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℃	I_D	8.3	A
	T_A=70℃		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℃	P_D	2.1	W
	T_A=70℃		1.3	
Operating temperature / storage temperature		T_J/T_{STG}	-55~150	℃

THERMAL RESISTANCE RATINGS				
Parameter		Symbol	Maximum	Units
Maximum Junction-to-Ambient [a]	t <= 10 sec	$R_{\theta JA}$	62.5	°C/W
	Steady State		110	

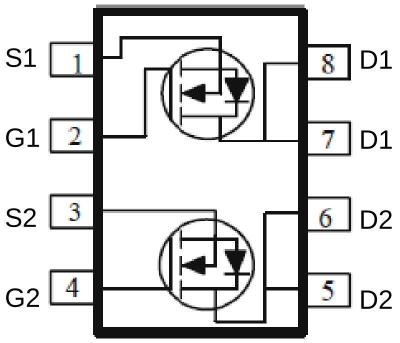
Notes

a. Surface Mounted on 1" x 1" FR4 Board.

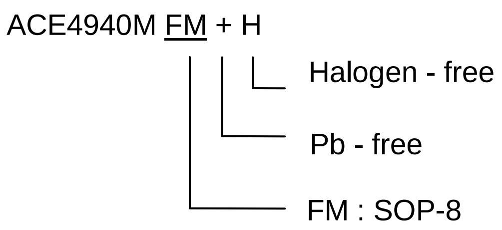
b. Pulse width limited by maximum junction temperature

Packaging Type

SOP-8



Ordering information



Electrical Characteristics

T_A=25℃, unless otherwise specified.

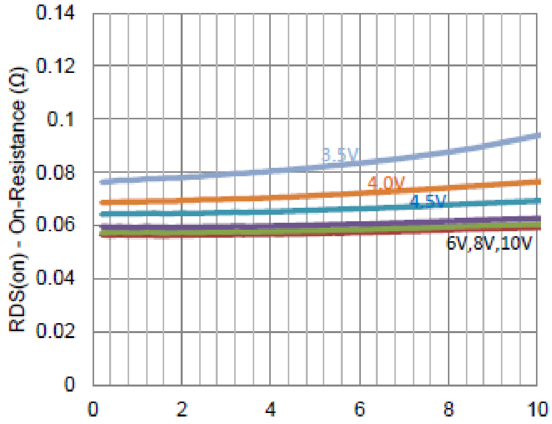
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 250 uA	1			V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 32 V, V_{GS} = 0 V			1	uA
		V_{DS} = 32 V, V_{GS} = 0 V, T_J = 55°C			25	
On-State Drain Current	$I_{D(on)}$	V_{DS} = 5 V, V_{GS} = 10 V	4.1			A
Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS} = 10 V, I_D = 6.6A			22	mΩ
		V_{GS} = 4.5 V, I_D =5.9 A			27	
Forward Transconductance	g_{FS}	V_{DS} = 15 V, I_D = 6.6 A		40		S
Diode Forward Voltage	V_{SD}	I_S = 1.5 A, V_{GS} = 0 V		0.7		V
Dynamic						
Total Gate Charge	Q_g	V_{DS} = 20 V, V_{GS} = 4.5 V, I_D =6.6 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 V, R_L = 3 Ω, I_D = 6.6 A, V_{GEN} = 10 V, R_{GEN} = 6 Ω		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 V, V_{GS} = 0 V, f = 1 MHz		1309		pF
Output Capacitance	C_{oss}			250		
Reverse Transfer Capacitance	C_{rss}			151		

Note :

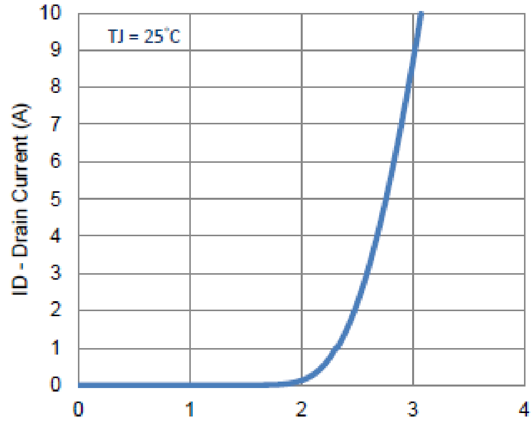
a. Pulse test: PW <= 300us duty cycle <= 2%.

