ACE1420M
N-Channel 20-V MOSFET

Description

The ACE1420M 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

- Power Routing
- Li Ion Battery Packs
- Level Shifting and Driver Circuits

Absolute Maximum Ratings

Parameter		Symbol	Limit	Units
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	±8	V
Continuous Drain Current [a]	T_A=25℃	I_D	15	A
	T_A=70℃		11.9	
Pulsed Drain Current [b]		I_{DM}	60	A
Continuous Source Current (Diode Conduction) [a]		I_S	2.9	A
Power Dissipation [a]	T_A=25℃	P_D	3	W
	T_A=70℃		1.9	
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	$R_{\theta JA}$	40	°C/W
	Steady State		90	

Notes

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

b. Pulse width limited by maximum junction temperature

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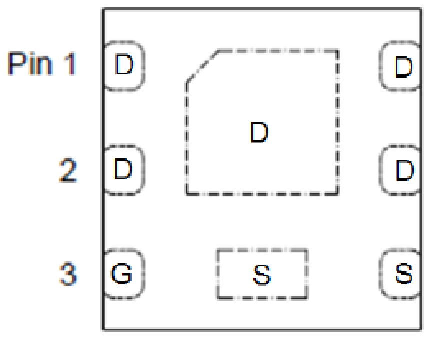
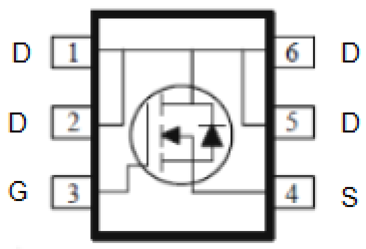
Packaging Type
DFN2*2-6L





1. DRAIN
2. DRAIN
3. GATE
4. SOURCE
5. DRAIN
6. DRAIN

Ordering information

ACE1420M MN + H

- H: Halogen - free
- +: Pb - free
- MN : DFN2*2-6L

Electrical Characteristics

T_A=25℃, unless otherwise specified.

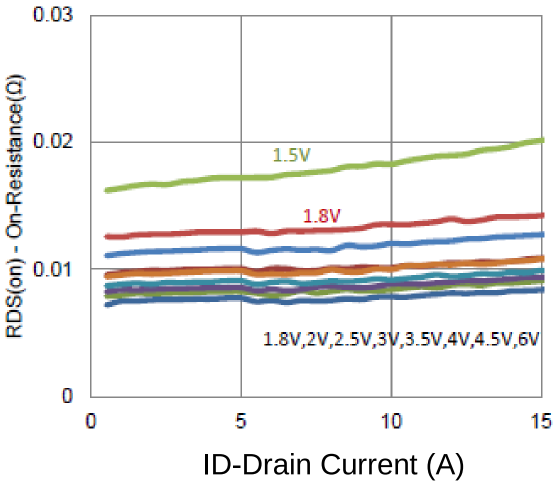
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 250 uA	0.4			V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±8 V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 16 V, V_{GS} = 0 V			1	uA
		V_{DS} = 16 V, V_{GS} = 0 V, T_J = 55℃			10	
On-State Drain Current	$I_{D(on)}$	V_{DS} = 5 V, V_{GS} = 4.5 V	20			A
Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS} = 4.5 V, I_D = 10 A			9	mΩ
		V_{GS} = 2.5 V, I_D = 8 A			11	
Forward Transconductance	g_{FS}	V_{DS} = 15 V, I_D = 10 A		5		S
Diode Forward Voltage	V_{SD}	I_S = 1.4 A, V_{GS} = 0 V		0.74		V
Dynamic						
Total Gate Charge	Q_g	V_{DS} = 10 V, V_{GS} = 4.5 V, I_D = 10 A		20		nC
Gate-Source Charge	Q_{gs}			3.6		
Gate-Drain Charge	Q_{gd}			5.5		
Turn-On Delay Time	$t_{d(on)}$	V_{DS} = 10 V, R_L = 1 Ω, I_D = 10 A, V_{GEN} = 4.5 V, R_{GEN} = 6 Ω		6		ns
Rise Time	t_r			14		
Turn-Off Delay Time	$t_{d(off)}$			84		
Fall Time	t_f			24		
Input Capacitance	C_{iss}	V_{DS} = 15 V, V_{GS} = 0 V, f = 1 Mhz		1920		pF
Output Capacitance	C_{oss}			160		
Reverse Transfer Capacitance	C_{rss}			143		

