DESCRIPTION

AM4185 is available in TO-220F package.

FEATURES

- -40V/-36A,
  $R_{DS(ON)}$= 17mΩ(max.) @ V_{GS}=-10V
  $R_{DS(ON)}$= 25mΩ(max.) @ V_{GS}=-4.5V
- 100% UIS + R_g Tested
- Reliable and Rugged
- Available in TO-220F package.

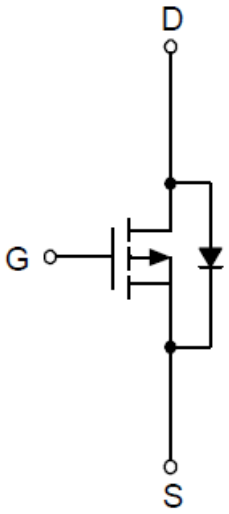
ORDERING INFORMATION

Package Type	Part Number	
TO-220F SPQ: 50pcs/Tube	T3F	AM4185T3FU
		AM4185T3FVU
Note	V: Halogen free Package U: Tube	
AiT provides all RoHS products		

APPLICATION

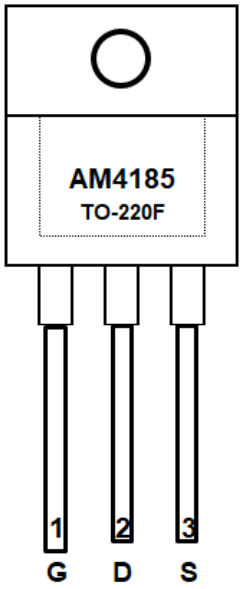
- Power Management in LCD TV Inverter.

PIN DESCRIPTION



N-Channel MOSFET

PIN DESCRIPTION



Top View

Pin #	Symbol	Function
1	G	Gate
2	D	Drain
3	S	Source

ABSOLUTE MAXIMUM RATINGS

T_A = 25°C, unless otherwise noted

V_{DSS}, Drain-Source Voltage		-40V
V_{GSS}, Gate-Source Voltage		±25V
I_D[NOTE3], Continuous Drain Current (V_{GS}=-10V)	T_C=25°C	-36A
	T_C=100°C	-23A
I_{DP}[NOTE3], 300μs Pulsed Drain Current Tested	T_C=25°C	-145A
I_S[NOTE3], Diode Continuous Forward Current		-18A
I_{AS}[NOTE2], Avalanche Current, Single Pulse	L=0.1mH	-30A
	L=1mH	-13A
E_{AS}[NOTE2], Avalanche Energy, Single Pulse	L=0.1mH	45mJ
	L=1mH	84mJ
T_J, Maximum Junction Temperature		150°C
T_{STG}, Storage Temperature Range		-55°C~+150°C
P_D[NOTE1], Maximum Power Dissipation	T_A=25°C	6.3W
	T_A=70°C	4.0W
P_D[NOTE3], Maximum Power Dissipation	T_C=25°C	38W
	T_C=100°C	15W
$R_{\theta JA}$[NOTE1], Thermal Resistance-Junction to Ambient	t ≤ 10s	20°C/W
	Steady State	62.5°C/W
$R_{\theta JC}$[NOTE3], Thermal Resistance-Junction to Case	Steady State	3.3°C/W

Stress beyond above listed “Absolute Maximum Ratings” may lead permanent damage to the device. These are stress ratings only and operations of the device at these or any other conditions beyond those indicated in the operational sections of the specifications are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

NOTE1: Surface Mounted on 1in^2 pad area, t ≤ 10sec. $R_{\theta JA}$ steady state t = 100s.

NOTE2: UIS tested and pulse width limited by maximum junction temperature 150°C (initial temperature T_J=25°C).

NOTE3: The power dissipation P_D is based on $T_{J(MAX)}$ = 150°C, and it is useful for reducing junction-to-case thermal resistance ($R_{\theta JC}$) when additional heat sink is used.

