

Single N-Channel MOSFET

DESCRIPTION

STN3400S is the N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced trench technology devices are well suited for high efficiency fast switching applications, low in-line power loss are needed in small outline surface mount package.

PART NUMBER INFORMATION

STN 3400 S - TR G
 a b c d e

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

FEATURES

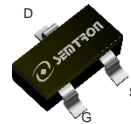
$V_{DS}=30V, I_D=6.1A$

- $R_{DS(ON)}=20m\Omega(Typ.)@V_{GS}=10V$
- $R_{DS(ON)}=23m\Omega(Typ.)@V_{GS}=4.5V$
- $R_{DS(ON)}=27m\Omega(Typ.)@V_{GS}=2.5V$

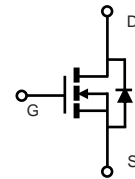
- ◆ Fast switch
- ◆ Low gate drive applications
- ◆ High power and current handling capability

APPLICATIONS

- ◆ Hand-Held Instruments
- ◆ Load Switch
- ◆ PWM Applications



SOT-23L



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	$T_A=25^{\circ}C$	6.1
		$T_A=70^{\circ}C$	4.8
I_{DM}	Pulsed Drain Current ^B	24	A
I_{AS}	Avalanche Current ^B	15	A
E_{AS}	Single Pulse Avalanche energy $L=0.1mH$ ^B	11	mJ
P_D	Power Dissipation ^A	$T_A=25^{\circ}C$	1.6
		$T_A=70^{\circ}C$	1
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	$t \leq 10s$	80	$^{\circ}C/W$
	Thermal Resistance Junction to Ambient ^{AC}	Steady-State	120	

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

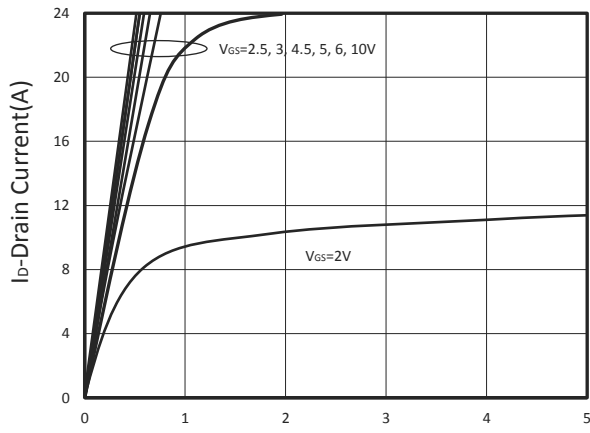
Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250 μ A	30			V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250 μ A	0.5	0.7	1	V
I _{GSS}	Gate Leakage Current	V _{DS} =0V, V _{GS} = \pm 12V			\pm 100	nA
I _{DSS}	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 =6.1A		20	24	m Ω
		V _{GS} =4.5V, I _D =5A		23	26	
		V _{GS} =2.5V, I _D =3.2A		27	32	
G _{fs}	Forward Transconductance	V _{DS} =5V, I _D =5A		11		S
Diode Characteristics						
V _{SD}	Diode Forward Voltage ^D	I _S =1A, V _{GS} =0V			1.0	V
I _S	Diode Continuous Forward Current				3.1	A
Dynamic and Switching Parameters^E						
Q _g	Total Gate Charge	V _{DS} =15V, V _{GS} =10V, I _D =5A		15.4	21.5	nC
Q _g	Total Gate Charge (4.5V)			7.5	10.5	
Q _{gs}	Gate-Source Charge			1.3	1.8	
Q _{gd}	Gate-Drain Charge			1.8	2.5	
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1MHz		645		pF
C _{oss}	Output Capacitance			63		
C _{rss}	Reverse Transfer Capacitance			52		
t _{d(on)}	Turn-On Time	V _{DD} =15V, V _{GEN} =10V R _G =3.3 Ω , I _D =1A		4.7	9	nS
t _r				12.5	24	
t _{d(off)}	Turn-Off Time			28.5	54	
t _f				4.2	8	

