

Features

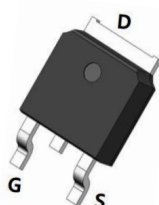
- N-channel SJ MOSFET with deep trench process
- Fast switching speed
- 100% avalanche tested
- Improved dv/dt capability

Application

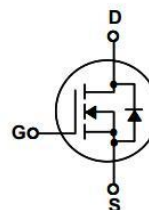
- Switch Mode Power Supply(SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)
- AC-DC Switching Power Supply

Key Performance Parameters

Parameter	Value	Unit
V_{DSS}	650	V
I_D	11	A
$R_{DS(ON)_{max}}$	360	mΩ



TO-252



Equivalent Circuit

Table 1. Absolute Maximum Ratings ($T_C=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter		Value	Units
V_{DSS}	Drain-Source Voltage		650	V
V_{GS}	Gate-Source Voltage		± 30	
I_D	Continuous Drain Current	($T_C=25^\circ\text{C}$)	11	A
	Continuous Drain Current	($T_C=100^\circ\text{C}$)	7	
I_{DM}	Pulsed Drain Current		44	
E_{AS}	Single Pulse Avalanche Energy L=10mH, VDS= 50V, RG = 25 Ω , TC=25°C		135	mJ
P_D	Power Dissipation		33	W
dv/dt	Peak Diode Recovery dv/dt		50	V/ns
T_L, T_{PKG}	Maximum Temperature for Soldering		300	°C
	Leads at 0.063in(1.6mm)from Case for 10 seconds		260	
T_J, T_{STG}	Operating Junction Storage Temperature Range		-55 to +150	

Table 2. Thermal Characteristic

Symbol	Parameter	Value	Units
$R_{\theta JA}$	Junction-to-Ambient	62	°C/ W
$R_{\theta JC}$	Junction-to-Case	3.79	°C/ W

Table 3. Electrical Characteristics ($T_J=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA	650	--	--	V
V _{GS(th)}	Gate-Source Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	2.2	3.2	4.2	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 650 V, V _{GS} = 0 V	--	--	1	μA
I _{GSS}	Gate- to- Source Forward Leakage	V _{DS} = 0 V ,V _{GS} = 30V	--	--	100	nA
	Gate- to- Source Reverse Leakage	V _{DS} = 0 V ,V _{GS} = -30V	-100	--	--	
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} = 10V, I _D = 5.5A	--	281	360	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{GS} = 0V, V _{DS} = 50V, f = 1.0MHz	--	574	--	pF
C _{oss}	Output Capacitance		--	45	--	
C _{rss}	Reverse Transfer Capacitance		--	5.5	--	
Q _g	Total Gate Charge	I _D = 5.5A, V _{DS} =400V V _{GS} = 10V	--	17.5	--	nC
Q _{gs}	Gate-Source Charge		--	4.7	--	
Q _{gd}	Gate-Drain Charge		--	8.5	--	
Resistive Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DS} = 400 V, I _D =5.5 A R _g = 25 Ω	--	25	--	ns
t _r	Turn-on Rise Time		--	44	--	
t _{d(off)}	Turn-off Delay Time		--	64.5	--	
t _f	Turn-off Fall Time		--	23	--	
Source-Drain Diode Characteristics						
V _{SD}	Body Diode Forward Voltage	I _S = 5.5A, V _{GS} =0V	--	--	1.4	V
I _S	Continuous Diode Forward Current	Integral pn- diode in MOSFET	--	--	11	A
I _{SM}	Pulse diode forward current		--	--	44	
t _{rr}	Reverse Recovery Time	I _S = 5.5A, di/dt = 100A/μs,	--	235	--	ns
Q _{rr}	Reverse Recovery Charge	V _R =400V	--	2.3	--	nC

Typical Electrical and Thermal Characteristics ($T_J = 25^\circ\text{C}$, unless otherwise noted)