b. Guaranteed by design, not subject to production testing

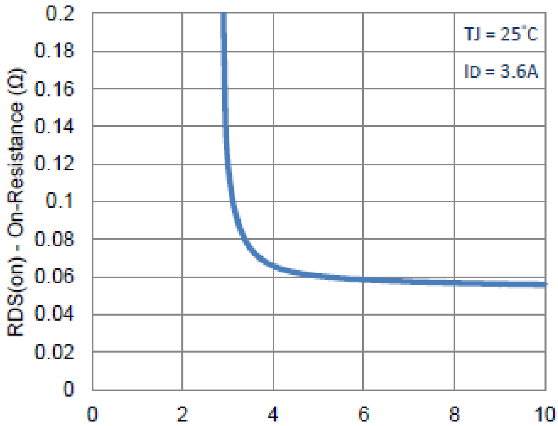
Typical Performance Characteristics



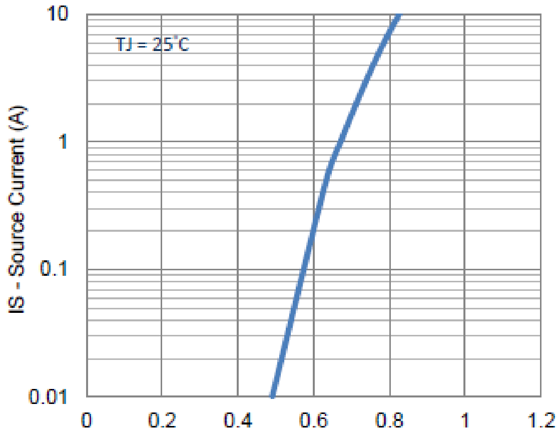
ID-Drain Current (A)
1. On-Resistance vs. Drain Current



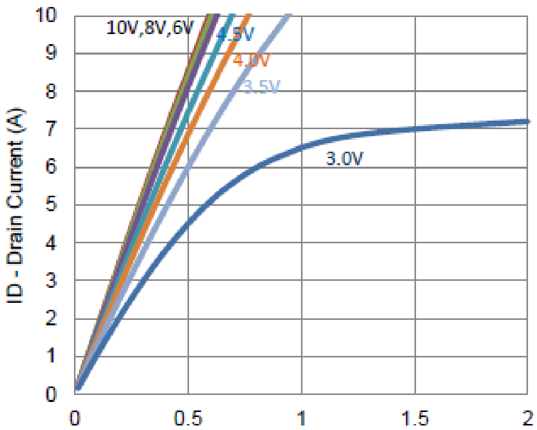
VGS - Gate-to-Source Voltage (V)
2. Transfer Characteristics



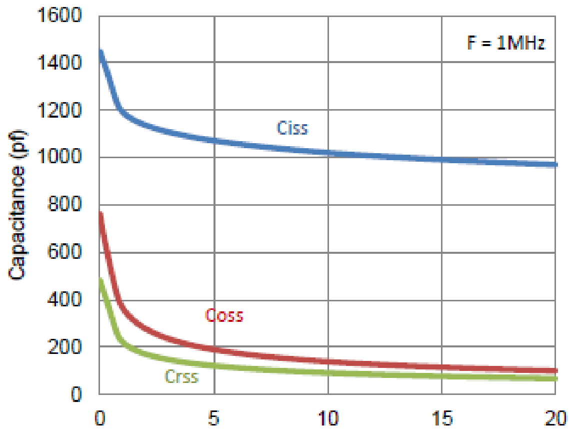
VGS - Gate-to-Source Voltage (V)
3. On-Resistance vs. Gate-to-Source Voltage



