

Single P-Channel MOSFET

DESCRIPTION

SMC3401SN is the P-Channel trench technology devices are well suited for high efficiency fast switching applications, low in-line power loss needed in small outline surface mount package

PART NUMBER INFORMATION

SMC 3401 SN - TR G
 a b c d e

- a : Company name.
- b : Product Serial number.
- c : Package code SN: SOT-23
- d : Handling code TR: Tape&Reel
- e : Green produce code G: *RoHS Compliant*

FEATURES

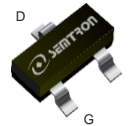
$V_{DS}=-30V$, $I_D=-4.3A$

$R_{DS(ON)}=42m\Omega(Typ.)@V_{GS}=-10V$
 $R_{DS(ON)}=48m\Omega(Typ.)@V_{GS}=-4.5V$
 $R_{DS(ON)}=62m\Omega(Typ.)@V_{GS}=-2.5V$

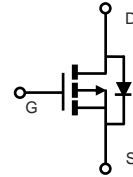
- ◆ Fast switch
- ◆ 2.5V Low gate drive applications

APPLICATIONS

- ◆ Portable Equipment
- ◆ Power Management
- ◆ Load Switch



SOT-23



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ C$ Unless otherwise noted)

Symbol	Parameter	Rating	Units	
V_{DSS}	Drain-Source Voltage	-30	V	
V_{GSS}	Gate-Source Voltage	± 12	V	
I_D	Continuous Drain Current ^A	$T_A=25^\circ C$	-4.3	A
		$T_A=70^\circ C$	-3.4	A
I_{DM}	Pulsed Drain Current ^B	-17.2	A	
P_D	Power Dissipation ^A	$T_A=25^\circ C$	1.3	W
		$T_A=70^\circ C$	0.8	W
T_J	Operation Junction Temperature	-55/150	$^\circ C$	
T_{STG}	Storage Temperature Range	-55/150	$^\circ C$	

THERMAL RESISTANCE

Symbol	Parameter	Typ	Max	Units
$R_{\theta JA}$	Thermal Resistance Junction to Ambient ^A	$t \leq 10s$	95	$^\circ C/W$
	Thermal Resistance Junction to Ambient ^{AC}	Steady-State	130	

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ Unless otherwise noted)

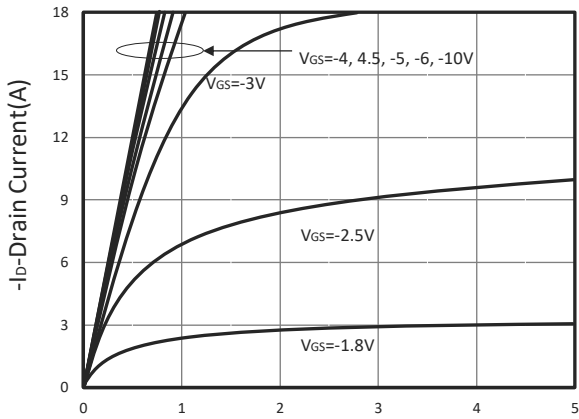
Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250 μ A	-30			V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250 μ A	-0.5	-0.7	-1	V
I _{GSS}	Gate Leakage Current	V _{DS} =0V, V _{GS} = \pm 12V			\pm 100	nA
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-30V, V _{GS} =0V, T _J =25 $^\circ$ C			-1	μ A
		V _{DS} =-24V, V _{GS} =0V, T _J =75 $^\circ$ C			-10	
R _{DS(ON)}	Drain-source On-Resistance ^D	V _{GS} =-10V, I _D =-4.3A		44	48	m Ω
		V _{GS} =-4.5V, I _D =-3.2A		50	58	
		V _{GS} =-2.5V, I _D =-2.2A		65	78	
G _{fs}	Forward Transconductance	V _{DS} =-10V, I _D =-4.3A		6		S
Diode Characteristics						
V _{SD}	Diode Forward Voltage ^D	I _S =-1A, V _{GS} =0V			-1	V
I _S	Diode Continuous Forward Current				-4.3	A
Dynamic and Switching Parameters ^E						
Q _g	Total Gate Charge	V _{DS} =-15V, V _{GS} =-10V I _D =-4.3A		25	35	nC
Q _g	Total Gate Charge(4.5V)		12.2	17.1		
Q _{gs}	Gate-Source Charge		2	2.8		
Q _{gd}	Gate-Drain Charge		3	4.2		
C _{iss}	Input Capacitance	V _{DS} =-15V, V _{GS} =0V, f=1MHz		915		pF
C _{oss}	Output Capacitance		71			
C _{rss}	Reverse Transfer Capacitance		60			
t _{d(on)}	Turn-On Time	V _{DD} =-15V, V _{GEN} =-10V R _G =3.3 Ω , I _D =-1A		6.2	12	nS
t _r			27	51		
t _{d(off)}	Turn-Off Time		23	44		
t _f			15	29		

