

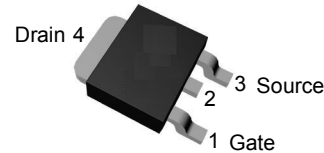
Features

- 100V/-38A,
 $R_{DS(ON)} = 39m\Omega(max.) @ V_{GS} = -10V$
 $R_{DS(ON)} = 49m\Omega(max.) @ V_{GS} = -4.5V$
- 100% UIS+Rg Tested
- Reliable and Rugged
- Lead Free and Green Devices Available
 (RoHS Compliant)

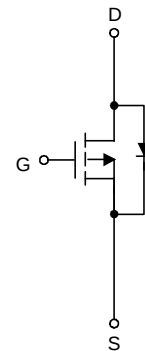
Applications

- Power Management for Industrial DC / DC Converters.

Pin Description



Top View of TO-252-2



P-Channel MOSFET

Ordering and Marking Information

SM1A33PS □□-□□□ Assembly Material Handling Code Temperature Range Package Code	Package Code U : TO-252-2 Operating Junction Temperature Range C : -55 to 150 °C Handling Code TR : Tape & Reel Assembly Material G : Halogen and Lead Free Device
SM1A33PS U :  SM1A33PS XXXXXX	XXXXX - Lot Code

Note: SINOPOWER lead-free products contain molding compounds/die attach materials and 100% matte tin plate termination finish; which are fully compliant with RoHS. SINOPOWER lead-free products meet or exceed the lead-free requirements of IPC/JEDEC J-STD-020D for MSL classification at lead-free peak reflow temperature. SINOPOWER defines "Green" to mean lead-free (RoHS compliant) and halogen free (Br or Cl does not exceed 900ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500ppm by weight).

SINOPOWER reserves the right to make changes to improve reliability or manufacturability without notice, and advise customers to obtain the latest version of relevant information to verify before placing orders.

Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$ Unless Otherwise Noted)

Symbol	Parameter		Rating	Unit
Common Ratings				
V _{DSS}	Drain-Source Voltage		-100	V
V _{GSS}	Gate-Source Voltage		±25	
T _J	Maximum Junction Temperature		150	°C
T _{STG}	Storage Temperature Range		-55 to 150	°C
I _S	Diode Continuous Forward Current		-19	A
I _{AS} ^a	Avalanche Current, Single pulse	L=0.5mH	-27	A
E _{AS} ^a	Avalanche Energy, Single pulse	L=0.5mH	182	mJ
I _{DP} ^b	Pulse Drain Current Tested	T _C =25°C	-152 ^c	A
I _D	Continuous Drain Current	T _C =25°C	-38	
		T _C =100°C	-24	
P _D	Maximum Power Dissipation	T _C =25°C	113	W
		T _C =100°C	45	
R _{θJC}	Thermal Resistance-Junction to Case		1.1	°C/W
I _D	Continuous Drain Current	T _A =25°C	-5.2	A
		T _A =70°C	-4.1	
P _D	Maximum Power Dissipation	T _A =25°C	2.1	W
		T _A =70°C	1.3	
R _{θJA} ^d	Thermal Resistance-Junction to Ambient	Steady State	60	°C/W

Note a: UIS tested and pulse width limited by maximum junction temperature 150°C (initial temperature $T_J=25^\circ\text{C}$).

Note b: Pulse width limited by max. junction temperature.

Note c: Wire limited.

Note d: $R_{\theta JA}$ steady state $t=999\text{s}$. $R_{\theta JA}$ is measured with the device mounted on 1in^2 , FR-4 board with 2oz. Copper.

