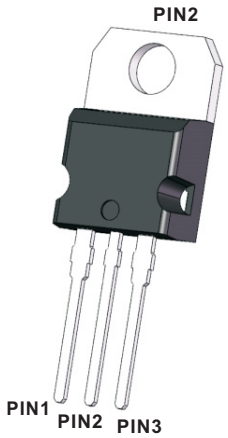
100A 120V N-CHANNEL POWER MOSFET

TO-220-3L(*Prefix :C)



RoHS COMPLIANT

Description

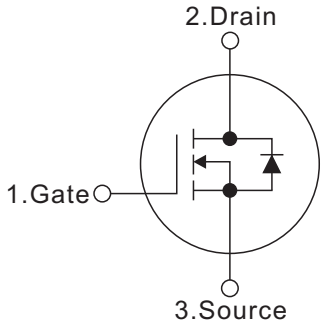
This model is an advanced SGT MOSFET with better characteristics, such as fast switching time, low gate charge and low on state resistance.
Such enhanced MOSFET are commonly used in switching power supplies and adapters for high-speed switching applications.

Features

- SGT technology
- $R_{DS(ON)}$ < 8.5 mΩ @ V_{GS}=10V, I_D=30A
- Fast switching capability
- Avalanche energy tested
- Improved dv/dt capability, high ruggedness

Mechanical data

- Case: TO-220-3L
- Approx. Weight: 2.04g (0.072oz)
- RoHS compliant
- Case Material: “Green” molding compound, UL flammability classification 94V-0,“Halogen-free”.



Absolute Maximum Ratings (Ta=25°C, Unless Otherwise Specified)

Parameter	Symbols	Ratings	Units
Drain-Source Voltage	V_{DS}	120	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current Tc=25°C	I_D	100	A
Pulsed Drain Current (Note 2)	I_{DM}	400	A
Avalanche Energy Single Pulsed (Note 3)	E_{AS}	500	mJ
Power Dissipation (Tc = 25°C)	P_D	62.5	W
Operating junction and storage temperature	T_J,T_{STG}	-55 ~+150	°C

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.
Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. Repetitive Rating: Pulse width limited by maximum junction temperature.
3. L = 0.5mH, V_{DD} = 50V, R_G = 25 Ω, Starting T_J = 25°C

Thermal Resistance

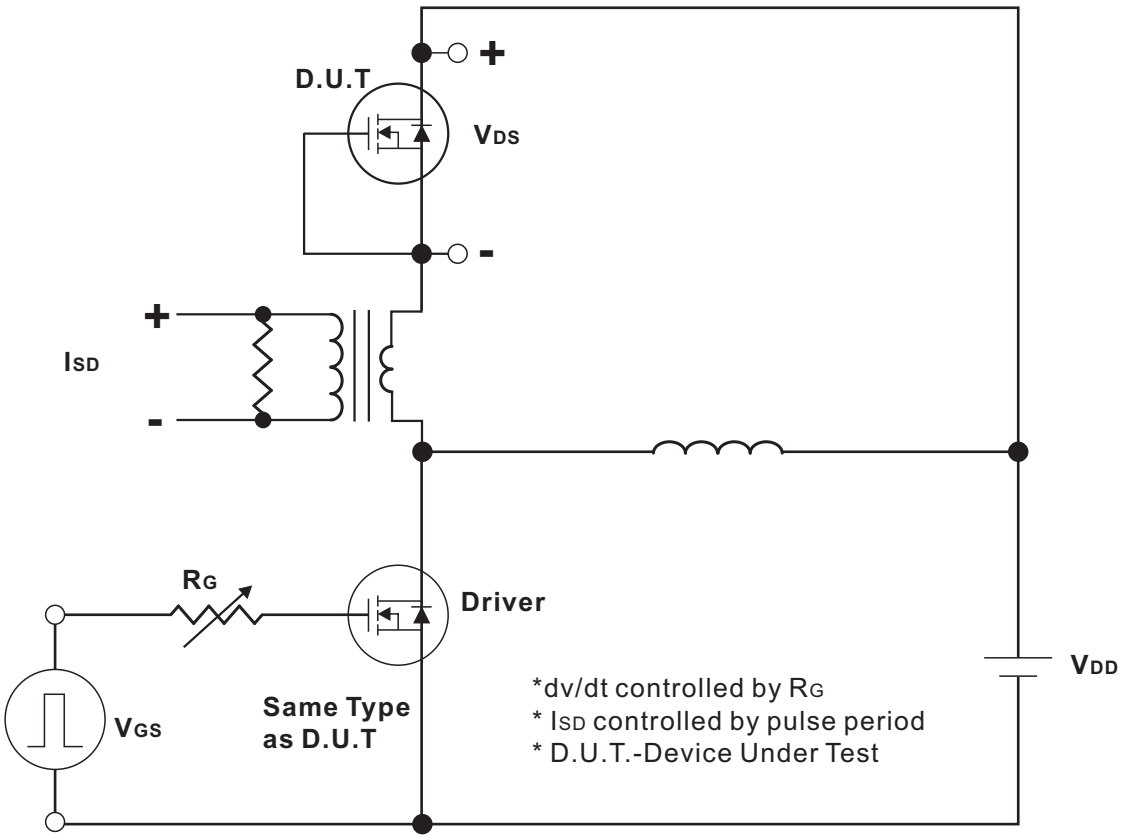
Parameter	Symbols	Ratings	Units
Thermal resistance, junction – case.	R_{thJC}	2	°C/W
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	51.5	°C/W

