

## P-Ch 100V Fast Switching MOSFETs

### Product Information

The SR33P10 is the high cell density trench P- ch MOSFETs, which provide excellent R<sub>DS(on)</sub> and gate charge for most of the synchronous buck converter applications.

The SR33P10 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.atures

### Applications

- ◆ Low Gate Charge and R<sub>DS(on)</sub>
- ◆ Low Reverse transfer capacitances
- ◆ Excellent CdV/dt effect decline
- ◆ Advanced high cell density Trench technology

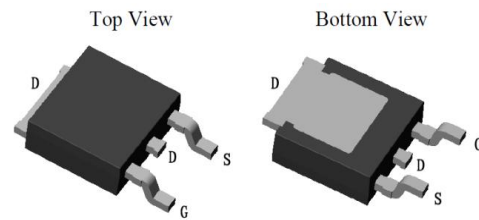
### Converter Quick reference

- ◆ BV ≅ - 100V
- ◆ ID ≅ -21 A
- ◆ R<sub>DS( ON)</sub> TYPE=68 mΩ @ V<sub>GS</sub> = -10 V
- ◆ P<sub>tot</sub> ≅ 75 W

### Symbol



### Simplified Outline TO-252-2L



### Marking Information

Marking	Part #	Package	Packing	Qty.
SR33P10D	SR33P10D	TO-252-2L	Reel	3000 units

**Note:** NHCX defines “ Green ” as lead-free ( RoHS compliant ) and halogen free ( Br or Cl does not exceed 900 ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500 ppm by weight; Follow IEC 61249-2-21 and IPC / JEDEC J-STD-020C )

## Limiting Values

Symbol	Parameter		Rating	Unit
<b>Common Ratings</b> (Tc=25°C Unless Otherwise Noted)				
V <sub>DSS</sub>	Drain-Source Voltage		-100	V
V <sub>GSS</sub>	Gate-Source Voltage		±20	V
T <sub>J</sub>	Maximum Junction Temperature		175	°C
T <sub>STG</sub>	Storage Temperature Range		-55 to 175	°C
I <sub>s</sub>	Drain Current-Continuous	Tc=25°C	-21	A
<b>Mounted on Large Heat Sink</b>				
I <sub>DM</sub>	Pulsed Drain Current *	Tc=25°C	-75	A
I <sub>D</sub>	Continuous Drain Current	Tc=25°C	-21	A
		Tc=100°C	-14.5	A
P <sub>D</sub>	Maximum Power Dissipation	Tc=25°C	75	W
		Tc=100°C	38	W
R <sub>θJC</sub>	Thermal Resistance, Junction-to-Case		2.0	°C/W
R <sub>θJA</sub>	Thermal Resistance, Junction-to-Ambient **		110	°C/W
E <sub>AS</sub>	SinglePulsed-Avalanche Energy ***	L=0.3mH	90	mJ

## Electrical Characteristics ( TA=25 °C Unless Otherwise Noted )

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V , I <sub>D</sub> =-250uA	-30	---	---	V
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =-10V , I <sub>D</sub> =-10A	---	68	75	mΩ
		V <sub>GS</sub> =-4.5V , I <sub>D</sub> =-10A	---	70	110	
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =-250uA	-1.3	-1.9	-2.5	V
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =-80V , V <sub>GS</sub> =0V , T <sub>J</sub> =25°C	---	---	1	uA
		V <sub>DS</sub> =-80V , V <sub>GS</sub> =0V , T <sub>J</sub> =125°C	---	---	50	
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =±25V , V <sub>DS</sub> =0V	---	---	±100	nA
Q <sub>g</sub>	Total Gate Charge (-4.5V)	V <sub>DS</sub> =-50V , V <sub>GS</sub> =-10V , I <sub>D</sub> =-10A	---	42	---	nC
Q <sub>gs</sub>	Gate-Source Charge		---	9.2	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	8.8	---	
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> =-50V , V <sub>GS</sub> =-10V , R <sub>G</sub> =3.3Ω , I <sub>D</sub> =-10A	---	14	---	ns
T <sub>r</sub>	Rise Time		---	21	---	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	20	---	
T <sub>f</sub>	Fall Time		---	10	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =-25V , V <sub>GS</sub> =0V , f=1MHz	---	3268	---	pF
C <sub>oss</sub>	Output Capacitance		---	110	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	67	---	

## Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current <sup>1,5</sup>	V <sub>G</sub> =V <sub>D</sub> =0V , Force Current	---	---	-21	A
I <sub>SM</sub>	Pulsed Source Current <sup>2,5</sup>		---	---	-75	A
V <sub>SD</sub>	Diode Forward Voltage <sup>2</sup>	V <sub>GS</sub> =0V , I <sub>S</sub> =-10A , T <sub>J</sub> =25°C	---	---	-1.2	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>F</sub> =-10A , dI/dt=100A/μs , T <sub>J</sub> =25°C	---	30	---	nS
Q <sub>rr</sub>	Reverse Recovery Charge		---	26	---	nC

### Notes :

- 1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%
- 3.The EAS data shows Max. rating . The test condition is V<sub>DD</sub>=-80V,V<sub>GS</sub>=-10V,L=0.3mH
- 4.The power dissipation is limited by 150°C junction temperature
- 5.The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

## Typical Characteristics

Fig.1 Typical Output Characteristics

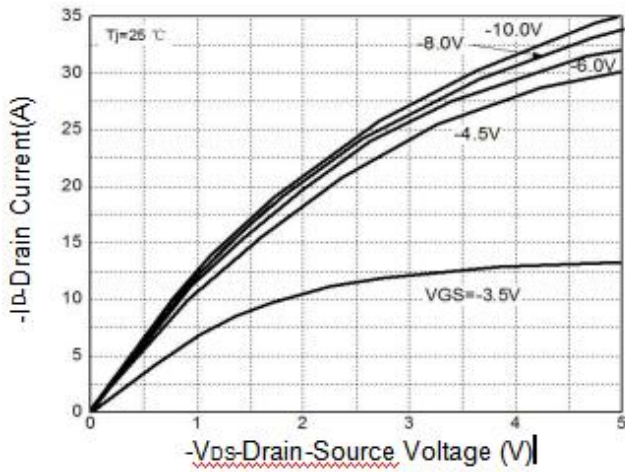


Fig.2 Drain-Source On Resistance

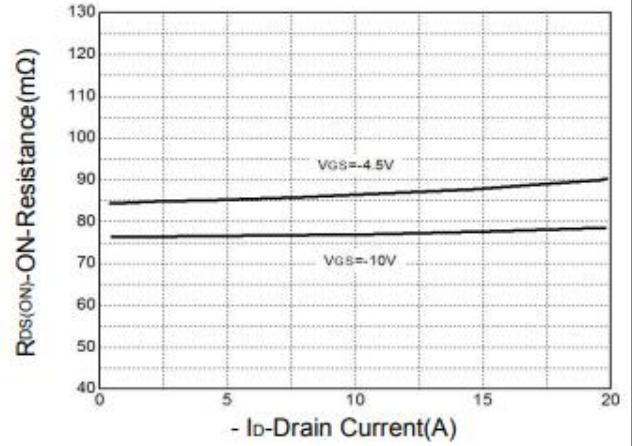


Fig.3 Source-Drain Diode Forward

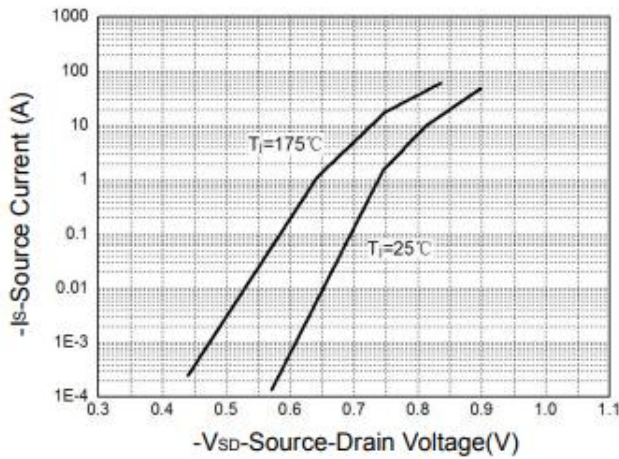


Fig.4 Gate-Charge Characteristics

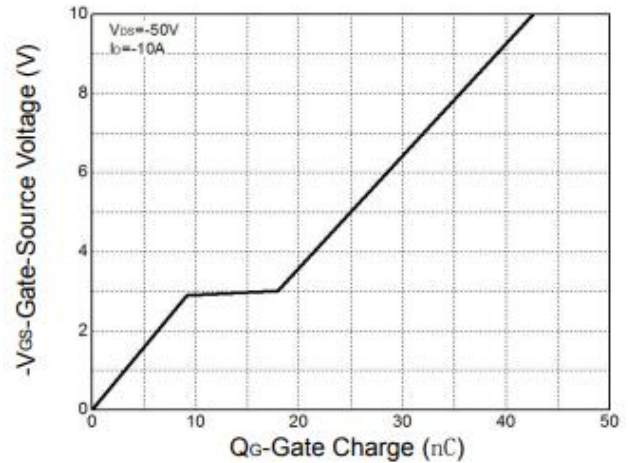


Fig.5 Power Dissipation

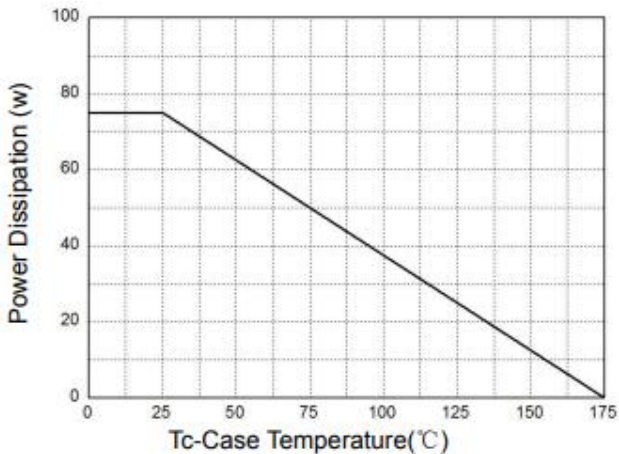
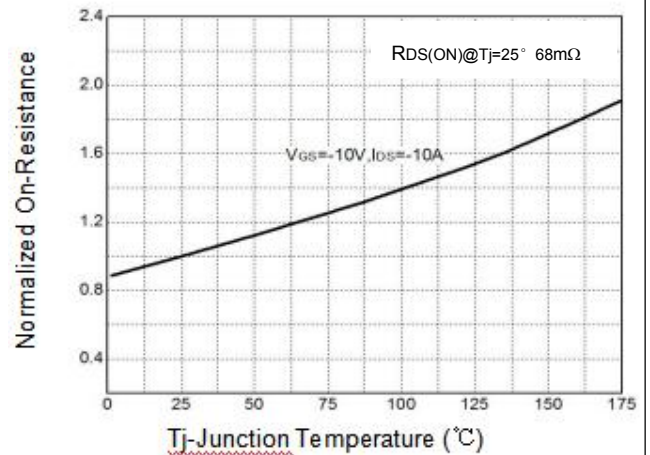


