

Features:

- Advanced trench process technology
- Ultra low $R_{DS(on)}$, typical 23mohm
- High avalanche energy, 100% test
- Fully characterized avalanche voltage and current

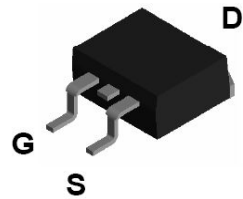
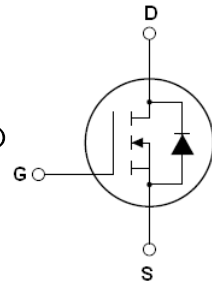
Description:

The SSF1030D is a new generation of middle voltage and high current N-Channel enhancement mode trench power MOSFET. This new technology increases the device reliability and electrical parameter repeatability. SSF1030D is assembled in high reliability and qualified assembly house.

Application:

- Power switching application

$I_D = 45A$
 $BV = 100V$
 $R_{DS(on)} = 23m\Omega$ (typ.)



SSF1030D TOP View (DPAK)

Absolute Maximum Ratings

	Parameter	Max.	Units
$I_D @ T_c = 25^\circ C$	Continuous drain current, $V_{GS} @ 10V$	45	A
$I_D @ T_c = 100^\circ C$	Continuous drain current, $V_{GS} @ 10V$	35	
I_{DM}	Pulsed drain current ①	180	
$P_D @ T_c = 25^\circ C$	Power dissipation	84	W
	Linear derating factor	1.5	W/ $^\circ C$
V_{GS}	Gate-to-Source voltage	± 20	V
E_{AS}	Single pulse avalanche energy ②	168	mJ
E_{AR}	Repetitive avalanche energy	TBD	
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to +175	$^\circ C$

Thermal Resistance

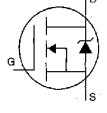
	Parameter	Min.	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-case	—	1.78	—	$^\circ C/W$
$R_{\theta JA}$	Junction-to-ambient	—	—	62	

Electrical Characteristics @ $T_J = 25^\circ C$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS}	Drain-to-Source breakdown voltage	100	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	23	25	m Ω	$V_{GS} = 10V, I_D = 30A$
$V_{GS(th)}$	Gate threshold voltage	2.0	3.1	4.0	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
g_{fs}	Forward transconductance	-	50	—	S	$V_{DS} = 5V, I_D = 30A$
I_{DSS}	Drain-to-Source leakage current	—	—	1	μA	$V_{DS} = 100V, V_{GS} = 0V$
		—	—	10		$V_{DS} = 100V, V_{GS} = 0V, T_J = 150^\circ C$

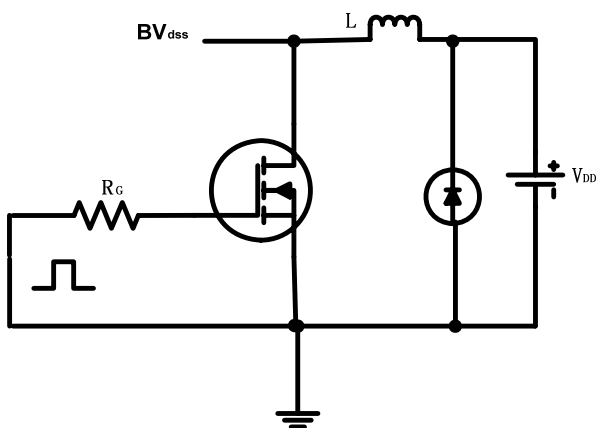
I_{GSS}	Gate-to-Source forward leakage	—	—	100	nA	$V_{GS}=20V$
	Gate-to-Source reverse leakage	—	—	-100		$V_{GS}=-20V$
Q_g	Total gate charge	—	4.2	—	nC	$I_D=30A$
Q_{gs}	Gate-to-Source charge	—	15	—		$V_{DD}=30V$
Q_{gd}	Gate-to-Drain("Miller") charge	—	14.6	—		$V_{GS}=10V$
$t_{d(on)}$	Turn-on delay time	—	14.2	—	nS	$V_{DD}=30V$
t_r	Rise time	—	40	—		$I_D=2A, R_L=15\Omega$
$t_{d(off)}$	Turn-Off delay time	—	7.3	—		$R_G=2.5\Omega$
t_f	Fall time	—	14.8	—		$V_{GS}=10V$
C_{iss}	Input capacitance	—	190	—	pF	$V_{GS}=0V$
C_{oss}	Output capacitance	—	135	—		$V_{DS}=25V$
C_{rss}	Reverse transfer capacitance	—	4.2	—		$f=1.0MHz$

