

Silicon N-Channel Power MOSFET

General Description :

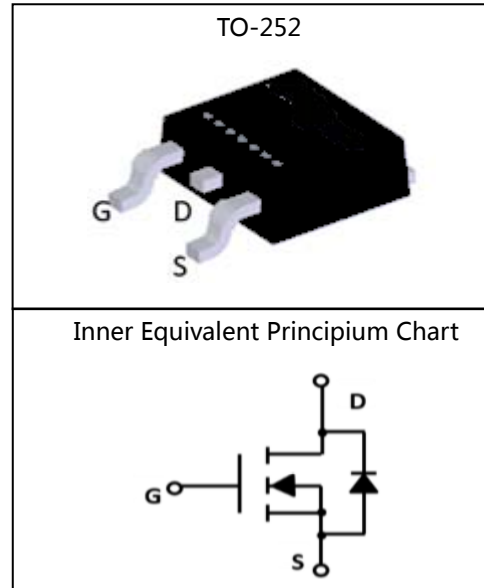
The SR15N10D uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge and operation with gate voltage as low as 4.5V. It can be used in a wide variety of applications. The package form is TO-252, which accords with the RoHS standard and Halogen Free standard.

Features :

- Fast Switching
- Low Gate Charge and $R_{DS(on)}$
- Low Reverse transfer capacitances

Applications :

- DC-DC converter
- Portable Equipment
- Power management



Package Marking and Ordering Information:

Device Marking	Device	Device Package	Quantity
SR15N10D	SR15N10D	TO-252	2500 units

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

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage	100	V
I_D	Continuous Drain Current $T_C = 25^\circ\text{C}$	18	A
	Continuous Drain Current $T_C = 70^\circ\text{C}$	12	A
I_{DM}^{a1}	Pulsed Drain Current	60	A
V_{GS}	Gate-to-Source Voltage	± 20	V
P_D	Power Dissipation	34	W
T_J, T_{stg}	Operating Junction and Storage Temperature Range	150 , -55 to 150	$^\circ\text{C}$
T_L	Maximum Temperature for Soldering	300	$^\circ\text{C}$

Electrical Characteristics ($T_c = 25^\circ\text{C}$ unless otherwise specified) :

OFF Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
V_{DSS}	Drain to Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	100	--	--	V
I_{DSS}	Drain to Source Leakage Current	$V_{DS} = 100V, V_{GS}= 0V$	--	--	1	μA
I_{GSS}	Gate to Source Forward Leakage	$V_{GS} = \pm 20V$	--	--	± 100	nA

ON Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$R_{DS(ON)1}$	Drain-to-Source On-Resistance	$V_{GS}=10V, I_D=3.0A$	--	61	73	m Ω
$R_{DS(ON)2}$	Drain-to-Source On-Resistance	$V_{GS}=4.5V, I_D=2.4A$	--	65	84	m Ω
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.1	1.8	3.0	V

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
C_{iss}	Input Capacitance	$V_{GS} = 0V$	--	1616	--	pF
C_{oss}	Output Capacitance	$V_{DS} = 50V$	--	35	--	
C_{rss}	Reverse Transfer Capacitance	$f = 1.0MHz$	--	27	--	

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	$R_L = 16 \Omega$	--	7.1	--	ns
t_r	Rise Time	$V_{DS} = 50V$	--	4.3	--	
$t_{d(OFF)}$	Turn-Off Delay Time	$V_{GS} = 10V$	--	32	--	
t_f	Fall Time	$R_G = 3.0\Omega$	--	12	--	
Q_g	Total Gate Charge	$V_{GS} = 10V$		27		nC
Q_{gs}	Gate Source Charge	$V_{DS} = 50V$		6.5		
Q_{gd}	Gate Drain Charge	$I_D = 3.0A$		3.4		

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_S	Diode Forward Current		--	--	18	A
V_{SD}	Diode Forward Voltage	$I_S=3.0A, V_{GS}=0V$	--	--	1.2	V

Thermal Characteristics

Symbol	Parameter	Typ.	Units
$R_{\theta JC}$	Junction-to-Case	4.1	$^{\circ}\text{C}/\text{W}$

