

30V N-Channel Enhancement Mode MOSFET

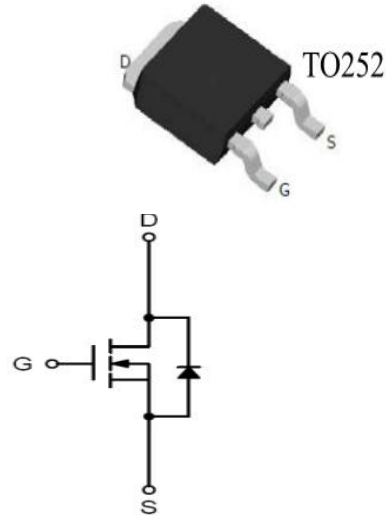
Features

- $V_{DSS}=30V / V_{GS}=\pm 12V / I_D=5A$
- $R_{DS(ON)}=35m\Omega(\text{Max.})@V_{GS}=10V$
- $R_{DS(ON)}=36m\Omega(\text{Max.})@V_{GS}=4.5V$
- $R_{DS(ON)}=52m\Omega(\text{Max.})@V_{GS}=2.5V$
- Super High Dense Cell Design
- Reliable and Rugged
- Advanced trench process technology

Applications

- Load Switch
- Synchronous Rectification

PIN DESCRIPTION



Part Number	Package	Marking	ROHS Status	Packing
SI30N02D	T0-252	SI30N02D	Pb-Free	2.5K/Reel

Absolute Maximum Ratings ($T_A=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Typical	Unit
BV_{DSS}	Drain-Source Voltage	30	V
V_{GS}	Gate –Source Voltage	± 12	V
I_D	Continuous Drain Current	$T_C=25^\circ\text{C}$ 5	A
I_{DM}	Pulsed Drain Current Tested	30	A
P_D	Power Dissipation	$T_C=25^\circ\text{C}$ 1.4	W
T_J	Operating Junction Temperature	-55 ~ 150	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 ~ 150	$^\circ\text{C}$

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal resistance, junction–case.	$R_{\theta JC}$	0.75	$^\circ\text{C}/\text{W}$
Thermal resistance, junction–ambient.	$R_{\theta JA}$	62	

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 _D =250uA	30	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =24V, V _{GS} =0V	-	-	1	uA
		T _J =85°C	-	-	30	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250uA	0.6	0.85	1.5	V
I _{GSS}	Gate Leakage Current	V _{GS} =±12V, V _{DS} =0V	-	-	±100	nA
R _{DS(on)}	Drain-Source On-Resistance	V _{GS} =10V, I _D =5A	-	27	35	mΩ
		V _{GS} =4.5V, I _D =4A	-	30	36	mΩ
		V _{GS} =2.5V, I _D =3A	-	39	52	mΩ
Diode Characteristics						
V _{SD}	Diode Forward Voltage	I _{SD} =3A, V _{GS} =0V	-	-	1.3	V
t _{rr}	Reverse Recovery Time	I _F =5A, dI _{SD} /dt=100A/us	-	8.5	-	nS
Q _{rr}	Reverse Recovery Charge		-	2.6	-	nC
Dynamic Characteristics ²						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, Frequency=1MHz	1.5	3	4.5	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V Frequency=1MHz	-	630	-	pF
C _{oss}	Output Capacitance		-	75	-	
C _{rss}	Reverse Transfer Capacitance		-	50	-	
T _{d(on)}	Turn-On Delay Time	V _{GS} =10V, R _L =2.6Ω V _{DS} =15V, R _{GEN} =3Ω	-	3	-	nS
T _r	Turn-On Rise Time		-	2.5	-	
T _{d(off)}	Turn-Off Delay Time		-	25	-	
T _f	Turn-Off Fall Time		-	4	-	
Gate Charge Characteristics²						
Q _g	Total Gate Charge	V _{GS} =4.5V, V _{DS} =15A I _D =5A	-	6	-	nC
Q _{gs}	Gate-Source Charge		-	1.3	-	
Q _{gd}	Gate-Drain Charge		-	1.8	-	