Source-Drain Ratings and Characteristics

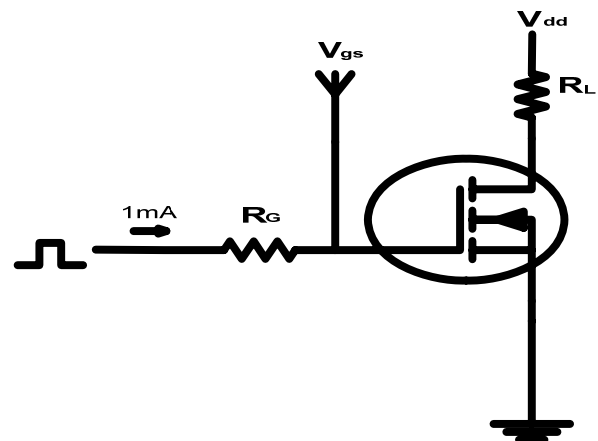
	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I_S	Continuous Source Current (Body Diode)	—	—	45	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	180		
V_{SD}	Diode Forward Voltage	—	—	1.3	V	$T_J=25^\circ C, I_S=30A, V_{GS}=0V$ ③
t_{rr}	Reverse Recovery Time	—	57	—	nS	$T_J=25^\circ C, I_F=30A$
Q_{rr}	Reverse Recovery Charge	—	107	—	nC	$di/dt=100A/\mu s$ ③
t_{on}	Forward Turn-on Time	Intrinsic turn-on time is negligible (turn-on is dominated by $L_S + L_D$)				

Notes:

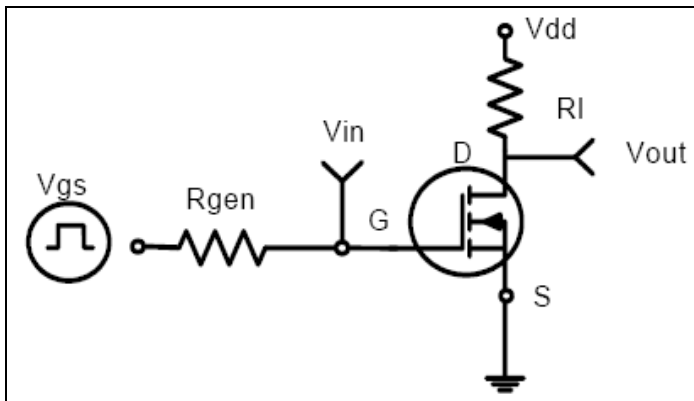
- ① Repetitive rating; pulse width limited by max junction temperature.
- ② Test condition: $L = 0.3mH$, $I_D = 33.5A$, $V_{DD} = 50V$
- ③ Pulse width $\leq 300\mu s$, duty cycle $\leq 1.5\%$; $R_G = 25\Omega$ Starting $T_J = 25^\circ C$