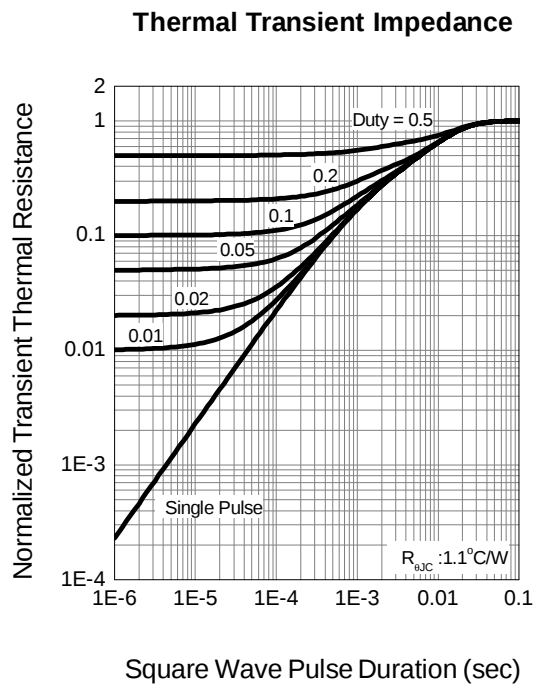
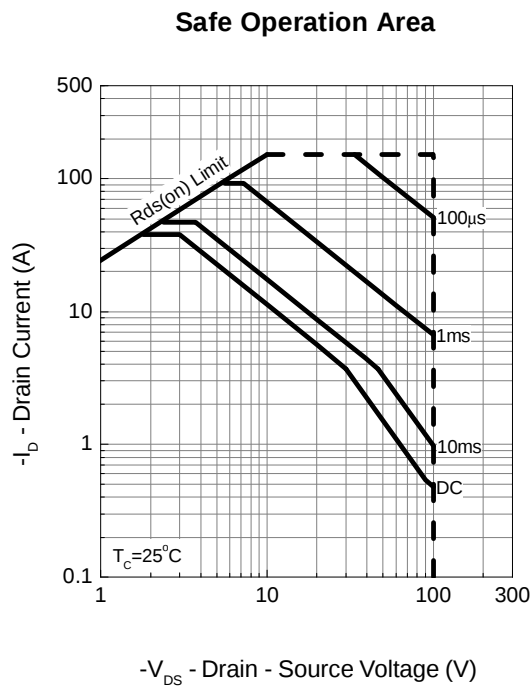
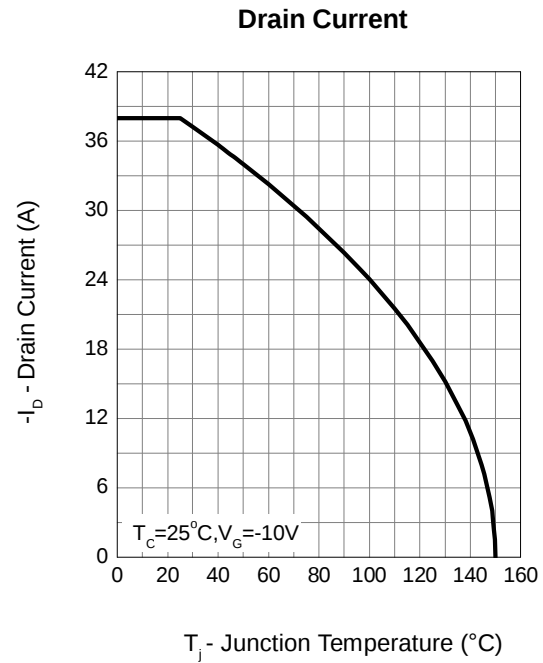
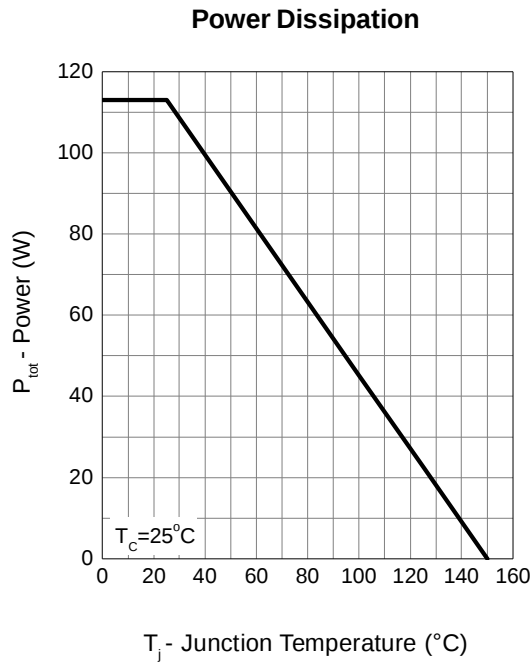
Electrical Characteristics (T_A = 25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =-250μA	-100	-	--	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-80V, V _{GS} =0V	-	-	-1	μA
		T _J =85°C	-	-	-30	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =-250μA	-1.5	-1.9	-2.5	V
I _{GSS}	Gate Leakage Current	V _{GS} =±25V, V _{DS} =0V		-	±100	nA
R _{DS(ON)} ^e	Drain-Source On-state Resistance	V _{GS} =-10V, I _{DS} =-15A	-	35	50	mΩ
		V _{GS} =-4.5V, I _{DS} =-10A	-	45	65	mΩ
Diode Characteristics			-			
V _{SD} ^e	Diode Forward Voltage	I _{SD} =-10A, V _{GS} =0V	-	-	-1.4	V
t _{rr}	Reverse Recovery Time	I _{SD} =-20A, dI _{SD} /dt=100A/μs	-	60	-	ns
Q _{rr}	Reverse Recovery Charge		-	95	-	nC
Dynamic Characteristics ^f						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz	-	3.4	6.8	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-30V, Frequency=1.0MHz	-	2467	3207	pF
C _{oss}	Output Capacitance		-	268	-	
C _{rss}	Reverse Transfer Capacitance		-	126	-	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =-30V, R _L =30Ω, I _{DS} =-1A, V _{GEN} =-10V, R _G =6Ω	-	15	27	ns
t _r	Turn-on Rise Time		-	8	14	
t _{d(OFF)}	Turn-off Delay Time		-	54	97	
t _f	Turn-off Fall Time		-	32	58	
Gate Charge Characteristics ^f						
Q _g	Total Gate Charge	V _{DS} =-50V, V _{GS} =-10V, I _{DS} =-20A	-	54	76	nC
Q _{gs}	Gate-Source Charge		-	10	-	
Q _{gd}	Gate-Drain Charge		-	13	-	

