SFP(B)190N85

SGT N-MOSFET 85V, 190A, 4.0mΩ

Features

- Uses advanced SGT MOSFET technology
- Extremely low on-resistance $R_{DS(on)}$
- High Ruggedness
- 100% Avalance Tested

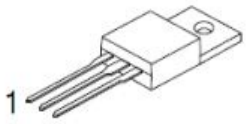
Application

- Motor Drives
- UPS (Uninterruptible Power Supplies)
- DC/DC converter
- General purpose applications

Product Summary

VDS	85V
$R_{DS(on)@VGS=10V}$	3.0 mΩ
I_D	190A

Part ID	Package Type	Marking
SFP190N85	TO-220	190N85
SFB190N85	TO-263	190N85



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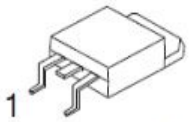

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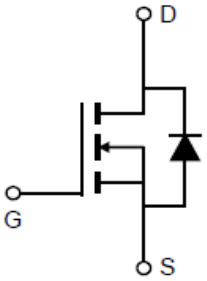


Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	85	V
Continuous drain current T_C = 25°C (Package limit) T_C = 100°C (Package limit)	I_D	 190 150	A
Pulsed drain current T_C = 25°C, t_p limited by T_{jmax}	$I_{D\ pulse}$	570	
Avalanche energy, single pulse (L=0.033mH,VDS=80V)	E_{AS}	600	mJ
Gate-emitter voltage	V_{GS}	±20	V
Power dissipation T_C = 25°C	P_{tot}	230	W
Operating junction and storage temperature	T_j , T_{stg}	-55...+150	℃

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal resistance, junction – case. Max	R_{thJC}	0.55	℃/W
Thermal resistance, junction – ambient. Max	R_{thJA}	62.0	

Electrical Characteristic, at Tj = 25 °C, unless otherwise specified

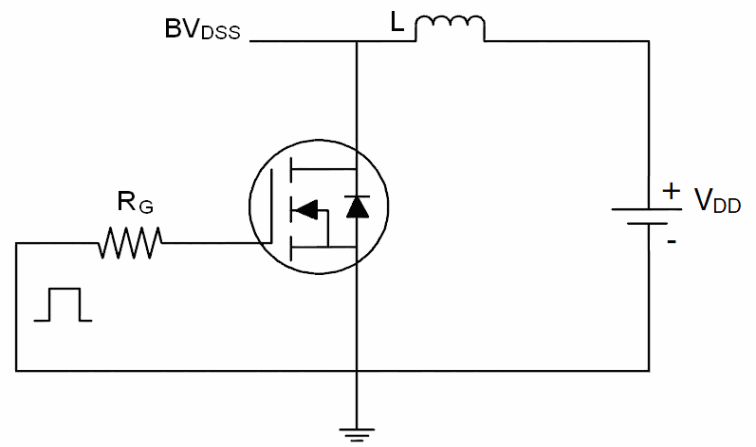
Parameter	Symbol	Test Condition	Value			Unit
			min.	typ.	max.	
Static Characteristic						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=250uA	85	95	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250uA T_j=25°C T_j=125°C	2.0 -	3.0	4.0 -	
Zero gate voltage drain current	I_{DSS}	V_{DS}=80V,V_{GS}=0V T_j=25°C T_j=125°C	- -	0.05	1 5	μA
Gate-source leakage current	I_{GSS}	V_{GS}=20V,V_{DS}=0V	-	20	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=10V, I_D=50A, T_j=25°C T_j=125°C	- -	2.8	4.0 -	mΩ
Gate resistance	R_G	V_{GS}=0V, V_{DS}=0V, f=1MHz	- -	3.3	- -	Ω

