

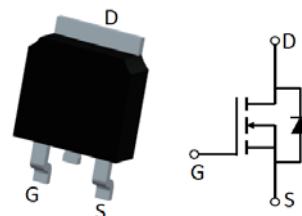
Features

- N-Channel, Low $R_{DS(on)}$ @ $V_{GS}=10V$
- 5V Logic Level Control
- 100% UIS Tested
- Green Device Available

$V_{(BR)DSS}$	$R_{DS(on)}$ Typ	I_D Max
100V	7.2m Ω @ 10V	62A
	10.8m Ω @ 4.5V	

Applications

- Quick Charger
- Load Switch
- Optimized for Power Management Applications for Portable Products, such as H-bridge, Inverters Car Charger and Others


Order Information
TO-252

Product	Package	Marking	Packing	Min Unit Quantity
SPS009N10T1	TO-252	009N10	2500PCS/Reel	5000PCS

Absolute Maximum Ratings

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

Symbol	Parameter	Rating	Unit	
Common Ratings (T _J =25°C Unless Otherwise Noted)				
V _{GS}	Gate-Source Voltage	+20 / -12	V	
V _{(BR)DSS}	Drain-Source Breakdown Voltage	100	V	
T _J , T _{STG}	Junction and Storage Temperature Range	-50 to 175	°C	
Mounted on Large Heat Sink				
I _{DM}	Pulse Drain Current Tested①	T _C =25°C	220	A
I _S	Diode continuous forward current	T _C =25°C	62	A
I _D	Continuous Drain Current	T _C =25°C	62	A
		T _C =70°C	50	
P _D	Maximum Power Dissipation	T _C =25°C	75	W
EAS	Avalanche energy, single pulsed ②		211	mJ
R _{θJC}	Thermal Resistance-Junction to Case		2	°C/W

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Electrical Characteristics @ T _J = 25°C (unless otherwise stated)						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V I _D =250μA	100	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current(T _C =25°C)	V _{DS} =100V, V _{GS} =0V	--	--	1	μA
	Zero Gate Voltage Drain Current(T _C =125°C)	V _{DS} =80V, V _{GS} =0V	--	--	100	uA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =+20V, V _{DS} =0V	--	--	±100	nA
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	1.0	1.6	2.5	V
R _{DS(ON)}	Drain-Source On-State Resistance③	V _{GS} =10V, I _D =15A	--	7.2	9.2	mΩ
R _{DS(ON)}	Drain-Source On-State Resistance③	V _{GS} =4.5V, I _D =8A	--	10.8	14	mΩ
Dynamic Electrical Characteristics @ T _J = 25°C (unless otherwise stated)						
C _{iss}	Input Capacitance	V _{DS} =50V, V _{GS} =0V, f=1MHz	--	2330	--	pF
C _{oss}	Output Capacitance		--	465	--	pF
C _{rss}	Reverse Transfer Capacitance		--	21	--	pF
R _g	Gate Resistance	f=1MHz		3		Ω
Q _g	Total Gate Charge	V _{DS} =50V I _D =20A, V _{GS} =10V	--	39.7	--	nC
Q _{gs}	Gate Source Charge		--	6.8	--	nC
Q _{gd}	Gate Drain Charge		--	9.2	--	nC
Switching Characteristics @ T _J = 25°C (unless otherwise stated)						
t _{d(on)}	Turn on Delay Time	V _{DD} =50V, I _D =10A, R _G =6Ω, V _{GS} =10V	--	14.6	--	ns
t _r	Turn on Rise Time		--	8	--	ns
t _{d(off)}	Turn Off Delay Time		-	22.2	--	ns
t _f	Turn Off Fall Time		--	6.4	--	ns
Source Drain Diode Characteristics @ T _J = 25°C (unless otherwise stated)						
t _{rr}	Reverse Recovery Time	I _{SD} =20A, V _{GS} =0V di/dt=500A/μs	--	45	--	nS
Q _{rr}	Reverse Recovery Charge		--	185	--	nC
V _{SD}	Forward on voltage②	I _{SD} =10A, V _{GS} =0V	--	0.78	1.2	V

Notes: ① Pulse width limited by maximum allowable junction temperature

② Limited by T_{Jmax}, starting T_J = 25°C, L = 0.1mH, R_G = 25Ω, I_{AS} = 65A, V_{GS} = 10V. Part not recommended for use above this value

③ Pulse width ≤ 300μs; duty cycles ≤ 2%.