Electrical Characteristics (TA=25°C, Unless Otherwise Specified)

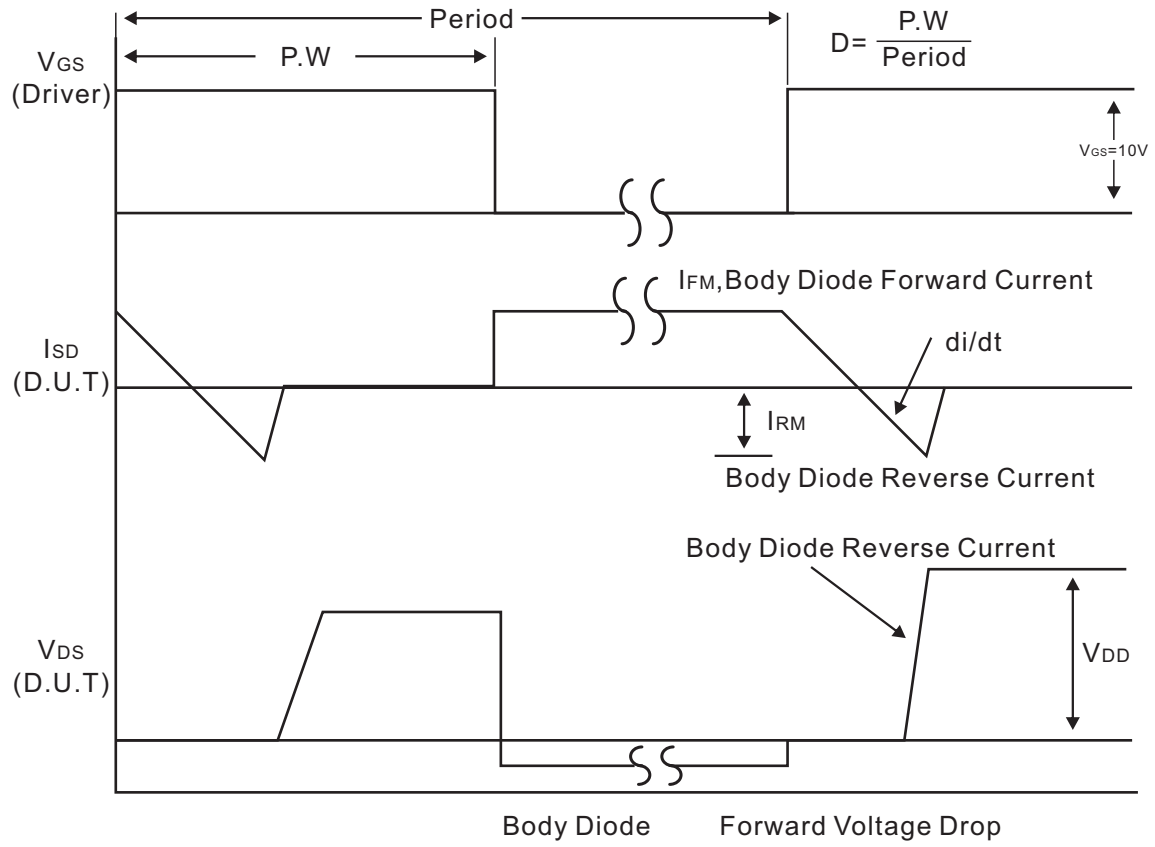
Parameter	Symbols	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V,I_D=250uA	120			V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=120V,V_{GS}=0V			1.0	uA
Gate- Source Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V			±100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS},I_D=250uA	1.4		2.6	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V,I_D=30A		6.7	8.5	mΩ
Transconductance	g_{fs}	V_{DS}=5V,I_D=20A		46.9		S
Dynamic Characteristics						
Input Capacitance	C_{ISS}	V_{DS}=25V,		5115		pF
Output Capacitance	C_{OSS}	V_{GS}=0V,		1930		pF
Reverse Transfer Capacitance	C_{RSS}	f=1.0MHz		75		pF
Gate resistance	R_G	VDS=0V,F_{REQ}=1.00MHz		1.8		Ω
Switching Characteristics						
Total Gate Charge (Note 1)	Q_G	V_{DS}=60V,V_{GS}=10V,		18		nC
Gate-Source Charge	Q_{GS}	I_D=20A(NOTE1,2)		6.9		nC
Gate-Drain Charge	Q_{GD}			7.4		nC
Turn-On Delay Time (Note 1)	$t_{D(ON)}$	V_{DS}=60V,V_{GS}=10V,		4.9		ns
Turn-On Rise Time	t_R	R_G=10Ω,I_D=20A		15.7		ns
Turn-Off Delay Time	$t_{D(OFF)}$	(NOTE1,2)		82		ns
Turn-Off Fall Time	t_F			40		ns
Drain-source Diode Characteristics And Maximum Ratings						
Drain-Source Diode Forward Voltage (Note 1)	V_{SD}	I_{SD}=20A,V_{GS}=0V			1.1	V
Diode continuous forward current	I_S				100	A
Reverse Recovery time	trr	I_{SD}=40A di/dt=100A/us		62		nS
Reverse Recovery Charge	Qrr			84		nC