Switching Time Test Circuit and Wave forms

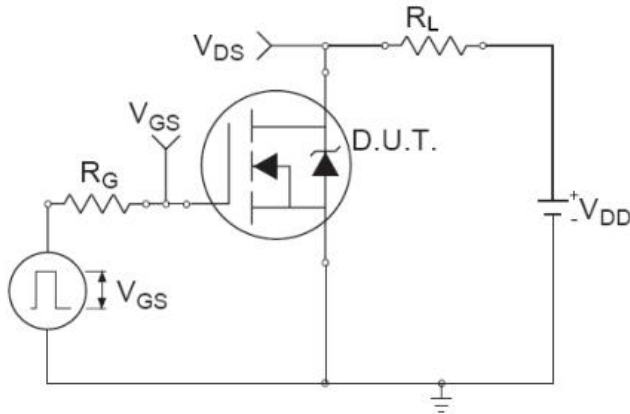


Fig1.Switching Time Test Circuit

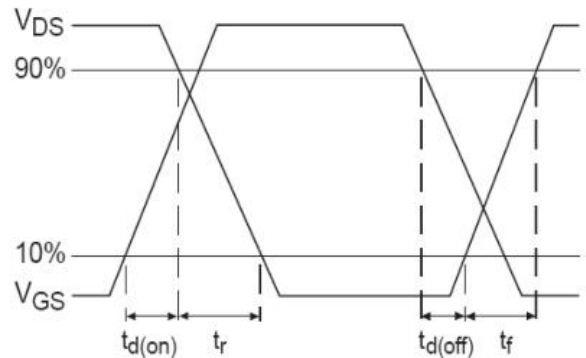


Fig2.Switching Time Waveforms

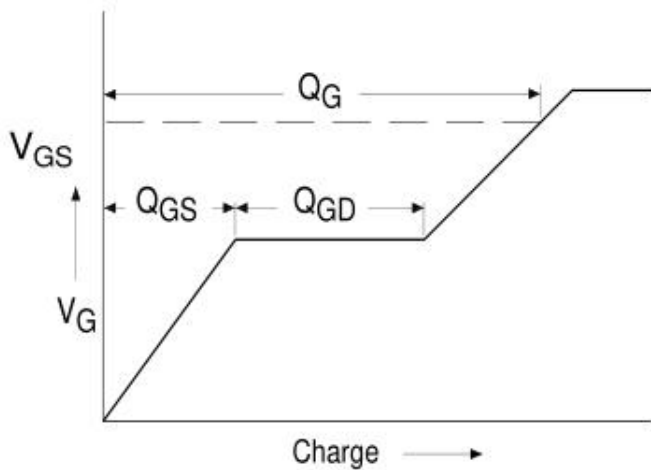


Fig3.Basic Gate Charge Waveform

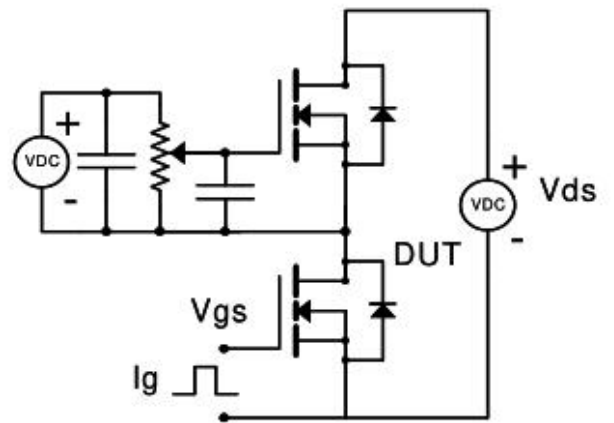


Fig4.Gate Charge Test Circuit

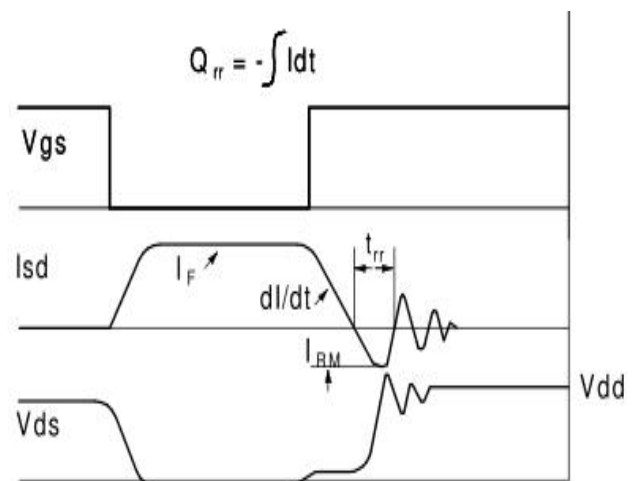
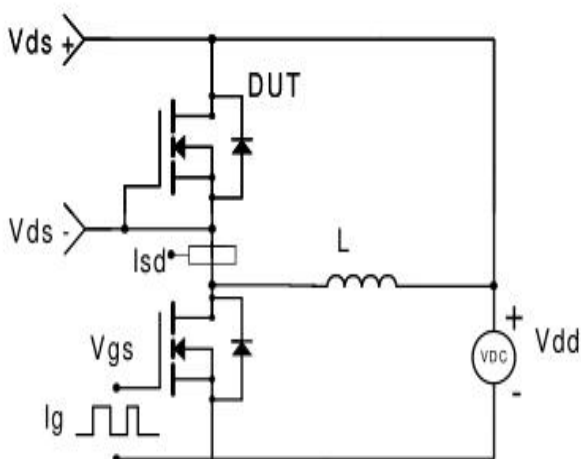


