

59A, 300V N-CHANNEL POWER MOSFET

GENERAL DESCRIPTION

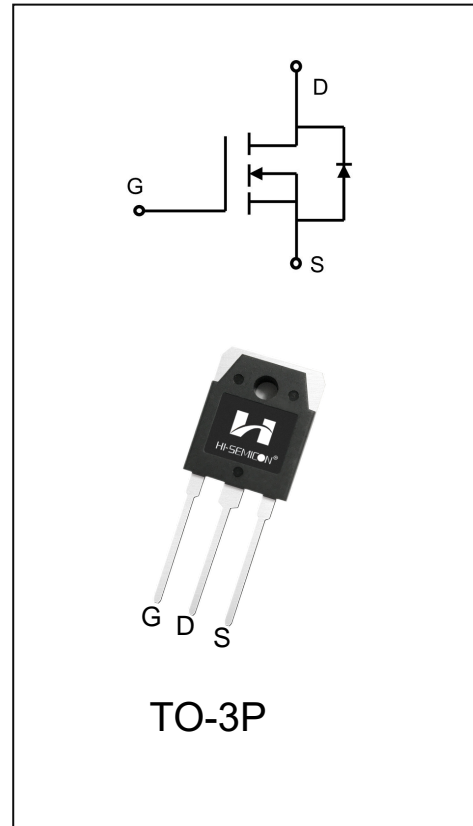
These N-Channel enhancement mode power field effect transistors are produced using Hi-semicon's proprietary . the silicon N-channel Enhanced VDMOSFETs, is obtained by the self-aligned planar Technology which reduce the conduction loss, improves switching performance and enhance the avalanche energy. The transistor can be used in various power switching circuit for system miniaturization and higher efficiency. The package form is TO-3P, which accords with the RoHS standard.

Features

- ◆ $V_{DS}(V)=300V, I_D=59A$
- ◆ $R_{DS(ON)}$
 TYP: $45m\Omega @ V_{GS}=10V$
 MAX: $55m\Omega$

Applications

- ◆ PDP TV.
- ◆ AC-DC Power Supply.
- ◆ Uninterruptible Power Supply.



ORDERING INFORMATION

Part No.	Package	Marking	Material	Packing
SFB59N30	TO-3P	SFB59N30	Pb free	Tube

ABSOLUTE MAXIMUM RATINGS (T_J=25°C unless otherwise noted)

Characteristics	Symbol	Ratings	Unit
Drain-Source Voltage	V _{DS}	300	V
Gate-Source Voltage	V _{GS}	±30	V
Drain Current	I _D	T _C = 25°C	59
		T _C = 100°C	41
Drain Current Pulsed (Note 1)	I _{DM}	236	A
Power Dissipation(T _C =25°C) -Derate above 25°C	P _D	501	W
		40	W/°C
Single Pulsed Avalanche Energy (Note 2)	E _{AS}	2370	mJ
Operation Junction Temperature Range	T _J	-55~+150	°C
Storage Temperature Range	T _{stg}	-55~+150	°C
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	TL	300	°C

THERMAL CHARACTERISTICS

Characteristics	Symbol	Ratings	Unit
Thermal Resistance, Junction-to-Case	R _{θJC}	0.25	°C/W
Thermal Resistance, Junction-to-Ambient	R _{θJA}	40	°C/W

ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain -Source Breakdown Voltage	B _{VDS}	V _{GS} =0V, I _D =250μA	300	--	--	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =300V, V _{GS} =0V	--	--	1.0	uA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =30V, V _{DS} =0V	--	--	100	nA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =-30V, V _{DS} =0V	--	--	-100	nA
On Characteristics						
Gate Threshold Voltage	V _{GS(th)}	V _{GS} = V _{DS} , I _D =250μA	2.0	3.0	4.0	V
Static Drain- Source On State Resistance	R _{DS(on)}	V _{GS} =10V, I _D =29.5A	--	45	55	mΩ
Forward Transconductance	g _{FS}	V _{DS} =40V, I _D =20A	--	20	--	S
Dynamic Characteristics						
Gate Resistance	R _g	V _{GS} =0V; f=1.0MHZ	--	2.4	--	Ω
Input Capacitance	C _{iss}	V _{DS} =25V V _{GS} =0V f=1.0MHZ	--	4150	--	pF
Output Capacitance	C _{oss}		--	601	--	
Reverse Transfer Capacitance	C _{rss}		--	48.3	--	

Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=150V, V_{GS}=10V$ $R_G=25\Omega, I_D=59A$ (Note 3.4)	--	56.1	--	ns
Turn-on Rise Time	t_r		--	120.6	--	
Turn-off Delay Time	$t_{d(off)}$		--	191.7	--	ns
Turn-off Fall Time	t_f	--	126.1	--		
Total Gate Charge	Q_g	$V_{DS}=240V, I_D=59A$ $V_{GS}=10V$ (Note 3.4)	--	95.9	--	nc
Gate-Source Charge	Q_{gs}		--	29.1	--	
Gate-Drain Charge	Q_{gd}		--	41.7	--	

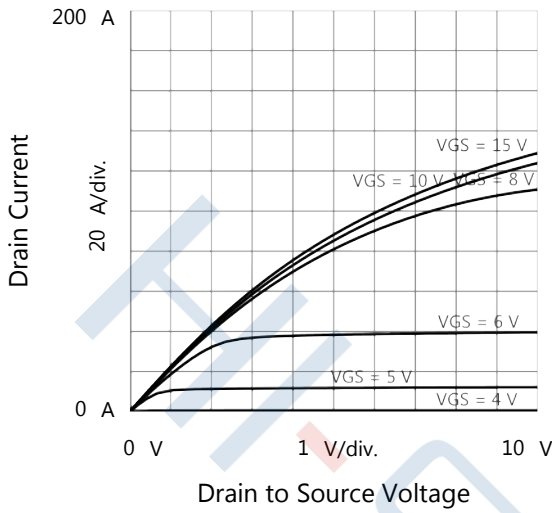
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	I_S	Integral Reverse P-N Junction Diode in the MOSFET	--	--	59	A
Pulsed Source Current	I_{SM}		--	--	236	
Diode Forward Voltage	V_{SD}	$I_S=59A, V_{GS}=0V$	--	1.0	1.4	V
Reverse Recovery Time	T_{rr}	$I_F=59A, V_{GS}=0V,$ $dI_F/dt=100A/\mu S$	--	311.1	--	ns
Reverse Recovery Charge	Q_{rr}		--	4.56	--	μC

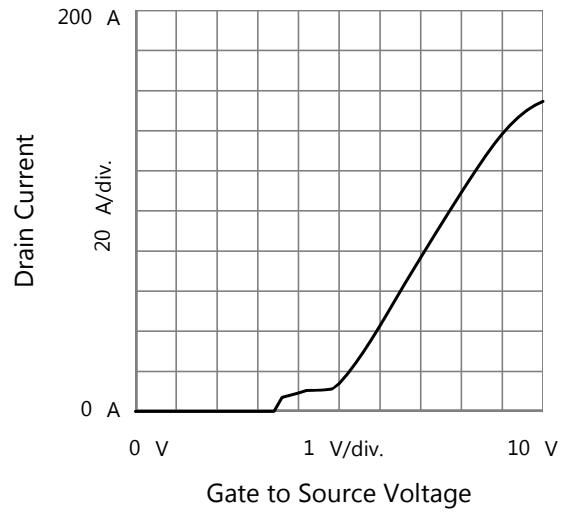
- 1.Pulse width limited by maximum junction temperature
- 2.L=0.8mH, $I_{AS}=75A, V_{DD}=50V, V_G=10V, R_G=25\Omega$, starting $T_J=25^\circ C$
- 3.Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$
- 4.Essentially independent of operating temperature