VSD - Source-to-Drain Voltage (V)
4. Drain-to-Source Forward Voltage

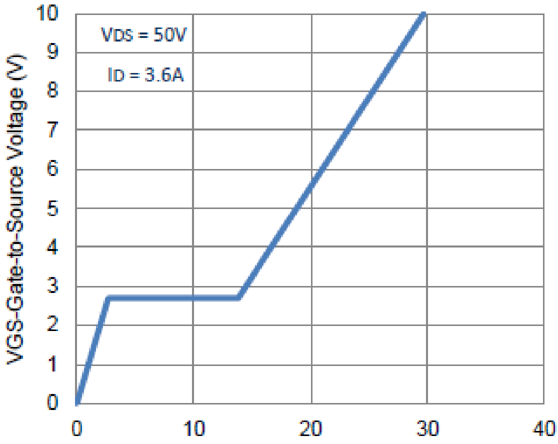


VDS - Drain-to-Source Voltage (V)
5. Output Characteristics

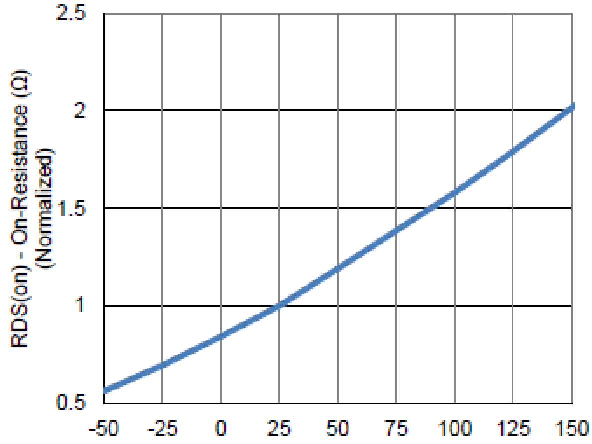


VDS-Drain-to-Source Voltage (V)
6. Capacitance

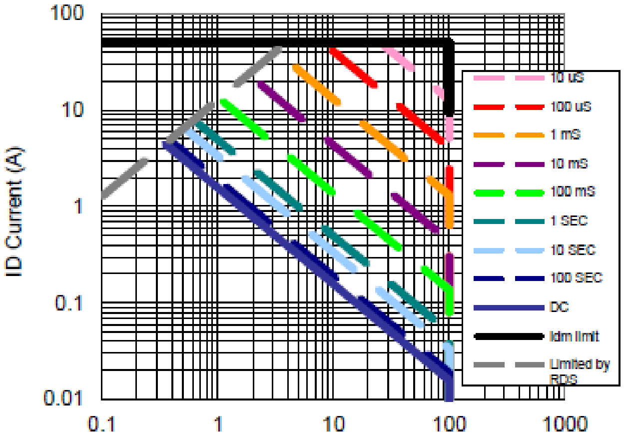
Typical Performance Characteristics



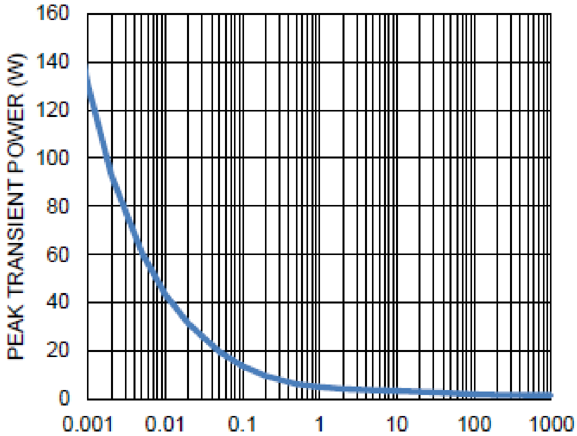
7. Gate Charge



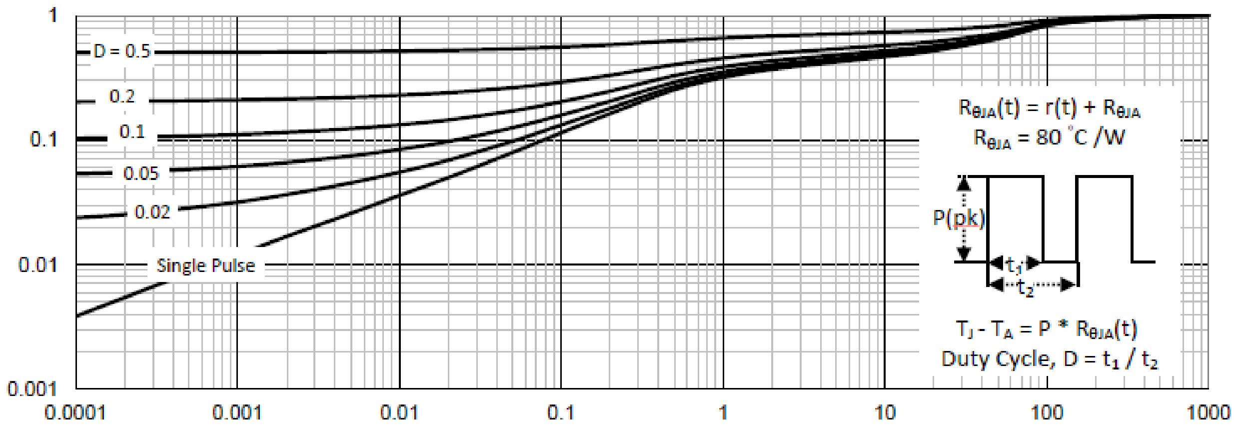
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area