^{a1} : Repetitive rating; pulse width limited by maximum junction temperature

Test Circuit and Waveform

Figure A: Gate Charge Test Circuit and Waveform

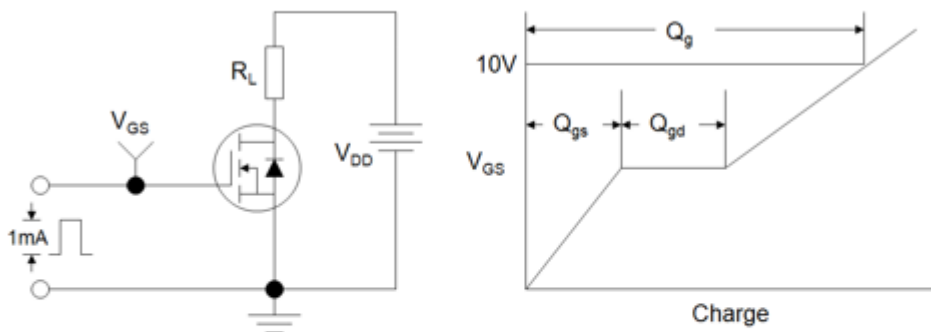


Figure B: Resistive Switching Test Circuit and Waveform

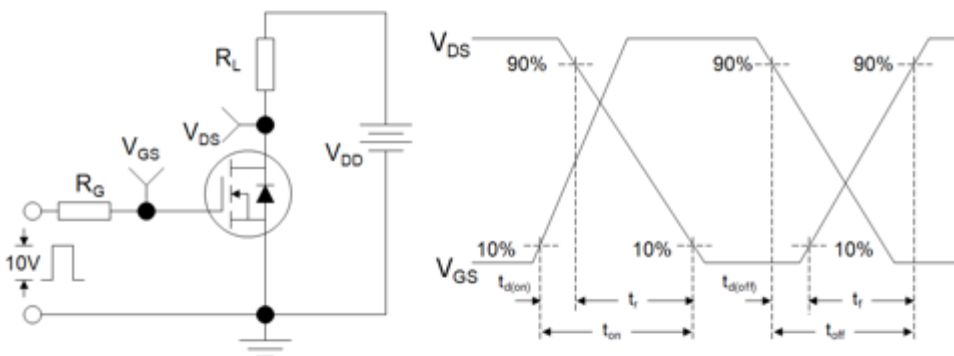
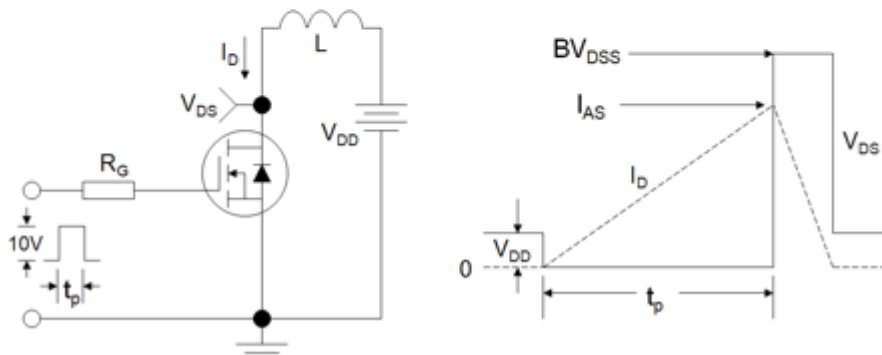


