



# ACE1421M

## P-Channel 20-V MOSFET

### Description

The ACE1421M 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

- Load Switches
- DC/DC Conversion
- Motor Drives

### Absolute Maximum Ratings

Parameter		Symbol	Limit	Units
Drain-Source Voltage		$V_{DS}$	-20	V
Gate-Source Voltage		$V_{GS}$	$\pm 8$	V
Continuous Drain Current <sup>a</sup>	$T_A=25^\circ\text{C}$	$I_D$	-8.8	A
	$T_A=70^\circ\text{C}$		-7	
Pulsed Drain Current <sup>b</sup>		$I_{DM}$	-40	A
Continuous Source Current (Diode Conduction) <sup>a</sup>		$I_S$	-5	A
Power Dissipation <sup>a</sup>	$T_A=25^\circ\text{C}$	$P_D$	3	W
	$T_A=70^\circ\text{C}$		1.9	
Operating temperature / storage temperature		$T_J/T_{STG}$	-55~150	$^\circ\text{C}$

### THERMAL RESISTANCE RATINGS

Parameter		Symbol	Maximum	Units
Maximum Junction-to-Ambient <sup>a</sup>	$t \leq 10 \text{ sec}$	$R_{\theta JA}$	40	$^\circ\text{C/W}$
	Steady State		90	

#### Notes

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

b. Pulse width limited by maximum junction temperature

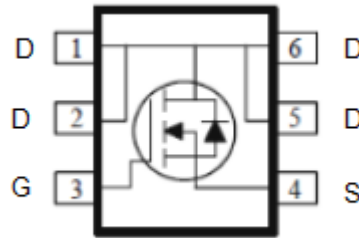
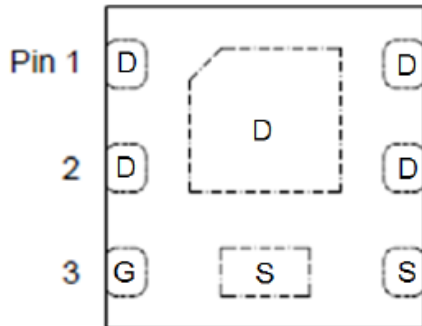


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## P-Channel 20-V MOSFET

### Packaging Type

DFN2\*2-6L



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

### Ordering information

ACE1421M MN + H

- └─ Halogen - free
- └─ Pb - free
- └─ MN : DFN2\*2-6L



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### Electrical Characteristics

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static</b>						
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250 \mu\text{A}$	0.4			V
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 8 \text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 24 \text{ V}, V_{GS} = 0 \text{ V}$			-1	uA
		$V_{DS} = -16 \text{ V}, V_{GS} = 0 \text{ V}, T_J = 55^{\circ}\text{C}$			-25	
On-State Drain Current	$I_{D(on)}$	$V_{DS} = -5 \text{ V}, V_{GS} = -4.5 \text{ V}$	-12			A
Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS} = -4.5 \text{ V}, I_D = -7 \text{ A}$			26	m $\Omega$
		$V_{GS} = -2.5 \text{ V}, I_D = -5.6 \text{ A}$			34	
Forward Transconductance	$g_{FS}$	$V_{DS} = -15 \text{ V}, I_D = -7 \text{ A}$		8		S
Diode Forward Voltage	$V_{SD}$	$I_S = -2.5 \text{ A}, V_{GS} = 0 \text{ V}$		0.68		V
<b>Dynamic</b>						
Total Gate Charge	$Q_g$	$V_{DS} = -10 \text{ V}, V_{GS} = -4.5 \text{ V}, I_D = -7 \text{ A}$		30		nC
Gate-Source Charge	$Q_{gs}$			4		
Gate-Drain Charge	$Q_{gd}$			6		
Turn-On Delay Time	$t_{d(on)}$	$V_{DS} = -10 \text{ V}, R_L = 1.4 \Omega, I_D = -7 \text{ A},$ $V_{GEN} = -4.5 \text{ V}, R_{GEN} = 6 \Omega$		6		ns
Rise Time	$t_r$			12		
Turn-Off Delay Time	$t_{d(off)}$			85		
Fall Time	$t_f$			35		
Input Capacitance	$C_{iss}$	$V_{DS} = -15 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ Mhz}$		1435		pF
Output Capacitance	$C_{oss}$			126		
Reverse Transfer Capacitance	$C_{rss}$			113		

