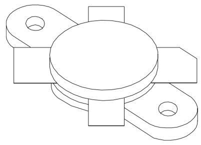
SD2933

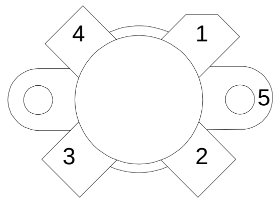
RF POWER TRANSISTORS
HF/VHF/UHF N-CHANNEL MOSFETs

- GOLD METALLIZATION
- EXCELLENT THERMAL STABILITY
- COMMON SOURCE CONFIGURATION
- P_{OUT} = 300 W MIN. WITH 20 dB GAIN @ 30 MHz
- THERMALLY ENHANCED PACKAGING FOR LOWER JUNCTION TEMPERATURES



M177
epoxy sealed

PIN CONNECTION



1. Drain
2. Source
3. Gate
4. Source
5. Source

DESCRIPTION

The SD2933 is a gold metallized N-Channel MOS field-effect RF power transistor. It is intended for use in 50 V dc large signal applications up 150 MHz. It’s special low thermal resistance package, makes it ideal for ISM applications where reliability and ruggedness are critical factors.

ORDER CODES

Order Codes	Marking	Package	Packaging
SD2933	SD2933	M177	Plastic Tray

ABSOLUTE MAXIMUM RATINGS (T_{CASE} = 25 °C)

Symbol	Parameter	Value	Unit
$V_{(BR)DSS}$	Drain Source Voltage	125	V
V_{DGR}	Drain-Gate Voltage (R_{GS} = 1MΩ)	125	V
V_{GS}	Gate-Source Volatge	±20	V
I_D	Drain Current	40	A
P_{DISS}	Power Dissipation	648	W
T_j	Max. Operating Junction Temperature	200	°C
E_{AS}	Avalanche Energy, Single Pulse (I_D = 60 A)	1500	mJ
E_{AR}(1)	Avalanche Energy, Repetitive	50	mJ
T_{STG}	Storage Temperature	-65 to +150	°C

(1) Repetitive rating: Pulse width limited by maximum junction temperature
Repetitive avalanche causes additional power losses that can be calculated as: $P_{AV} = E_{AR} * f$

THERMAL DATA

$R_{th(j-c)}$	Junction -Case Thermal Resistance	0.27	°C/W

REV. 9

ELECTRICAL SPECIFICATION (T_{CASE} = 25°C)

STATIC

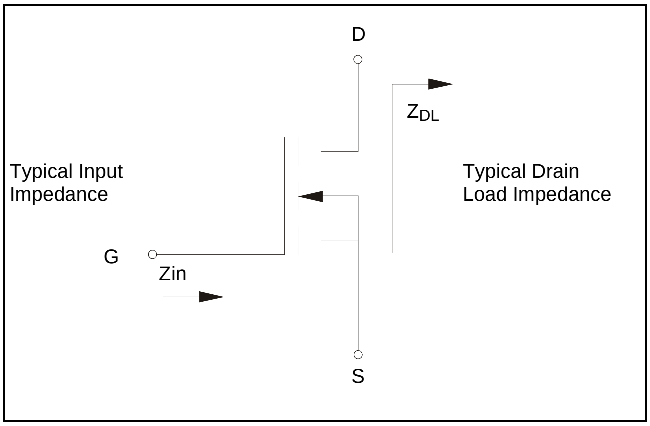
Symbol	Test Conditions			Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	V_{GS} = 0 V	I_{DS} = 200 mA		125			V
I_{DSS}	V_{GS} = 0 V	V_{DS} = 50 V				100	µA
I_{GSS}	V_{GS} = 20 V	V_{DS} = 0 V				500	nA
$V_{GS(Q)}$	V_{DS} = 10 V	I_D = 250 mA		1.5		4	V
$V_{DS(ON)}$	V_{GS} = 10 V	I_D = 20 A				3	V
G_{FS}	V_{DS} = 10 V	I_D = 10 A		10			mho
C_{ISS}	V_{GS} = 0 V	V_{DS} = 50 V	f = 1 MHz		1000		pF
C_{OSS}	V_{GS} = 0 V	V_{DS} = 50 V	f = 1 MHz		372		pF
C_{RSS}	V_{GS} = 0 V	V_{DS} = 50 V	f = 1 MHz		29		pF