Fig5.Diode Recovery Test Circuit & Waveforms

Typical Performance Characteristics

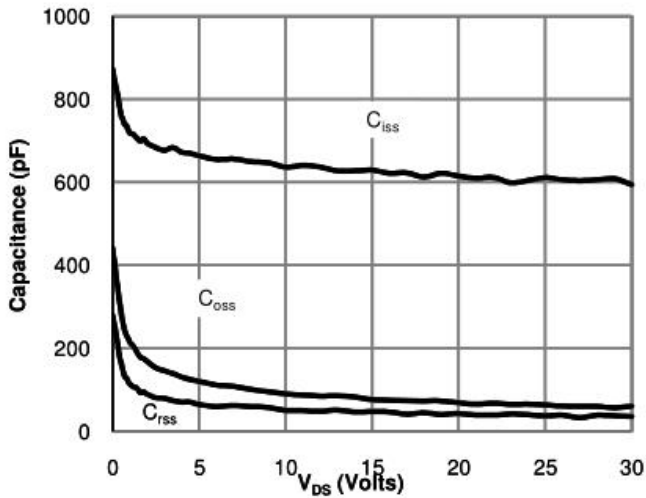


Fig1. Capacitance Characteristics

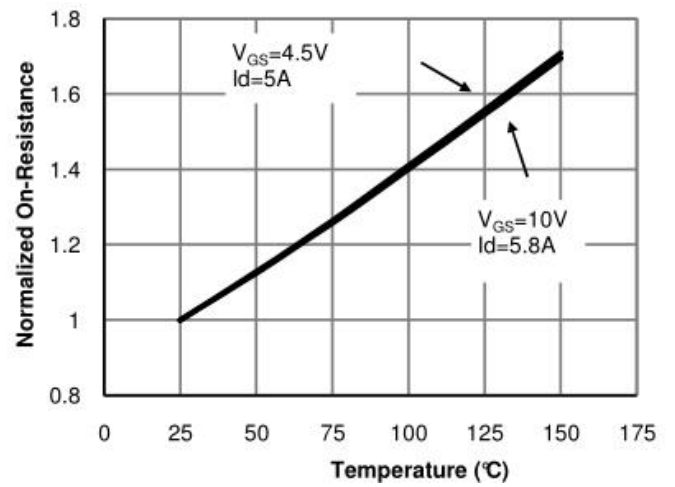


Fig2. On-Resistance vs. Junction Temperature

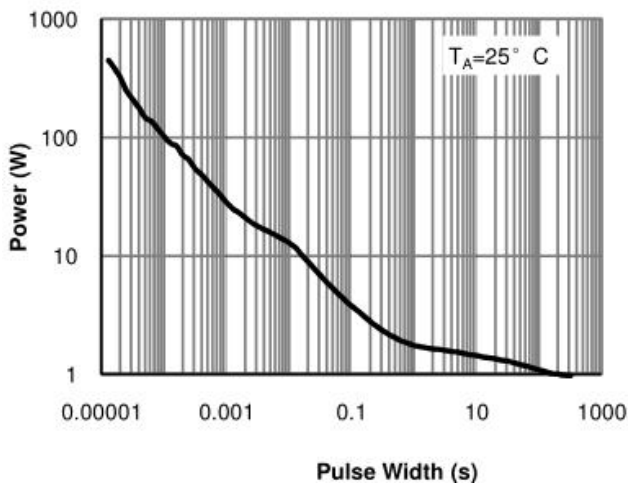


Fig3. Single Pulse Power Rating Junction-to-Ambient .

