



ACE4940M

Dual N-Channel 40-V MOSFET

Description

The ACE4940M uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. This device is suitable for use as a load switch or in PWM applications. The source leads are separated to allow a Kelvin connection to the source, which may be used to bypass the source inductance.

Features

- Low $r_{DS(on)}$ trench technology
- Low thermal impedance
- Fast switching speed

Applications

- White LED boost converters
- Automotive Systems
- Industrial DC/DC Conversion Circuits

Absolute Maximum Ratings

Parameter		Symbol	Limit	Units
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current ^a	$T_A=25^\circ\text{C}$	I_D	8.3	A
	$T_A=70^\circ\text{C}$		6.8	
Pulsed Drain Current ^b		I_{DM}	50	A
Continuous Source Current (Diode Conduction) ^a		I_S	3	A
Power Dissipation ^a	$T_A=25^\circ\text{C}$	P_D	2.1	W
	$T_A=70^\circ\text{C}$		1.3	
Operating temperature / storage temperature		T_J/T_{STG}	-55~150	$^\circ\text{C}$

THERMAL RESISTANCE RATINGS

Parameter		Symbol	Maximum	Units
Maximum Junction-to-Ambient ^a	$t \leq 10 \text{ sec}$	$R_{\theta JA}$	62.5	$^\circ\text{C/W}$
	Steady State		110	

Notes

- a. Surface Mounted on 1" x 1" FR4 Board.
 b. Pulse width limited by maximum junction temperature

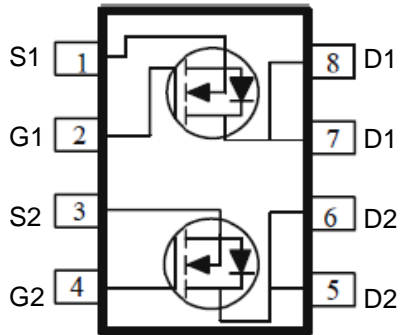


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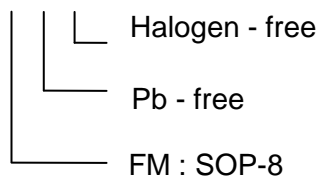
Packaging Type

SOP-8



Ordering information

ACE4940M FM + H





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Electrical Characteristics

$T_A=25^{\circ}\text{C}$, unless otherwise specified.

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250 \mu\text{A}$	1			V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 20 \text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 32 \text{ V}, V_{GS} = 0 \text{ V}$			1	uA
		$V_{DS} = 32 \text{ V}, V_{GS} = 0 \text{ V}, T_J = 55^{\circ}\text{C}$			25	
On-State Drain Current	$I_{D(on)}$	$V_{DS} = 5 \text{ V}, V_{GS} = 10 \text{ V}$	4.1			A
Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS} = 10 \text{ V}, I_D = 6.6 \text{ A}$			22	m Ω
		$V_{GS} = 4.5 \text{ V}, I_D = 5.9 \text{ A}$			27	
Forward Transconductance	g_{FS}	$V_{DS} = 15 \text{ V}, I_D = 6.6 \text{ A}$		40		S
Diode Forward Voltage	V_{SD}	$I_S = 1.5 \text{ A}, V_{GS} = 0 \text{ V}$		0.7		V
Dynamic						
Total Gate Charge	Q_g	$V_{DS} = 20 \text{ V}, V_{GS} = 4.5 \text{ V}, I_D = 6.6 \text{ A}$		19		nC
Gate-Source Charge	Q_{gs}			5.7		
Gate-Drain Charge	Q_{gd}			9.2		
Turn-On Delay Time	$t_{d(on)}$	$V_{DS} = 20 \text{ V}, R_L = 3 \Omega, I_D = 6.6 \text{ A},$ $V_{GEN} = 10 \text{ V}, R_{GEN} = 6 \Omega$		9		ns
Rise Time	t_r			17		
Turn-Off Delay Time	$t_{d(off)}$			59		
Fall Time	t_f			26		
Input Capacitance	C_{iss}	$V_{DS} = 15 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$		1309		pF
Output Capacitance	C_{oss}			250		
Reverse Transfer Capacitance	C_{rss}			151		

Note :

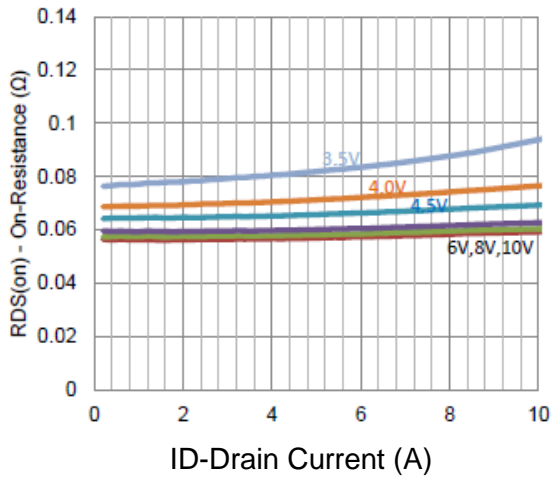
- a. Pulse test: PW \leq 300us duty cycle \leq 2%.
- b. Guaranteed by design, not subject to production testing