G_{FS} sorts for each unit

DYNAMIC

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
P_{OUT}	V_{DD} = 50 V I_{DQ} = 250 mA f = 30 MHz	300	400		W
G_{PS}	V_{DD} = 50 V I_{DQ} = 250 mA P_{OUT} = 300 W f = 30 MHz	20	23.5		dB
η_D	V_{DD} = 50 V I_{DQ} = 250 mA P_{OUT} = 300 W f = 30 MHz	50	65		%
Load Mismatch	V_{DD} = 50 V I_{DQ} = 250 mA P_{OUT} = 300 W f = 30 MHz All Phase Angles	3:1			VSWR

IMPEDANCE DATA



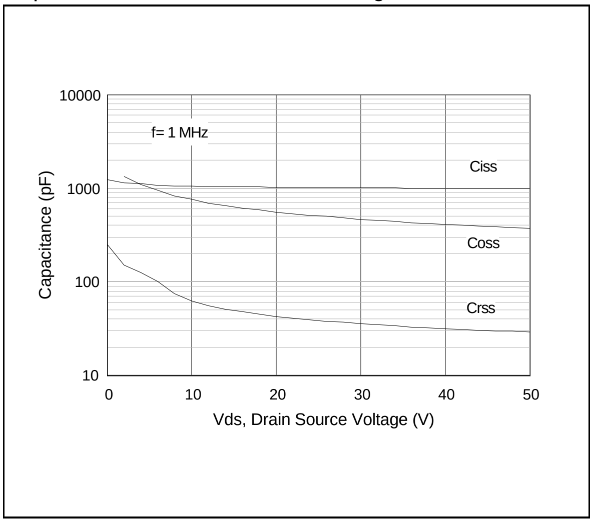
FREQ	Z_{IN} (Ω)	Z_{DL} (Ω)
30 MHz	1.8 - j 0.2	2.8 + j 2.3
108 MHz	1.9 + j 0.2	1.6 + j 1.4
175 MHz	1.9 + j 0.3	1.5 + j 1.6

G_{FS} SORTS

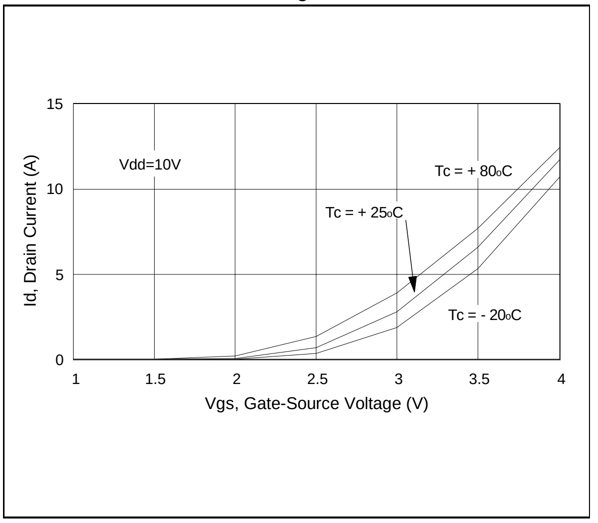
A	10 ÷ 10.99	E	14 ÷ 14.99
B	11 ÷ 11.99	F	15 ÷ 15.99
C	12 ÷ 12.99	G	16 ÷ 16.99
D	13 ÷ 13.99	H	17 ÷ 18

