

## Silicon N - Channel Power MOSFET

### General Descriptio

The SR20N10D uses advanced trench technology and design to provide excellent RDS(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.

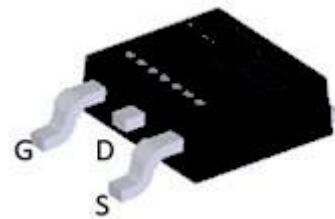
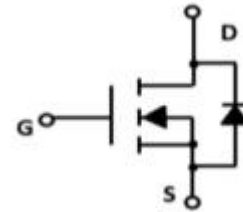
#### Features :

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

#### Applications :

- ◆ DC-DC converter
- ◆ Portable Equipment
- ◆ Power management

Inner Equivalent Principium Chart



#### Package Marking and Ordering Information:

Device Marking	Device	Device Package	Quantity
SR20N10D	SR20N10D	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	$\pm 20$	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.	
VDSS	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	$\mu A$
$I_{GSS}$	Gate to Source Forward Leakage	$V_{GS} = \pm 20V$	--	--	$\pm 100$	nA
ON Characteristics						
$R_{DS(ON)1}$	Drain-to-Source On-Resistance	$V_{GS}=10V, I_D=3.0A$	--	61	73	m $\Omega$
$R_{DS(ON)2}$	Drain-to-Source On-Resistance	$V_{GS}=4.5V, I_D=2.4A$	--	65	84	m $\Omega$
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.1	1.8	3.0	V
Dynamic Characteristics						
$C_{iss}$	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						
$t_{d(ON)}$	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						
$I_S$	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	$^{\circ}\text{C}/\text{W}$

Note:

$a^1$  : Repetitive rating; pulse width limited by maximum junction temperature

## Test Circuit and Waveform

Figure A- Gate Charge Test Circuit and Waveform

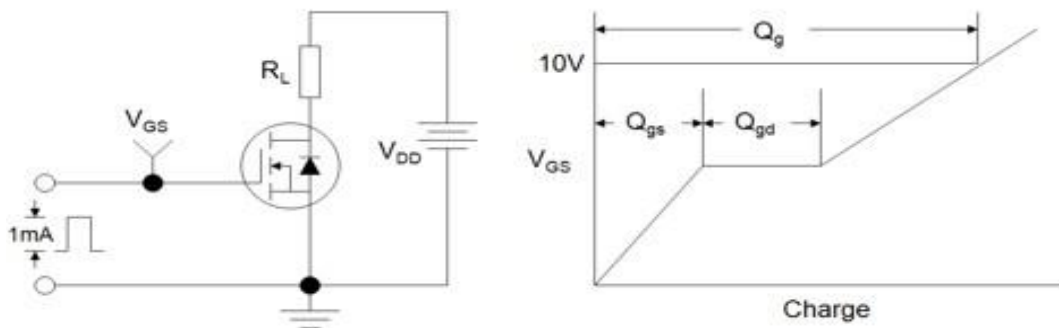


Figure B- Resistive Switching Test Circuit and Waveform

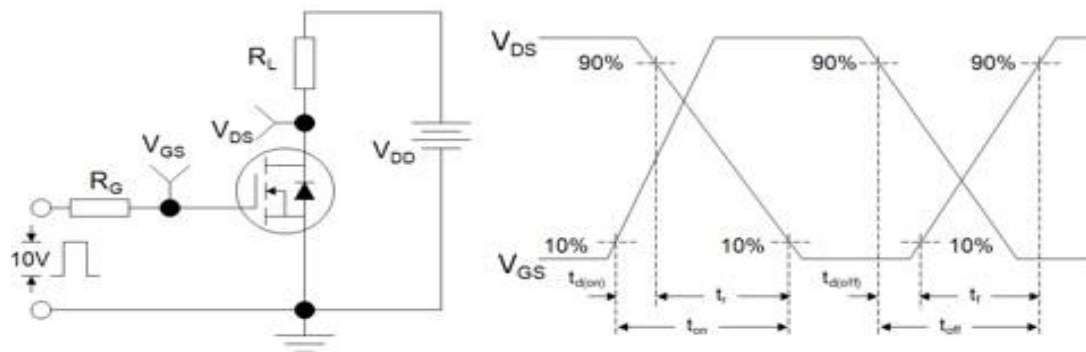
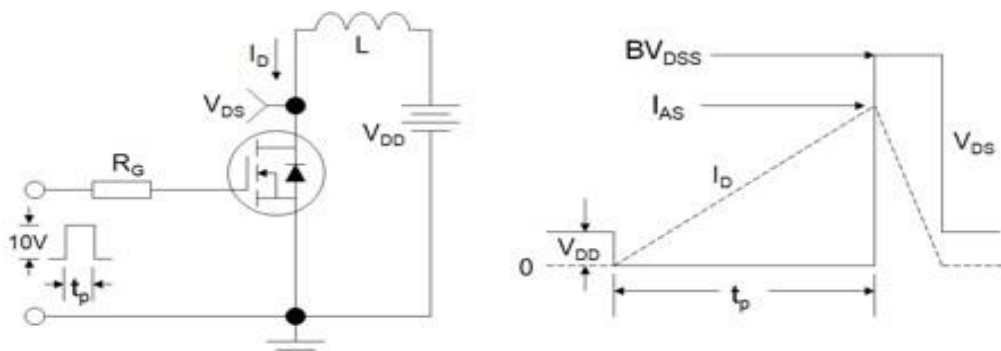
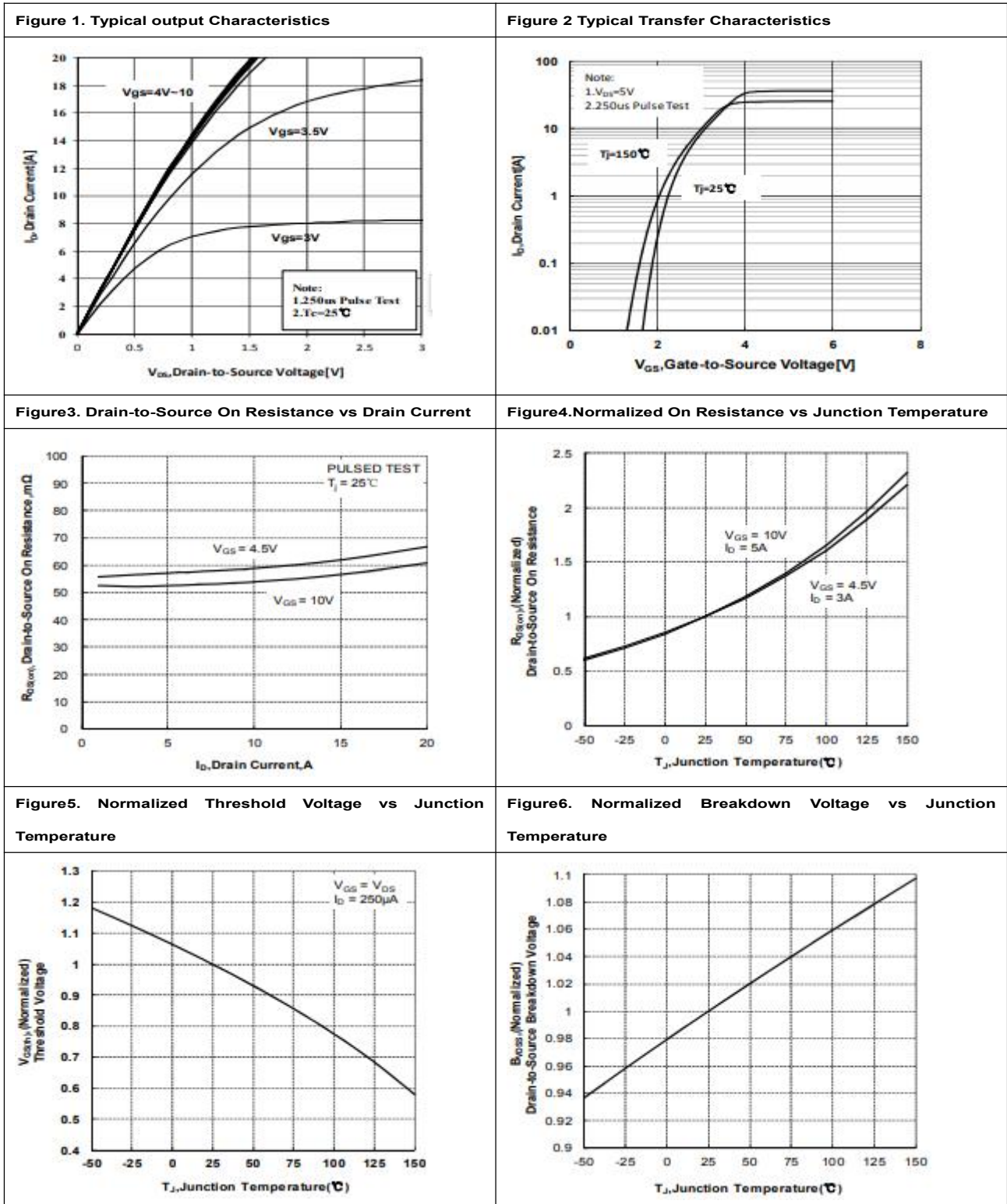


