

TSD60R180S6Z

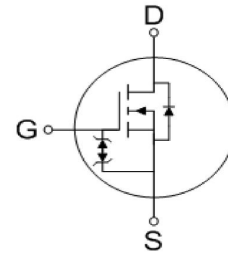
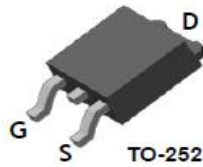
600V N-Channel MOSFET

Description

Superior 6th generation SJ MOSFETs (S6-series) are cutting-edge high voltage power MOSFETs, based on Truesemi's extensive design expertise and years of experience. The main strengths of S6-series are low on-resistance, low gate charge and reduced tendency for ringing. As a result, its switching loss is very low, making it optimized for switching applications. Moreover, these user friendly devices offer the advantages of improved ruggedness and remarkable ESD capability by integrated zener diode, making it an ideal choice for designers.

Features

- 18A,600V,Max.RDS(on)=0.180Ω @ VGS =10V
- Low power loss by high speed switching and low on-resistance
- 100% avalanche tested
- Zener-integrated



Absolute Maximum Ratings T_C=25°C unless otherwise specified

Symbol	Parameter		Value	Units
V _{DSS}	Drain-Source Voltage		600	V
V _{GS}	Gate-Source Voltage		± 25	V
I _D	Continuous drain current ⁽¹⁾	T _C = 25°C	18	A
		T _C = 100 °C	11.4	A
I _{DM}	Pulsed drain current ⁽²⁾		54	A
E _{AS}	Single - pulse avalanche energy ⁽³⁾		56	mJ
P _D	Power Dissipation (T _C = 25°C)		72	W
T _J , T _{STG}	Operating and Storage Temperature Range		-55 to +150	°C

1) I_D limited by maximum junction temperature, Duty cycle D=0.5

2) Pulse width tP limited by T_{J,max}

3) I_{AS} = 3.2 A

4) I_{SD} ≤ I_D, V_{DS peak} ≤ 400V, di/dt ≤ 900A/μs

Thermal Resistance Characteristics

Symbol	Parameter	Value	Units
R _{θJC}	Thermal resistance, junction-case max	1.73	°C/W
R _{θJA}	Thermal resistance, junction-ambient max	40.6	°C/W

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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250 uA	2.5	--	4.5	V
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} = 10 V, I _D =5.6A	--	0.160	0.180	Ω
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0 V, I _D = 1mA	600	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 600 V, V _{GS} = 0 V	--	--	1	μA
I _{GSSF}	Gate-Body Leakage Current,Forward	V _{GS} =25 V, V _{DS} = 0 V	--	--	10	μA
I _{GSSR}	Gate-Body Leakage Current,Reverse	V _{GS} =- 25 V, V _{DS} = 0 V	--	--	-10	μA
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} = 400V, V _{GS} = 0 V, f =250kHz	--	1322	--	pF
C _{oss}	Output Capacitance		--	28	--	pF
C _{rss}	Reverse Transfer Capacitance		--	5.7	--	pF
Switching Characteristics						
t _{d(on)}	Turn-On Time	V _{GS} = 10V, R _G = 25Ω, V _{DS} = 300V, I _D =18A	--	28	--	ns
t _r	Turn-On Rise Time		--	53	--	ns
t _{d(off)}	Turn-Off Delay Time		--	104	--	ns
t _f	Turn-Off Fall Time		--	31	--	ns
R _G	Gate resistance	V _G S = 0V, f = 1.0MHz	--	8.1	--	Ω
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =400V, I _D =5.6A	--	32.3	--	nC
Q _{gs}	Gate-Source Charge		--	6.5	--	nC
Q _{gd}	Gate-Drain Charge		--	13.7	--	nC
Source-Drain Diode Maximum Ratings and Characteristics						
V _{SD}	Source-Drain Diode Forward Voltage	I _{SD} = 5.6A,, V _{GS} = 0 V	--	--	1.4	V
t _{rr}	Reverse Recovery Time	I _{SD} =5.6A dI/dt=100A/us	--	235	--	ns
Q _{rr}	Reverse Recovery Charge	V _{ds} =400V	--	2.2	--	μC