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

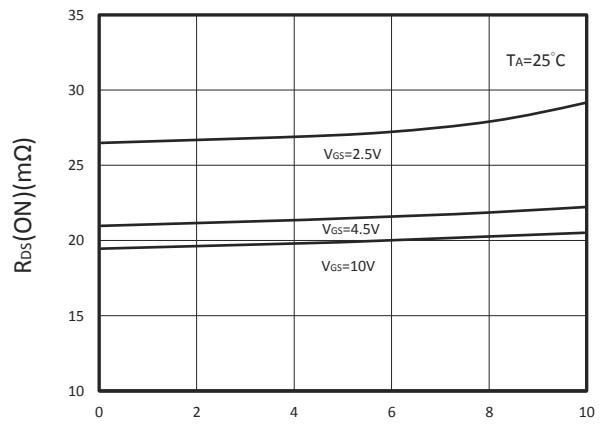
- Surface mounted on FR4 board using 1 in² pad size.
- Pulsed width limited by maximum junction temperature, T_{J(MAX)}=150 $^\circ$ C (initial temperature T_J=25 $^\circ$ C).
- Using \leq 10s junction-to-ambient thermal resistance is base on T_{J(MAX)}=150 $^\circ$ C.
- Pulse test width \leq 300 μ s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

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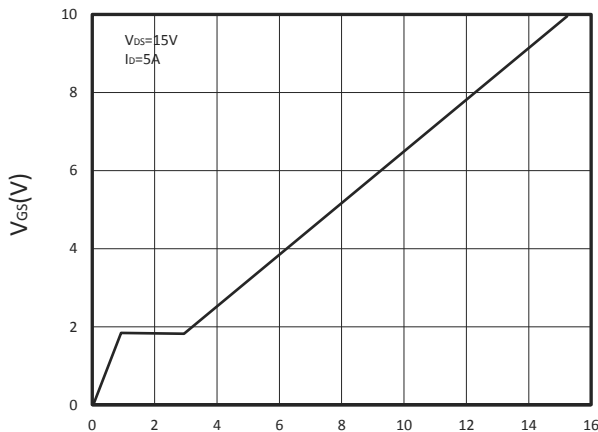
TYPICAL CHARACTERISTICS