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

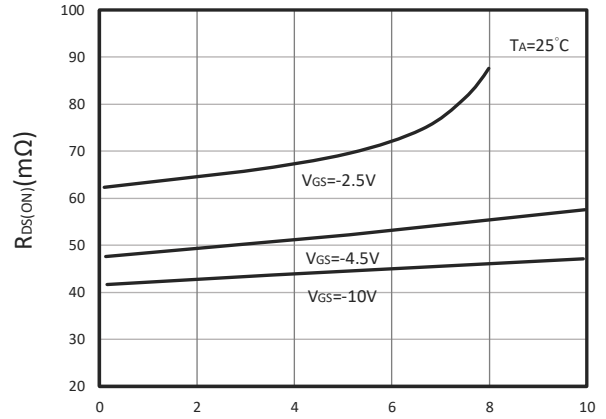
- Surface mounted on FR4 board using 1 in² pad size.
- Pulsed width limited by maximum junction temperature, T_{J(MAX)}=150 $^\circ$ C (initial temperature T_J=25 $^\circ$ C).
- Using \leq 10s junction-to-ambient thermal resistance is base on T_{J(MAX)}=150 $^\circ$ C.
- Pulse test width \leq 300 μ s and duty cycle \leq 2%.
- Guaranteed by design, not subject to production testing.

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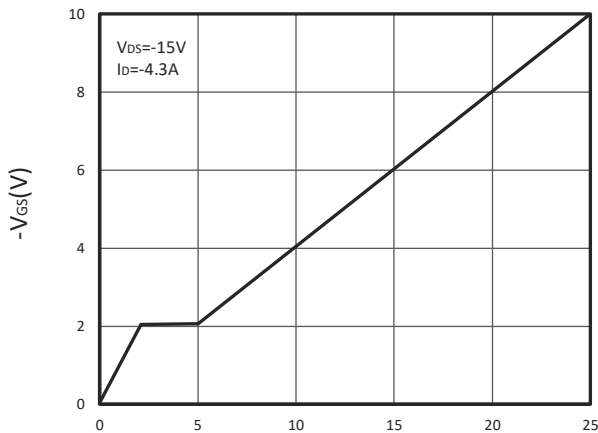
TYPICAL CHARACTERISTICS



