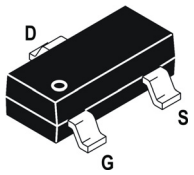
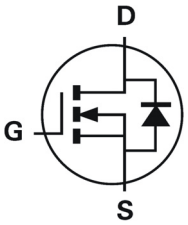
SGN3025V

30V N-CHANNEL POWER MOSFET

V_{DSS} , 30V $R_{DS(ON)}$, 26mΩ (max.) @ V_{GS}=10V $R_{DS(ON)}$, 31mΩ (max.) @ V_{GS}=4.5V $R_{DS(ON)}$, 39mΩ (max.) @ V_{GS}=2.5V I_D , 4.8A	**SOT-23S** 	

Description

The SGN3025V uses advanced Trench technology and designs to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use in PWM, load switching and general purpose applications.

Features

- Low On-Resistance
- Low Input Capacitance
- Low Miller Charge
- Low Input/Output Leakage

Applications

- Motor / Body Load Control
- Automotive Systems
- Load Switch
- DC-DC converters and Off-line UPS

Ordering Information

Ordering Code	RoHS Status	Package	Package Code	Packing	Quantity
SGN3025V	Halogen-Free	SOT-23S	V	Tape & Reel	3,000

Absolute Maximum Ratings (T_A=25°C unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±12	V
Drain Current-Continuous	T_A=25°C	I_D	4.8	A
	T_A=70°C		3.8	A
Drain Current-Pulsed [Note 1]		I_{DM}	20	A
Maximum Power Dissipation	T_A=25°C	P_D	1	W
	T_A=70°C		0.6	W
Storage Temperature Range		T_{STG}	-55 to +150	°C
Operating Junction Temperature Range		T_J	-55 to +150	°C

Thermal Resistance Ratings

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Maximum Junction-to-Ambient [Note 2]	$R_{\theta JA}$	Steady State	-	-	125	°C/W
Maximum Junction-to-Case [Note 2]	$R_{\theta JC}$	Steady State	-	-	80	°C/W

Electrical Characteristics (T_J=25°C unless otherwise noted)

OFF CHARACTERISTICS						
Parameter	**Symbol**	**Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_{DS}=250μA	30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=24V, V_{GS}=0V	-	-	1	μA
Gate-Body Leakage	I_{GSS}	V_{GS}=±12V, V_{DS}=0V	-	-	±100	nA

ON CHARACTERISTICS						
Parameter	**Symbol**	**Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_{DS}=250μA	0.5	0.7	1.2	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_{DS}=4A	-	24	26	mΩ
		V_{GS}=4.5V, I_{DS}=3A	-	25	31	
		V_{GS}=2.5V, I_{DS}=2A	-	29	39	

DYNAMIC CHARACTERISTICS						
Parameter	**Symbol**	**Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Input Capacitance	C_{iss}	V_{DS}=15V, V_{GS}=0V, f=1MHz	-	636	-	pF
Output Capacitance	C_{oss}		-	50	-	
Reverse Transfer Capacitance	C_{rss}		-	43	-	

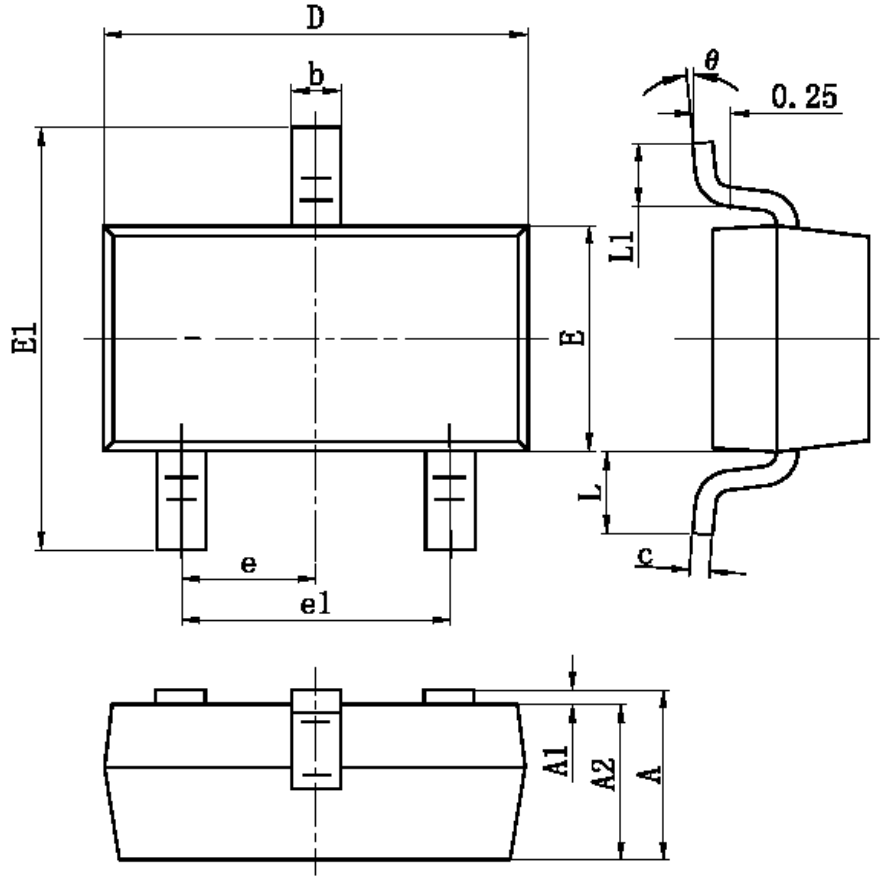
SWITCHING CHARACTERISTICS						
Parameter	**Symbol**	**Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Turn-On Delay Time	$T_{d(on)}$	V_{DD}=15V, V_{GS}=4.5V, R_G=3.3Ω, I_D=3A	-	3.3	-	ns
Rise Time	t_r		-	41.2	-	
Turn-Off Delay Time	$T_{d(off)}$		-	21.5	-	
Fall Time	t_f		-	6.2	-	
Total Gate Charge	Q_g	V_{DS}=15V, I_{DS}=3A, V_{GS}=4.5V	-	8.2	-	nC
Gate to Source Gate Charge	Q_{gs}		-	1.3	-	
Gate to Drain “Miller” Charge	Q_{gd}		-	1.9	-	

DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Parameter	**Symbol**	**Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Continuous Source Current [Note 2, 3]	I_S	V_G=V_D=0V , Force Current	-	-	4.5	A
Pulsed Source Current [Note 1, 3]	I_{SM}		-	-	18	A
Drain-Source Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=4A	-	-	1.3	V
Body Diode Reverse Recovery Time	t_{rr}	I_F=4A, dI/dt=100A/μs,	-	6.6	-	ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	2.2	-	nC

Notes:

1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
2. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design. $R_{\theta JA}$ shown below for single device operation on FR-4 in still air.
3. The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.

Package Dimensions

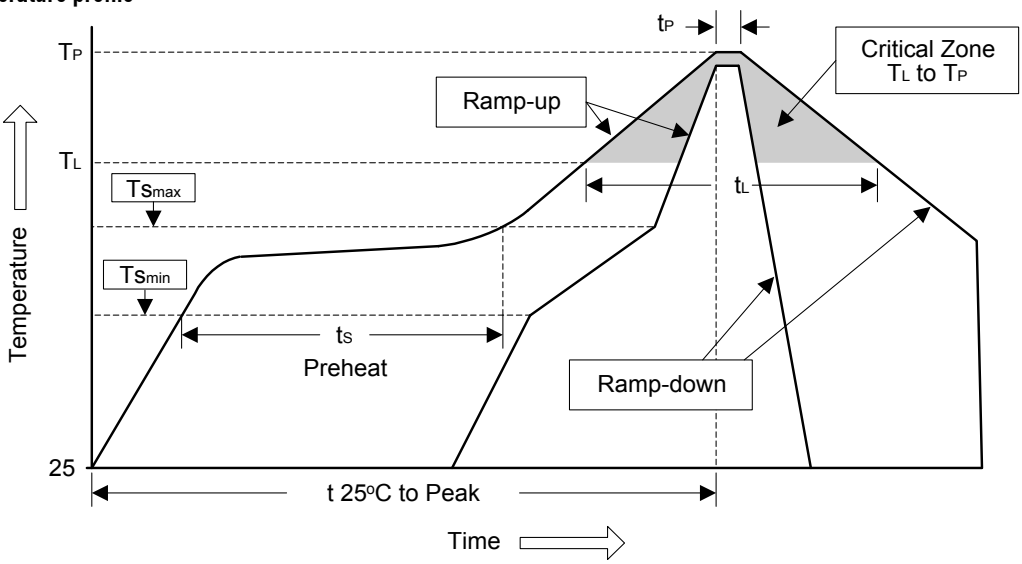


	Dimensions					
	Millimeters			Inches		
Symbols	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.90	1.03	1.15	0.035	0.040	0.045
A1	0.00	0.08	0.15	0.000	0.003	0.006
A2	0.90	0.50	0.11	0.035	0.020	0.004
b	0.30	0.40	0.50	0.012	0.016	0.020
c	0.08	0.12	0.15	0.003	0.005	0.006
D	2.80	2.90	3.00	0.110	0.114	0.118
E	1.20	1.30	1.40	0.047	0.051	0.055
E1	2.25	2.40	2.55	0.089	0.094	0.100
e	--	0.95	--	--	0.037	--
e1	1.80	1.90	2.00	0.071	0.075	0.079
L	--	0.55	--	--	0.022	--
L1	0.20	0.35	0.50	0.008	0.014	0.020
θ	0°	4°	9°	0°	4°	9°

Soldering Methods for Silicongear's Products

1. Storage environment: Temperature=10°C to 35°C Humidity=65%±15%
2. Reflow soldering of surface-mount devices

Figure 1: Temperature profile



Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average ramp-up rate (T_L to T_P)	<3°C/sec	<3°C/sec
Preheat - Temperature Min (Ts_{min}) - Temperature Max (Ts_{max}) - Time (min to max) (ts)	 100°C 150°C 60 to 120 sec	 150°C 200°C 60 to 180 sec
Tsmax to T_L - Ramp-up Rate	 <3°C/sec	 <3°C/sec
Time maintained above: - Temperature (T_L) - Time (t_L)	 183°C 60 to 150 sec	 217°C 60 to 150 sec
Peak Temperature (T_P)	240°C +0/-5°C	260°C +0/-5°C
Time within 5°C of actual Peak Temperature (t_P)	10 to 30 sec	20 to 40 sec
Ramp-down Rate	<6°C/sec	<6°C/sec
Time 25°C to Peak Temperature	<6 minutes	<8 minutes

3. Flow (wave) soldering (solder dipping)

Products	Peak Temperature	Dipping Time
Pb devices.	245°C ±5°C	5sec ±1sec
Pb-Free devices.	260°C +0/-5°C	5sec ±1sec

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