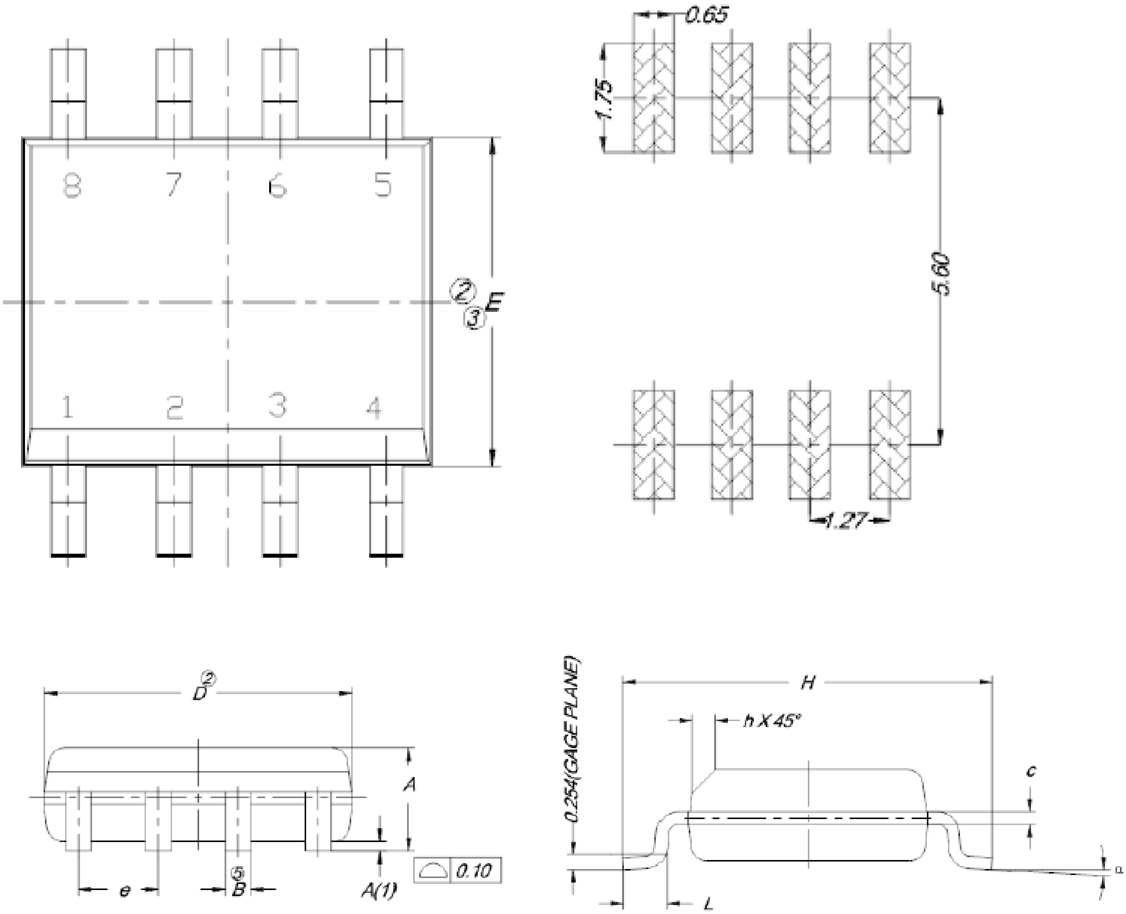
10. Single Pulse Maximum Power Dissipation



11. Normalized Thermal Transient Junction to Ambient

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	0^0	4^0	8^0
h	0.25	0.38	0.50

Unit: mm

Notes

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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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