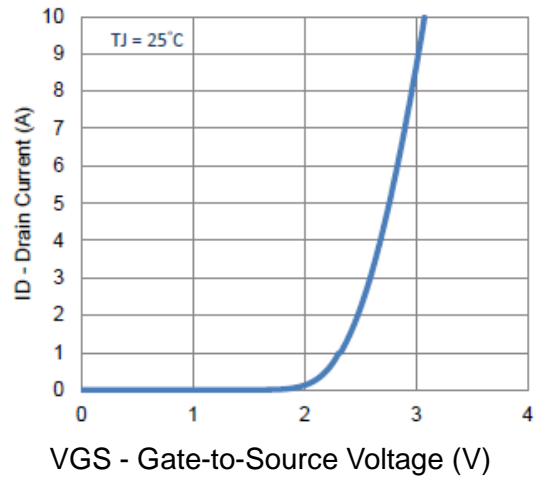
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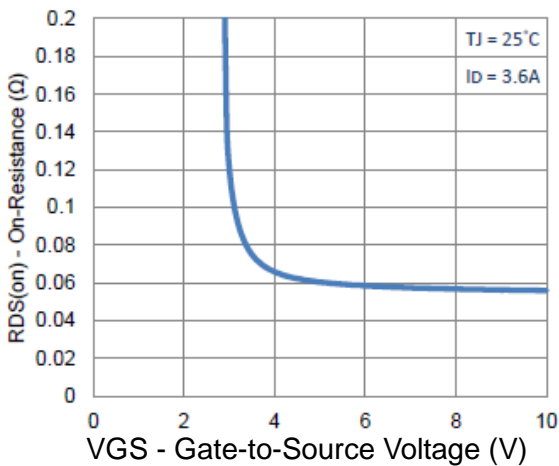
Typical Performance Characteristics



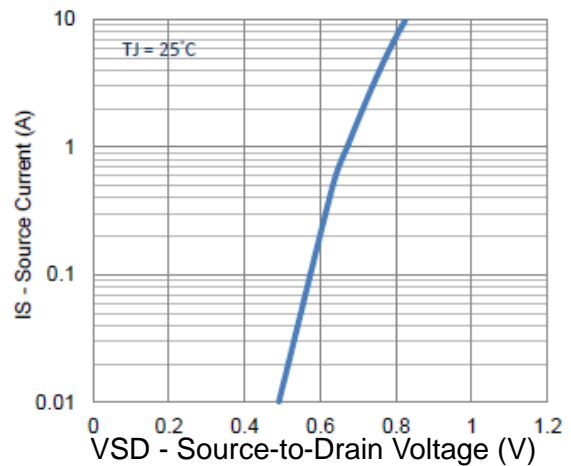
1. On-Resistance vs. Drain Current



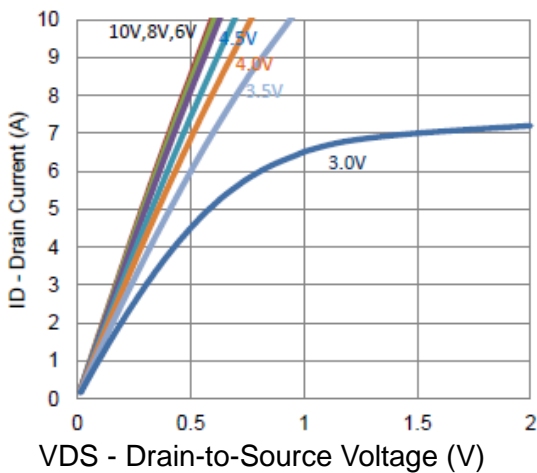
2. Transfer Characteristics



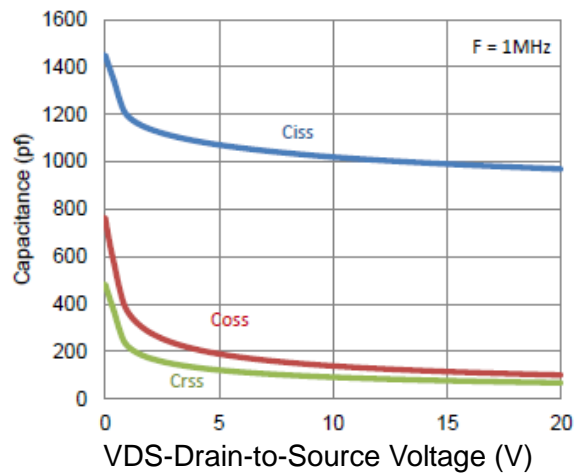
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage



5. Output Characteristics



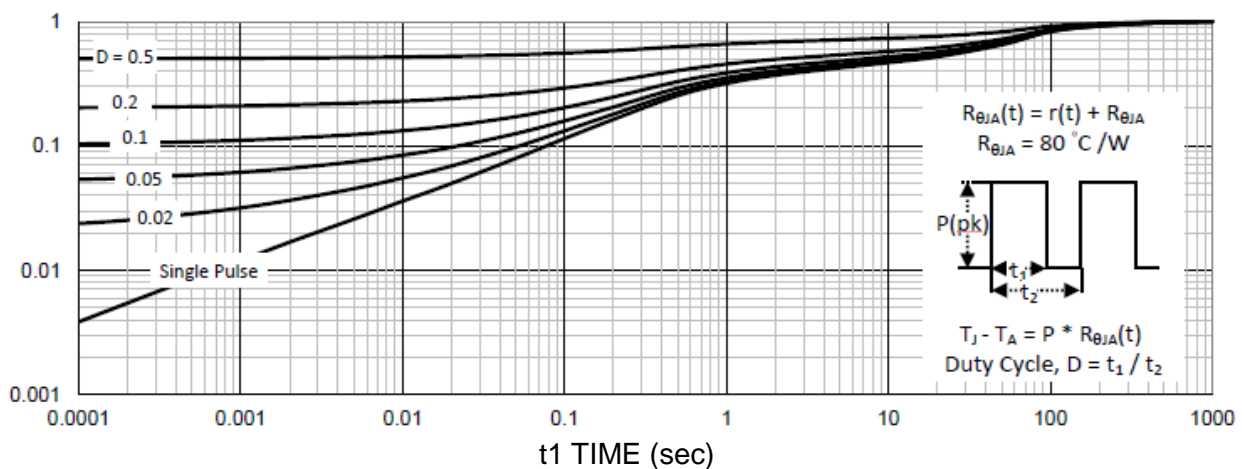
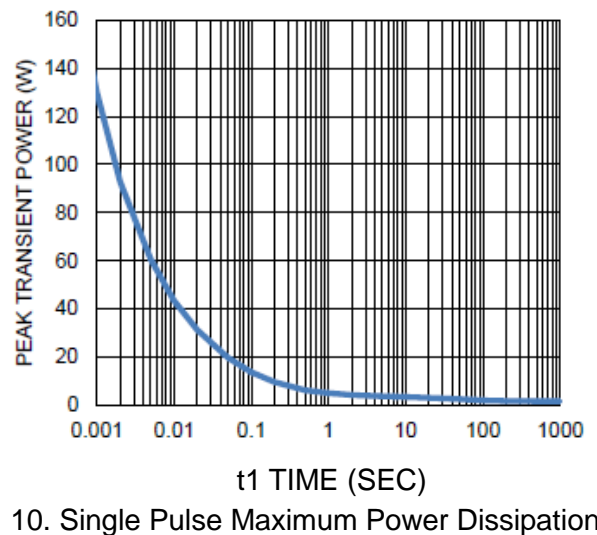
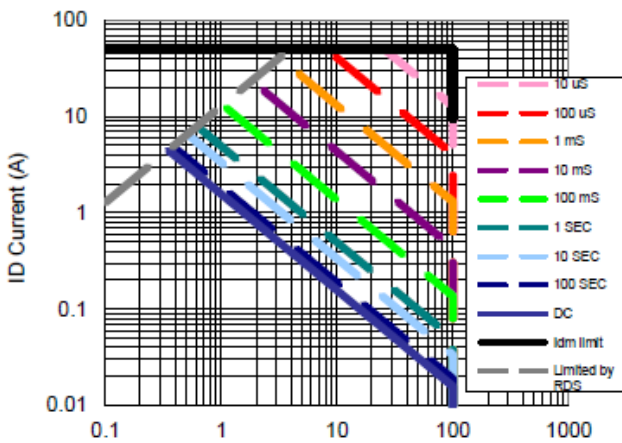
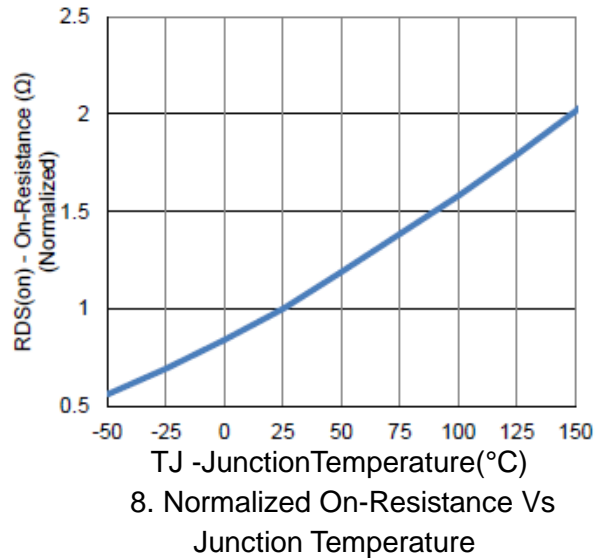
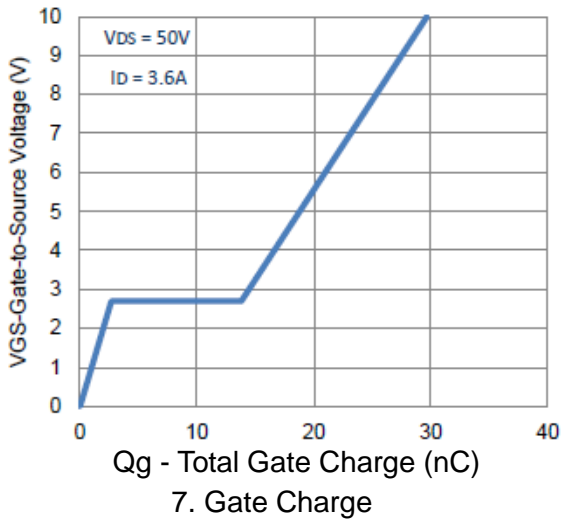
6. Capacitance