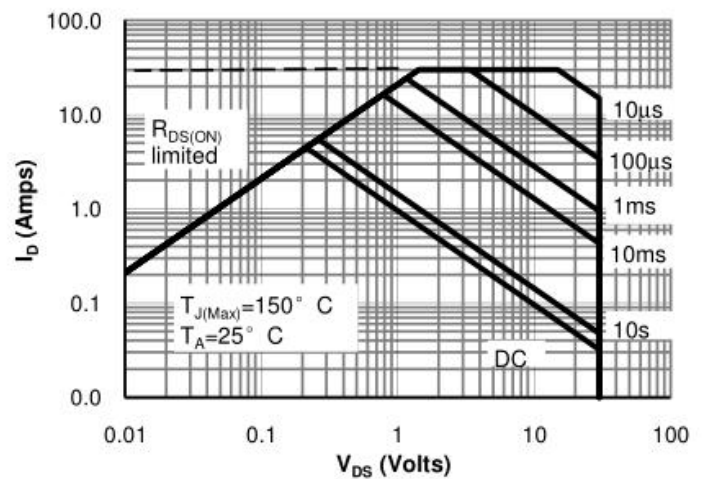


Fig4. Maximum Safe Operating Area

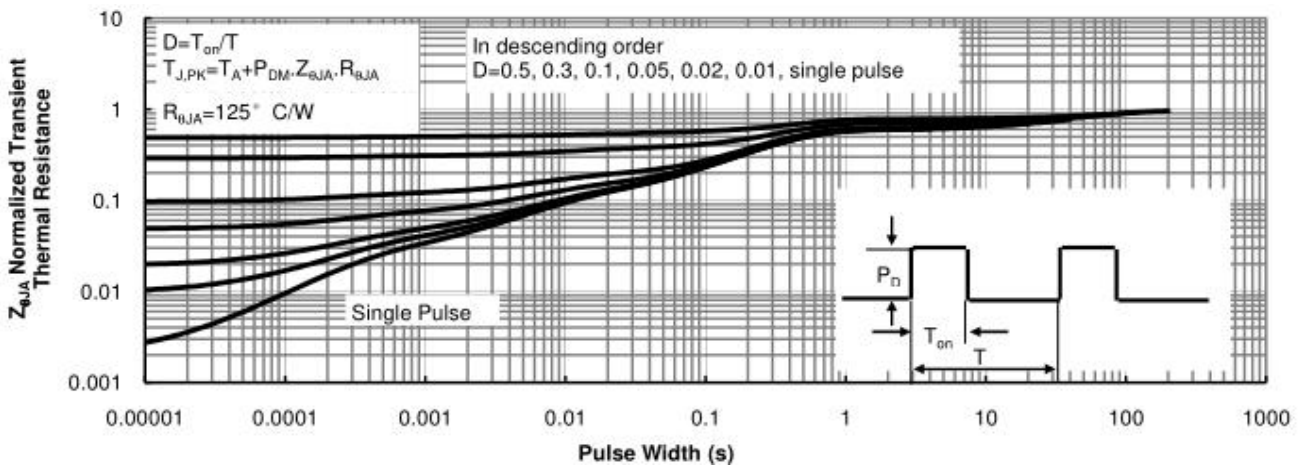
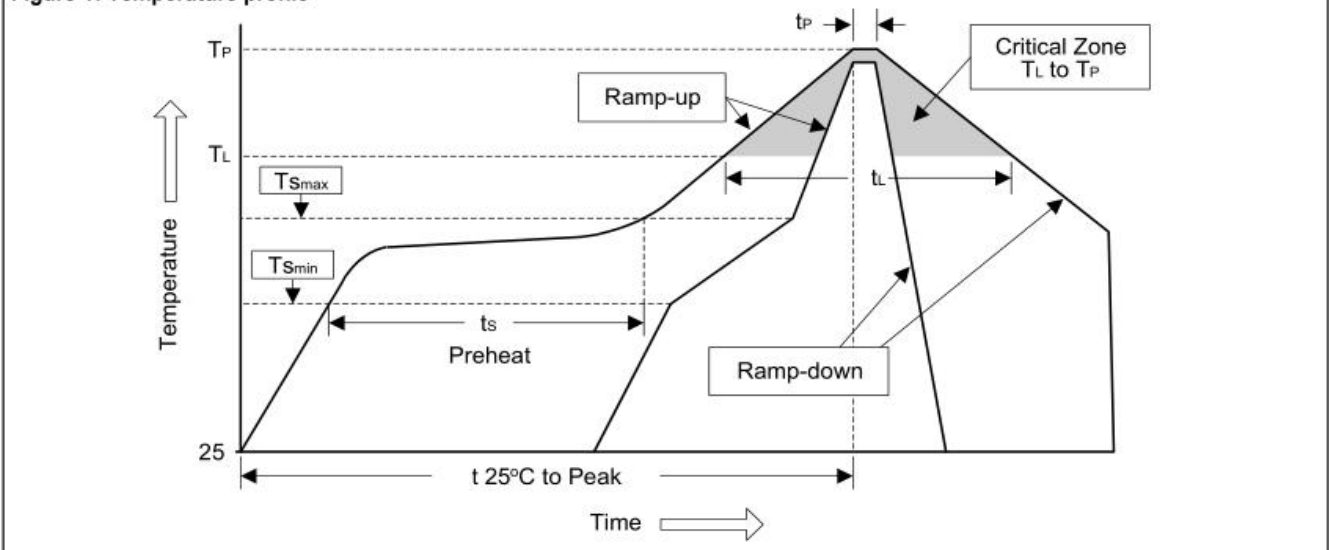


Fig5. Normalized Maximum Transient Thermal Impedance

Soldering Methods for Products

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average ramp-up rate (TL to TP)	<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
Ts max to TL - ramp-up rate	<3°C/sec	<3°C/sec
Time maintained above: -Temperature(TL) -Time(tL)	183°C 60 to 150 sec	217°C 60 to 150 sec
Peak Temperature(Tp)	240°C+0/-5°C	250°C+0/-5°C
Time within 5°C of actual Peak Temperature	10 to 30 sec	20 to 40sec
Ramp-down Rate	<6°C/sec	<6°C/sec
Time 25 °C to Peak Temperature	<6 minutes	<8 minutes