Note :

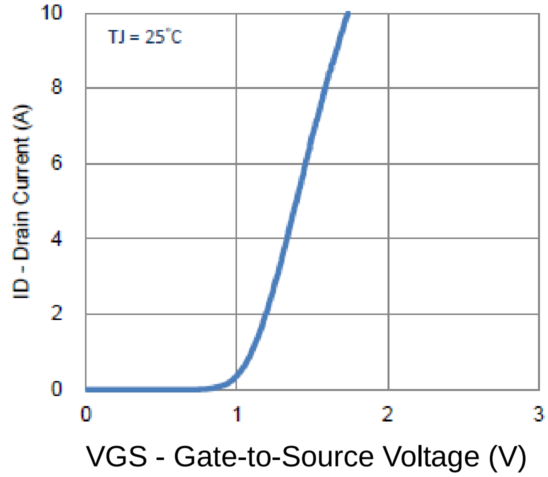
a. Pulse test: PW <= 300us duty cycle <= 2%.

b. Guaranteed by design, not subject to production testing

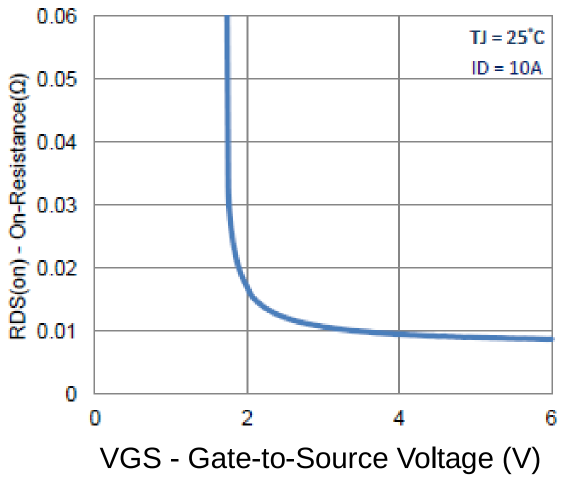
Typical Performance Characteristics



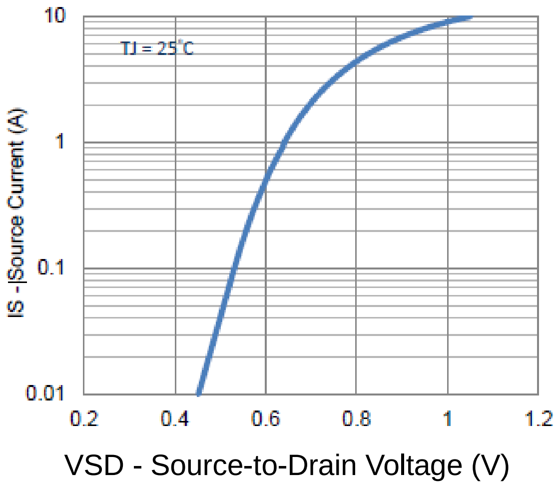
1. On-Resistance vs. Drain Current



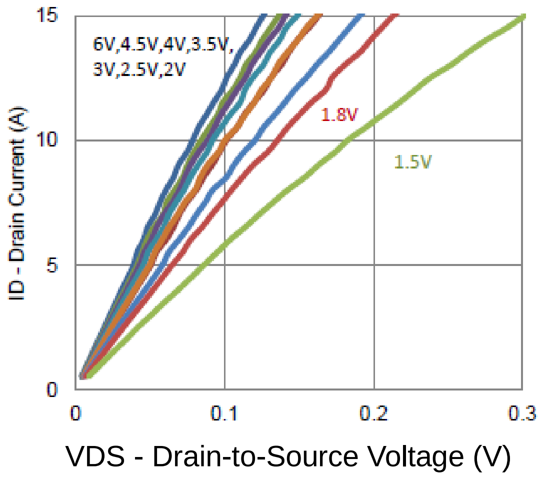
2. Transfer Characteristics



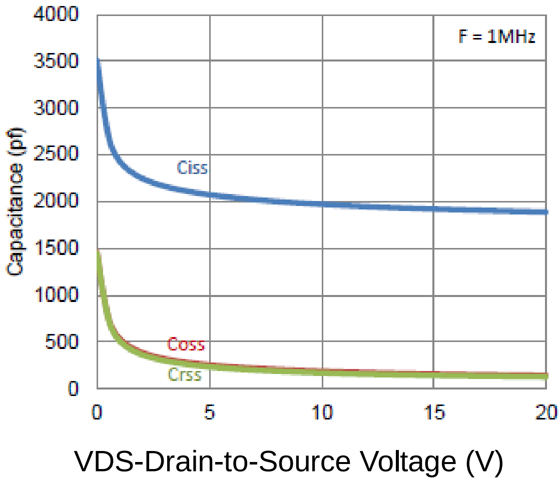
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