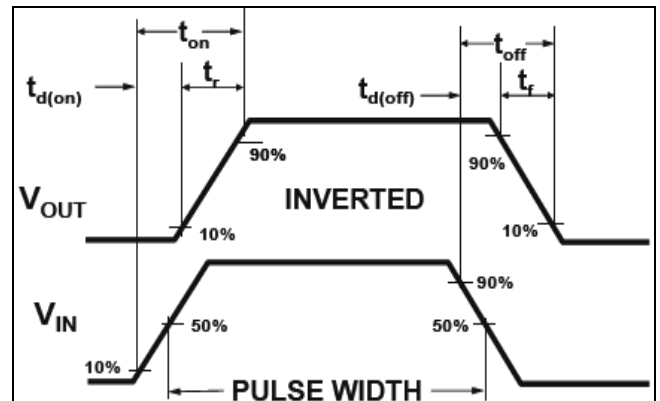
EAS test circuit



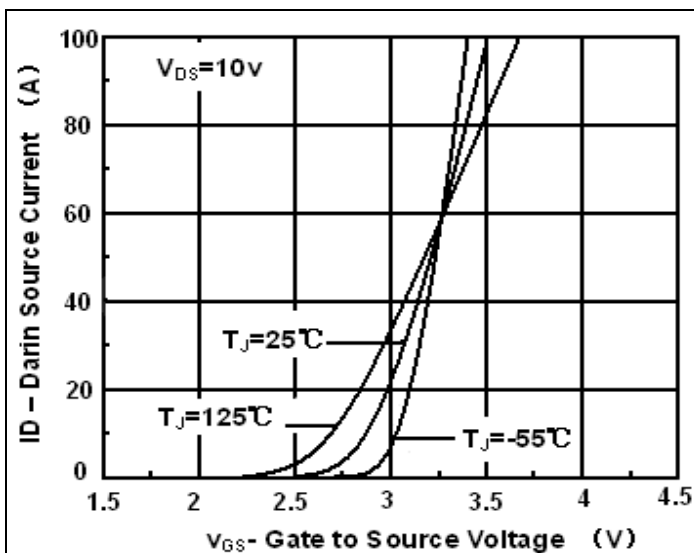
Gate charge test circuit



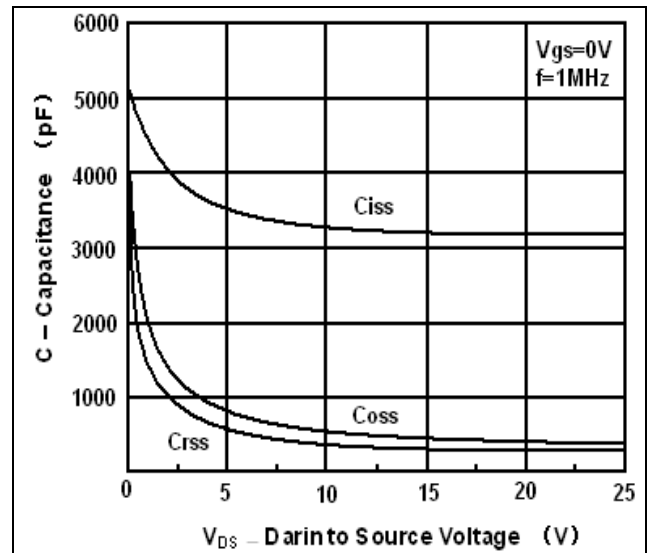
Switch Time Test Circuit:



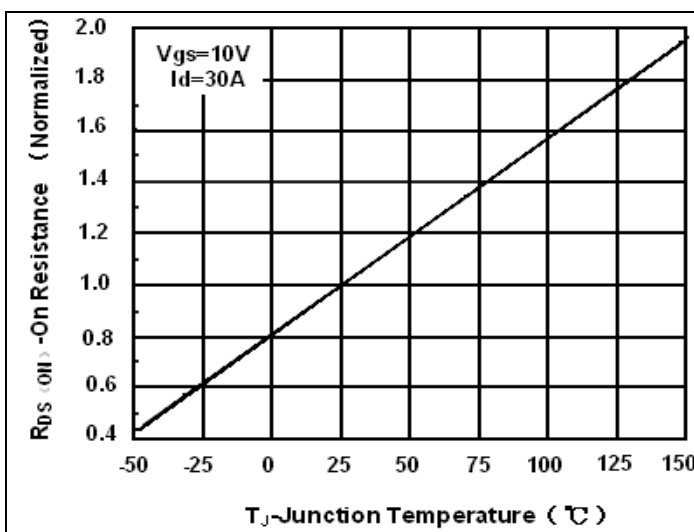
Switch Waveforms:



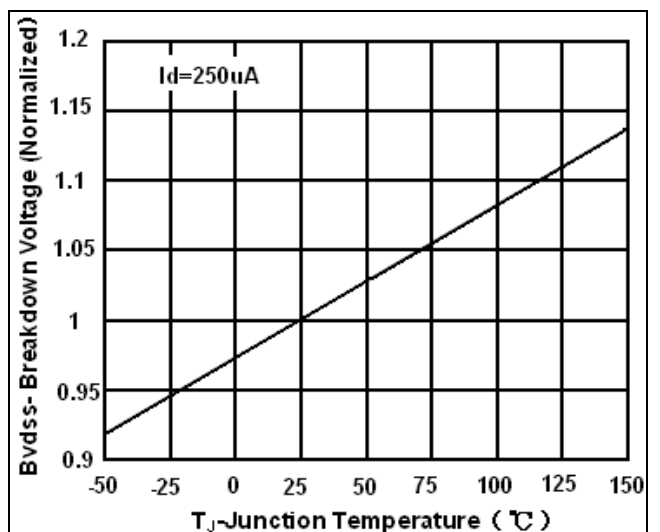
Transfer Characteristic



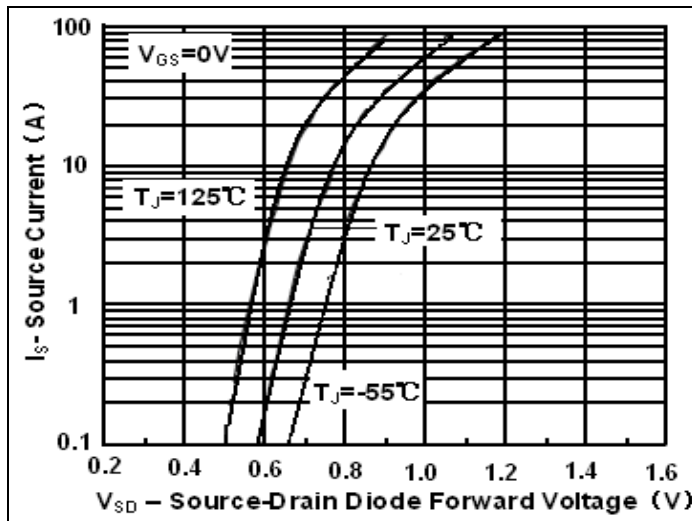
Capacitance:



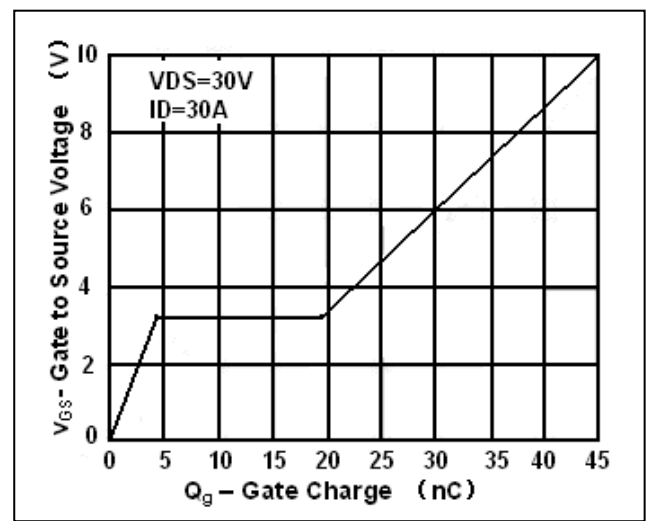
On Resistance vs. Junction Temperature



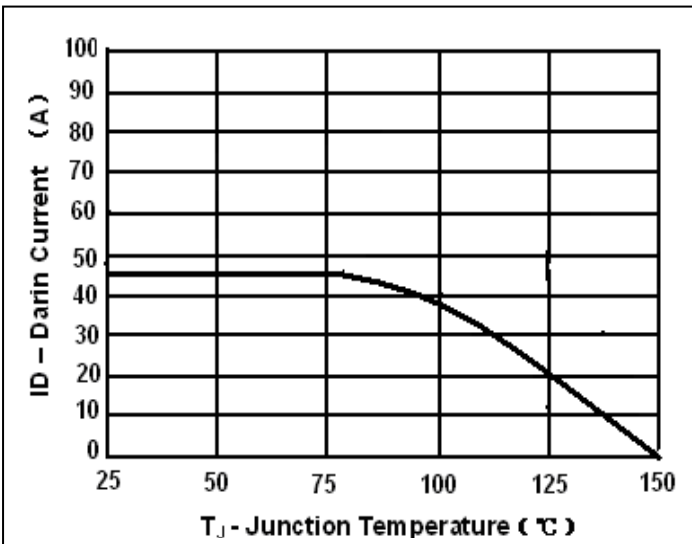
Breakdown Voltage vs. Junction Temperature



