DESCRIPTION

The AM3413 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 1.8V. This device is suitable for use as a load switch or in PWM applications.

AM3413 is available in a SOT-23 package.

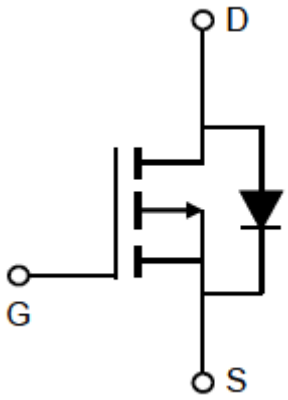
FEATURES

- V_{DS} = -20V
- I_D = -3A (V_{GS} = -4.5V)
- $R_{DS(ON)}$ < 80mΩ (V_{GS} =- 4.5V)
- $R_{DS(ON)}$ < 100mΩ (V_{GS} = -2.5V)
- $R_{DS(ON)}$ < 130mΩ (V_{GS} = -1.8V)
- Available in a SOT-23 package.

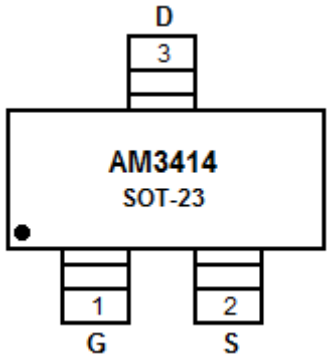
ORDERING INFORMATION

Package Type	Part Number	
SOT-23	E3	AM3413E3R
		AM3413E3VR
Note	V: Halogen free Package R: Tape & Reel	
AiT provides all RoHS products Suffix " V " means Halogen free Package		

PIN DESCRIPTION



PIN DESCRIPTION



Top View

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

ABSOLUTE MAXIMUM RATINGS

T_A = 25°C, unless otherwise noted

V_{DS}, Drain-Source Voltage		-20V
V_{GS}, Gate-Source Voltage		±8V
I_D, Continuous Drain Current NOTE1	T_A=25°C	-3A
	T_A=70°C	-2.4A
I_{DM}, Pulsed Drain Current NOTE2		-15A
P_D, Power Dissipation NOTE1	T_A=25°C	1.4W
	T_A=70°C	0.9W
T_J, T_{STG}, Junction and Storage Temperature Range		-55°C~150°C

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: The value of $R_{\theta JA}$ is measured with the device mounted on 1 in ^{2} FR-4 board with 2oz. copper, in a still air environment with T_A=25°C. The value in any given application depends on the user's specific board design. The current rating is based on the t ≤10s thermal resistance rating.

NOTE2: Repetitive rating, pulse width limited by junction temperature.

THERMAL CHARACTERISTICS

Parameter		Symbol	Typ.	Max	Units
Maximum Junction-to-Ambient NOTE1	t ≤ 10s	$R_{\theta JA}$	70	90	°C/W
	Steady-State		100	125	
Maximum Junction-to-Lead NOTE3	Steady-State	$R_{\theta JL}$	63	80	°C/W

NOTE3: The $R_{\theta JA}$ is the sum of the thermal impedence from junction to lead $R_{\theta JL}$ and lead to ambient.