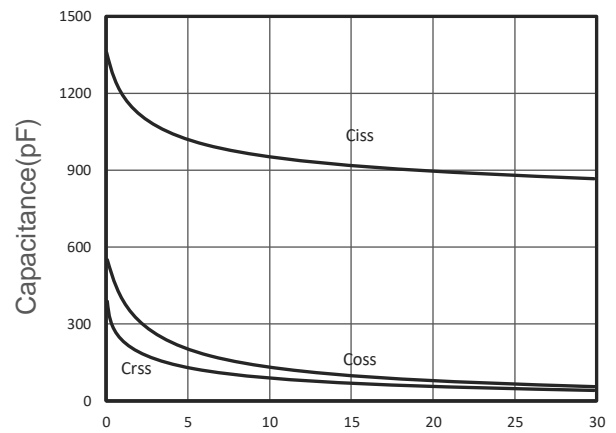
Output Characteristics



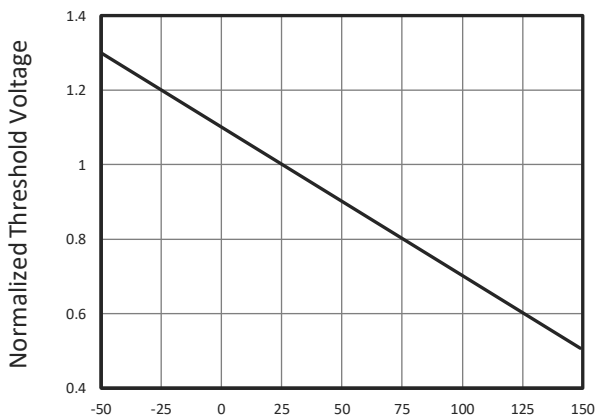
Drain-Source On Resistance



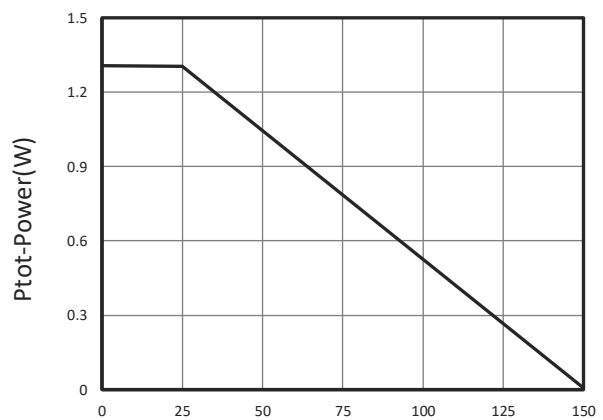
Gate Charge



Capacitance

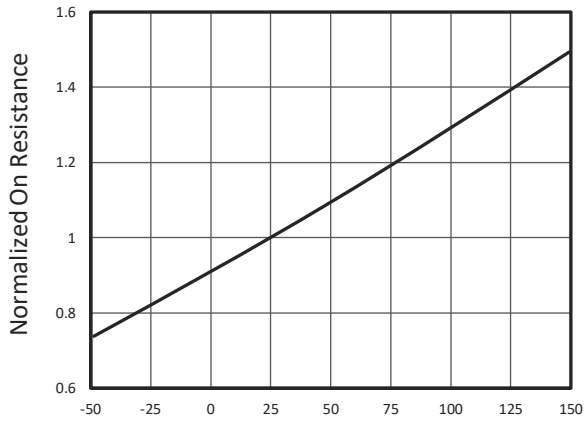


Gate Threshold Voltage

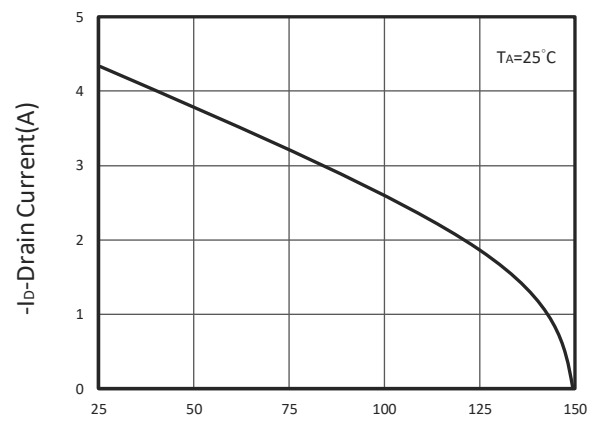


Power Dissipation

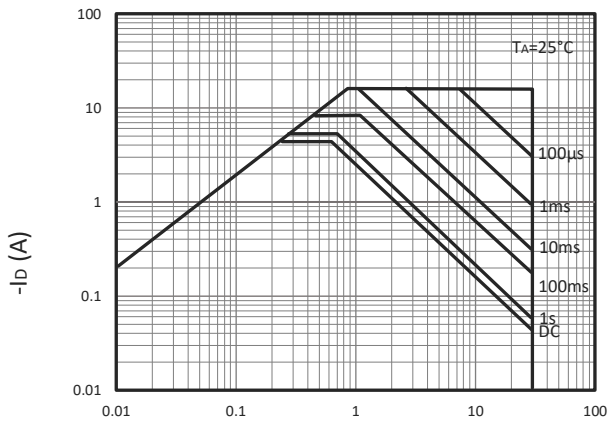
TYPICAL CHARACTERISTICS



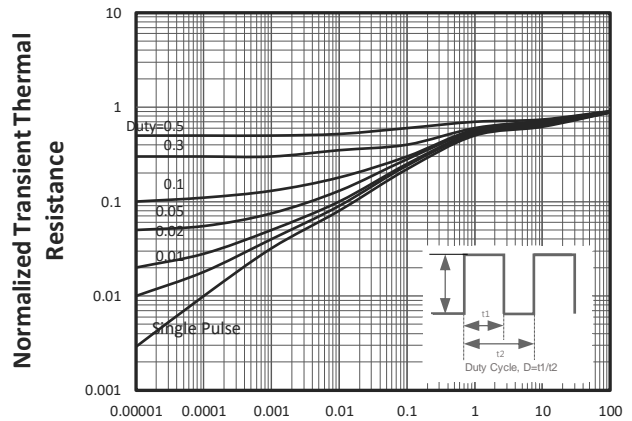
$R_{DS(ON)}$ vs Junction Temperature