Figure C: Unclamped Inductive Switching Test Circuit and Waveform



Typical Performance Characteristics

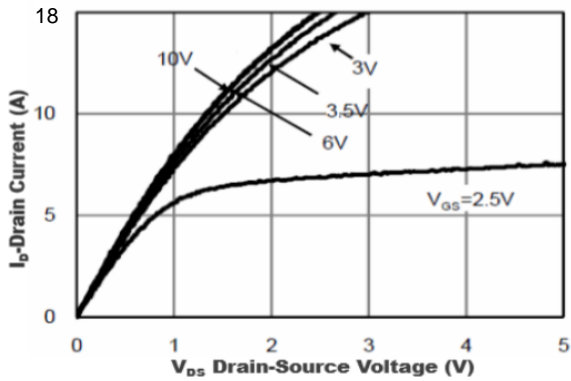


Figure1. Output Characteristics

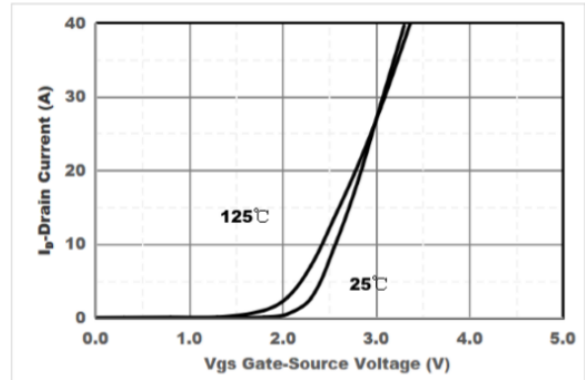


Figure2. Transfer Characteristics

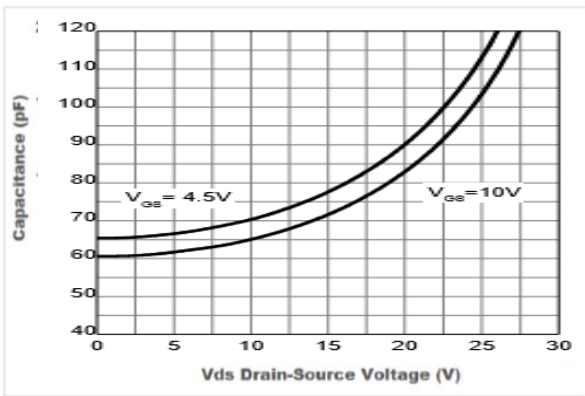


Figure3. Capacitance Characteristics

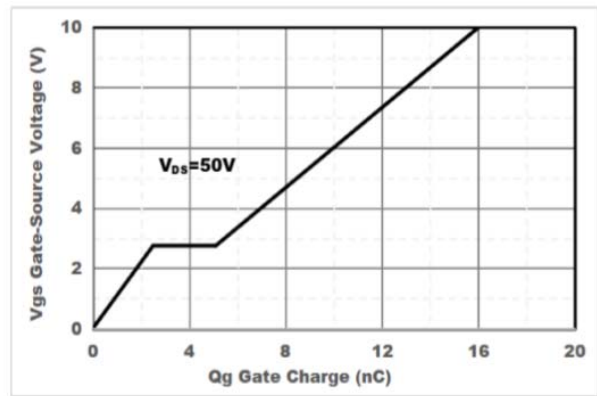


Figure4. Gate Charge

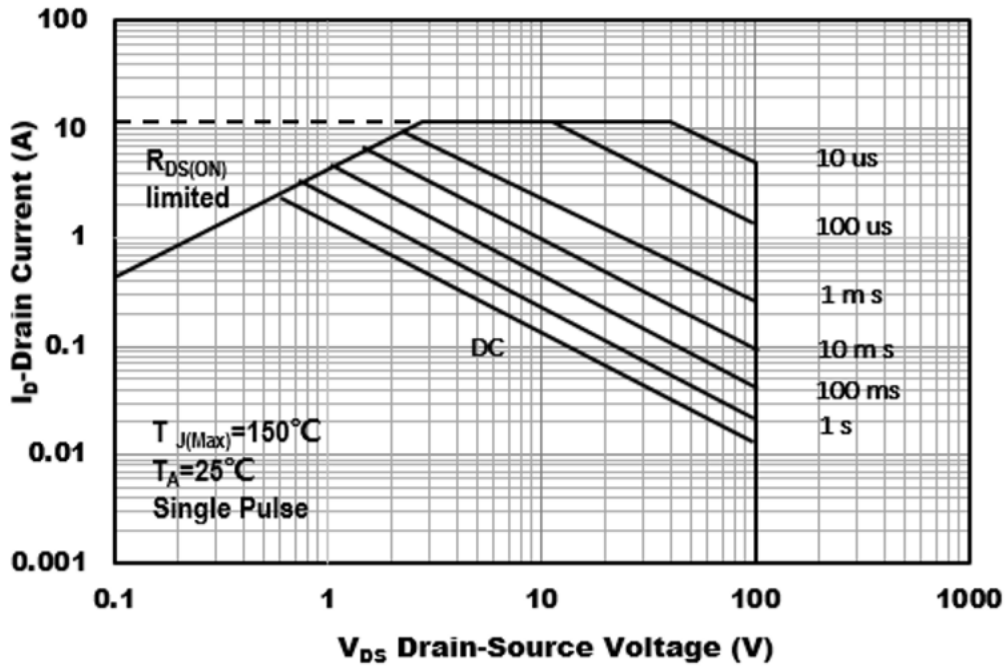
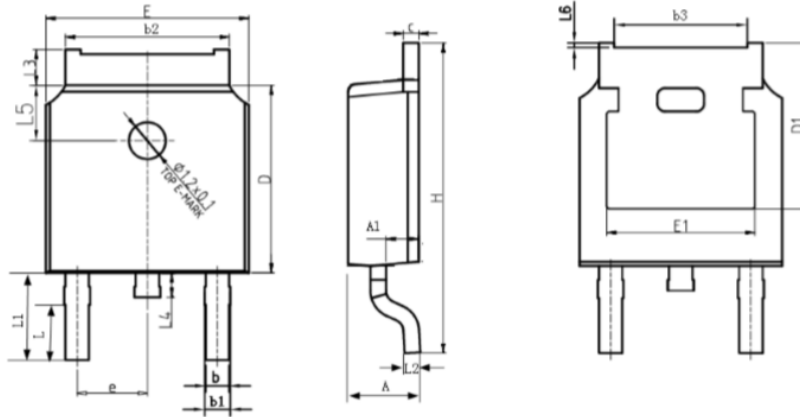


Figure7. Safe Operation Area

Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.056	0.061
A1	0.970	1.17	0.025	0.030
b	0.720	0.850	0.018	0.022
b1	0.720	0.930	0.018	0.024
b2	5.230	5.460	0.133	0.139
b3	4.270	4.370	0.108	0.111
c	0.470	0.580	0.012	0.015
D	6.000	6.200	0.152	0.157
D1	5.300 TYP.		0.135	
E	6.500	6.700	0.165	0.170
E1	4.700	4.920	0.119	0.125
e	2.286 TYP.		0.058	
L	1.400	1.700	0.036	0.043
L1	2.900 TYP.		0.074	
L2	0.510 TYP.		0.013	
L3	0.900	1.250	0.023	0.032
L4	0.600	1.000	0.015	0.025
L5	1.700	1.900	0.043	0.048
L6	0	0.1223	0.000	0.003

Revision History

Revision	Date	Descriptions
REV.2.0	July, 022	Initial Version