TYPICAL PERFORMANCE

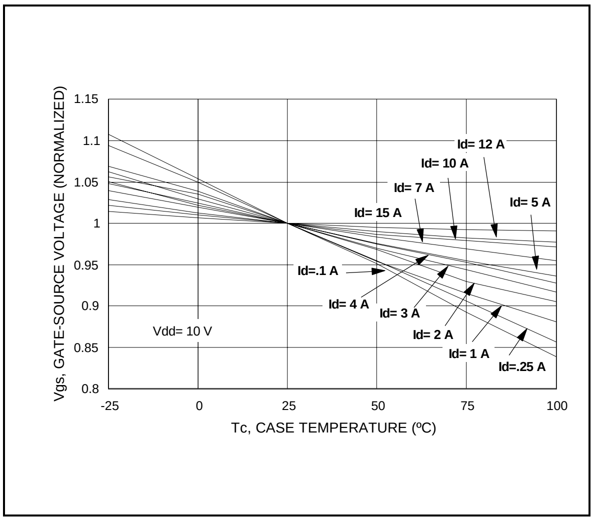
Capacitance vs. Drain-Source Voltage



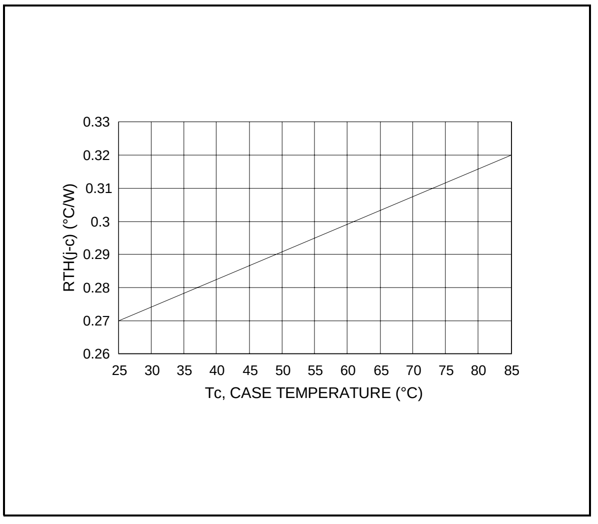
Drain Current vs. Gate Voltage



Gate-Source Voltage vs. Case Temperature

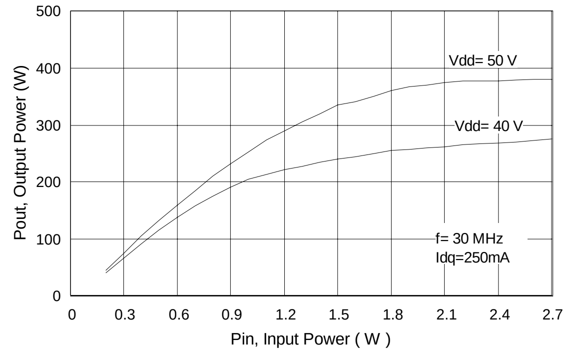


Maximum Thermal Resistance vs. Case Temperature

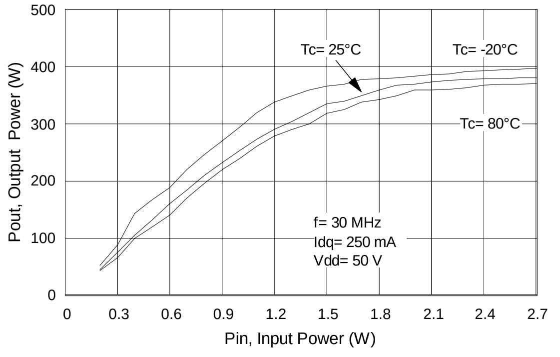


TYPICAL PERFORMANCE

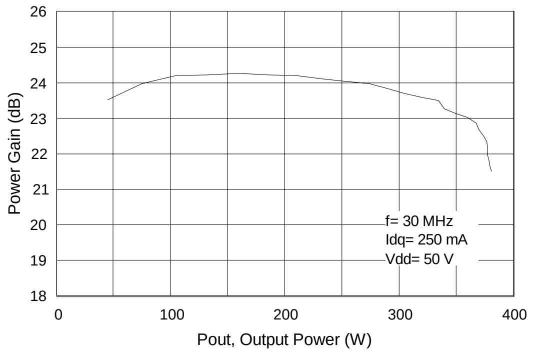
Output Power vs. Input Power



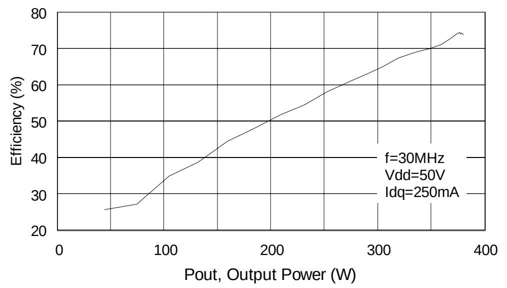
Output Power vs. Input Power



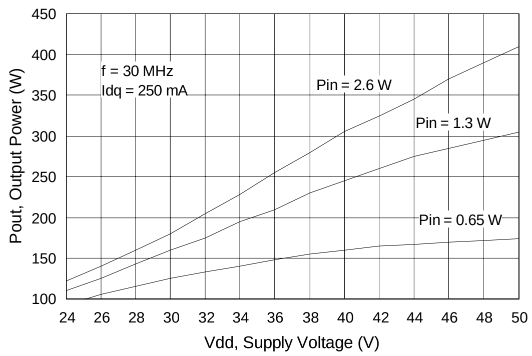
Power Gain vs. Output Power



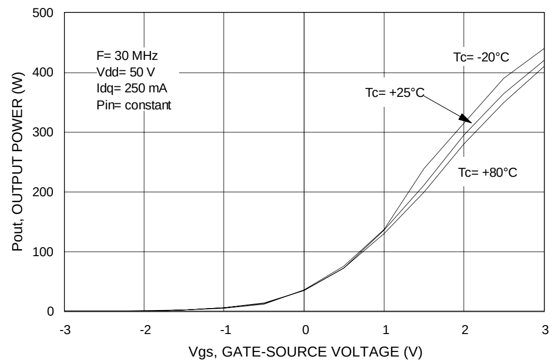
Efficiency vs. Output Power