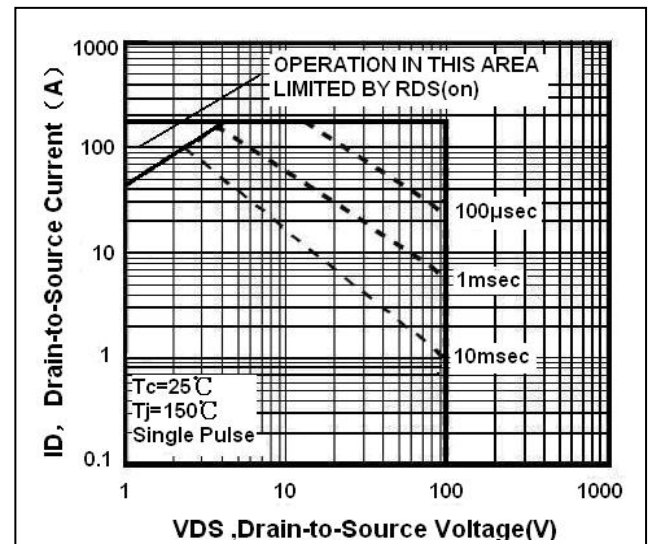
Source-Drain Diode Forward Voltage



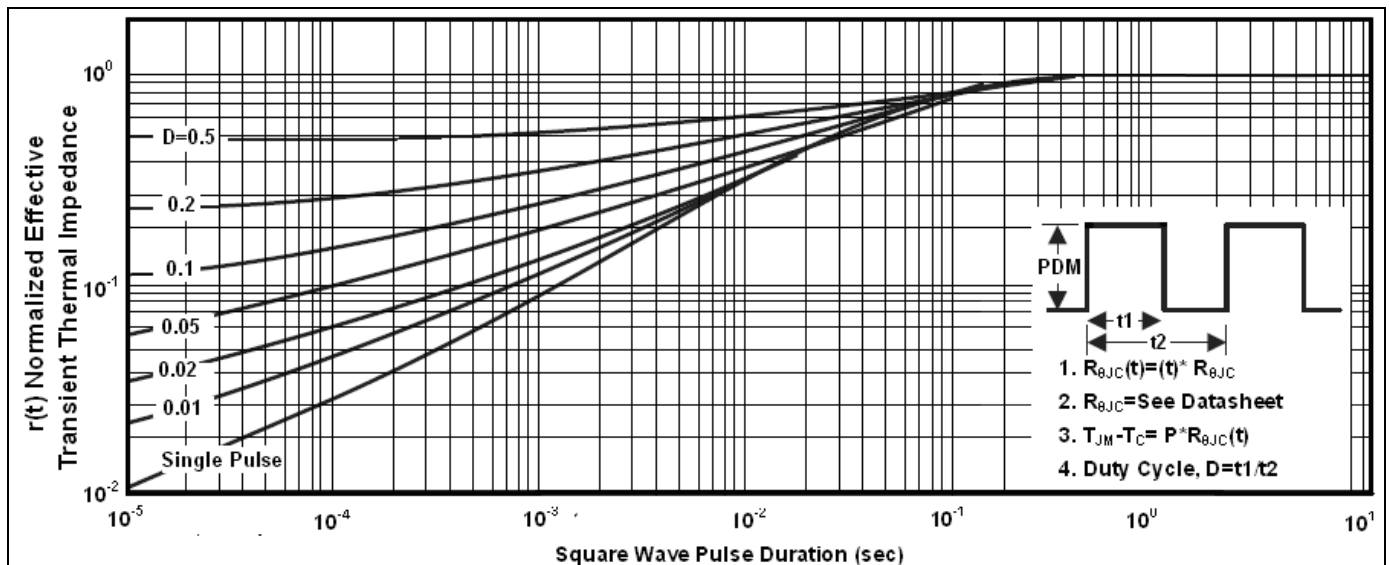
Gate Charge



Max Drain Current vs. Junction Temperature

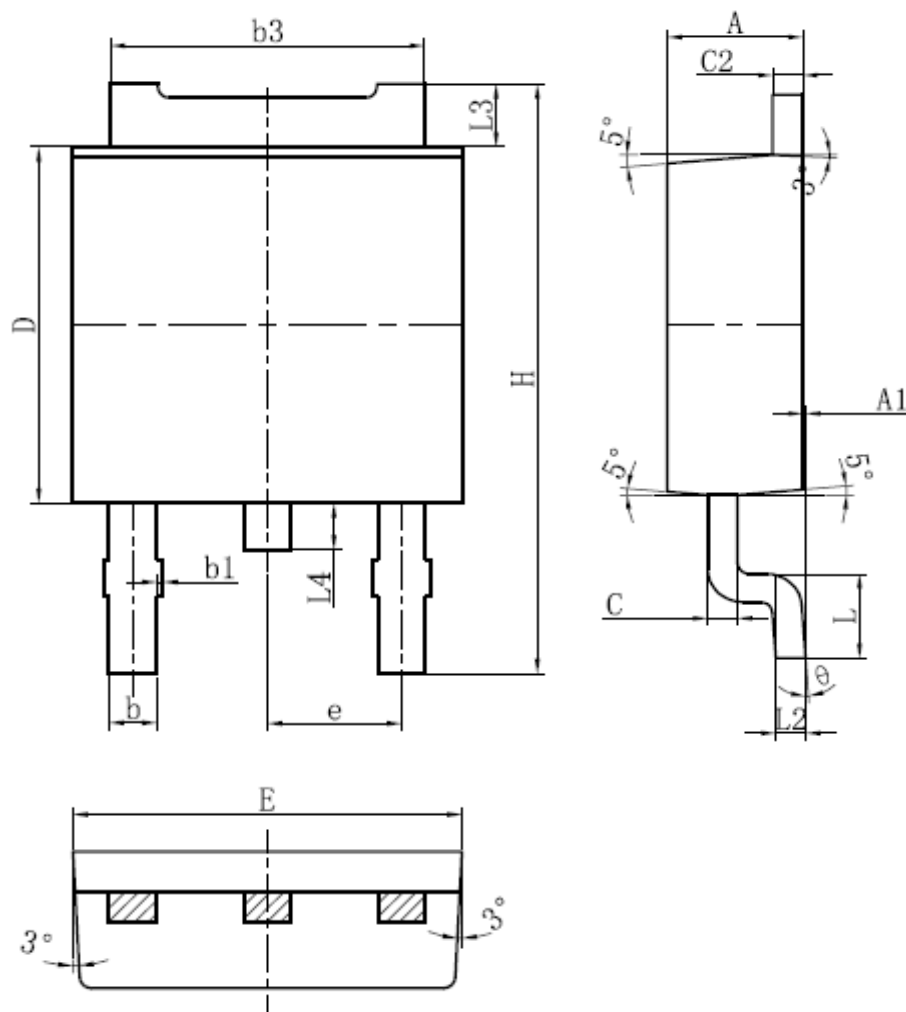


Safe Operation Area



Transient Thermal Impedance Curve

DPAK MECHANICAL DATA:



Symbol	Min.	Normal	Max.
E	6.55	6.6	6.65
L	1.40	1.5	1.60
L2	—	0.51BSC	—
L3	0.93	1.08	1.23
L4	0.7	0.8	0.9
D	6.05	6.1	6.15
H	9.9	10.1	10.3
b	0.763	0.813	0.863
b1	0	—	0.1
b3	5.28	5.33	5.38
e	2.23	2.28	2.33
A	2.25	2.3	2.35
A1	0	0.05	0.10
C	0.498	0.508	0.518
C2	0.498	0.508	0.518
θ	0	—	8°

NOTE:

- 1.Package body size exclude flash and gate burrs.
- 2.Dimension L is measured in gage plane.
- 3.Tolerance 0.10mm unless otherwise specified.
- 4.Controlling dimension is millimeter. Converted inch dimension are not necessarily exact.