



SWITCHING REGULATOR APPLICATIONS

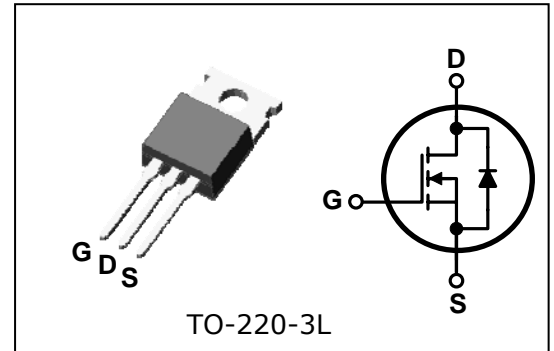
Features

- High Voltage: $BV_{DSS}=85V$ (Min.)
- Low C_{rss} : $C_{rss}=24.4pF$ (Typ.)
- Low gate charge : $Qg=55.7nC$ (Typ.)
- Low $R_{DS(on)}$: $R_{DS(on)}=5.2m\Omega$ (Typ.)

Ordering Information

Type No.	Marking	Package Code
HGS120N85C	HGS120N85C	TO-220-3L

PIN Connection



Absolute maximum ratings ($T_C=25^\circ C$ unless otherwise noted)

Characteristic	Symbol	Rating	Unit	
Drain-source voltage	V_{DSS}	85	V	
Gate-source voltage	V_{GSS}	± 20	V	
Drain current (DC) *	I_D	$T_C=25^\circ C$	120	A
		$T_C=100^\circ C$	73	A
Drain current (Pulsed) *	I_{DM}	480	A	
Drain power dissipation	P_D	150	W	
Avalanche current (Single) ②	I_{AS}	120	A	
Single pulsed avalanche energy ②	E_{AS}	300	mJ	
Avalanche current (Repetitive) ①	I_{AR}	120	A	
Repetitive avalanche energy ①	E_{AR}	8.6	mJ	
Junction temperature	T_J	150	$^\circ C$	
Storage temperature range	T_{stg}	-55~150	$^\circ C$	

* Limited by maximum junction temperature

Characteristic	Symbol	Typ.	Max	Unit
Thermal resistance	Junction-case	-	5.0	$^\circ C/W$
	Junction-ambient	-	60	



Electrical Characteristics ($T_C=25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Drain-source breakdown voltage	$V_{(BR)DSS}$	$I_D=250\ \mu\text{A}, V_{GS}=0\text{V}$	85	90	-	V
Gate threshold voltage	$V_{GS(th)}$	$I_D=250\ \mu\text{A}, V_{GS}=V_{DS}$	2.5	-	3.5	V
Drain-source cut-off current	I_{DSS}	$V_{DS}=85\text{V}, V_{GS}=0\text{V}$	-	-	1	μA
Gate leakage current	I_{GSS}	$V_{DS}=0\text{V}, V_{GS}=\pm 20\text{V}$	-	-	± 100	nA
Drain-source on-resistance ④	$R_{DS(on)}$	$V_{GS}=10\text{V}, I_D=20\text{A}$	-	5.2	6	$\text{m}\Omega$
Forward transfer conductance ④	g_{fs}	$V_{DS}=10\text{V}, I_D=20\text{A}$	-	5	-	S
Input capacitance	C_{iss}	$V_{GS}=0\text{V}, V_{DS}=40\text{V}$ $f=1\ \text{MHz}$	-	3730	-	pF
Output capacitance	C_{oss}		-	670	-	
Reverse transfer capacitance	C_{rss}		-	24.4	-	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=40\text{V}, I_{D}=10.0\text{A}$ $R_G=10\Omega$	-	16.5	-	ns
Rise time	t_r		-	13.7	-	
Turn-off delay time	$t_{d(off)}$		-	35.9	-	
Fall time	t_f		-	13.5	-	
Total gate charge	Q_g	$V_{DS}=40\text{V}, V_{GS}=10\text{V}$ $I_D=20.0\text{A}$	-	55.7	-	nC
Gate-source charge	Q_{gs}		-	14.5	-	
Gate-drain charge	Q_{gd}		-	14	-	