Dynamic Characteristics

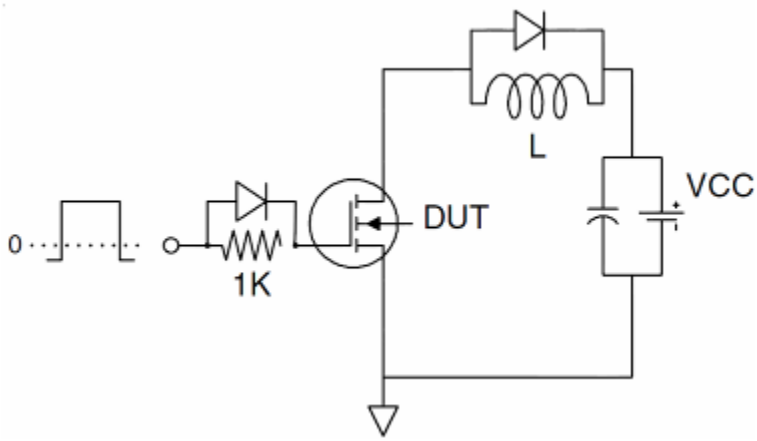
Input Capacitance	C_{lss}	V_{DS}=25V,V_{GS}=0V, F=1.0MHz	-	11000	-	PF
Output Capacitance	C_{oss}		-	914	-	PF
Reverse Transfer Capacitance	C_{rss}		-	695	-	PF
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=38V,I_D=40A V_{GS}=10V,R_{GEN}=1.2Ω(Note2)	-	23	-	nS
Turn-on Rise Time	t_r		-	190	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	130	-	nS
Turn-Off Fall Time	t_f		-	120	-	nS
Total Gate Charge	Q_g	V_{DS}=60V,I_D=40A, V_{GS}=10V(Note2)	-	250	-	nC
Gate-Source Charge	Q_{gs}		-	48	-	nC
Gate-Drain Charge	Q_{gd}		-	98	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage	V_{SD}	V_{GS}=0V,I_S=40A	-	-	1.2	V
Reverse Recovery Time	t_{rr}	TJ = 25°C, IF = 40A di/dt = 100A/μs(Note2)	-	63	-	nS
Reverse Recovery Charge	Qrr		-	98	-	nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Test Circuit