ELECTRICAL CHARACTERISTICS

T_A = 25°C, unless otherwise noted

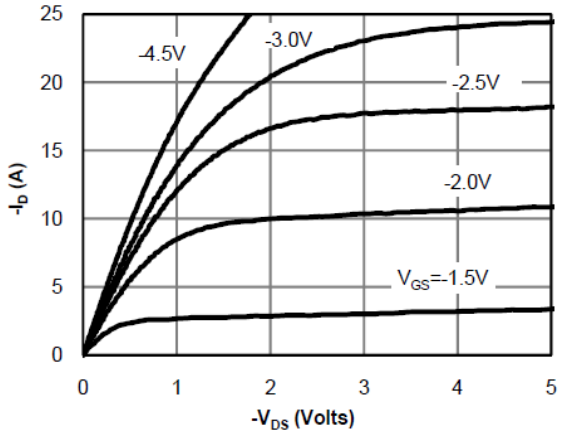
Parameter	Symbol	Conditions	Min	Typ.	Max	Units
Drain-Source Breakdown Voltage	BV_{DSS}	I_{DS}=-250μA, V_{GS}=0V	-20	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-20V,V_{GS}=0V	-	-	-1	μA
		T_J=55°C	-	-	-5	
Gate-Body leakage current	I_{GSS}	V_{DS}=0V, V_{GS}=±8V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_{DS}=-250μA	-0.4	-0.65	-1	V
On state drain current	$I_{D(ON)}$	V_{GS}=-4.5V, V_{DS}=-5A	-15	-	-	A
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=-4.5V,I_D=-3A	-	56	80	mΩ
		T_J=125°C	-	80	115	
		V_{GS}=-2.5V,I_D=-2.6A	-	70	100	
		V_{GS}=-1.8V,I_D=-1A	-	85	130	
Forward Transconductance	g_{FS}	V_{DS}=-5V, I_D=-3A	-	12	-	S
Diode Forward Voltage	V_{SD}	I_S=-1A,V_{GS}=0V	-	-0.7	-1	V
Maximum Body-Diode Continuous Current	I_S		-	-	-1.4	A
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	V_{GS}=0V,V_{DS}=-10V, f=1MHz	-	560	745	pF
Output Capacitance	C_{OSS}		-	80	-	
Reverse Transfer Capacitance	C_{RSS}		-	70	-	
Gate Resistance	R_G	V_{GS}=0V,V_{DS}=0V,f=1MHz	-	15	23	Ω
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	V_{GS}=-4.5V, V_{DS}=-10V, I_D≡-3A	-	8.5	11	nC
Gate Source Charge	Q_{GS}		-	1.2	-	
Gate Drain Charge	Q_{GD}		-	2.1	-	
Turn-On DelayTime	$t_{D(ON)}$	V_{GS}=-4.5V, V_{DS}=-10V, R_L=3.3Ω, R_{GEN}=6Ω	-	7.2	-	ns
Turn-On Rise Time	t_R		-	36	-	
Turn-Off DelayTime	$t_{D(OFF)}$		-	53	-	
Turn-Off Fall Time	t_F		-	56	-	
Body Diode Reverse Recovery Time	t_{rr}	I_F=-3A, dI/dt=100A/μs	-	37	49	ns
Body Diode Reverse Recovery Charge	Q_{rr}	I_F=-3A, dI/dt=100A/μs	-	27	-	nC

NOTE4: Pulse test; pulse width≤300μs, duty cycle≤2%.

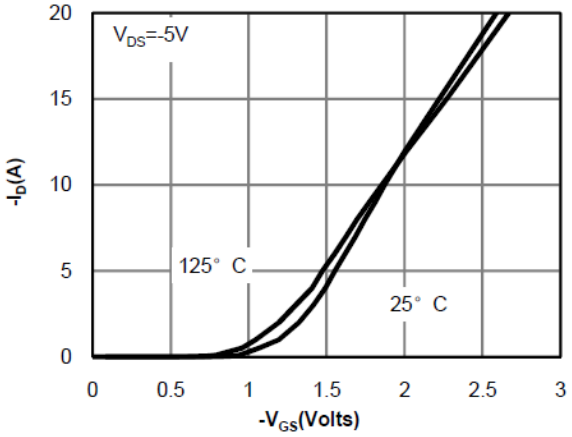
NOTE5: Guaranteed by design, not subject to production testing.