Notes:
1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating temperature.

Test Circuits and waveforms

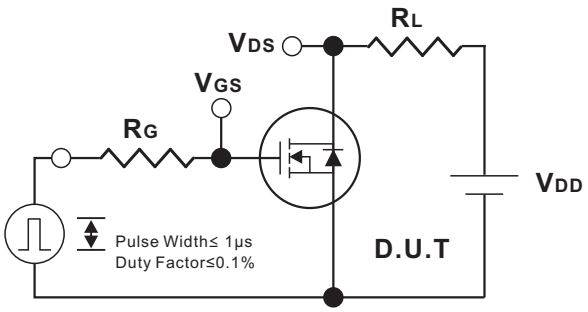


Peak Diode Recovery dv/dt Test Circuit

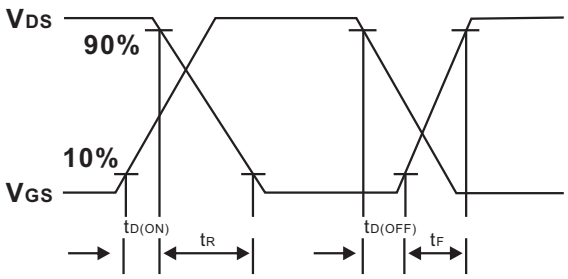


Peak Diode Recovery dv/dt Waveforms