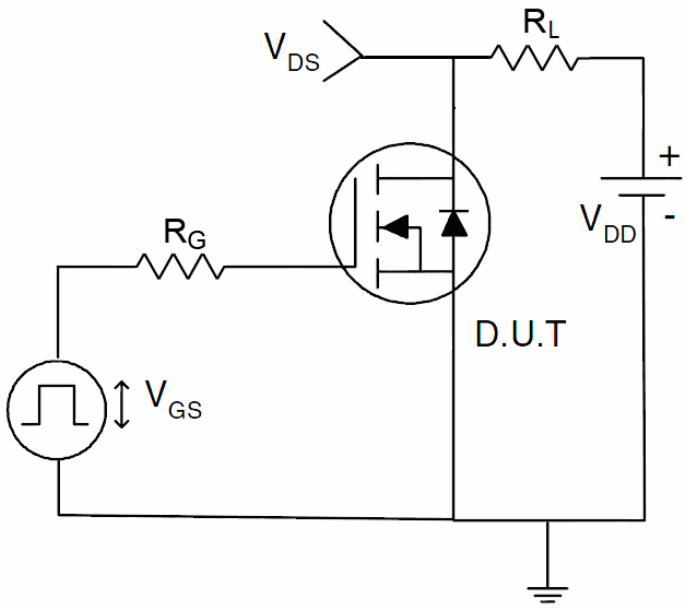
1）E_{AS} test Circuit



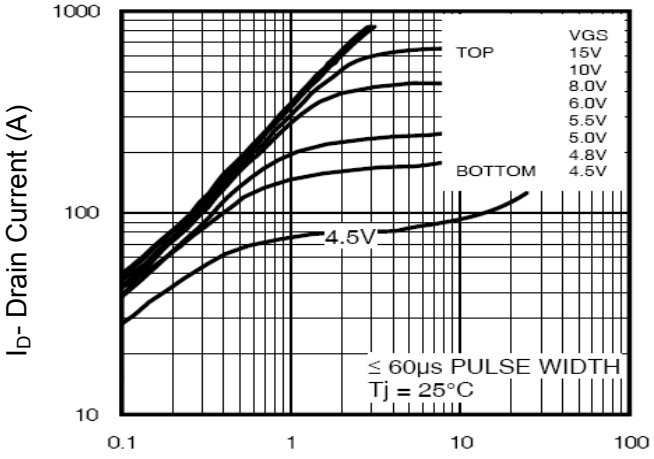
2）Gate charge test Circuit



3）Switch Time Test Circuit

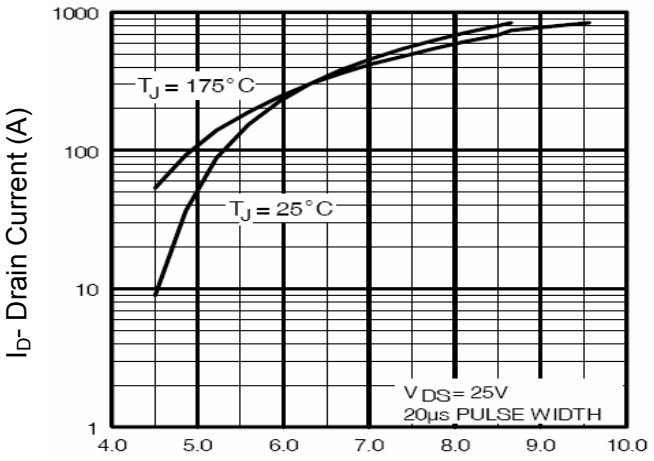


Typical Electrical and Thermal Characteristics



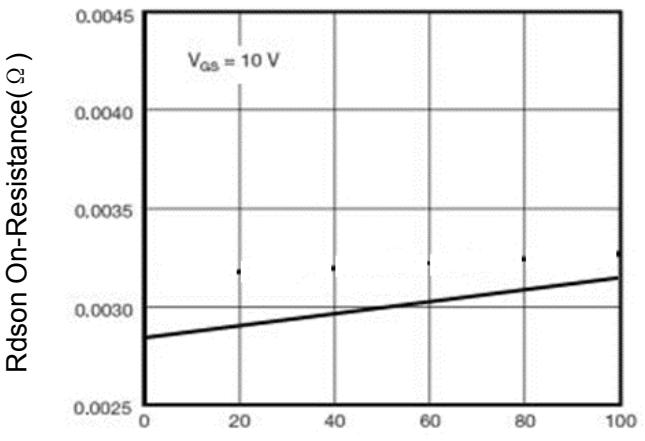
Vds Drain-Source Voltage (V)

Figure 1 Output Characteristics



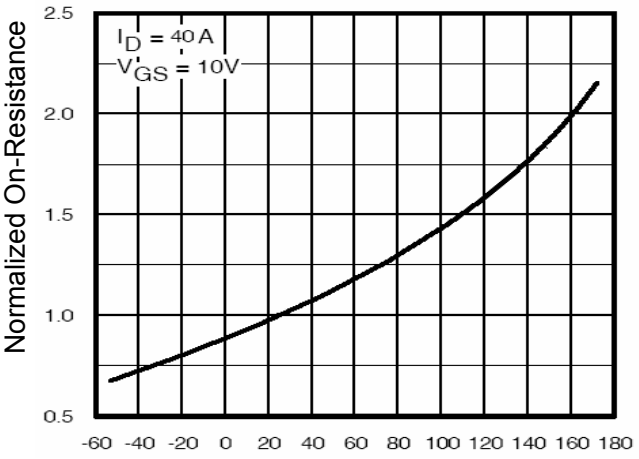
Vgs Gate-Source Voltage (V)

Figure 2 Transfer Characteristics



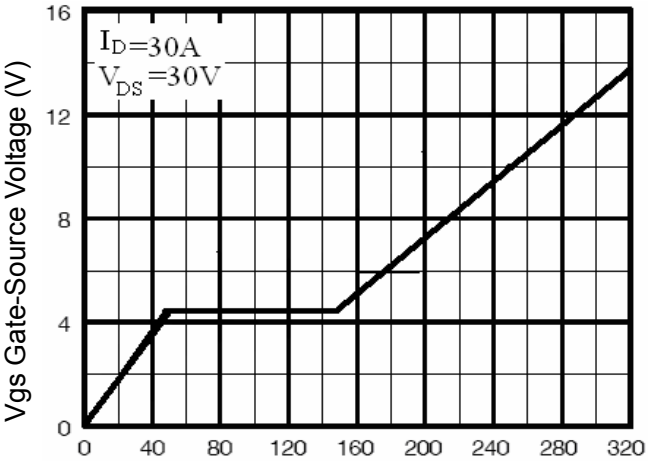
I_D- Drain Current (A)