Typical Performance Characteristics

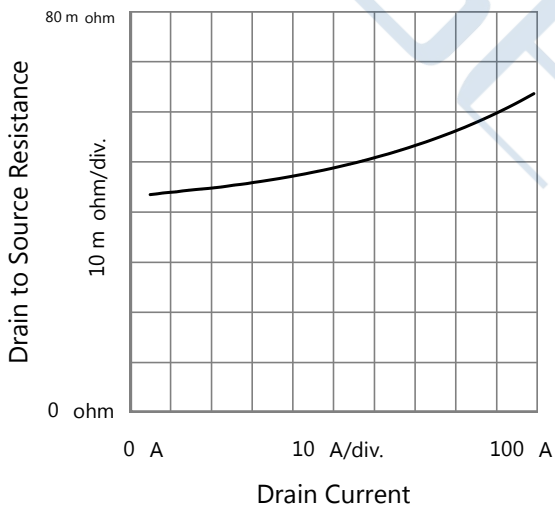
Output Characteristics



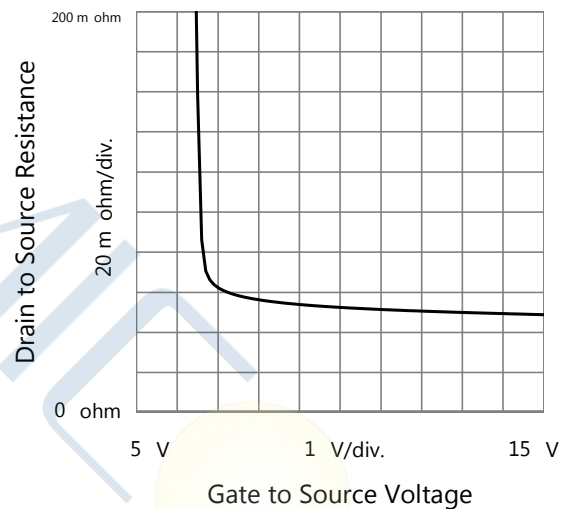
Transfer Characteristics



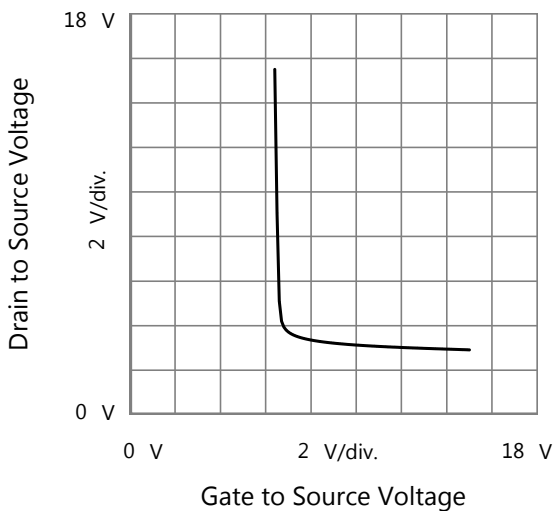
Drain to Source Resistance vs. Drain Current



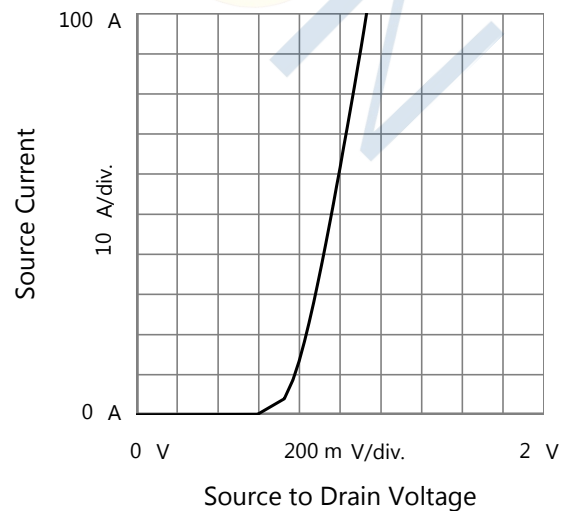
Drain to Source Resistance vs. Gate to Source Voltage