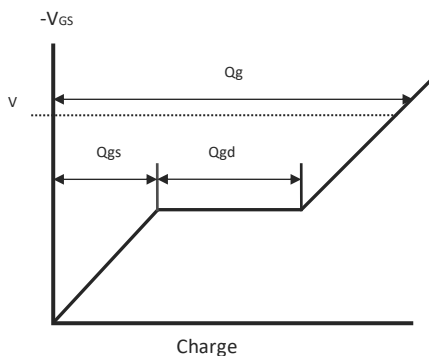
Drain Current vs T_J



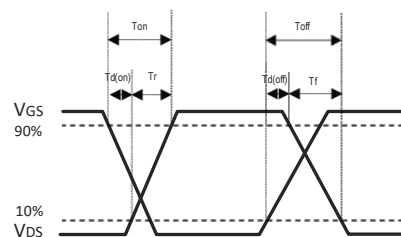
Maximum Safe Operation Area



**Square Wave Pulse Duration(Sec)
Thermal Transient Impedance**

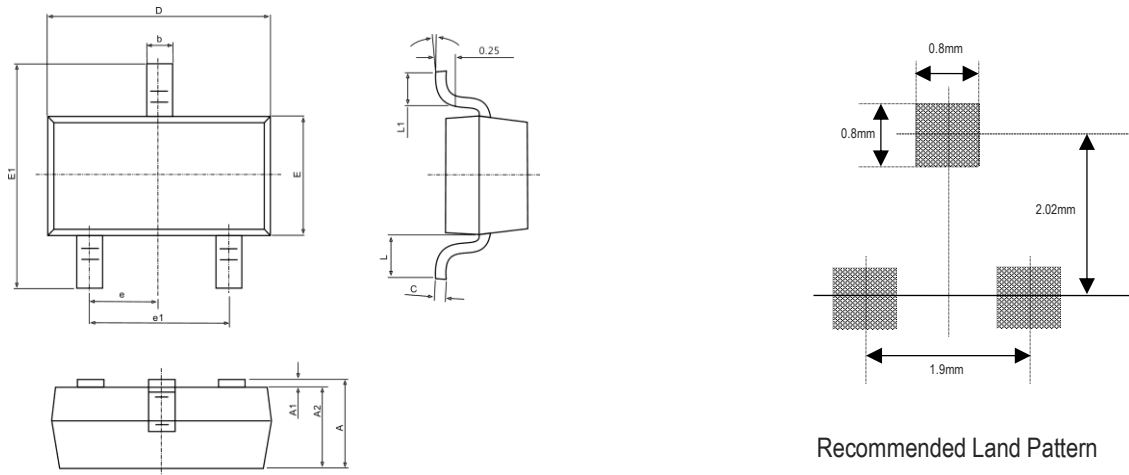


Gate Charge Waveform



Switching Time Waveform

SOT-23 PACKAGE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP.		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF.		0.022 REF.	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°