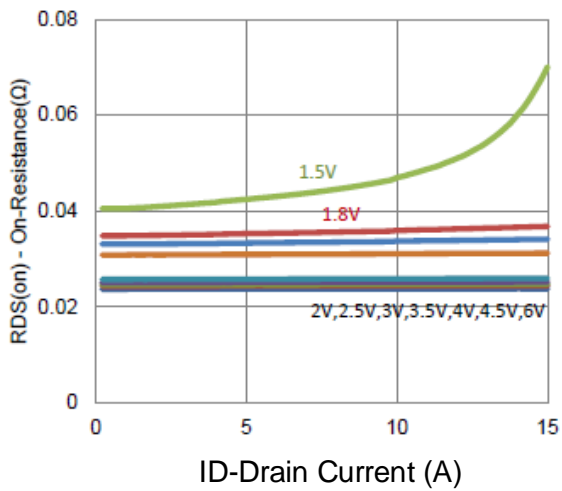
Note :

- a. Pulse test: PW  $\leq 300\mu\text{s}$  duty cycle  $\leq 2\%$ .
- b. Guaranteed by design, not subject to production testing

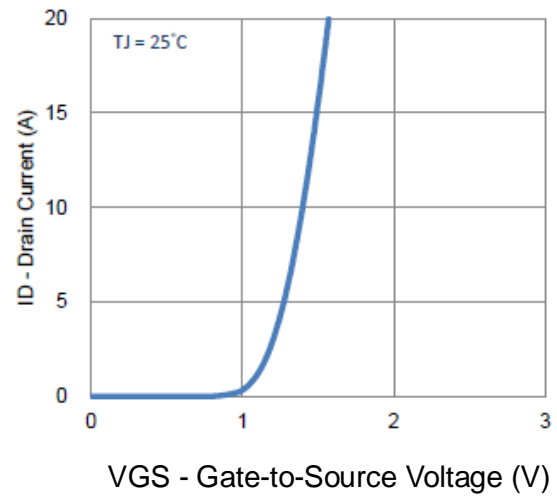


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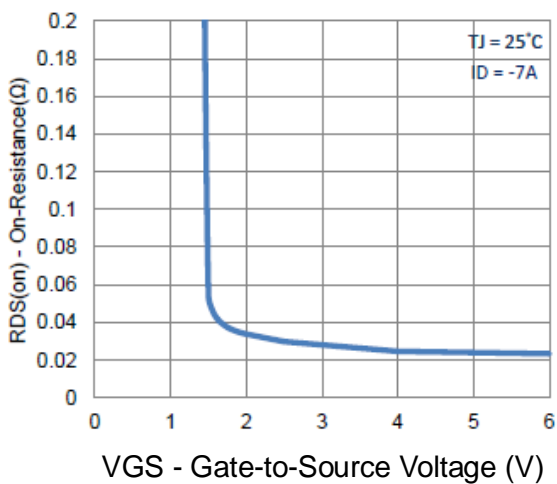
## Typical Performance Characteristics