TYPICAL CHARACTERISTICS

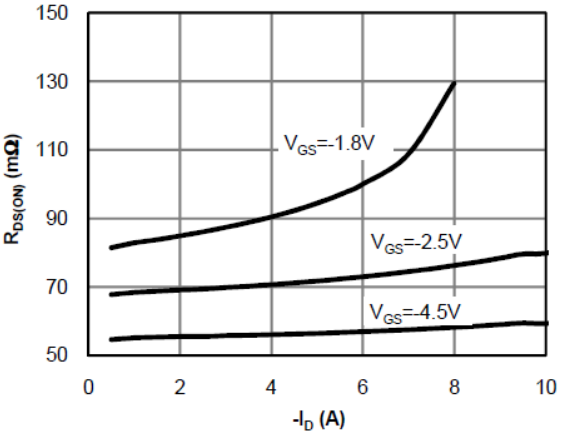
1. On-Region Characteristics



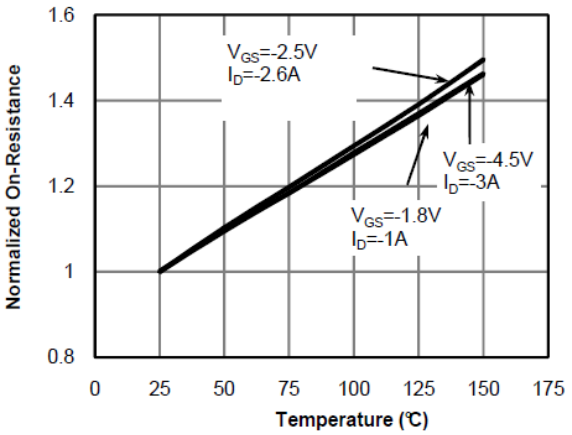
2. Transfer Characteristics



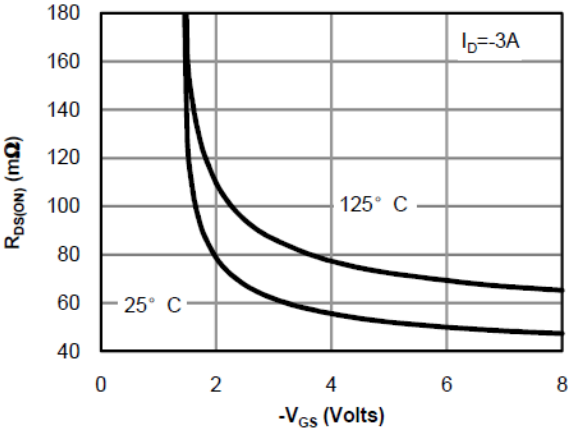
3. On-Resistance vs. Drain Current and Gate Voltage



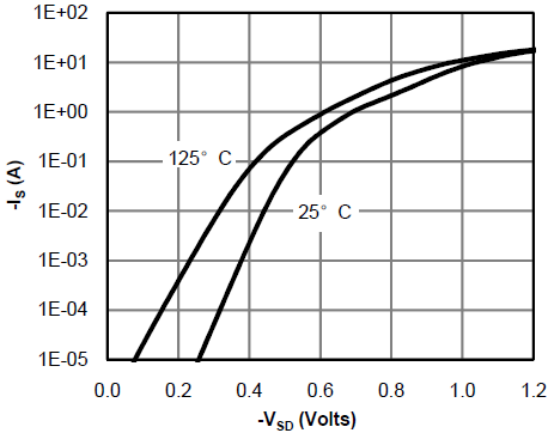
4. On-Resistance vs. Junction Temperature



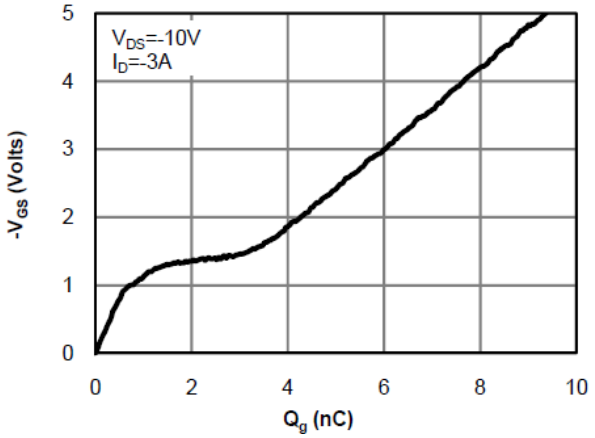
5. On-Resistance vs. Gate-Source Voltage