Source-Drain Diode Ratings and Characteristics ($T_C=25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Source current (DC)	I_S	Integral reverse diode in the MOSFET	-	-	120	A
Source current (Pulsed) ①	I_{SP}		-	-	480	
Forward voltage ④	V_{SD}	$V_{GS}=0\text{V}, I_S=18\text{A}$	-	-	1.4	V
Reverse recovery time	t_{rr}	$I_S=20\text{A}, V_{GS}=0\text{V}$ $dI_S/dt=100\text{A}/\mu\text{s}$	-	40	-	ns
Reverse recovery charge	Q_{rr}		-	115	-	nC

Note ;

- ① Repetitive rating : Pulse width limited by maximum junction temperature
- ② $L=2.0\text{mH}, I_{AS}=10\text{A}, V_{DD}=50\text{V}, R_G=25\Omega$, Starting $T_J = 25^\circ\text{C}$
- ③ Pulse Test : Pulse width $\leq 300\ \mu\text{s}$, Duty cycle $\leq 2\%$
- ④ Essentially independent of operating temperature



Electrical Characteristic Curves

● 特性曲线

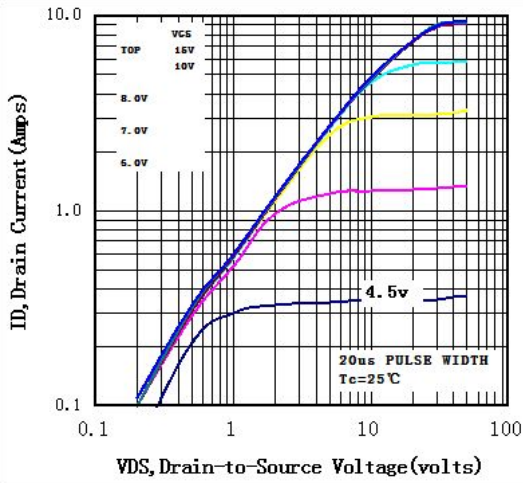


Fig1 Typical Output Characteristics, Tc=25°C

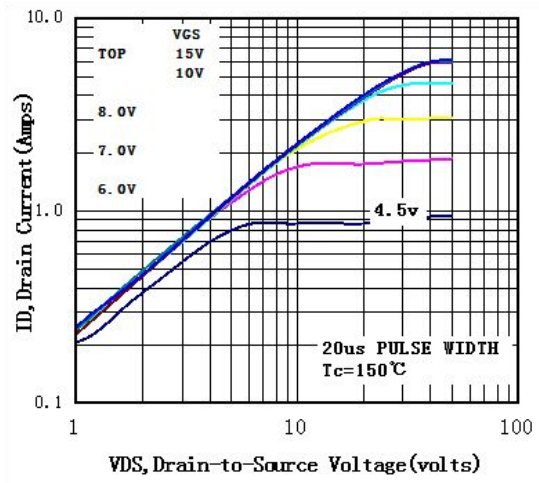


Fig2 Typical Output Characteristics, Tc=150°C

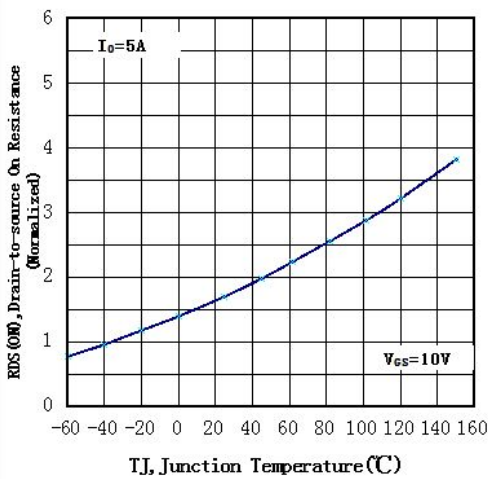