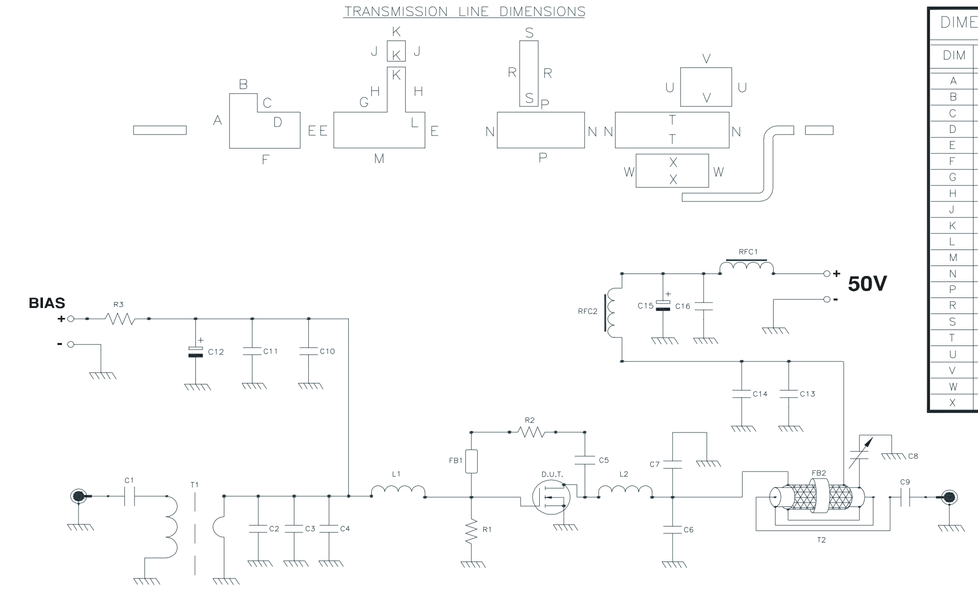
Output Power vs. Supply Voltage



Output Power vs. Gate Voltage



30 MHz Test Circuit Schematic



DIMENSION TABLE

DIM	IN	MM
A	0.532	13.51
B	0.250	6.35
C	0.181	4.59
D	0.383	9.73
E	0.351	8.91
F	0.633	16.08
G	0.477	12.12
H	0.438	11.12
J	0.200	5.08
K	0.164	4.16
L	0.174	4.42
M	0.817	20.75
N	0.350	8.89
P	0.779	19.79
R	0.639	16.23
S	0.165	4.19
T	1.017	25.84
U	0.375	9.52
V	0.456	11.58
W	0.325	8.24
X	0.650	16.50

NOTES:
1. DIMENSION AT COMPONENT SYMBOL ARE REFERENCE FOR COMPONENT PLACEMENT.
2. GAP BETWEEN GROUND & TRANSMISSION LINES ARE 0.056[1.42] TYP
3. TRANSMISSION LINE ARE NOT 1:1 SCALE
4. INPUT AND OUTPUT TRANSMISSION LINE ARE 50 OHMS