ELECTRICAL CHARACTERISTICS

T_A = 25°C, unless otherwise noted

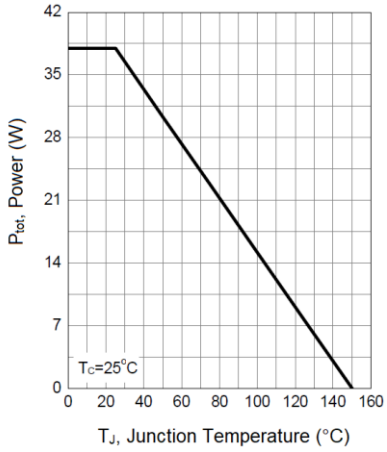
Parameter	Symbol	Conditions	Min	Typ.	Max	Units
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_{DS}=-250μA	-40	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-32V, V_{GS}=0V	-	-	-1	μA
		T_J=85°C	-	-	-30	
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_{DS}=-250μA	-1.4	-1.9	-2.4	V
Gate Leakage Current	I_{GSS}	V_{GS}=±25V, V_{DS}=0V	-	-	±100	nA
Drain-Source On-state Resistance	$R_{DS(ON)}$ NOTE4	V_{GS}=-10V, I_{DS}=-15A	-	13	17	mΩ
		V_{GS}=-4.5V, I_{DS}=-10A	-	19	25	
Diode Characteristics						
Diode Forward Voltage	V_{SD} NOTE4	I_{SD}=-1A, V_{GS}=0V	-	-0.75	-1	V
Reverse Recovery Time	t_{rr}	I_{SD}=-15A, dI_{SD}/dt=100A/μs	-	24	-	ns
Reverse Recovery Charge	Q_{rr}		-	18	-	nC
Dynamic CharacteristicsNOTE5						
Gate Resistance	R_G	V_{GS}=0V,V_{DS}=0V, f=1MHz	-	2.5	5	Ω
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=-20V, Frequency=1.0MHz	-	1500	1950	pF
Output Capacitance	C_{oss}		-	220	-	
Reverse Transfer Capacitance	C_{rss}		-	175	-	
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-20V, R_L=20Ω, I_{DS}=-1A, V_{GEN}=-10V, R_G=6Ω	-	14	25	ns
Turn-on Rise Time	t_r		-	12	22	
Turn-off Delay Time	$t_{d(off)}$		-	41	74	
Turn-off Fall Time	t_f		-	22	40	
Gate Charge CharacteristicsNOTE5						
Total Gate Charge	Q_g	V_{DS}=-20V, V_{GS}=-10V, I_{DS}=-15A	-	33	46	nC
Gate-Source Charge	Q_{gs}		-	5	-	
Gate-Drain Charge	Q_{gd}		-	9	-	

NOTE5: Pulse test; pulse width≤300μs, duty cycle≤2%.

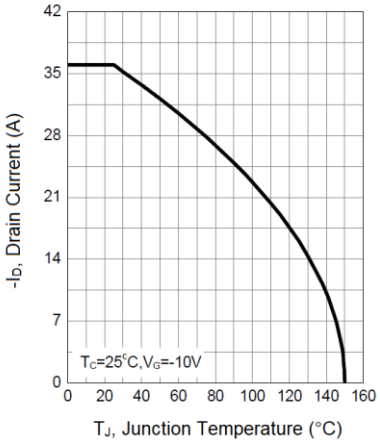
NOTE6: Guaranteed by design, not subject to production testing.