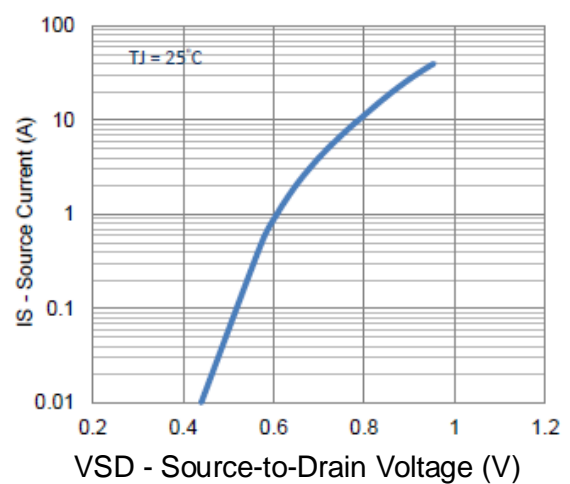
1. On-Resistance vs. Drain Current



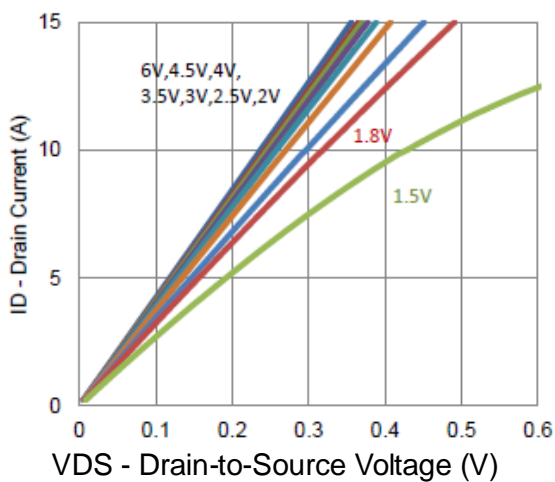
2. Transfer Characteristics



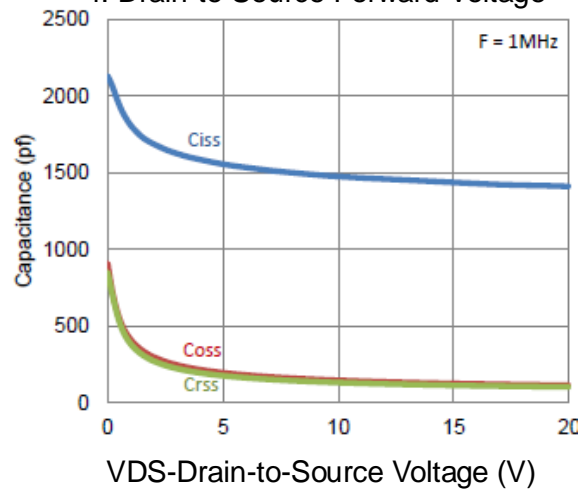
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage



5. Output Characteristics

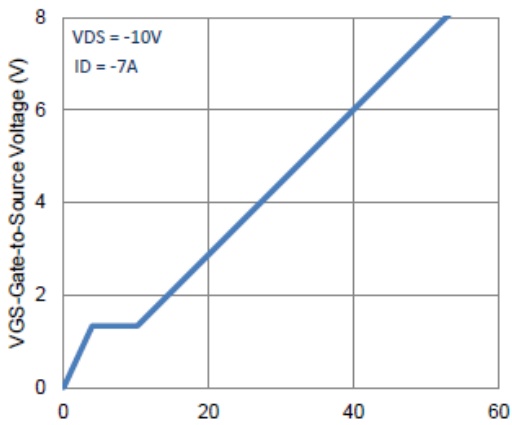


6. Capacitance

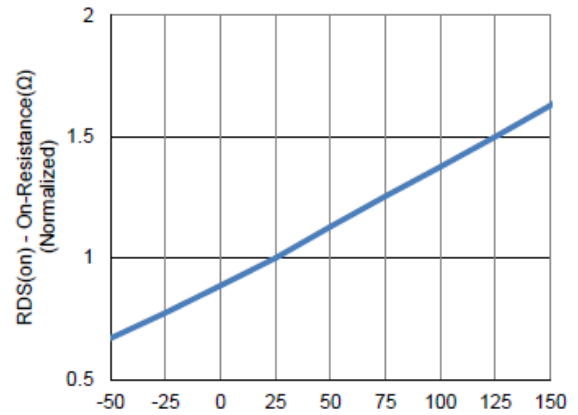


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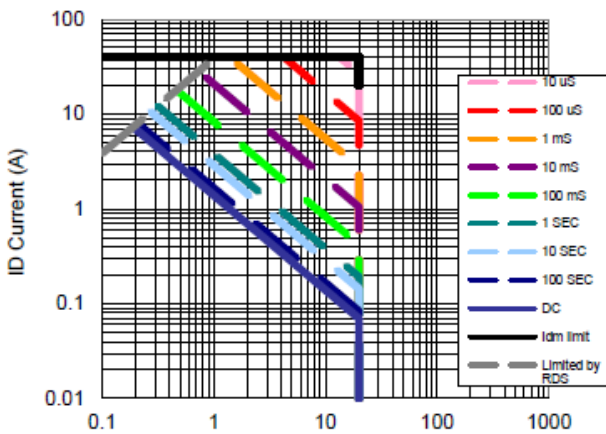
## Typical Performance Characteristics