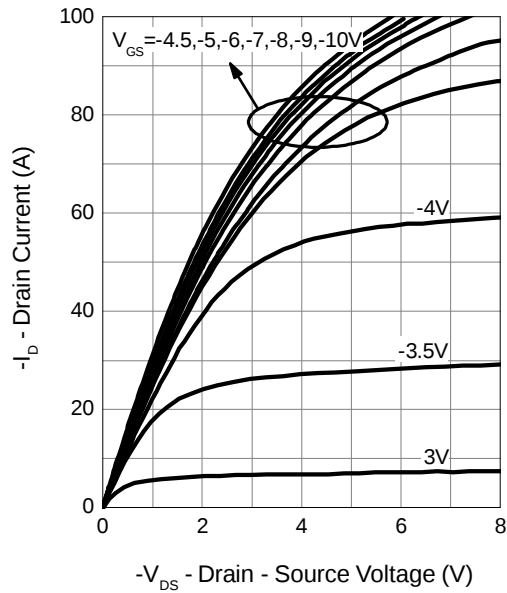
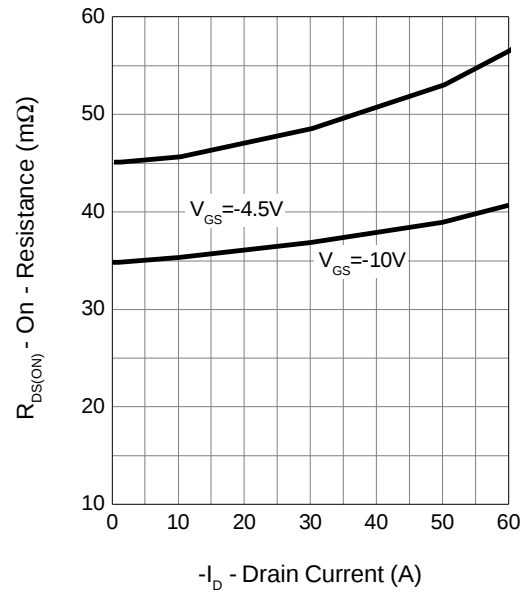
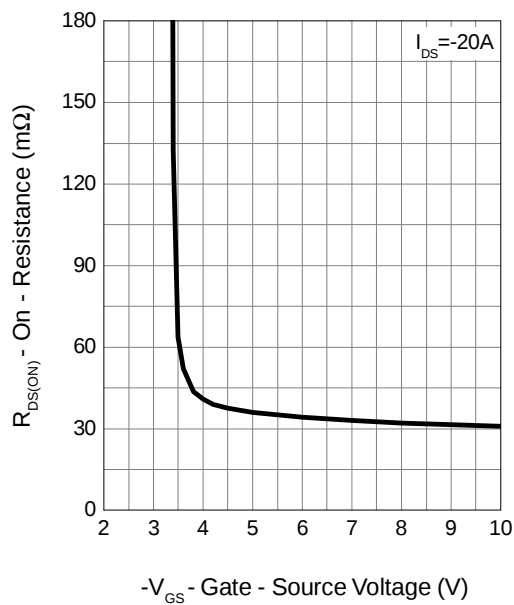
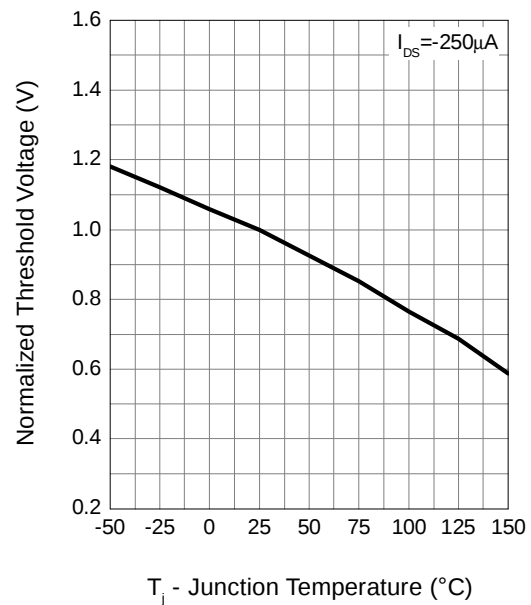
Note e: Pulse test; pulse width≤300μs, duty cycle≤2%.