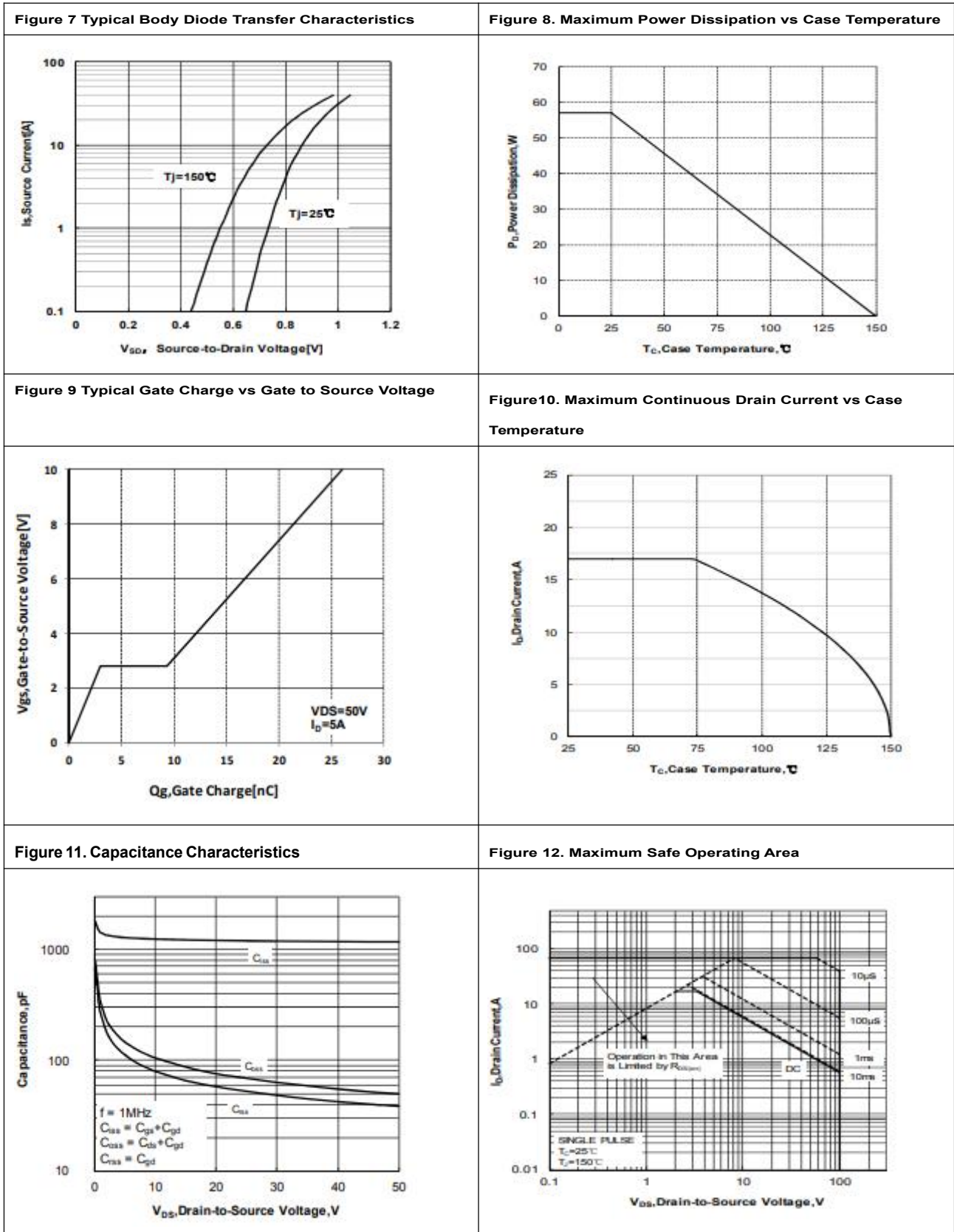
Figure C- Unclamped Inductive Switching Test Circuit and Waveform



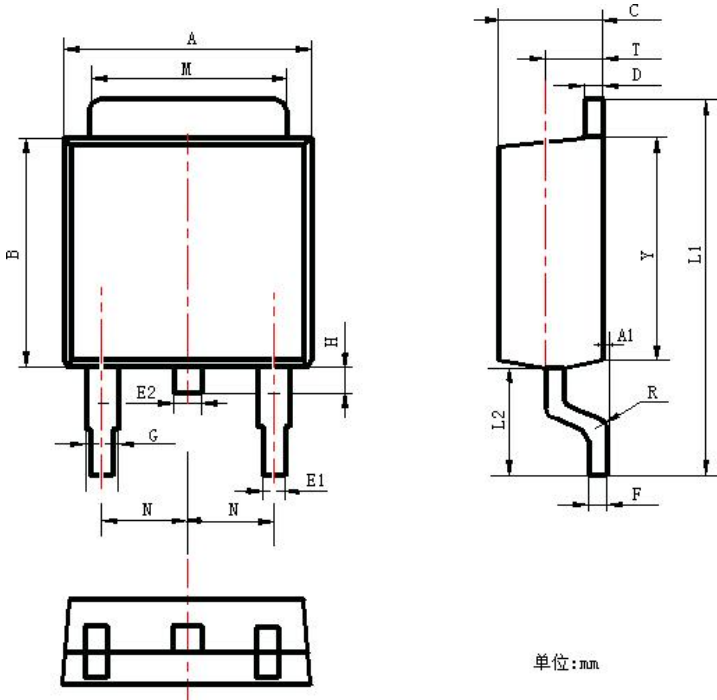
## Characteristics Curve:



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## Package Information



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