Fig.6 Normalized  $R_{DS(ON)}$  v.s  $T_J$



## Typical Characteristics(cont.)

Fig.7 Capacitance

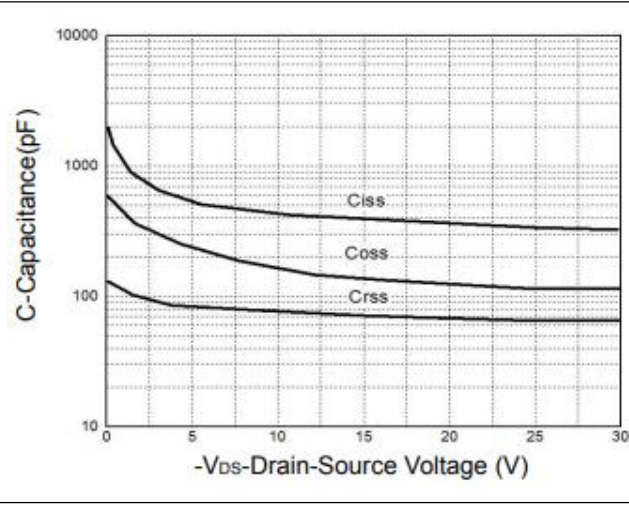


Fig.8 Safe Operating Area

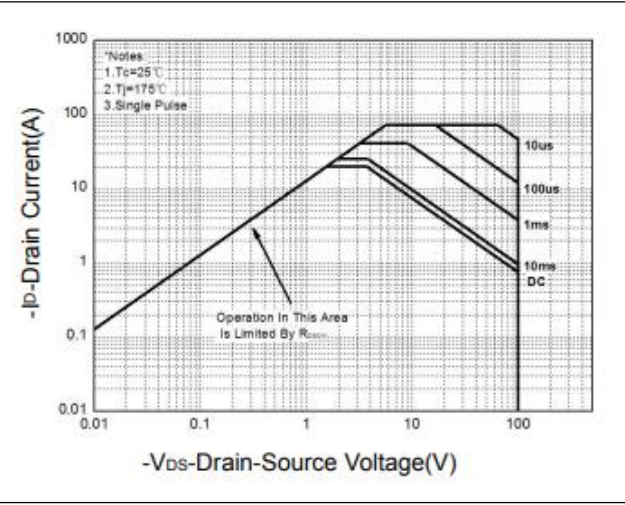


Fig.9 Normalized Maximum Transient Thermal Impedance

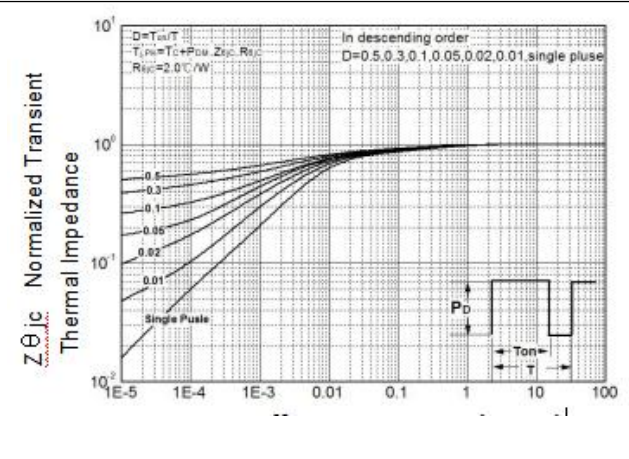
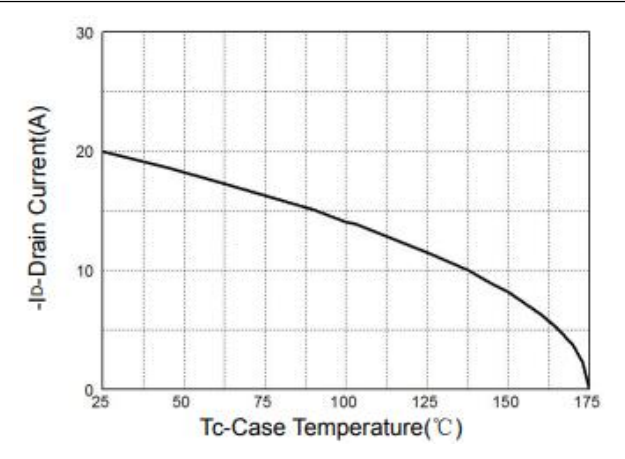
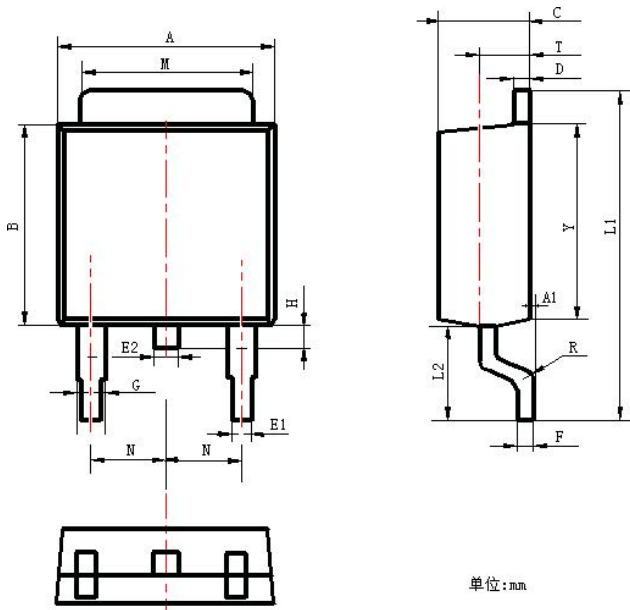


Fig.10 Drain Current





## Package Dimensions



单位: mm

Items	Values(mm)		
	MIN	NOM	MAX
A	6.3	6.5	6.9
A1	0	-	0.16
B	5.7	-	6.3
C	2.1	2.3	2.5
D	0.3	0.5	0.7
E1	0.6	0.65	0.9
E2	0.7	0.65	1
F	0.3	0.5	0.6
G	0.7	0.9	1.2
L1	9.6	10	10.5
L2	2.7	-	3.1
H	0.4	-	1
M	5.1	5.2	5.5
N	2.09	2.2	2.49
R	0.3		
T	1.4	-	1.6
Y	5.1	5.9	6.3