Fig 1: Typical Output Characteristics

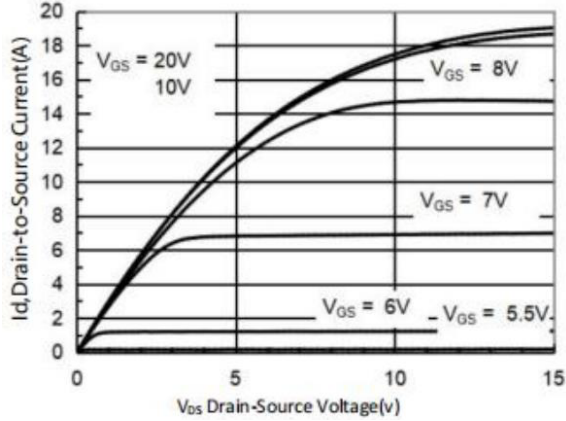


Fig 2: Typical Transfer Characteristics

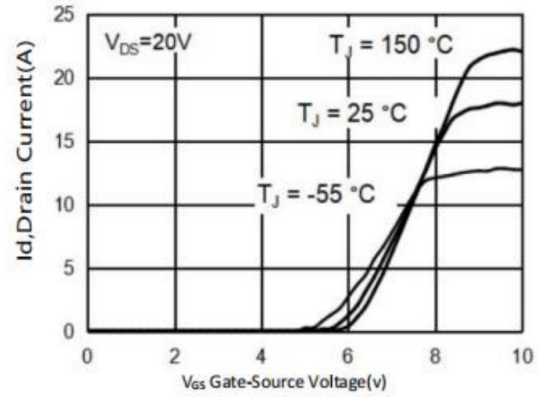


Fig 3: On-Resistance versus Drain Current

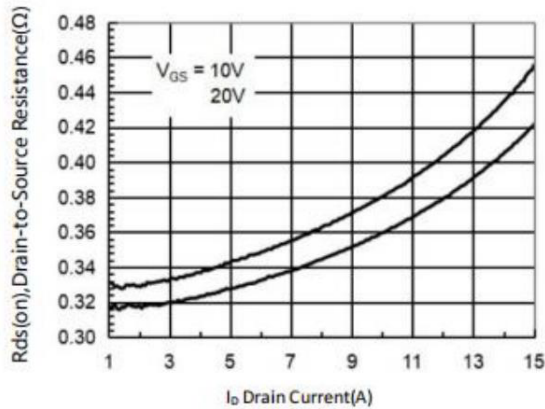


Fig 4: Diode forward voltage versus Current

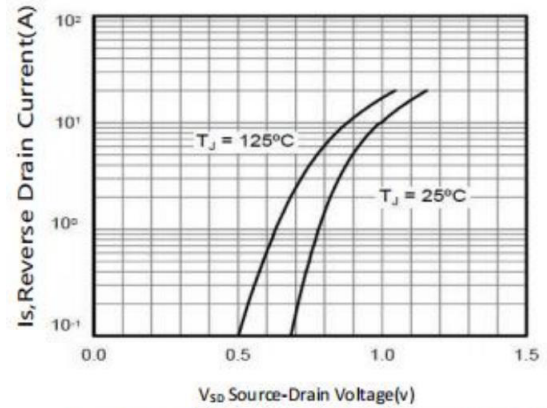


Fig 5: Typical Capacitance versus VDS

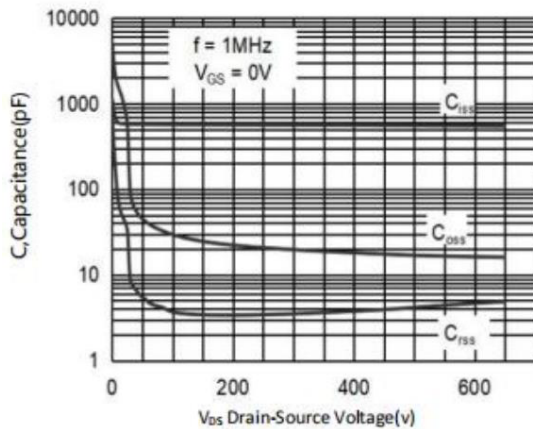


Fig 6: Typical Gate Charge versus VGS