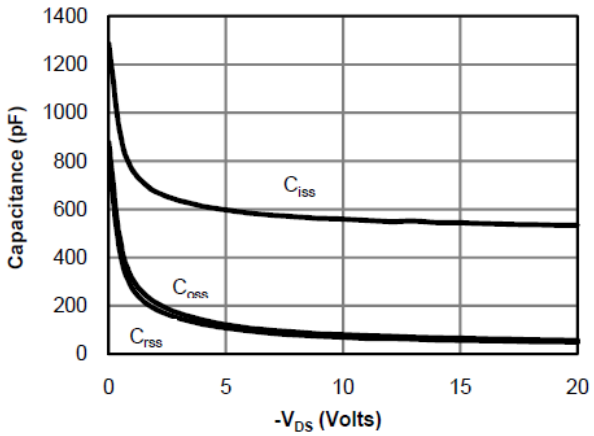
6. Body-Diode Characteristics



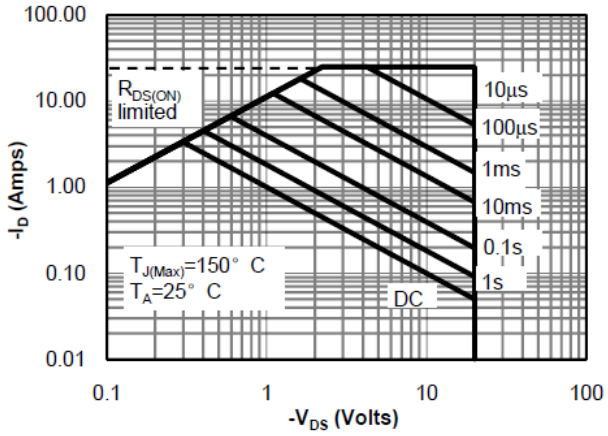
7. Gate-Charge Characteristics



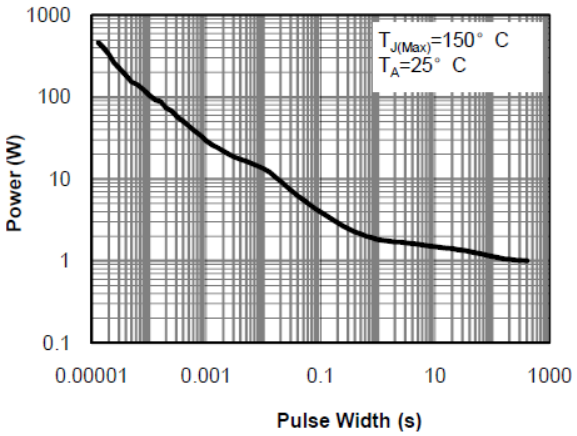
8. Capacitance Characteristics



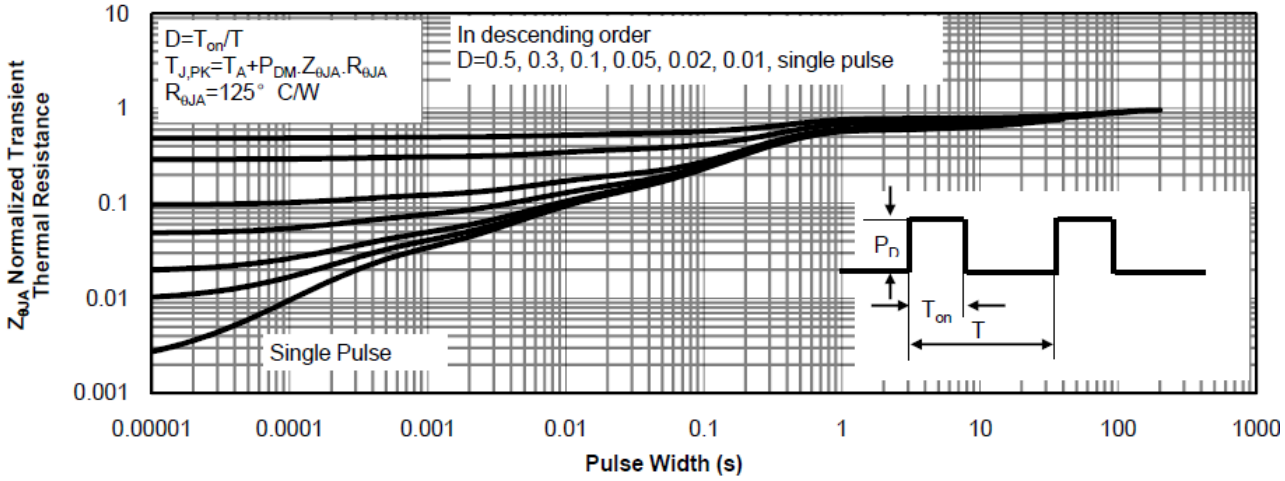
9. Maximum Forward Biased Safe Operating Area (NOTE5)