Note f: Guaranteed by design, not subject to production testing.

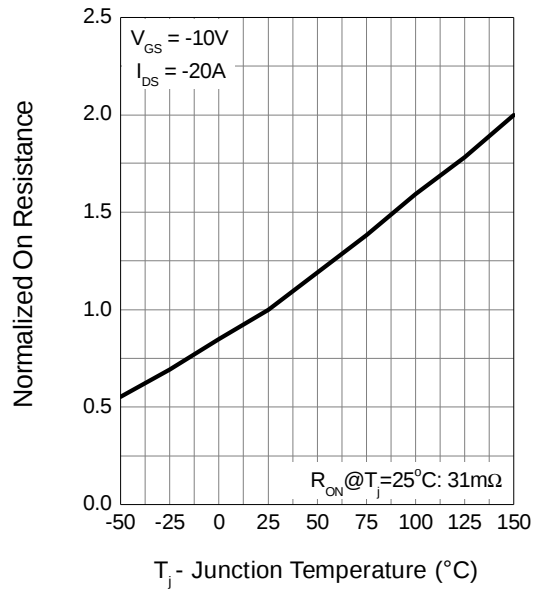
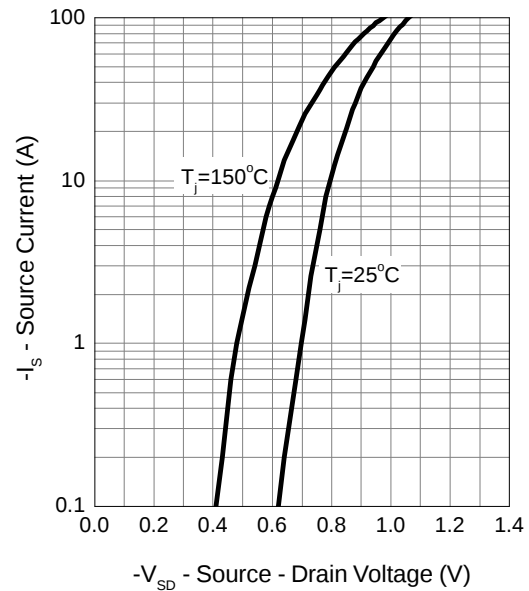
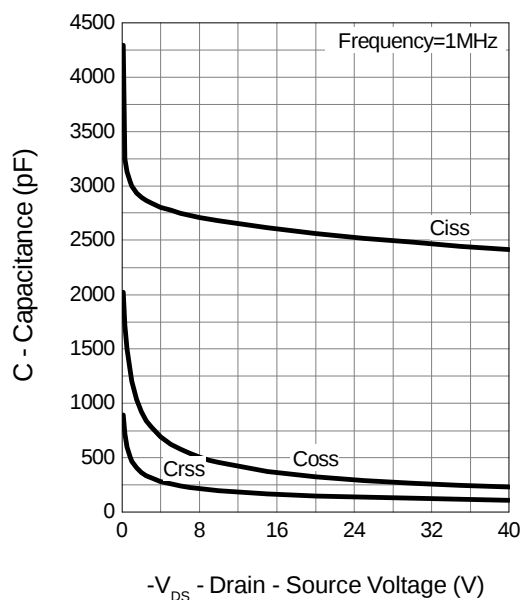
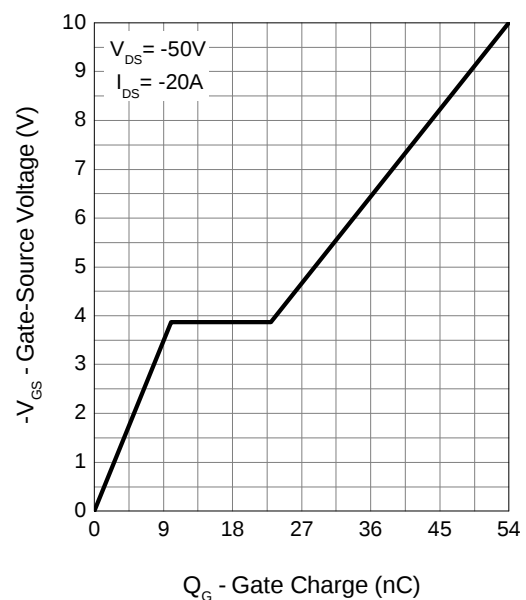
Typical Operating Characteristics



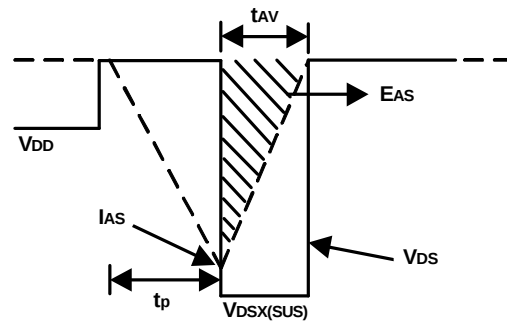
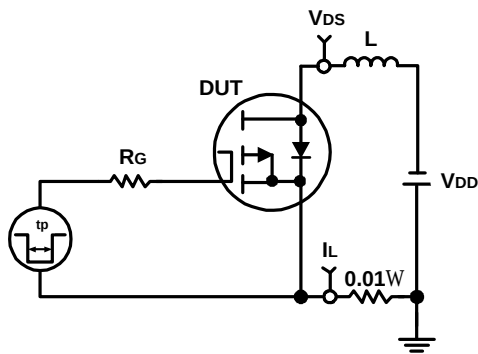
Typical Operating Characteristics (Cont.)