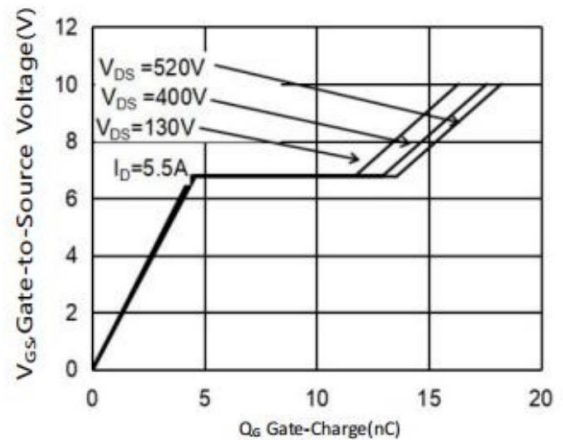


Fig 7: BV_{DSS} Variation with Temperature

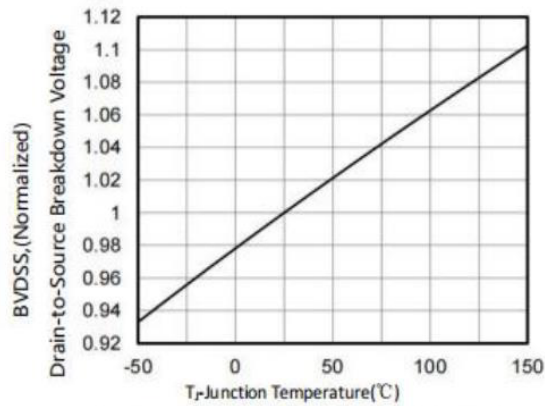


Fig 8: On-Resistance Variation with Temperature

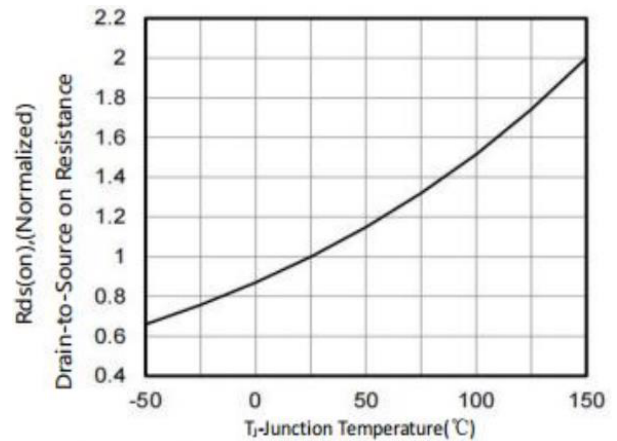


Fig 9: Maximum Safe Operating Area TO-252

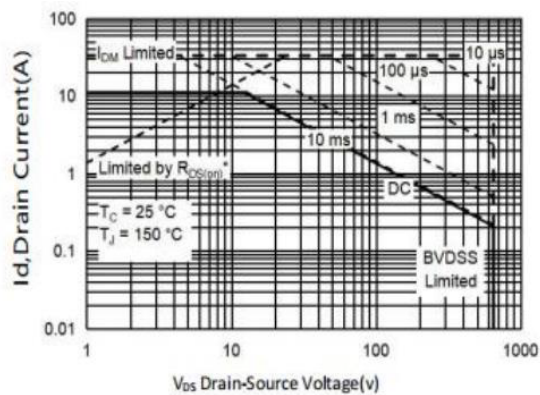


Fig 10: Maximum Safe Operating Area TO-220F

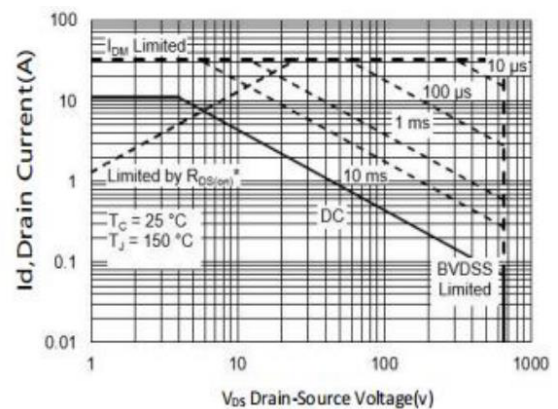
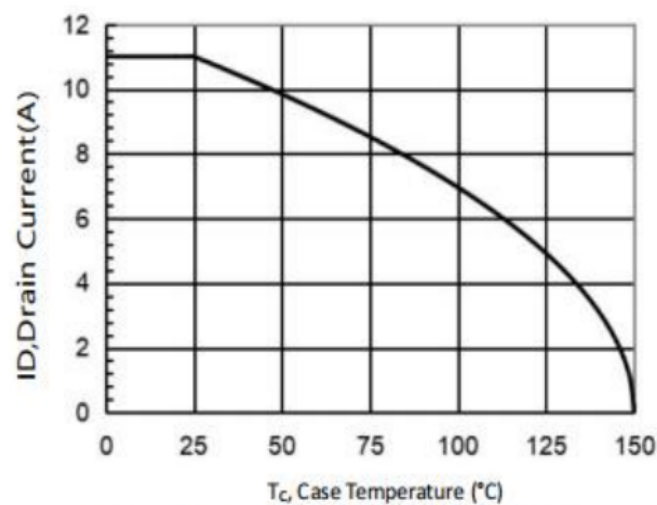