Test circuit

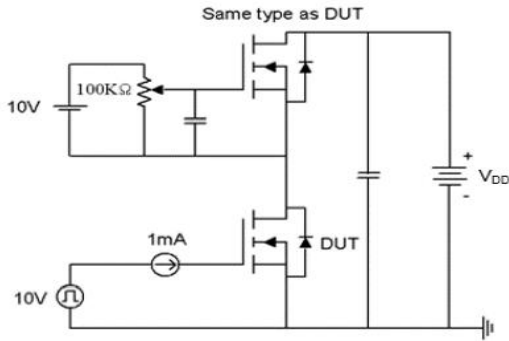


Fig15-1. Gate charge measurement circuit

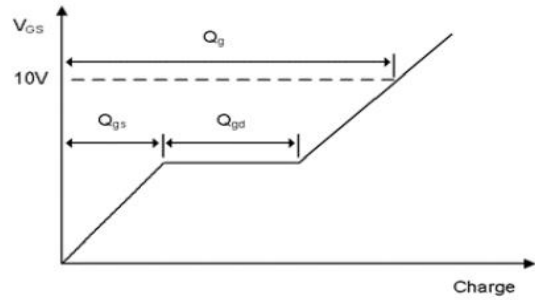


Fig15-2. Gate charge waveform

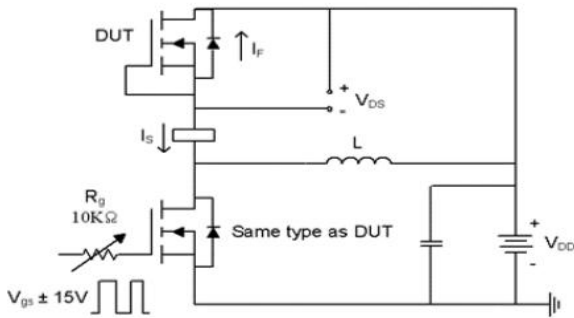


Fig16-1. Diode reverse recovery test circuit

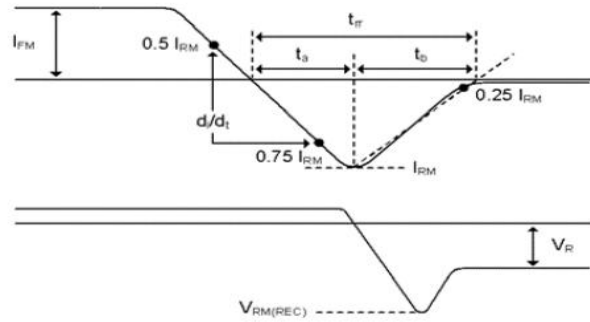


Fig16-2. Diode reverse recovery test waveform

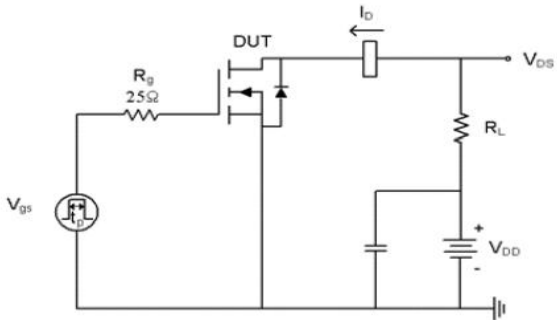


Fig17-1. Switching time test circuit for resistive load

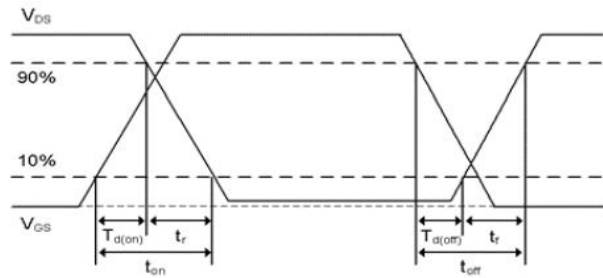


Fig17-2. Switching time waveform

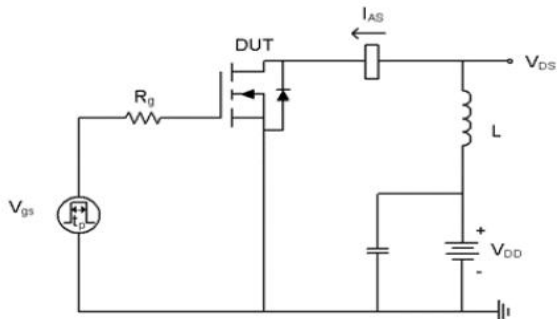


Fig18-1. Unclamped inductive load test circuit

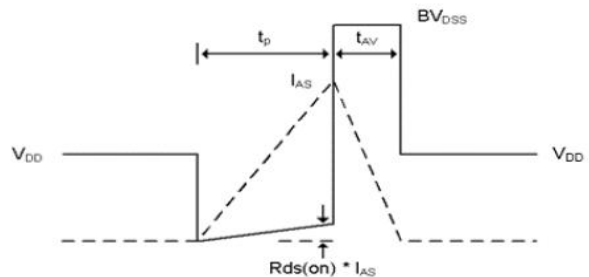


Fig18-2. Unclamped inductive waveform