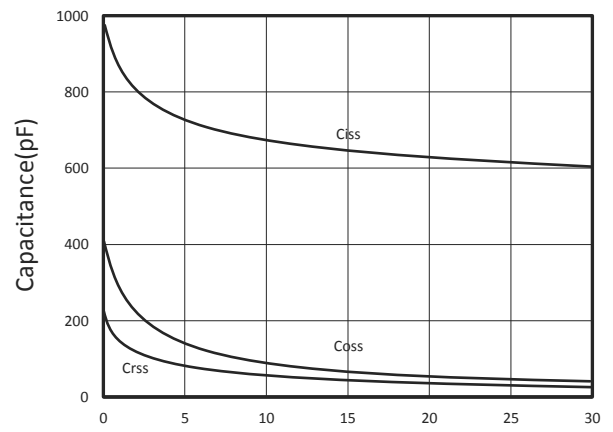
Output Characteristics



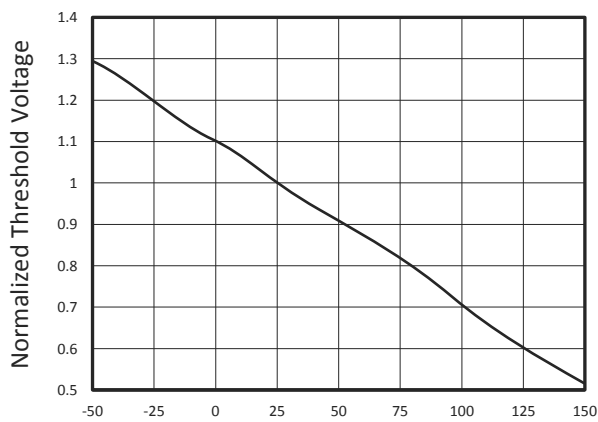
Drain-Source On Resistance



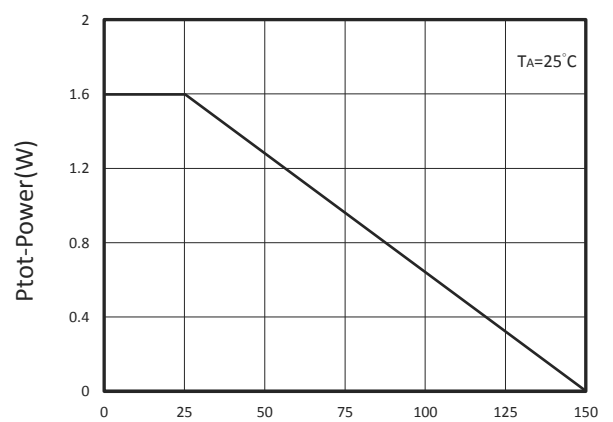
Gate Charge



Capacitance

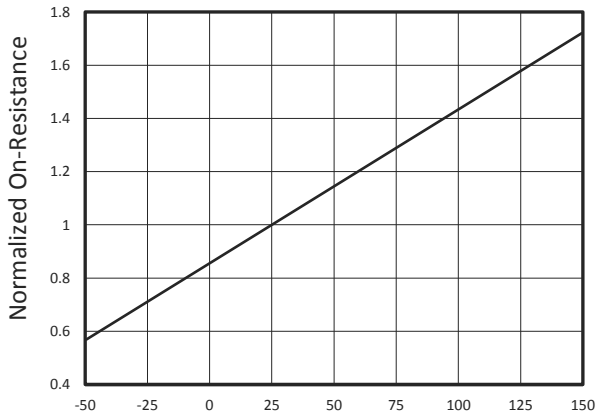


Gate Threshold Voltage

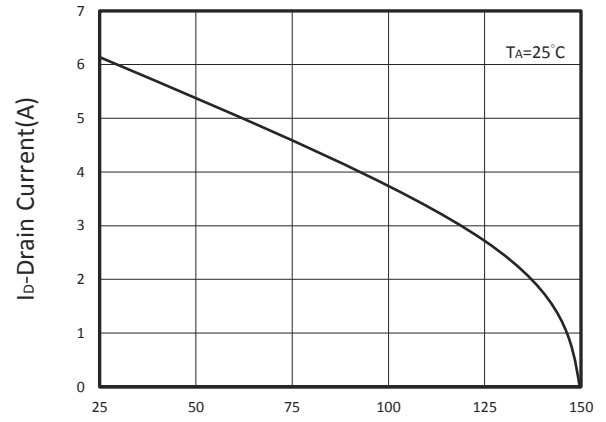


Power Dissipation

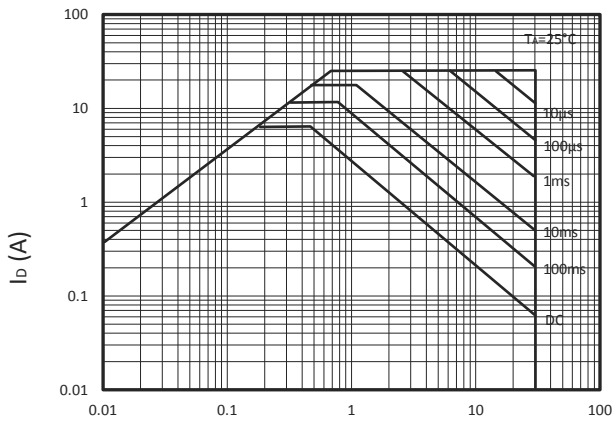
TYPICAL CHARACTERISTICS



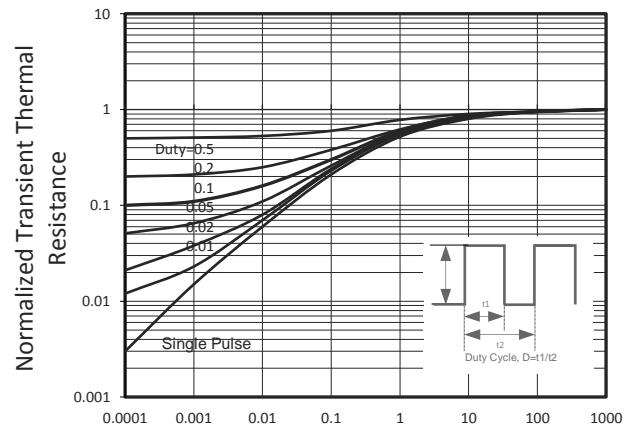
T_J-Junction Temperature(°C)
Drain-Source On Resistance