Fig 10: Maximum Continuous Drain Current versus Case Temperature



Test Circuit and Waveforms

Fig A: Gate Charge Test Circuit & Waveforms

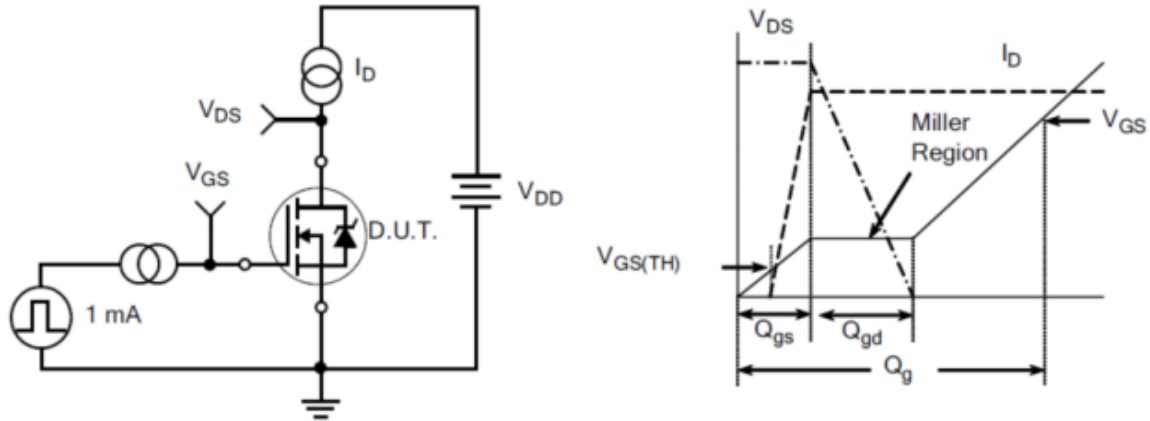


Fig B: Resistive Switching Test Circuit & Waveforms

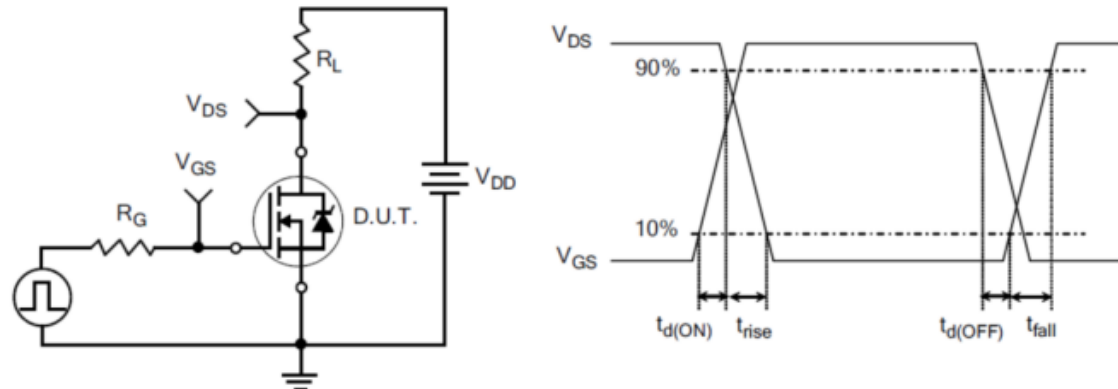


Fig C: Unclamped Inductive Switching Test Circuit & Waveforms

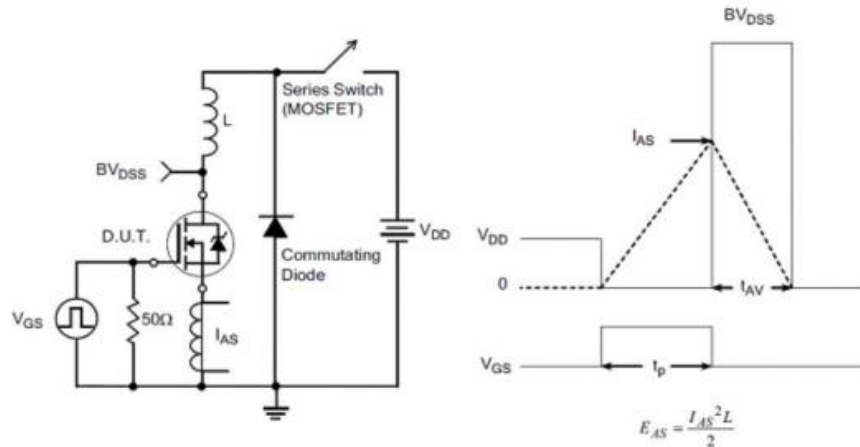