10. Single Pulse Power Rating Junctionto-Ambient (NOTE5)

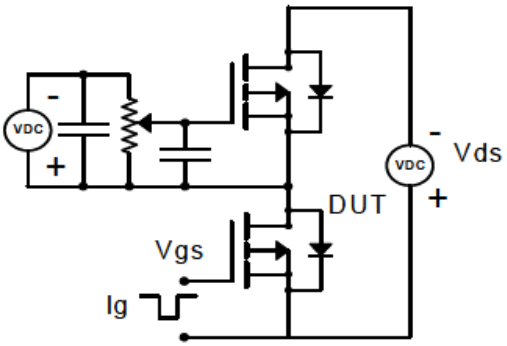


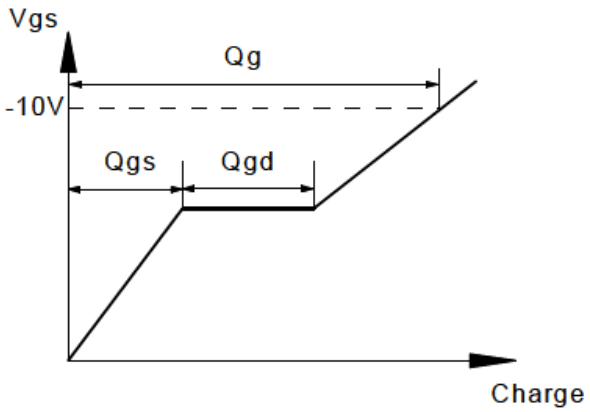
11. Normalized Maximum Transient Thermal Impedance (NOTE5)