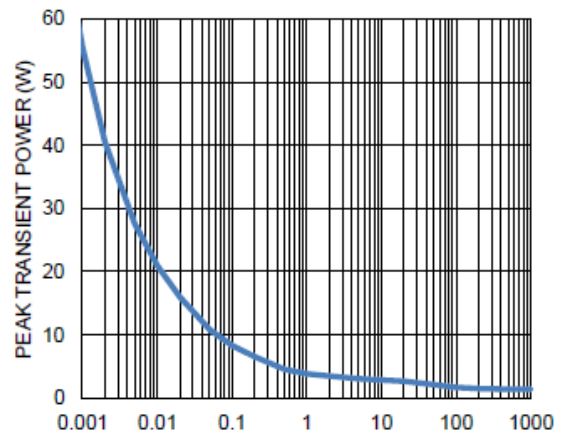
7. Gate Charge



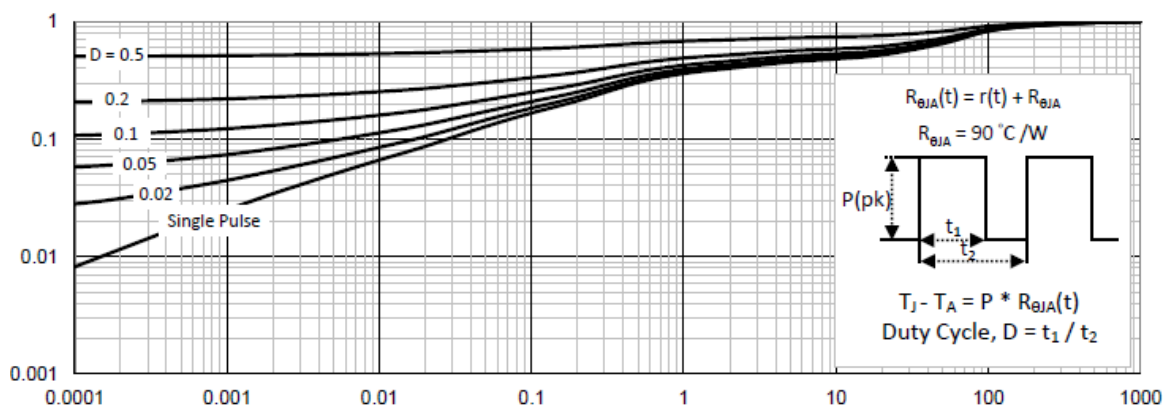
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area



10. Single Pulse Maximum Power Dissipation



11. Normalized Thermal Transient Junction to Ambient

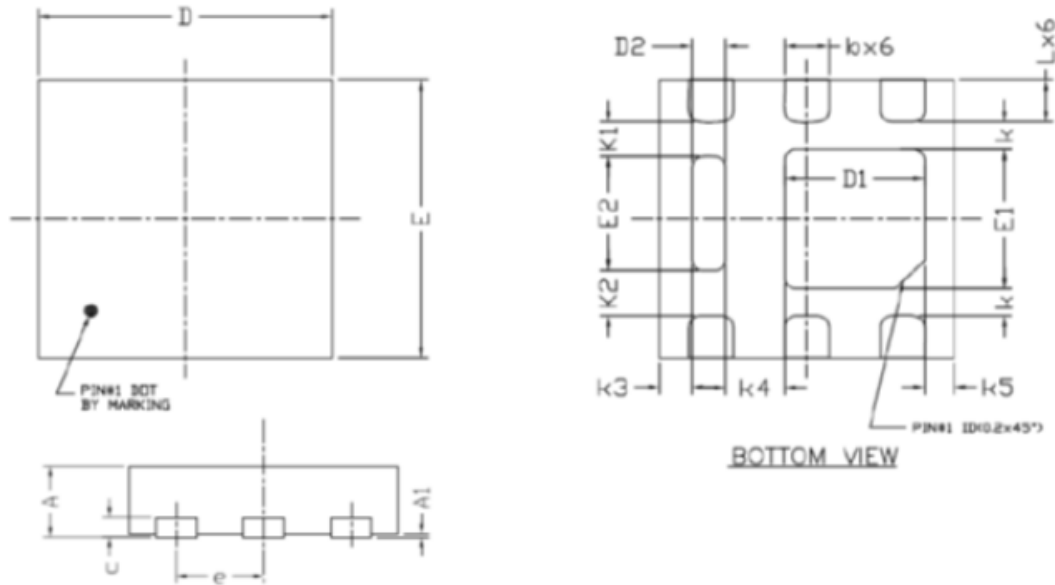


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### Packing Information

#### 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



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### 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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