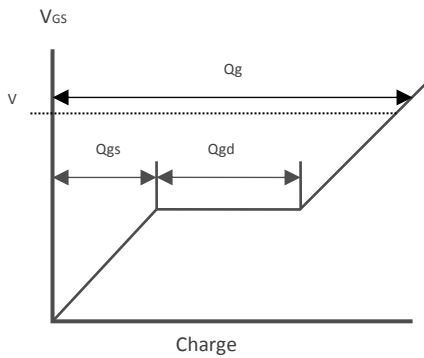
T_J-Junction Temperature(°C)
Drain Current vs T_J



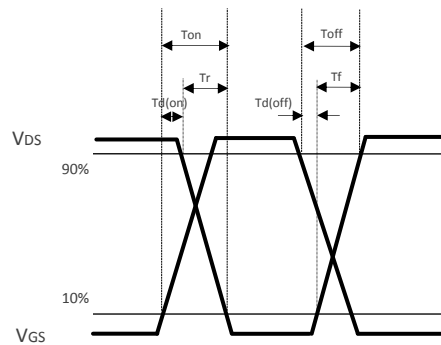
V_{DS} Voltage (V)
Maximum Safe Operation Area



Square Wave Pulse Duration(Sec)
Thermal Transient Impedance

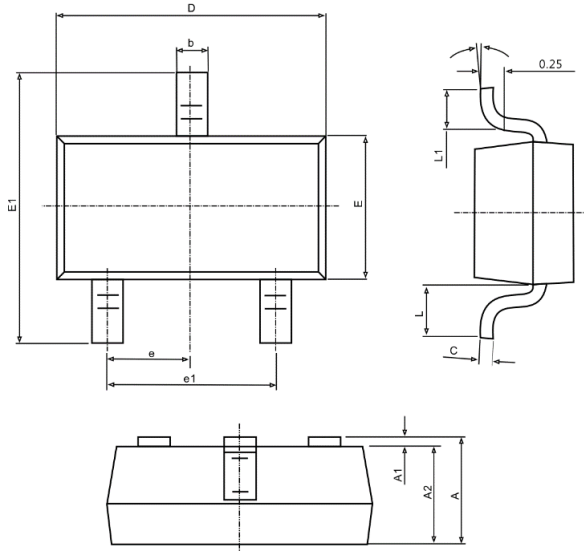


Gate Chrg Waveform

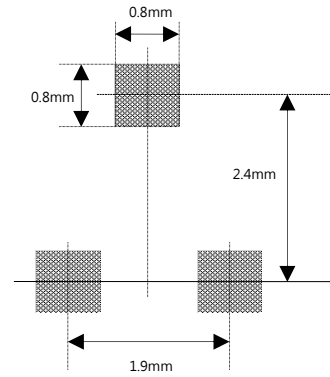


Switching Time Waveform

■ SOT-23L PACKAGE DIMENSIONS



Recommended Minimum Pad(mm)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.000	1.300	0.039	0.049
A1	0.000	0.100	0.000	0.004
A2	1.000	1.200	0.039	0.047
b	0.300	0.500	0.012	0.020
c	0.047	0.207	0.002	0.008
D	2.800	3.000	0.110	0.118
E	1.500	1.700	0.059	0.067
E1	2.600	3.000	0.102	0.118
e	0.950 TYP.		0.037 TYP.	
e1	1.900 TYP.		0.075 TYP.	
L1	0.250	0.550	0.010	0.022
θ	0°	8°	0°	8°