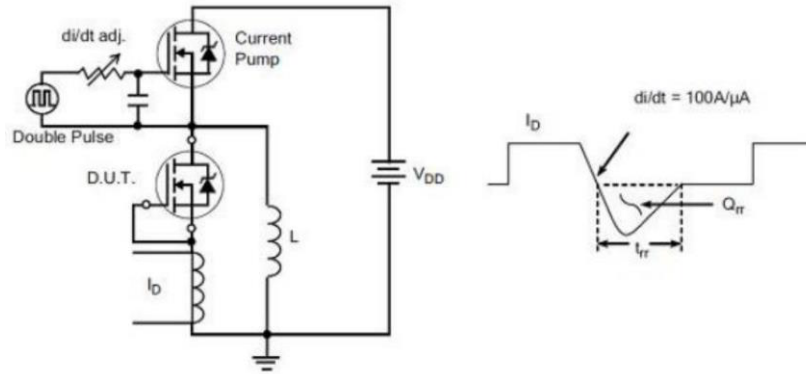
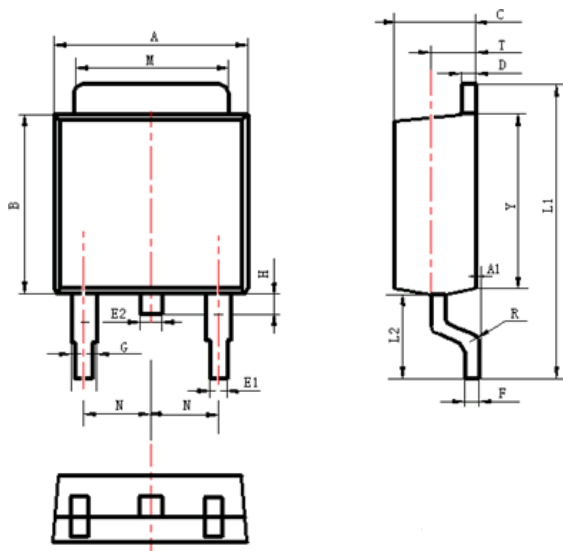


Fig D: Diode Reverse Recovery Test Circuit & Waveforms



Package Information

TO-252



Items	Values(mm)	
	MIN	MAX
A	6.30	6.90
A1	0	0.16
B	5.70	6.30
C	2.10	2.50
D	0.30	0.70
E1	0.60	0.90
E2	0.70	1.00
F	0.30	0.60
G	0.70	1.20
L1	9.60	10.50
L2	2.70	3.10
H	0.40	1.00
M	5.10	5.50
N	2.09	2.49
R	0.3	
T	1.40	1.60
Y	5.10	6.30