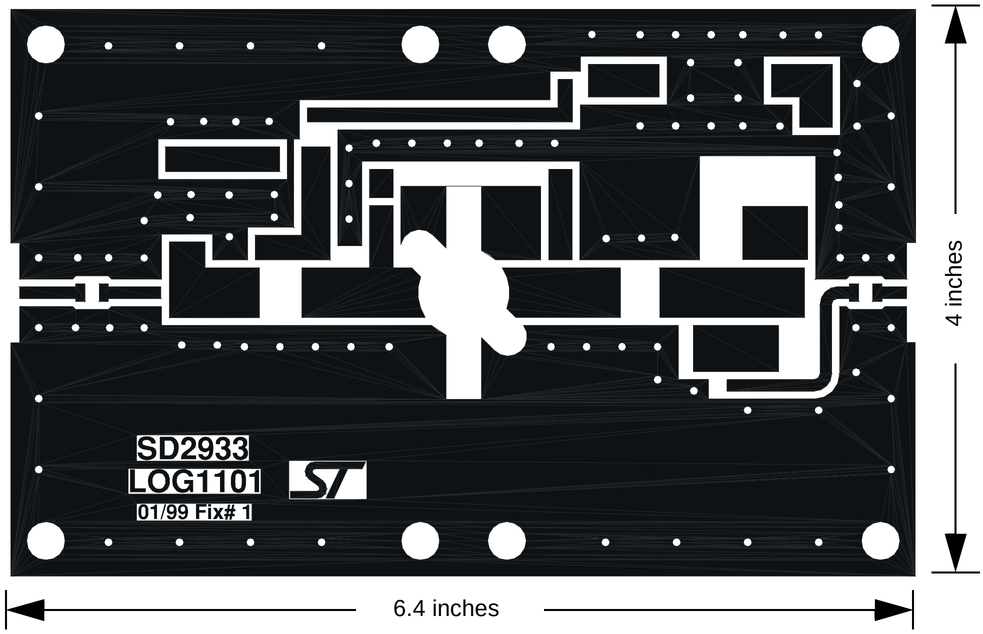
SC14300

REF. 1008706A

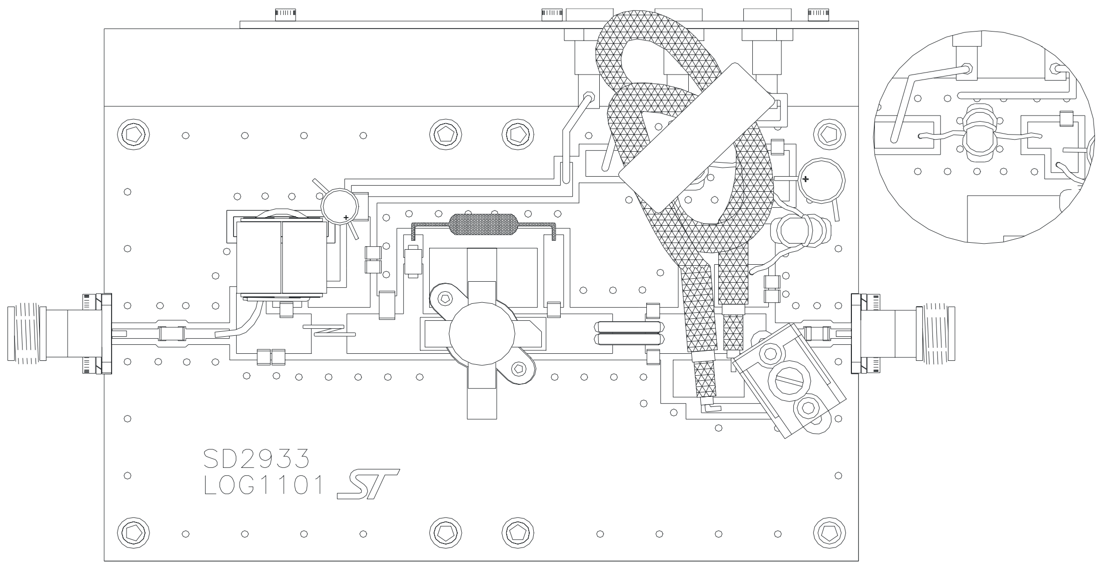
30 MHz Test Circuit Component Part List

C1,C9	0.01 µF / 500 V SURFACE MOUNT CERAMIC CHIP CAPACITOR
C2, C3	750 pF ATC 700B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C4	300 pF ATC 700B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C5,C10,C11,C14,C16	10000 pF ATC 200B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C6	510 pF ATC 700B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C7	300 pF ATC 700B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C8	175-680 pF TYPE 46 STANDARD TRIMMER CAPACITOR
C12	47 µF / 63 V ALUMINUM ELECTROLYTIC RADIAL LEAD CAPACITOR
C13	1200 pF ATC 700B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C15	100 µF / 63 V ALUMINUM ELECTROLYTIC RADIAL LEAD CAPACITOR
R1,R3	1 K OHM 1 W SURFACE MOUNT CHIP RESISTOR
R2	560 OHM 2 W WIRE-WOUND AXILS LEAD RESISTOR
T1	HF 2-30 MHz SURFACE MOUNT 9:1 TRANSFORMER