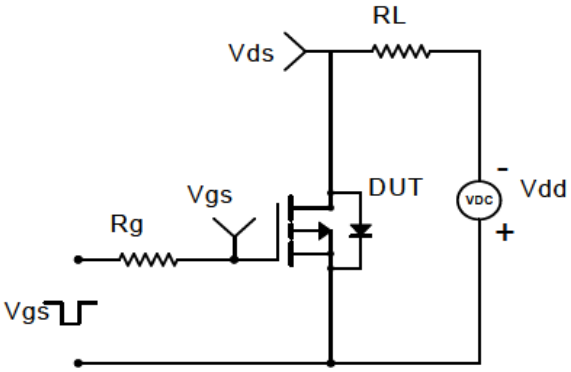
DETAILED INFORMATION

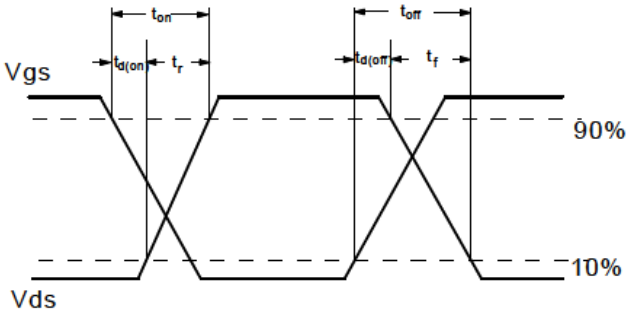
Gate Charge Test Circuit & Waveform



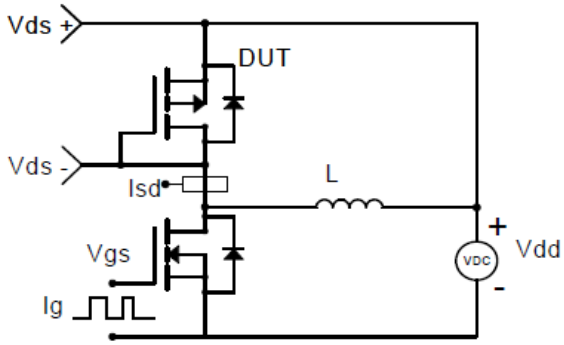


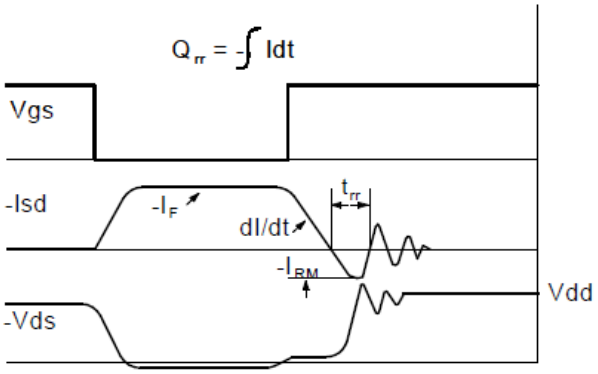
Resistive Switching Test Circuit & Waveforms





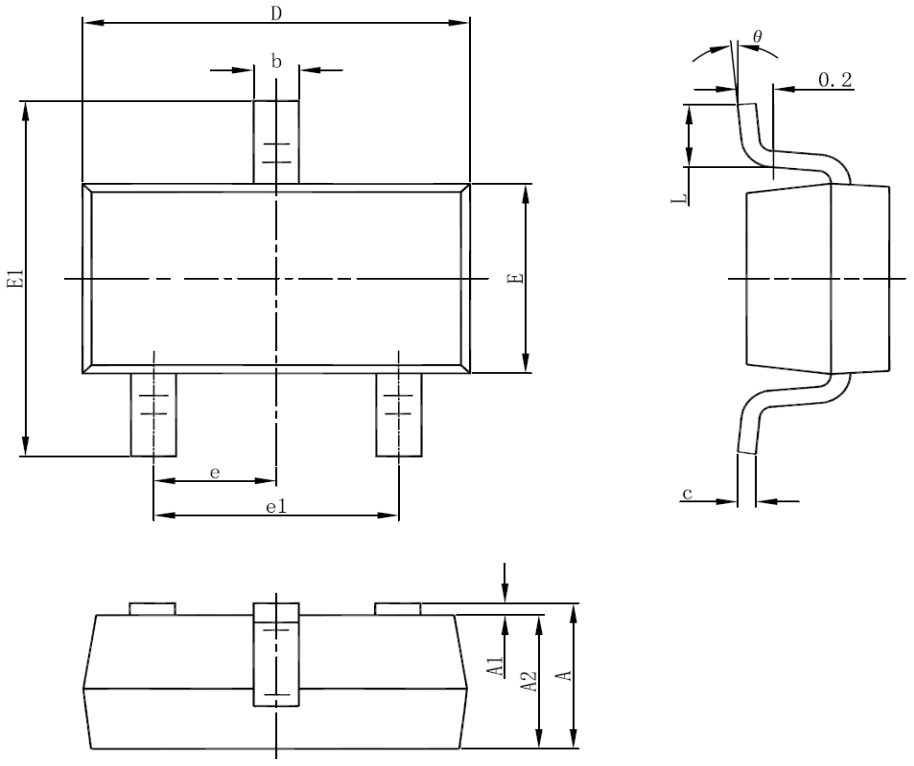
Diode Recovery Test Circuit & Waveforms





PACKAGE INFORMATION

Dimension in SOT-23 Package (Unit: mm)



SYMBOL	MIN	MAX
A	-	1.200
A1	0.000	0.080
A2	1.090	1.120
b	0.300	0.500
c	0.080	0.220
D	2.700	3.100
E	1.400	1.800
E1	2.600	3.000
e	0.950(BSC)	
e1	1.900(BSC)	
L	0.300	0.600
θ	0°	8°

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