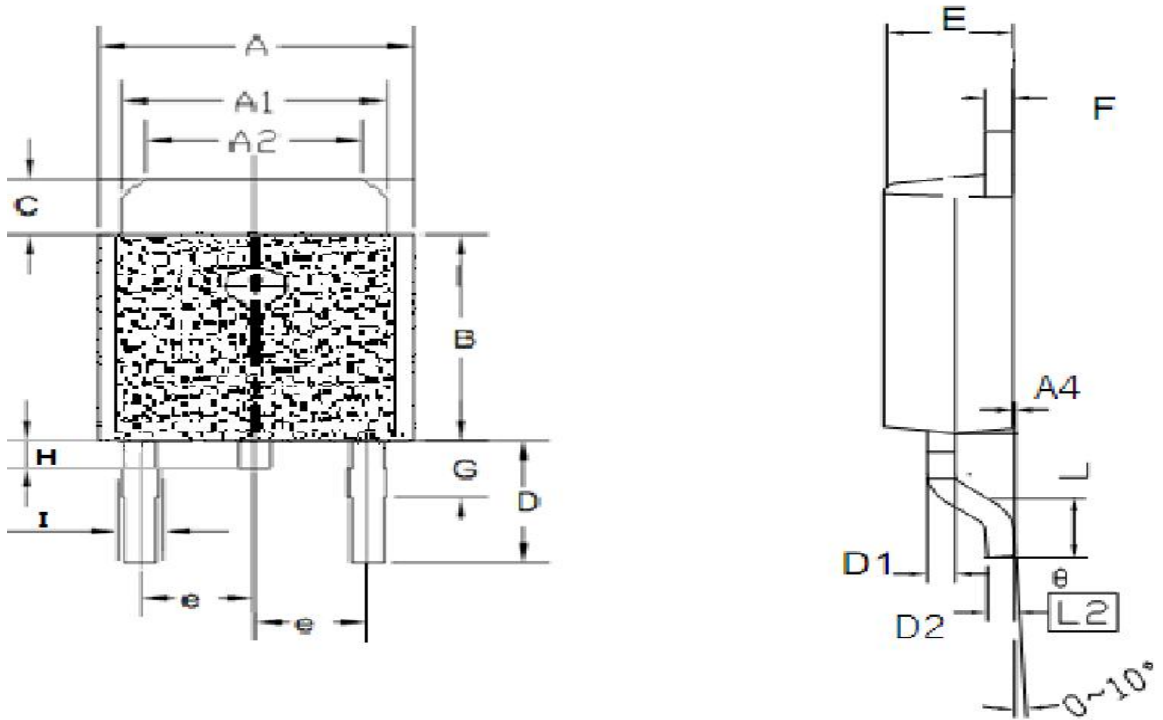
Figure 1: Temperature profile



- Note :**
- 1.Storage environment: Temperature=10°C to 35@Humidity=45%±15%
 - 2.Reflow soldering of surface-mount device
 - 3.Flow(wave) soldering(solder dipping)

Products	Peak Temperature	Dipping Time
Pb devices	245°C±5°C	5sec±1sec
Pb-free devices	250°C+0/-5°C	5sec±1sec

Package Outline



unit: mm					
Symbol	Min	Max	Symbol	Min	Max
A	6.40	6.60	D	2.90	3.10
A1	5.20	5.40	D1	0.45	0.55
A2	4.40	4.60	D2	0.45	0.55
A3	4.40	4.60	e	2.30	
A4	0.00	0.15	E	2.20	2.40
A5	4.65	4.95	F	0.49	0.59
B	6.00	6.20	G	1.70	
B1	1.57	1.77	L	1.40	1.60
C	0.90	0.96	θ (度)	0.00	10.00
I	0.80	0.85	H	0.49	0.52

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Any semiconductor under specific conditions are possible to certain failure or malfunction rate ; Customers are responsible in the use of Si-Trend products to system design and manufacturing in compliance with safety standards and adopting safety measures, To avoid the potential risk of failure may cause the personal safety and property loss。

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■ Modify record

Date	Version	Description	Pagination
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