TYPICAL CHARACTERISTICS

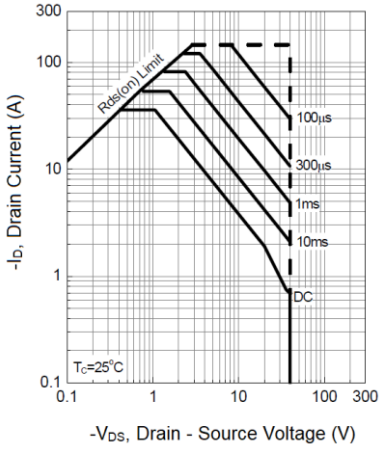
1. Power Dissipation



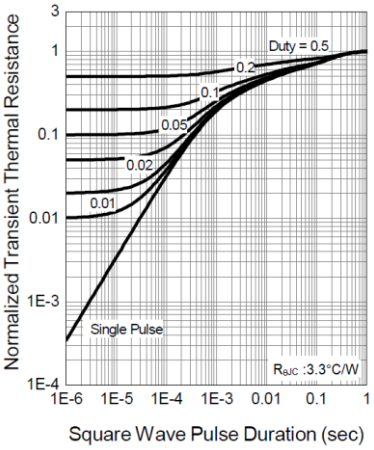
2. Drain Current



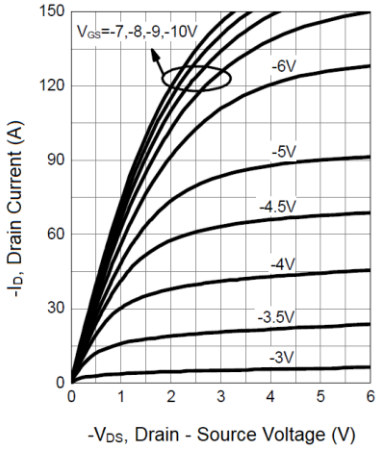
3. Safe Operation Area



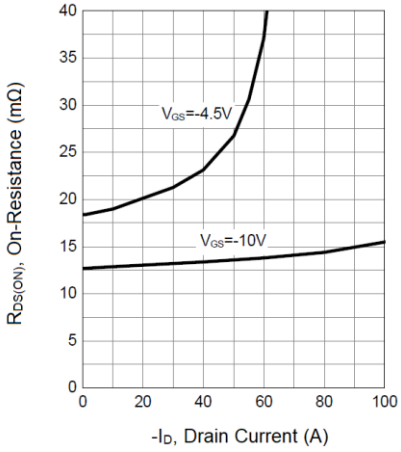
4. Thermal Transient Impedance



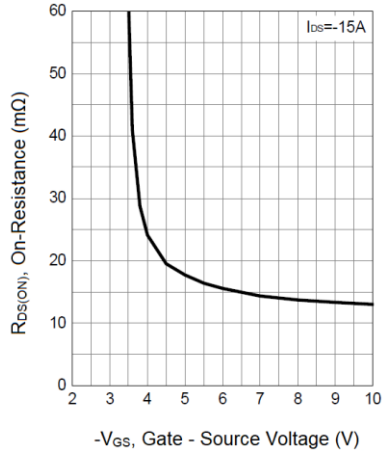
5. Output Characteristics



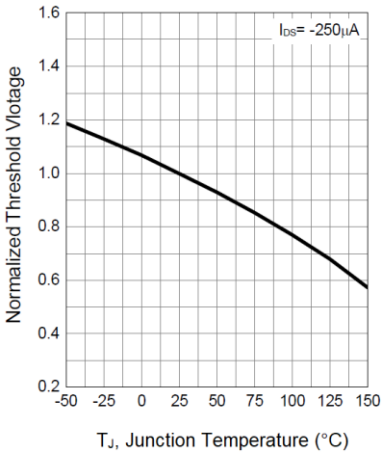
6. Drain-Source On Resistance



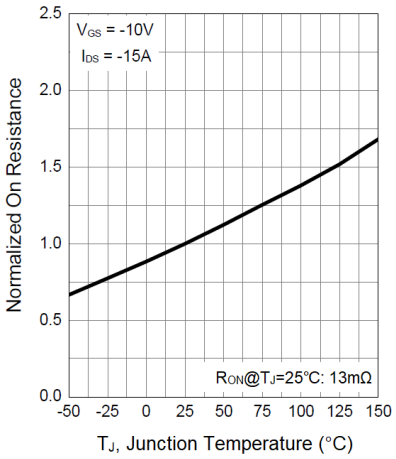
7. Gate-Source On Resistance



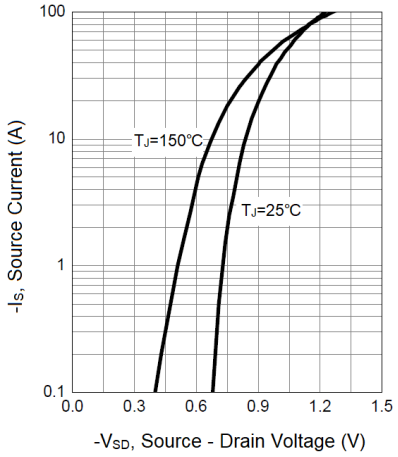
8. Gate Threshold Voltage



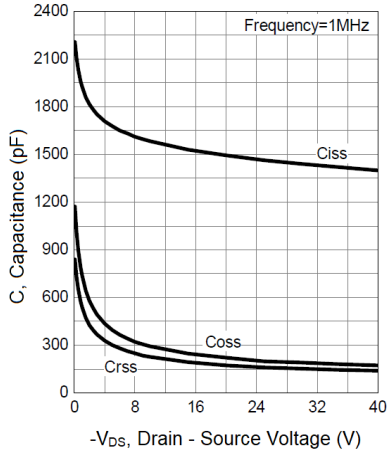
9. Drain-Source On Resistance



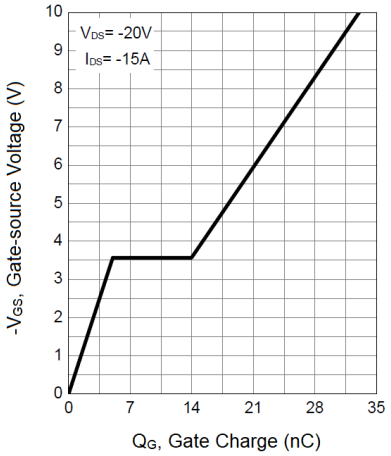
10. Source-Drain Diode Forward



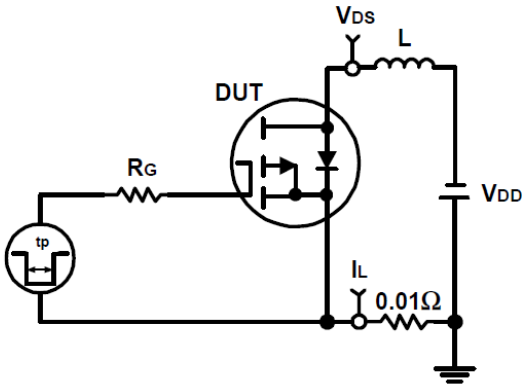
11. Capacitance

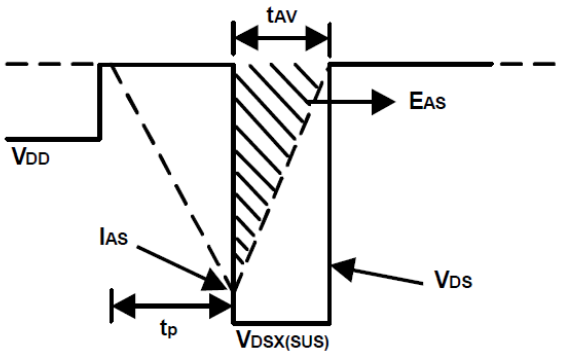


12. Gate Charge

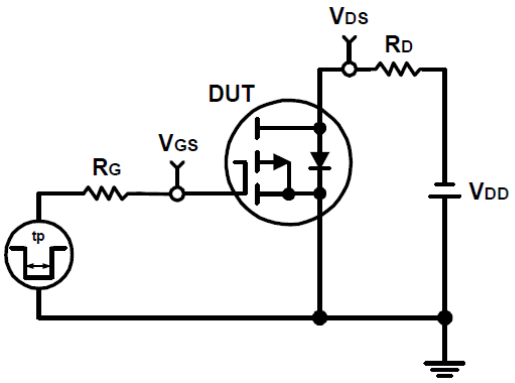