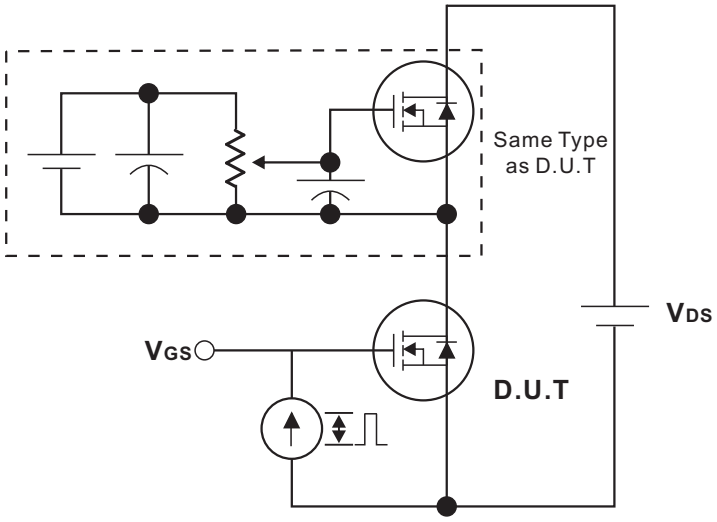
Test Circuits and waveforms



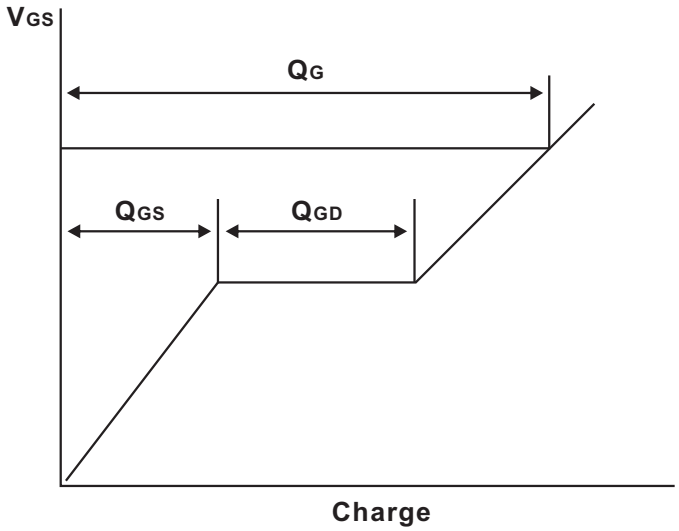
Switching Test Circuit



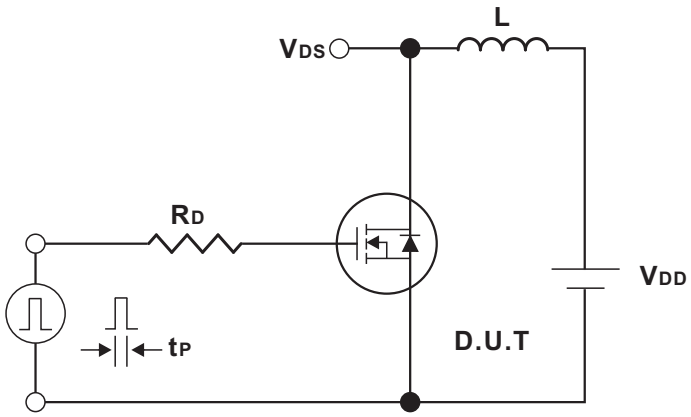
Switching Waveforms



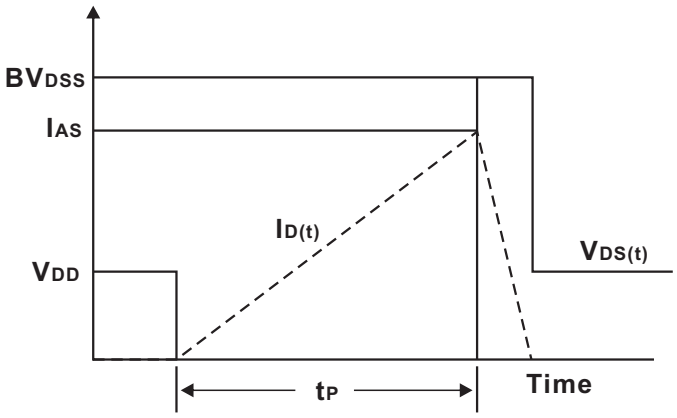
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