Typical Characteristics

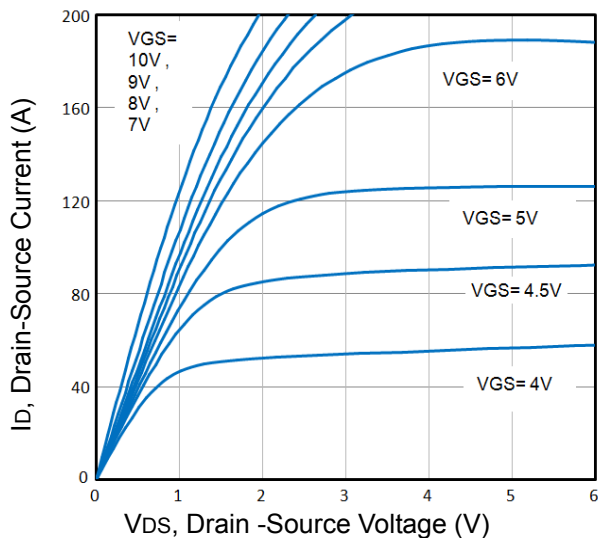


Fig1. Typical Output Characteristics

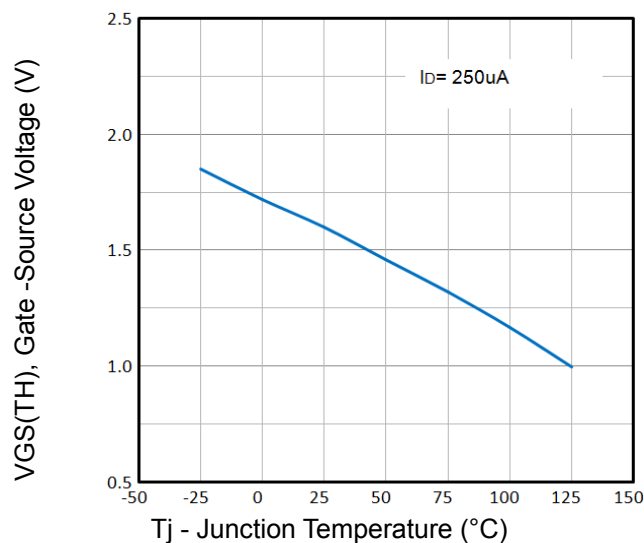


Fig2. VGS(TH) Voltage Vs. Temperature

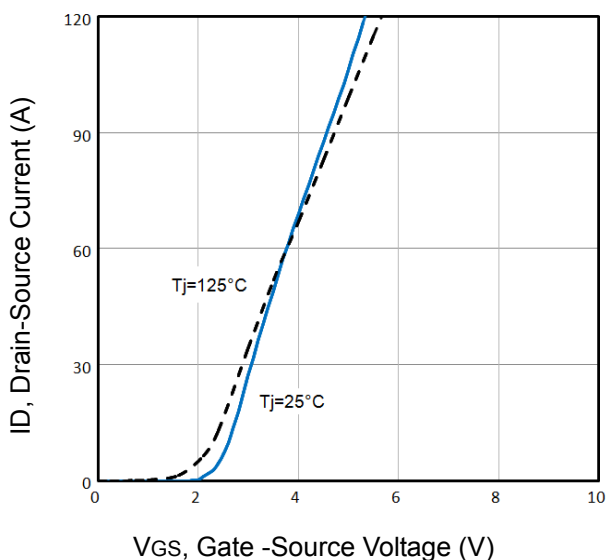


Fig3. Typical Transfer Characteristics

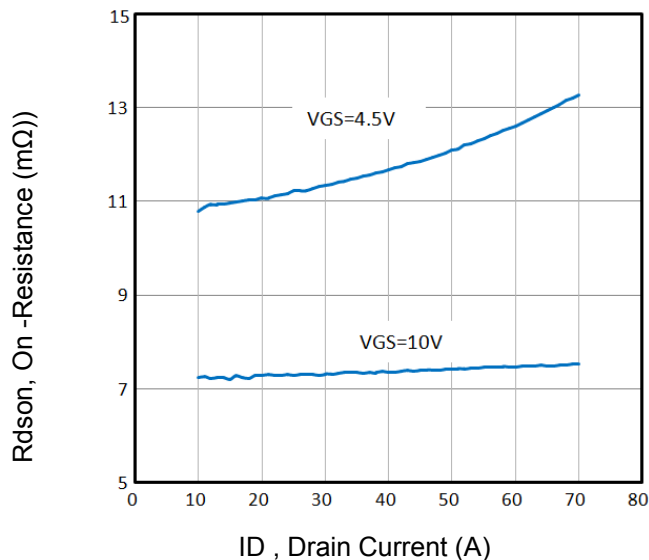


Fig4. On-Resistance vs. Drain Current and Gate Voltage