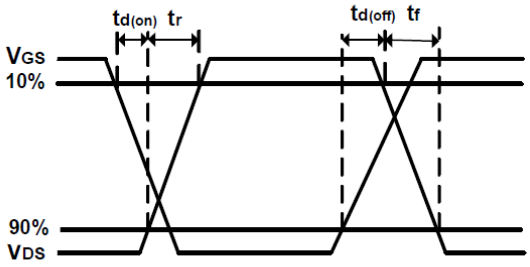
Avalanche Test Circuit and Waveforms





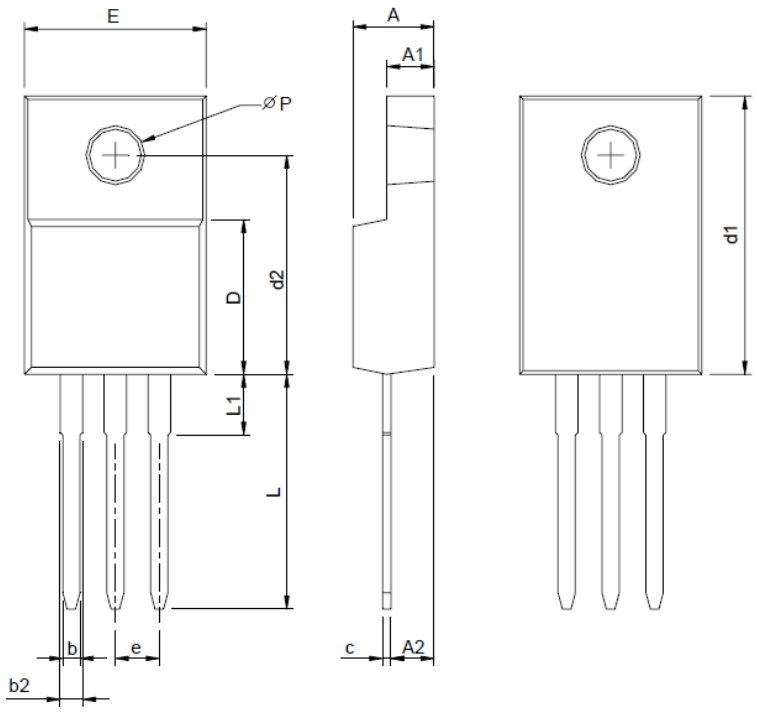
Switching Time Test Circuit and Waveforms



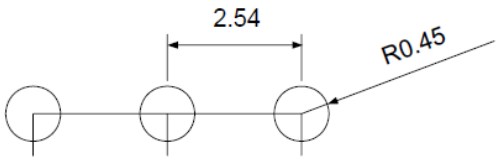


PACKAGE INFORMATION

Dimension in TO-220F Package (Unit: mm)



RECOMMENDED LAND PATTERN



UNIT: mm

Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.20	4.80	0.165	0.189
A1	2.34	3.20	0.092	0.126
A2	2.10	2.90	0.083	0.114
b	0.50	0.90	0.020	0.035
b2	0.91	1.90	0.035	0.075
c	0.30	0.80	0.012	0.031
D	8.10	9.40	0.319	0.370
d1	14.50	16.50	0.571	0.650
d2	12.10	12.90	0.476	0.508
E	9.70	10.70	0.382	0.421
e	2.54 BSC		0.100 BSC	
L	13.00	14.50	0.512	0.570
L1	1.60	4.00	0.063	0.157
P	3.00	3.60	0.118	0.142

IMPORTANT NOTICE

AiT Semiconductor Inc. (AiT) reserves the right to make changes to any its product, specifications, to discontinue any integrated circuit product or service without notice, and advises its customers to obtain the latest version of relevant information to verify, before placing orders, that the information being relied on is current.

AiT Semiconductor Inc.'s integrated circuit products are not designed, intended, authorized, or warranted to be suitable for use in life support applications, devices or systems or other critical applications. Use of AiT products in such applications is understood to be fully at the risk of the customer. As used herein may involve potential risks of death, personal injury, or server property, or environmental damage. In order to minimize risks associated with the customer's applications, the customer should provide adequate design and operating safeguards.

AiT Semiconductor Inc. assumes to no liability to customer product design or application support. AiT warrants the performance of its products of the specifications applicable at the time of sale.