Output Characteristics

Drain-Source On Resistance

Gate-Source On Resistance

Gate Threshold Voltage


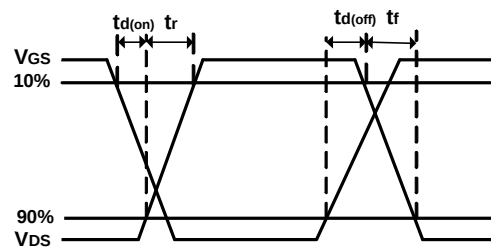
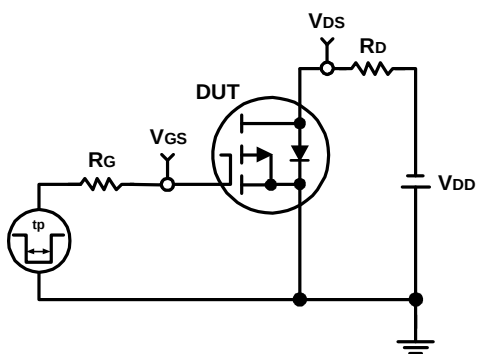
Typical Operating Characteristics (Cont.)

Drain-Source On Resistance

Source-Drain Diode Forward

Capacitance

Gate Charge


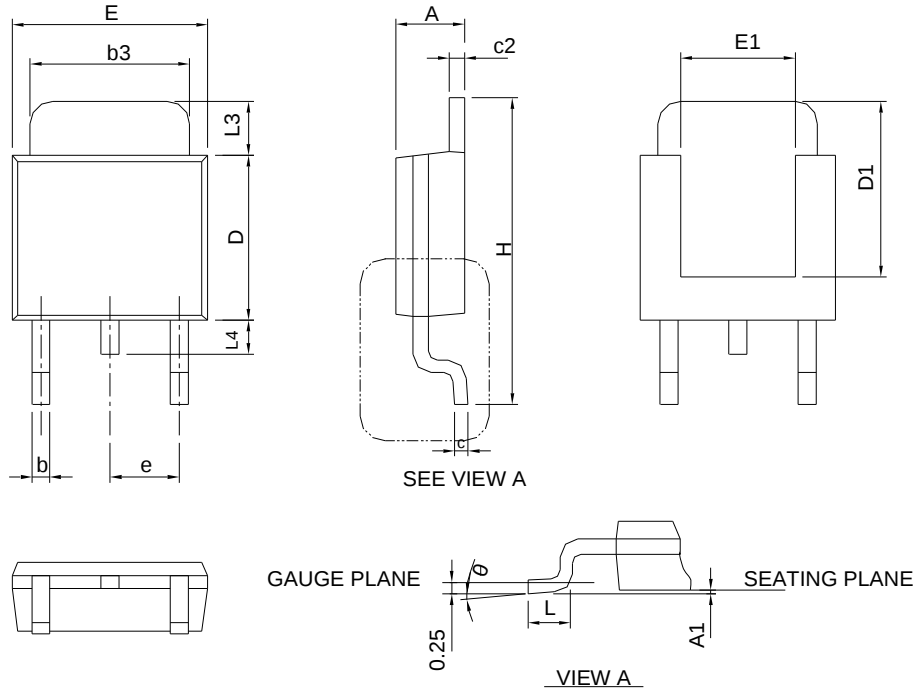
Avalanche Test Circuit and Waveforms



Switching Time Test Circuit and Waveforms



Package Information



	TO-252-2			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	2.18	2.39	0.086	0.094
A1	-	0.13	-	0.005
b	0.50	0.89	0.020	0.035
b3	4.95	5.46	0.195	0.215
c	0.46	0.61	0.018	0.024
c2	0.46	0.89	0.018	0.035
D	5.33	6.22	0.210	0.245
D1	4.57	6.00	0.180	0.236
E	6.35	6.73	0.250	0.265
E1	3.81	6.00	0.150	0.236
e	2.29 BSC		0.090 BSC	
H	9.40	10.41	0.370	0.410
L	0.90	1.78	0.035	0.070
L3	0.89	2.03	0.035	0.080
L4	-	1.02	-	0.040
θ	0°	8°	0°	8°

Note : Follow JEDEC TO-252 .

RECOMMENDED LAND PATTERN