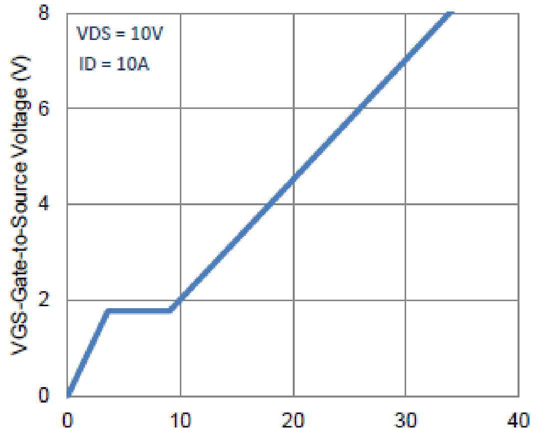


5. Output Characteristics



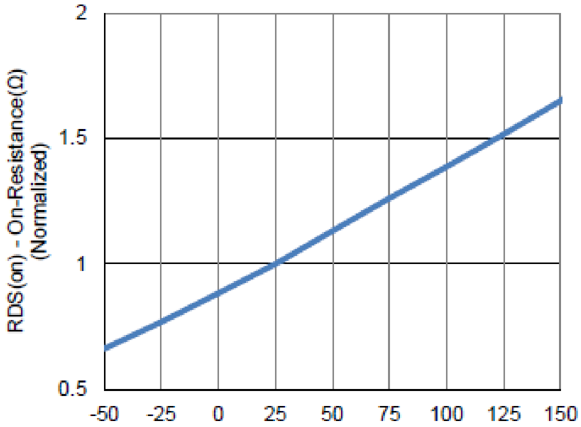
6. Capacitance

Typical Performance Characteristics



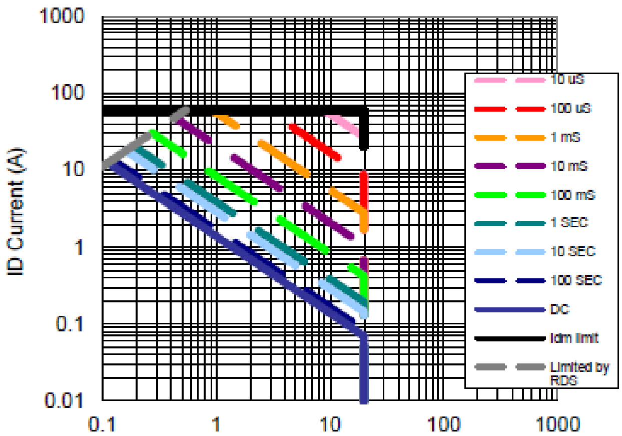
Qg - Total Gate Charge (nC)

7. Gate Charge



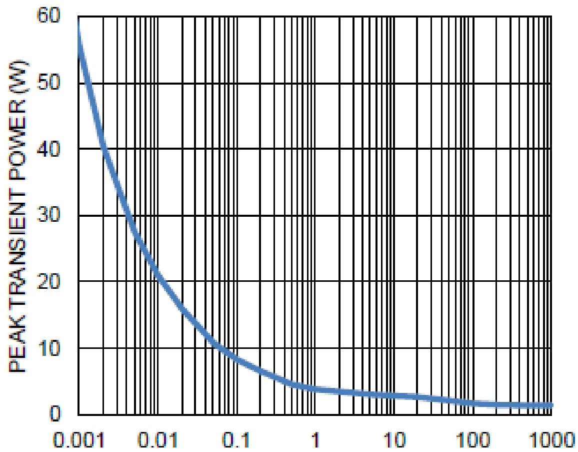
TJ –Junction Temperature(°C)

