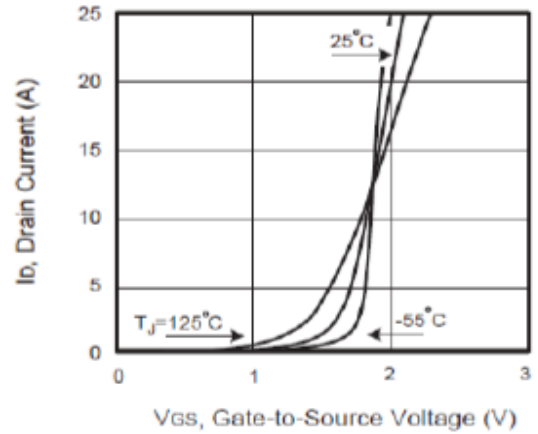


Figure 2. Transfer Characteristics

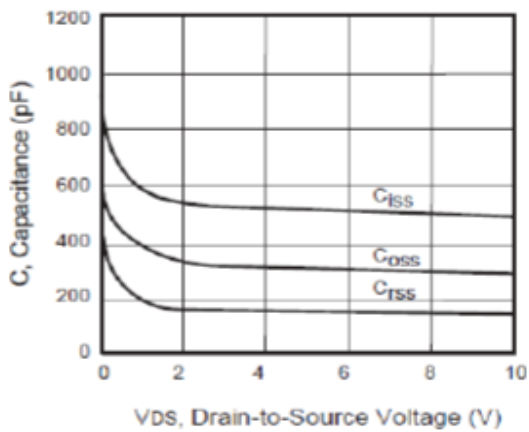


Figure 3. Capacitance

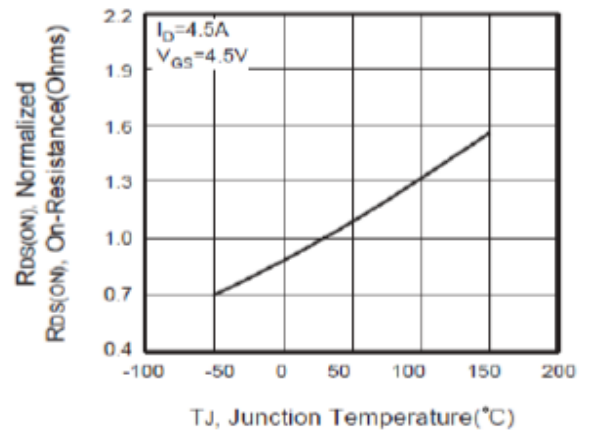


Figure 4. On-Resistance Variation with Temperature

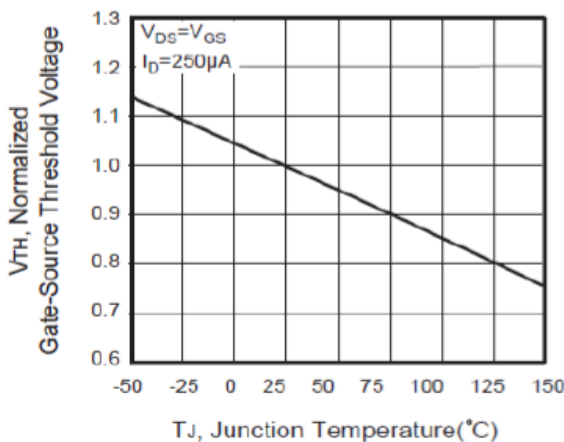


Figure 5. Gate Threshold Variation with Temperature

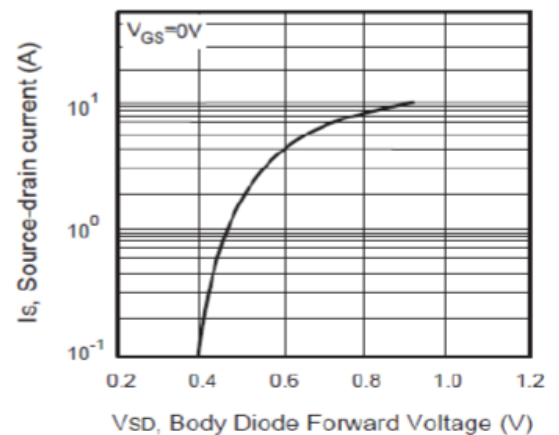


Figure 6. Body Diode Forward Voltage Variation with Source Current



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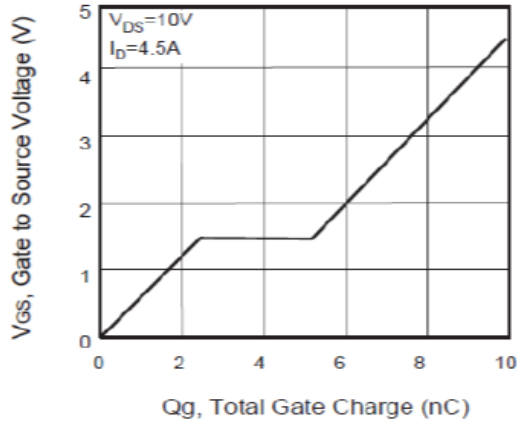