T2	RG - 142B/U 50 OHM COAXIAL CABLE OD = 0.165[4.18] L 15”[381.00] COVERED WITH 15”[381.00] TINNED COPPER TUBULAR BRAND 13/65” [5.1] WIDTH
L1	1 3/4 TURN AIR-WOUND 16 AWG ID = 0.219 [5.56] POLY-COATED MAGNET WIRE
L2	1 3/4 TURN AIR-WOUND 12 AWG ID = 0.250 [6.34] BUS BAR WIRE
RFC1,RFC2	3 TURNS 14 AWG WIRE THROUGH FAIR RITE TOROID
FB1	SURFACE MOUNT EMI SHIELD BEAD
FB2	TOROID
PCB	ULTRALAM 2000. 0.030” THK, ε_r = 2.55, 2 Oz ED CU BOTH SIDES

30 MHz Test Circuit Photomaster

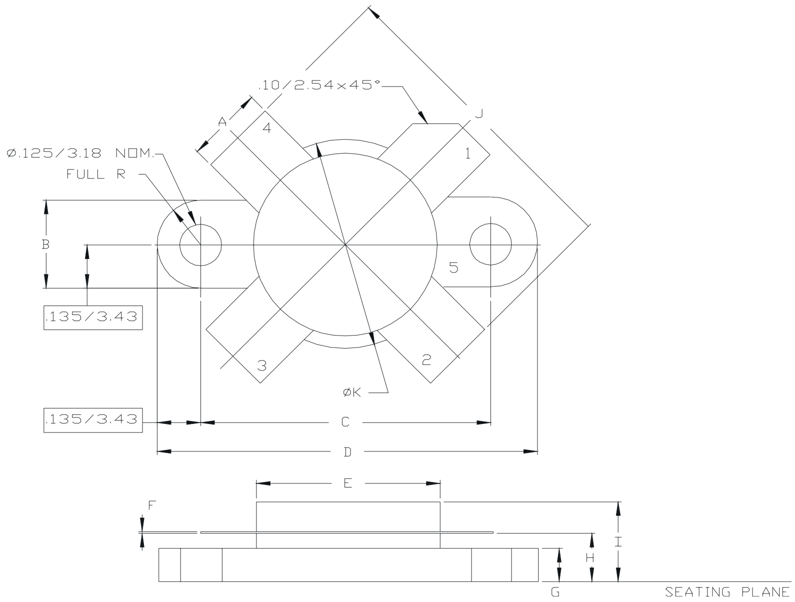


30 MHz Test Circuit



M177 (.550 DIA 4/L N/HERM W/FLG) MECHANICAL DATA

DIM.	mm			Inch		
	MIN.	TYP.	MAX	MIN.	TYP.	MAX
A	5.72		5.97	0.225		0.235
B	6.73		6.96	0.265		0.275
C	21.84		22.10	0.860		0.870
D	28.70		28.96	1.130		1.140
E	13.84		14.10	0.545		0.555
F	0.08		0.18	0.003		0.007
G	2.49		2.74	0.098		0.108
H	3.81		4.32	0.150		0.170
I			7.11			0.280
J	27.43		28.45	1.080		1.120
K	15.88		16.13	0.625		0.635



Controlling Dimension: Inches

1011012D

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