Figure 3 Rdson- Drain Current



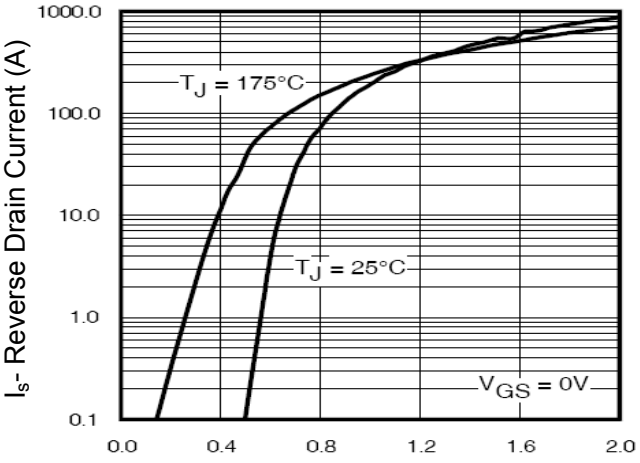
T_J-Junction Temperature(℃)

Figure 4 Rdson-JunctionTemperature



Qg Gate Charge (nC)

Figure 5 Gate Charge



Vsd Source-Drain Voltage (V)

Figure 6 Source- Drain Diode Forward

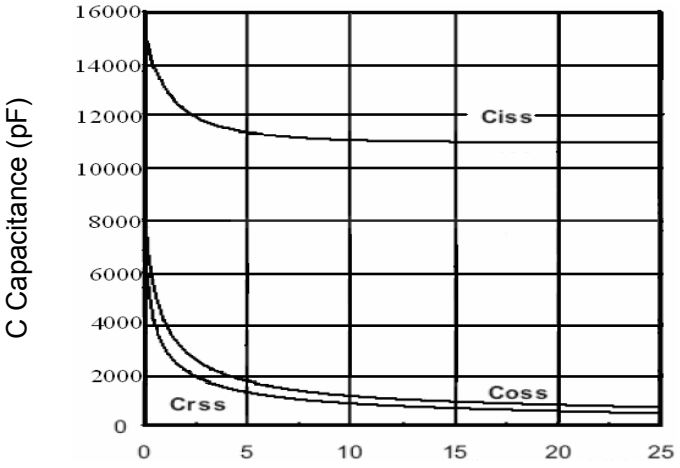


Figure 7 Capacitance vs Vds

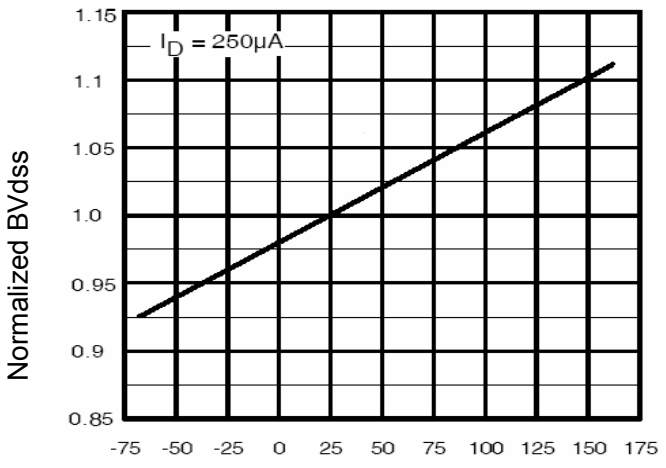


Figure 9 BV_{DSS} vs Junction Temperature

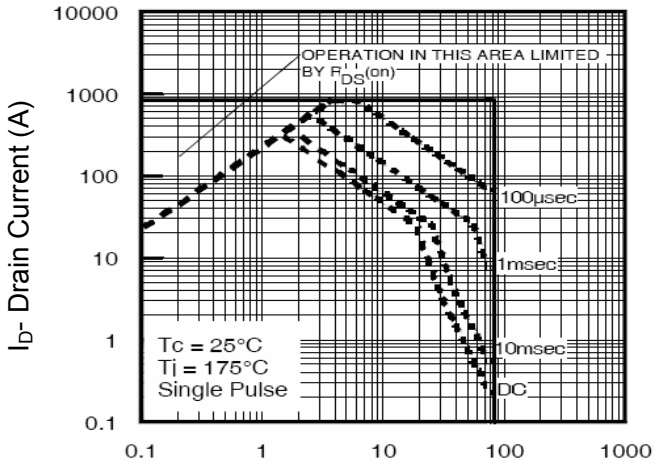


Figure 8 Safe Operation Area

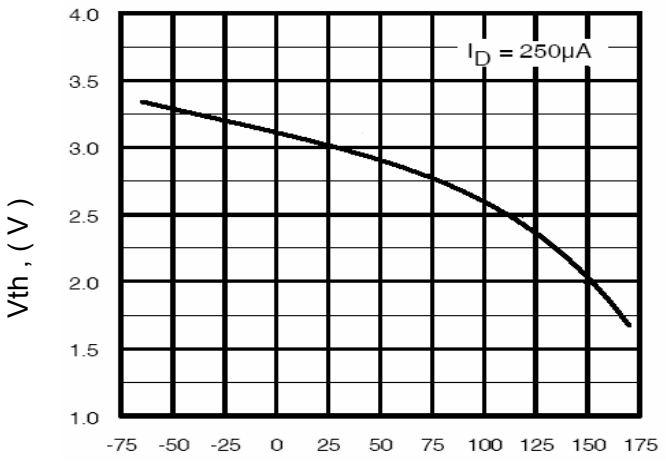