Figure 7. Gate Charge

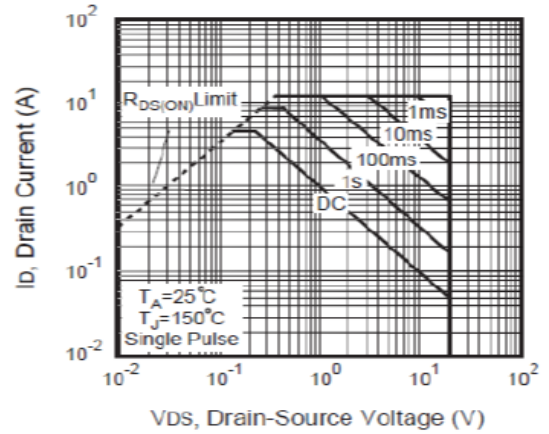


Figure 8. Maximum Safe Operating Area

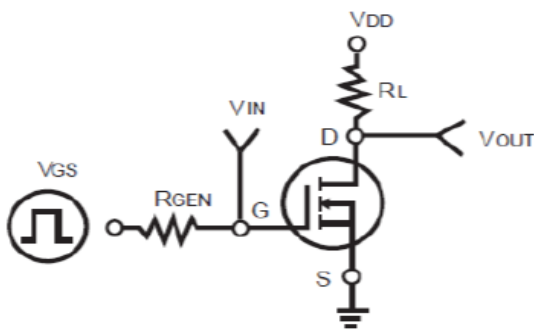


Figure 9. Switching Test Circuit

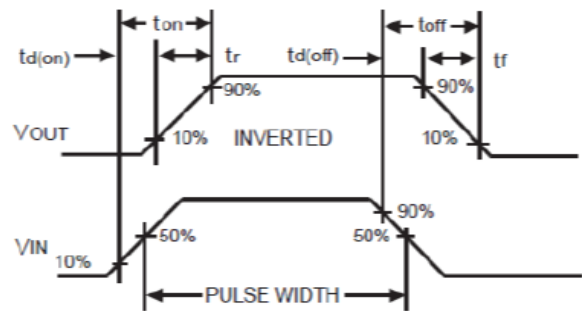


Figure 10. Switching Waveforms

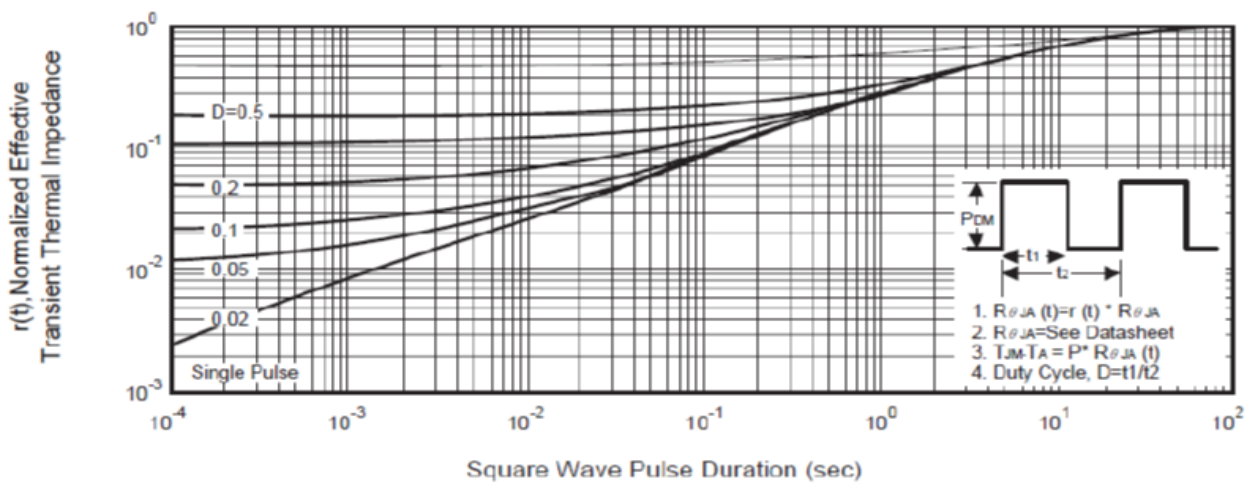


Figure 11. Normalized Thermal Transient Impedance Curve

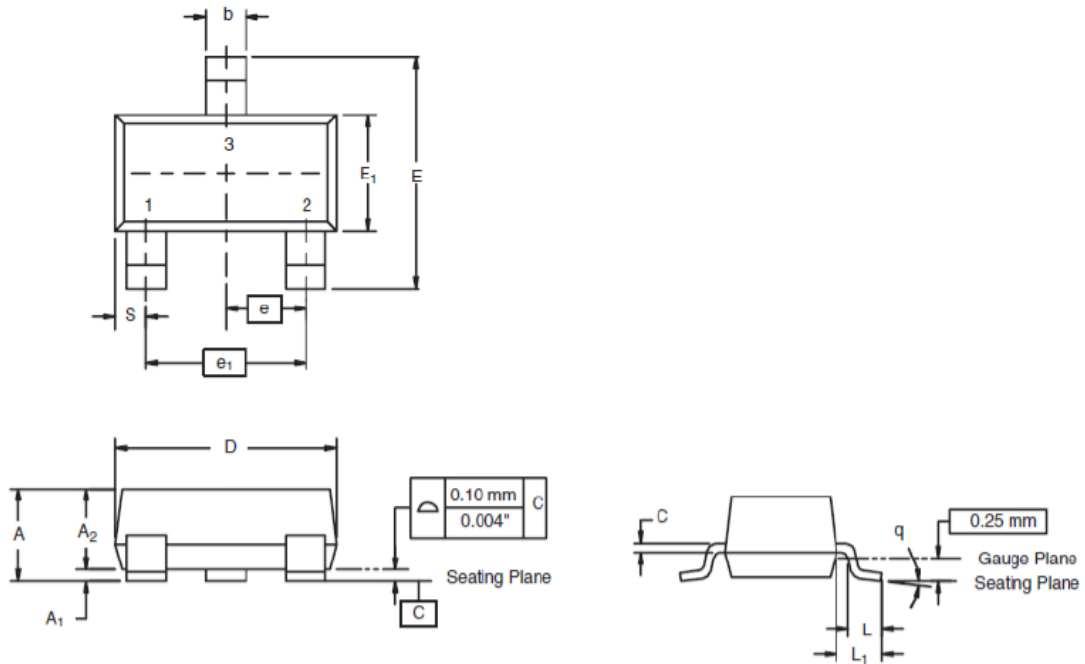


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Packing Information

TSOT-23-3



Dim	MILLIMETERS		INCHES	
	Min	Max	Min	Max
A	0.89	1.12	0.035	0.044
A ₁	0.01	0.10	0.0004	0.004
A ₂	0.88	1.02	0.0346	0.040
b	0.35	0.50	0.014	0.020
c	0.085	0.18	0.003	0.007
D	2.80	3.04	0.110	0.120
E	2.10	2.64	0.083	0.104
E ₁	1.20	1.40	0.047	0.055
e	0.95 BSC		0.0374 Ref	
e ₁	1.90 BSC		0.0748 Ref	
L	0.40	0.60	0.016	0.024
L ₁	0.64 Ref		0.025 Ref	
S	0.50 Ref		0.020 Ref	
q	3°	8°	3°	8°



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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 used 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 whose 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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