Drain to Source Voltage vs. Gate to Source Voltage

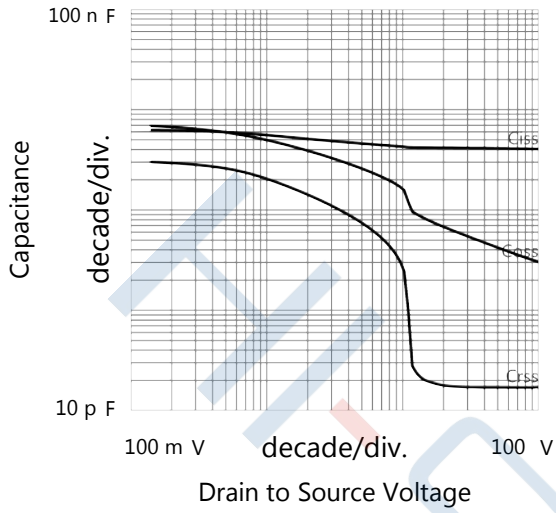


Body Diode Forward Characteristics

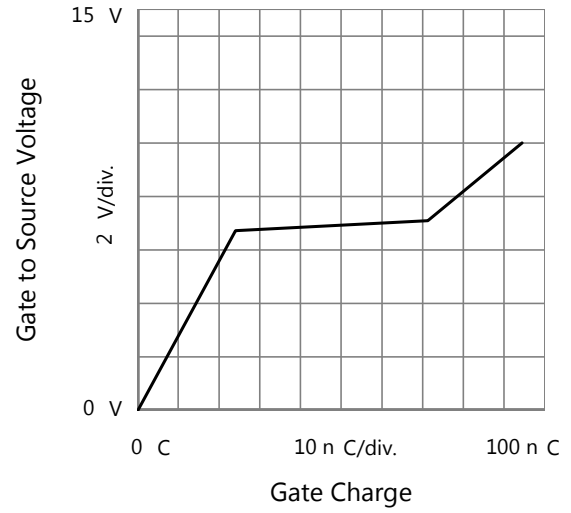


Typical Performance Characteristics

Capacitances

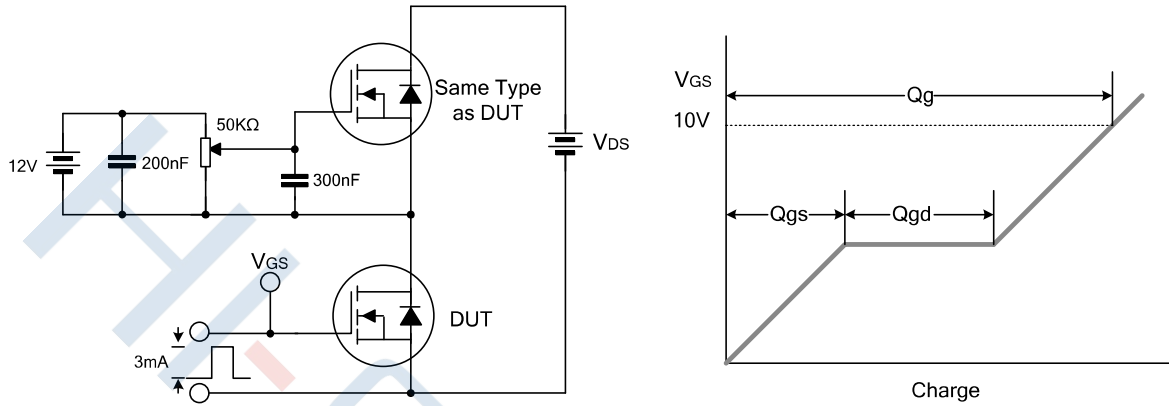


Gate Charge

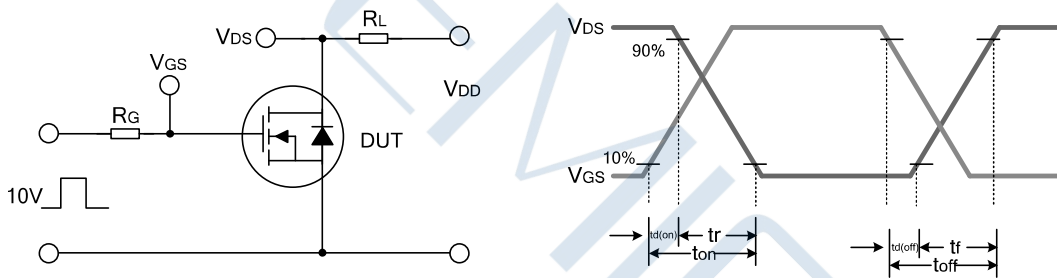


Test Circuit

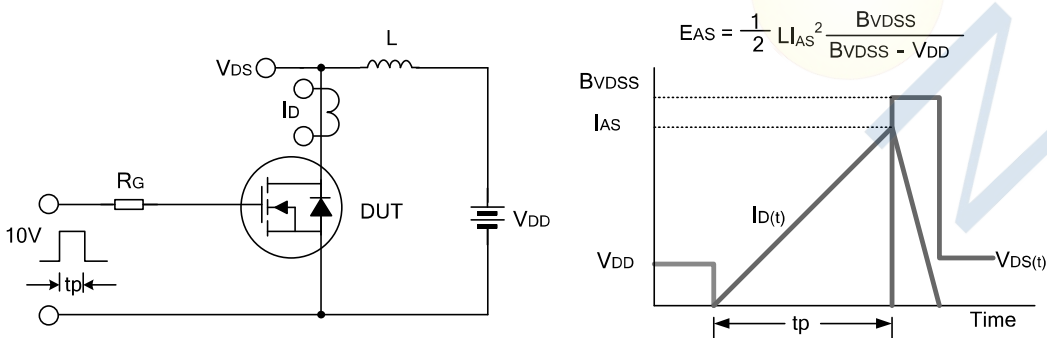
Gate Charge Test Circuit & Waveform



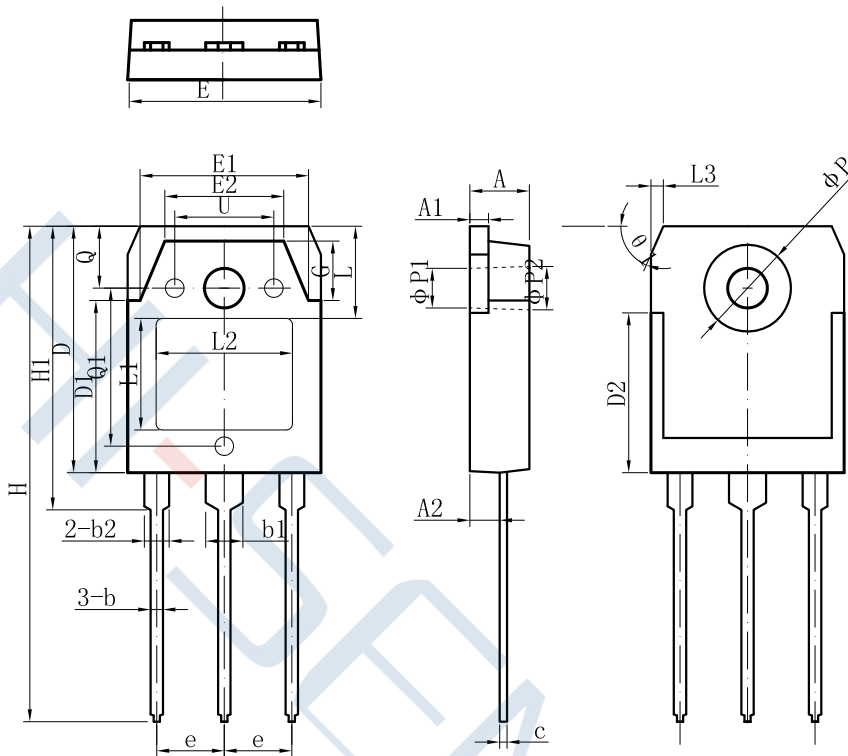
Resistive Switching Test Circuit & Waveform



Undamped Inductive Switching Test Circuit & Waveform



Package Dimensions of TO-3P



符号	机械尺寸/mm		
	最小值	典型值	最大值
A	4.60	4.80	5.00
A1	1.40	1.50	1.60
A2	2.30	2.40	2.50
b	0.80	1.00	1.20
b1	2.80	3.00	3.25
b2	1.80	2.00	2.25
c	0.50	0.60	0.75
D	19.7	19.9	20.1
D1		13.9	
D2		12.9REF	
E	15.4	15.6	15.8
E1		13.6	
E2		9.6	
e		5.45	
G		4.8	
H	39.5	40	40.5
H1		22.9	
L		7.4	
L1		9.0	
L2		11.0	
L3		1.00REF	
φP	6.80	7.00	7.20
φP1		3.20	
φP2		3.50	
Q		5.00	
Q1		12.76	
U		8	
θ 1		60°	

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