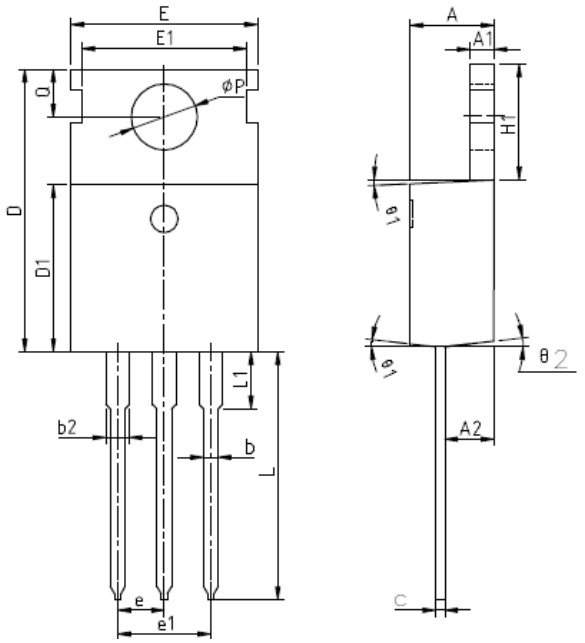


Figure 10 $V_{GS(th)}$ vs Junction Temperature

PACKAGE DIMENSION

TO-220



SYMBOL	MIN	NOM	MAX
A	4.27	4.57	4.87
A1	1.15	1.30	1.45
A2	2.10	2.40	2.70
b	0.70	0.80	1.00
b2	1.17	1.27	1.50
c	0.40	0.50	0.65
D	15.10	15.60	16.10
D1	8.80	9.10	9.40
D2	5.70	6.70	7.00
E	9.70	10.00	10.30
E1	-	8.70	-
E2	9.65	10.00	10.35
E3	7.00	8.00	8.40
e		2.54 BSC	
e1		5.08 BSC	
H1	6.00	6.50	6.85
L	12.75	13.50	13.90
L1	-	3.10	3.40
ΦP	3.45	3.60	3.75
Q	2.60	2.80	3.00
θ1	4°	7°	10°
θ2	0°	3°	6°

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