Fig3 Normalized Resistance Vs. Temperature

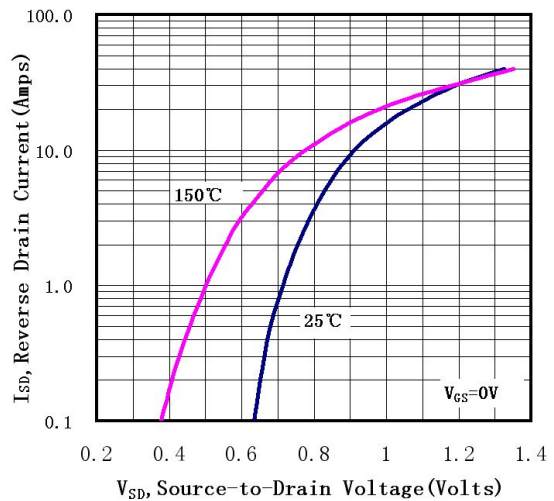


Fig4 Typical Source-Drain Diode Forward Voltage

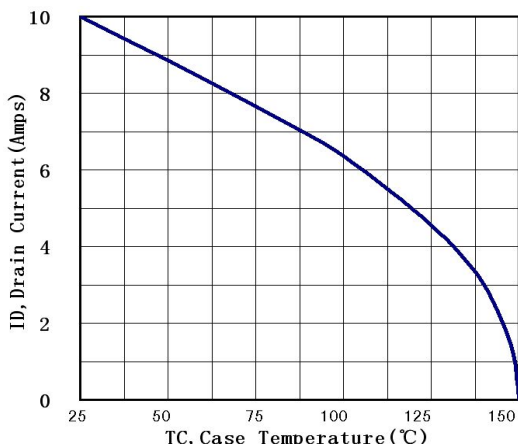


Fig5 Maximum Drain Current Vs. Case Temperature



Fig. 11 Gate Charge Test Circuit & Waveform

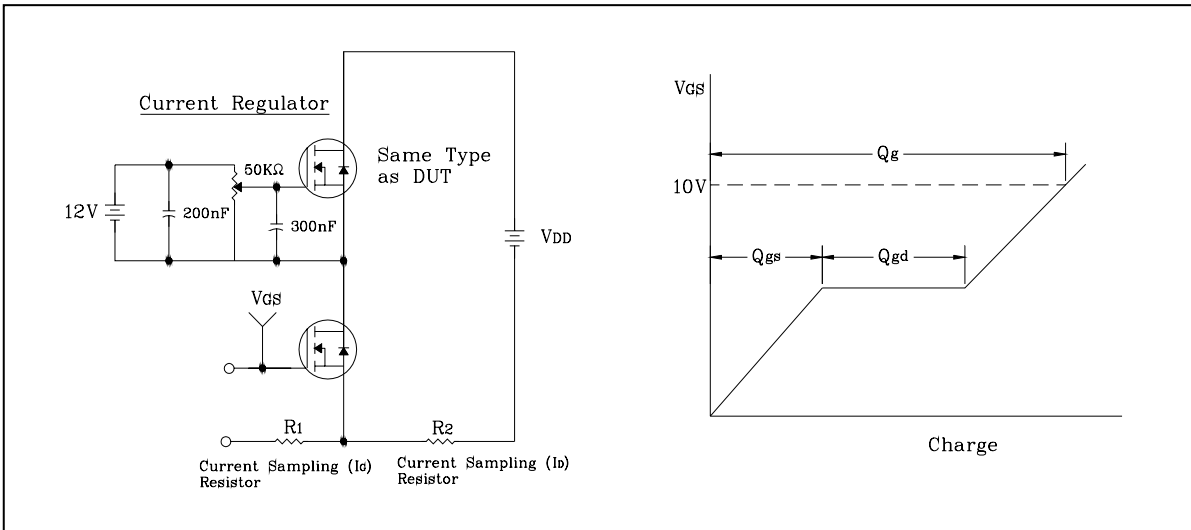


Fig. 12 Resistive Switching Test Circuit & Waveform

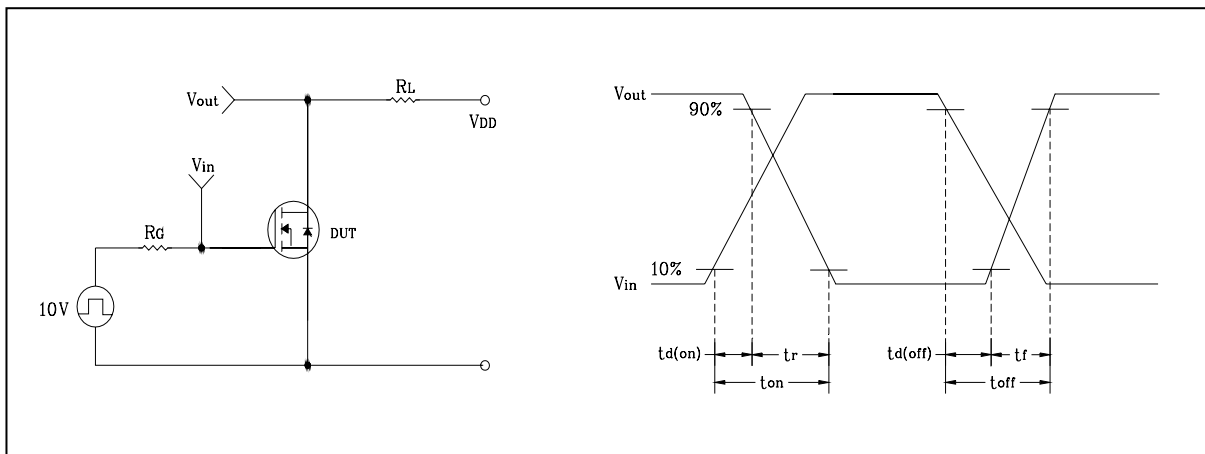
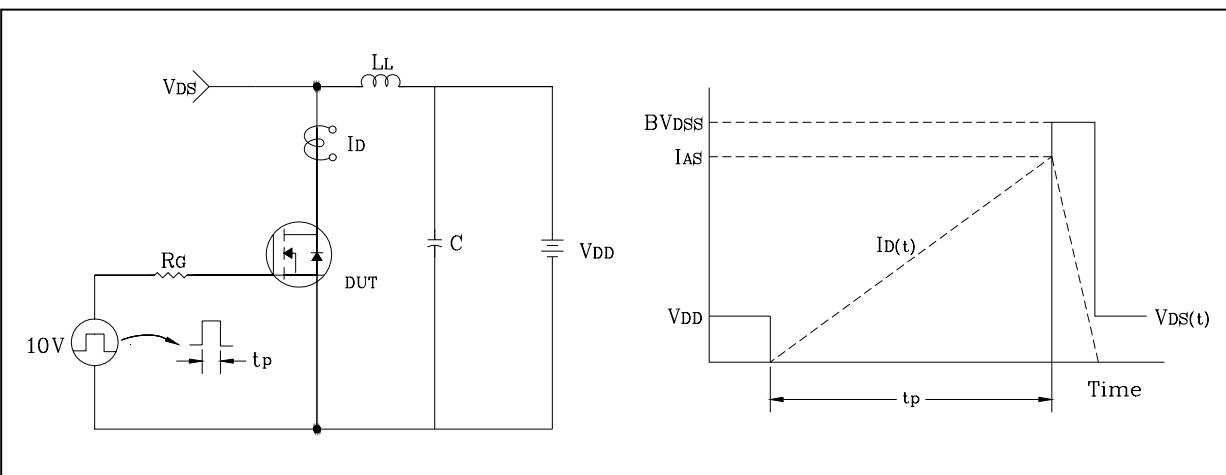


Fig. 13 EAS Test Circuit & Waveform





TO-220-3L Package Information

unit : mm