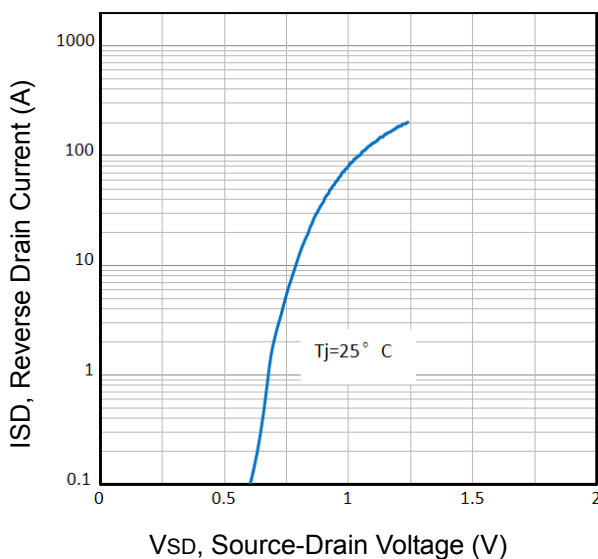


Fig5. Typical Source-Drain Diode Forward Voltage

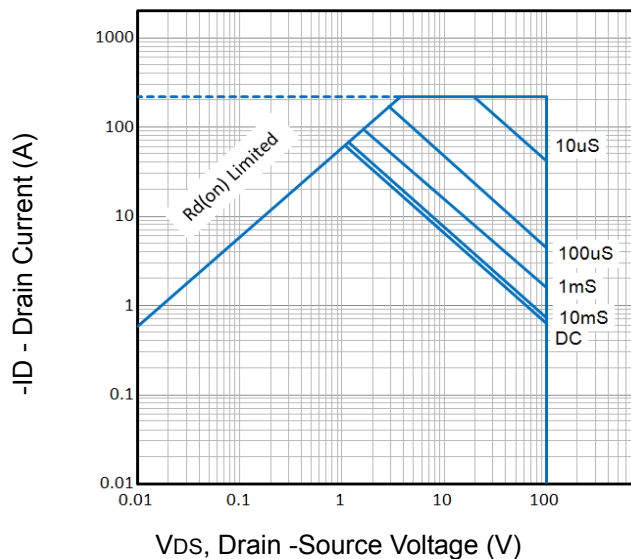


Fig6. Maximum Safe Operating Area

Typical Characteristics

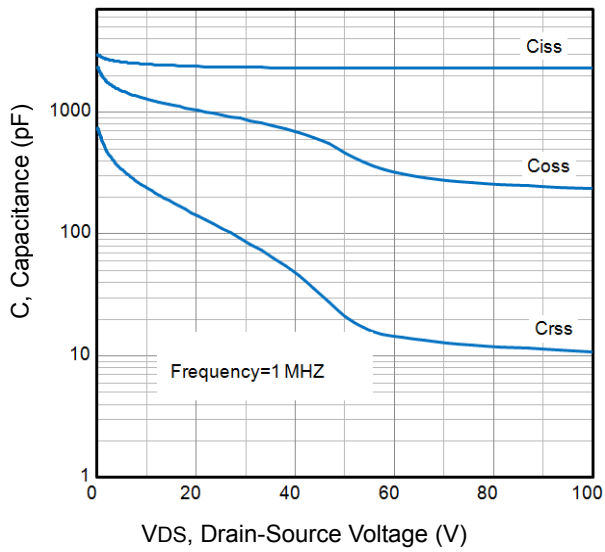


Fig7. Typical Capacitance Vs. Drain-Source Voltage

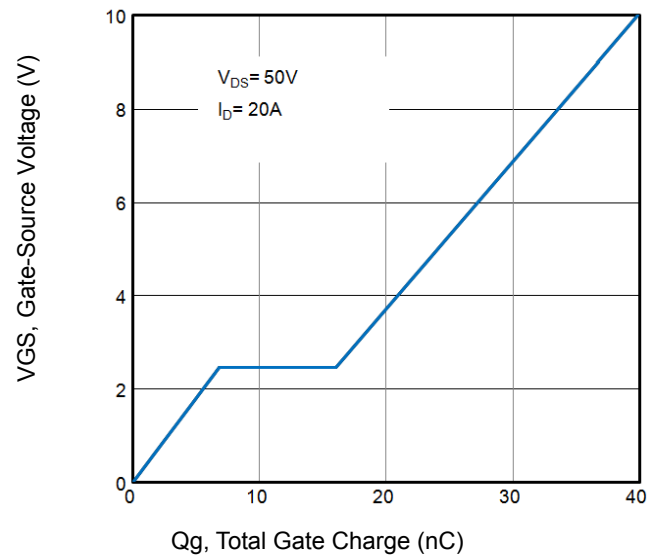


Fig8. Typical Gate Charge Vs. Gate-Source Voltage