Typical Characteristics

Fig.1 Output characteristics

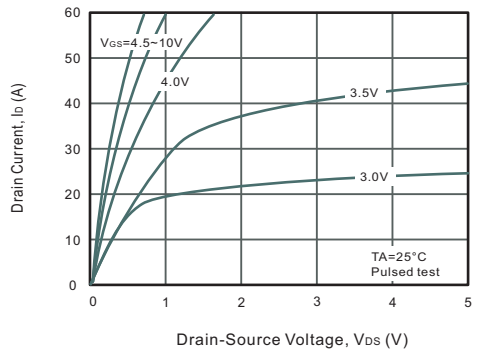


Fig.2 Power Dissipation

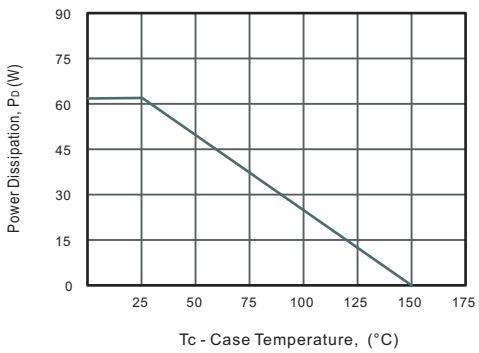


Fig.3 Drain Current Derating

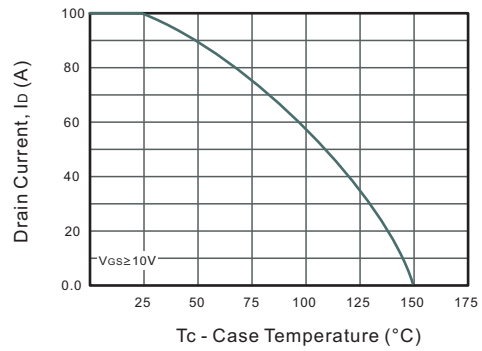


Fig.4 Drain-Source On-Resistance vs. Drain Current

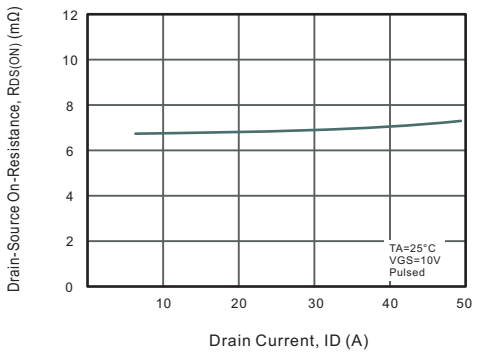


Fig.5 Gate Threshold Voltage vs. Junction Temperature

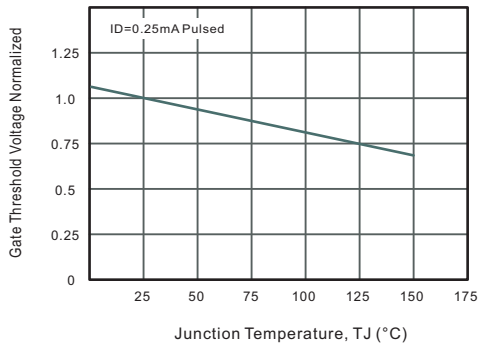


Fig.6 Body-diode Forward Characteristics

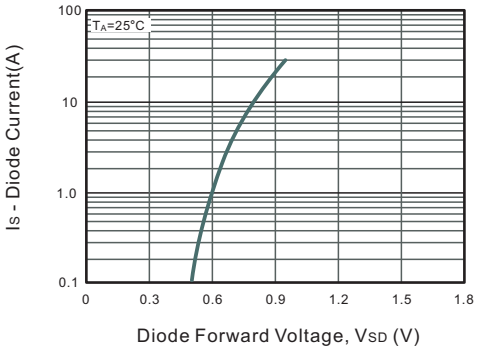


Fig.7 Drain-Source On-Resistance vs. Junction Temperature

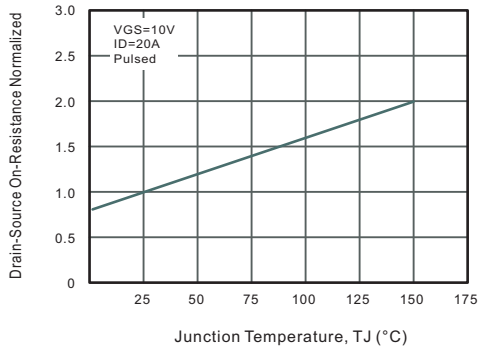


Fig.8 Breakdown Voltage vs. Junction Temperature