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Typical Performance Characteristics



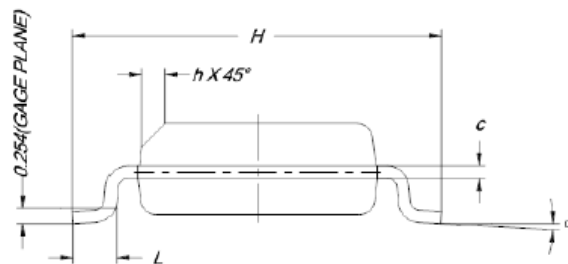
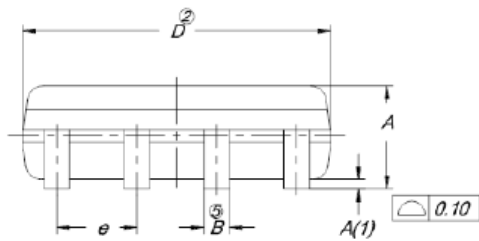
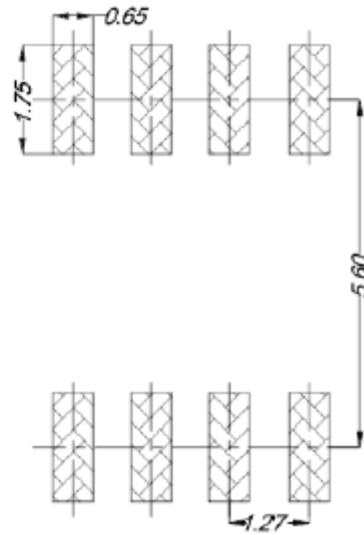
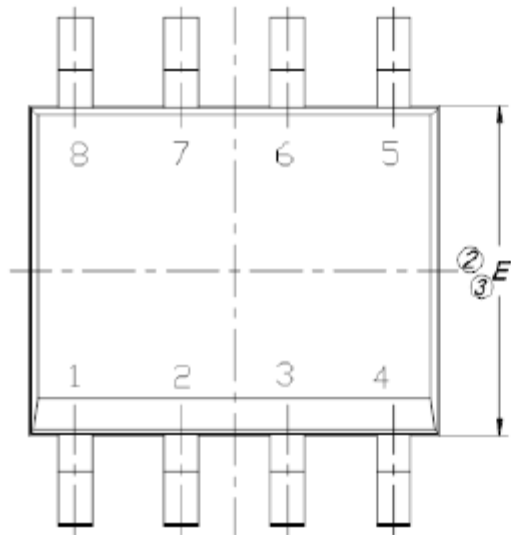


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Packing Information

SOP-8



DIM	MILLMETERS		
	MIN	NOM	MAX
A	1.35	1.55	1.75
A(1)	0.10	0.18	0.25
B	0.38	0.45	0.51
C	0.19	0.22	0.25
D	4.80	4.90	5.00
E	3.80	3.90	4.00
e	1.27 BSC		
H	5.8	6.00	6.20
L	0.50	0.72	0.93
a	0°	4°	8°
h	0.25	0.38	0.50

Unit: mm



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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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