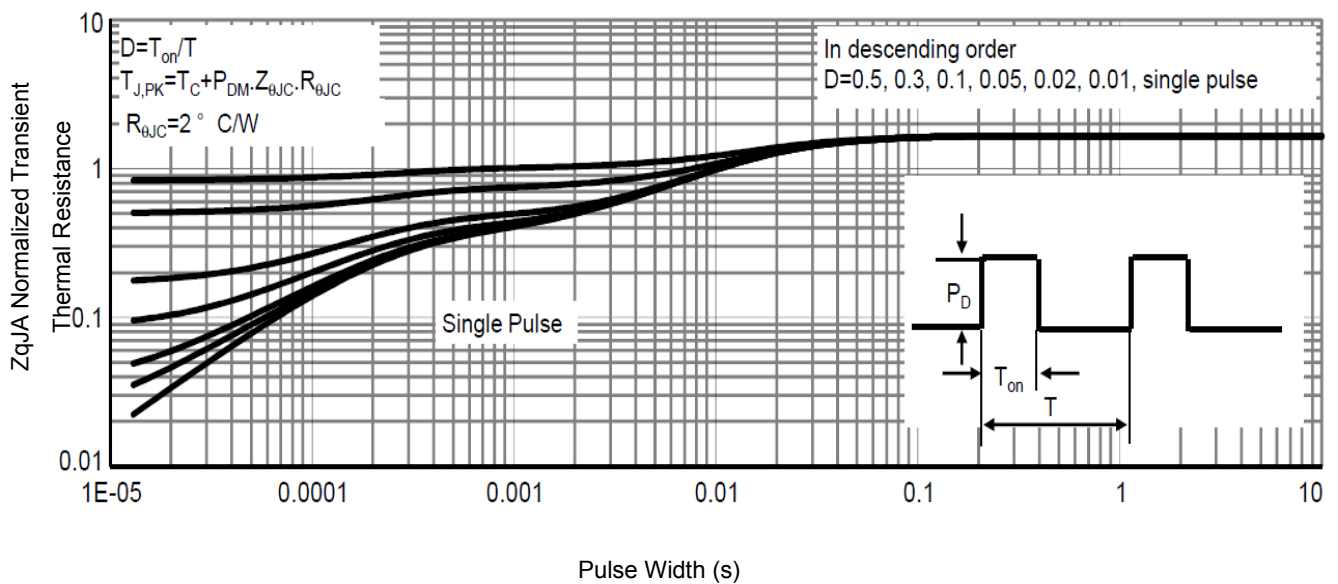


Fig9. Normalized Maximum Transient Thermal Impedance

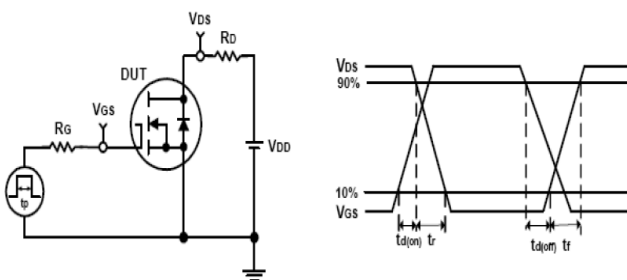


Fig10. Switching Time Test Circuit and waveforms

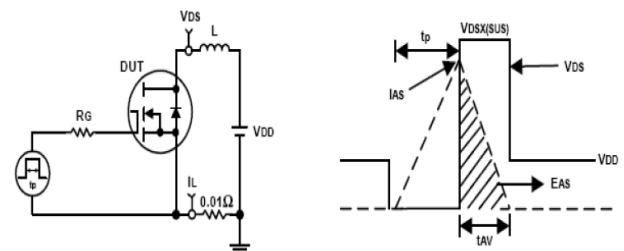
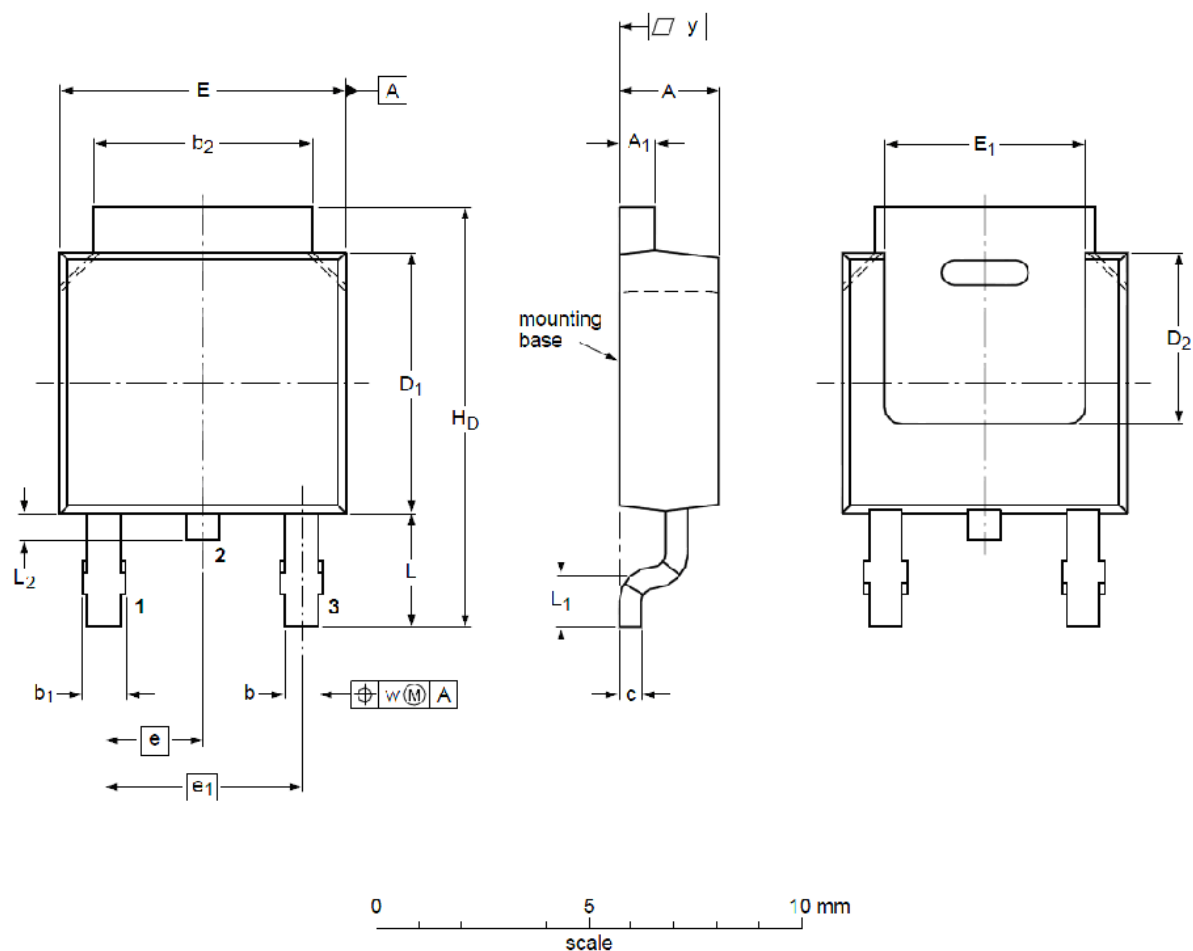


Fig11. Unclamped Inductive Test Circuit and waveforms

TO-252 Mechanical Data



DIMENSIONS (unit : mm)

Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	2.22	2.30	2.38	A ₁	0.4	0.53	0.65
b	0.68	0.78	0.89	b ₁	0.90	0.98	1.10
b ₂	5.20	5.33	5.55	c	0.45	0.5	0.55
D ₁	5.98	6.10	6.22	D ₂	--	4.00	--
E	6.47	6.60	6.73	E ₁	5.10	5.28	5.45
e	--	2.28	--	e ₁	--	4.57	--
H _b	9.60	10.08	10.40	L	2.75	2.95	3.05
L ₁	--	0.50	--	L ₂	0.50	--	1.10
w	--	0.20	--	y	0.20	--	--