8. Normalized On-Resistance Vs Junction Temperature



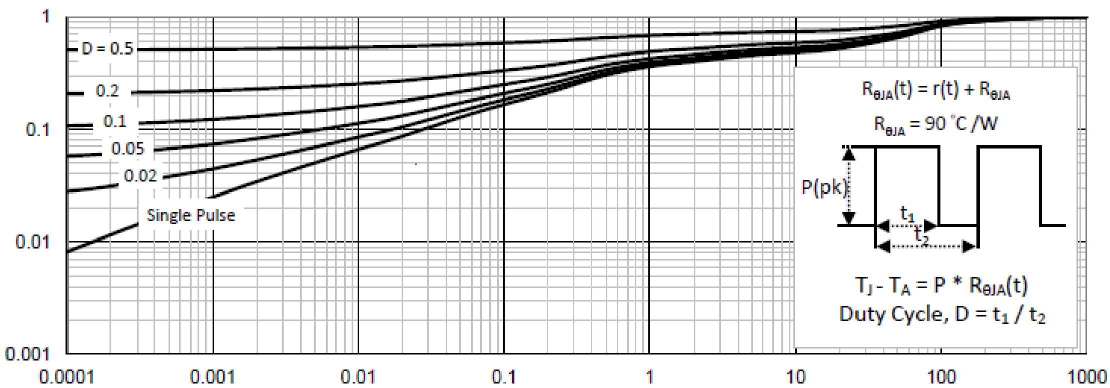
VDS Drain to Source Voltage (V)

9. Safe Operating Area



t1 TIME (SEC)

10. Single Pulse Maximum Power Dissipation

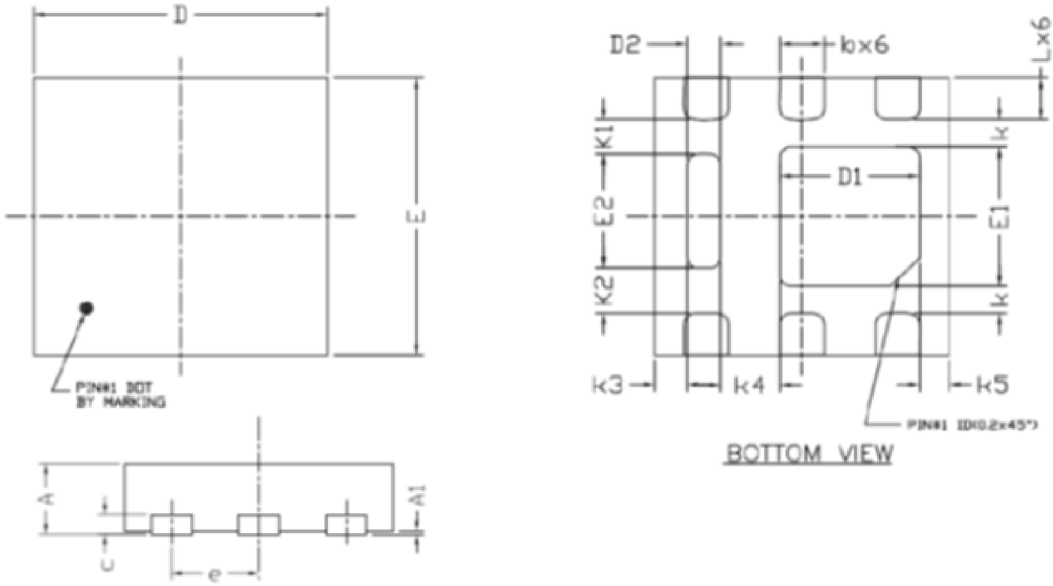


t1 TIME (sec)

11. Normalized Thermal Transient Junction to Ambient

Packing Information

DFN2*2-6PP



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.50	0.55	0.60	0.020	0.022	0.024
A1	0.00		0.05	0.000		0.002
b	0.25	0.30	0.25	0.010	0.012	0.014
c	0.152REF			0.006REF		
D	1.90	2.00	2.10	0.075	0.0179	0.083.
D1	0.85	0.95	1.05	0.033	0.037	0.041
D2	0.13	0.23	0.33	0.005	0.009	0.013
E	1.90	2.0	2.10	0.075	0.079	0.083
E1	0.90	1.00	1.10	0.035	0.039	0.043
E2	0.72	0.82	0.92	0.028	0.032	0.036
e	0.65BSC			0.026BSC		
K	0.20BSC			0.008BSC		
K1	0.25BSC			0.010BSC		
K2	0.33BSC			0.013BSC		
K3	0.22BSC			0.009BSC		
K4	0.40BSC			0.016BSC		
K5	0.20BSC			0.008BSC		
L	0.25	0.30	0.35	0.010	0.012	0.014

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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