

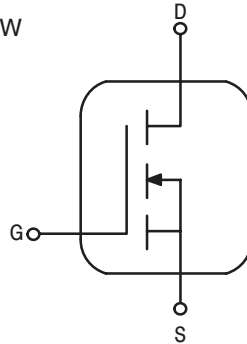
SEMICONDUCTOR TECHNICAL DATA

The RF MOSFET Line  
**RF Power Field Effect Transistor**  
N-Channel Enhancement-Mode Lateral MOSFET

**MRF6522-10R1**

Designed for Class A-AB common source, linear power amplifiers in the 960 MHz range. The MRF6522-10R1 has been specifically designed for use in Communications Network (GSM) base stations. The package offers the advantage of SMD.

- Specified 26 Volts, 960 MHz, Class AB Characteristics  
Output Power = 10 Watts CW  
Power Gain = 15 dB Min @ 960 MHz, 10 Watts CW  
Drain Efficiency = 48% Min @ 960 MHz, 10 Watts CW
- Excellent Thermal Stability
- Characterized with Series Equivalent Large-Signal Impedance Parameters
- S-Parameter Characterization at High Bias Levels
- Bottom Side Source Eliminates DC Isolators, Reducing Common Mode Inductances
- In Tape and Reel. R1 Suffix = 500 Units per 12 mm, 7 inch Reel.



960 MHz, 10 W, 26 V  
LATERAL N-CHANNEL  
RF POWER MOSFET



CASE 458C-03, STYLE 1  
NI-200Z

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain-Source Voltage	$V_{DSS}$	65	Vdc
Gate-Source Voltage	$V_{GS}$	$\pm 20$	Vdc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	29 0.17	Watts W/ $^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	-65 to +150	$^\circ\text{C}$
Operating Junction Temperature	$T_J$	200	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case (1)	$R_{\theta JC}$	4.0	$^\circ\text{C/W}$

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

Characteristic	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Drain-Source Breakdown Voltage ( $V_{GS} = 0$ Vdc, $I_D = 0.2$ mA)	$V_{(BR)DSS}$	65	—	—	Vdc
Zero Gate Voltage Drain Current ( $V_{DS} = 26$ Vdc, $V_{GS} = 0$ Vdc)	$I_{DSS}$	—	—	1.0	$\mu\text{Adc}$
Gate-Source Leakage Current ( $V_{GS} = 20$ Vdc, $V_{DS} = 0$ Vdc)	$I_{GSS}$	—	—	1.0	$\mu\text{Adc}$

(1) Thermal resistance is determined under specified RF operating condition.

NOTE - **CAUTION** - MOS devices are susceptible to damage from electrostatic charge. Reasonable precautions in handling and packaging MOS devices should be observed.

**ELECTRICAL CHARACTERISTICS continued** ( $T_C = 25^\circ\text{C}$  unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
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**ON CHARACTERISTICS**

Gate Threshold Voltage ( $V_{DS} = 10\text{ V}$ , $I_D = 50\ \mu\text{A}$ )	$V_{GS(th)}$	1.25	3.0	4.0	Vdc
Gate Quiescent Voltage ( $V_{DS} = 26\text{ Vdc}$ , $I_D = 100\text{ mA}$ )	$V_{GS(Q)}$	2.25	4.0	5.0	Vdc
Drain-Source On-Voltage ( $V_{GS} = 10\text{ V}$ , $I_D = 0.5\text{ A}$ )	$V_{DS(on)}$	—	—	0.9	Vdc

**DYNAMIC CHARACTERISTICS**

Input Capacitance ( $V_{DS} = 26\text{ V}$ , $V_{GS} = 0\text{ V}$ , $f = 1.0\text{ MHz}$ )	$C_{iss}$	—	17	—	pF
Output Capacitance ( $V_{DS} = 26\text{ V}$ , $V_{GS} = 0\text{ V}$ , $f = 1.0\text{ MHz}$ )	$C_{oss}$	—	10	—	pF
Reverse Transfer Capacitance ( $V_{DS} = 26\text{ V}$ , $V_{GS} = 0\text{ V}$ , $f = 1.0\text{ MHz}$ )	$C_{rss}$	—	0.9	—	pF

**FUNCTIONAL TESTS** (In Motorola Test Fixture, 50 ohm system)

Common-Source Power Gain ( $V_{DS} = 26\text{ V}$ , $P_{out} = 10\text{ W CW}$ , $I_{DQ} = 100\text{ mA}$ , $f = 960\text{ MHz}$ )	$G_{ps}$	15	17	—	dB
Drain Efficiency ( $V_{DS} = 26\text{ V}$ , $P_{out} = 10\text{ W CW}$ , $I_{DQ} = 100\text{ mA}$ , $f = 960\text{ MHz}$ )	$\eta$	48	50	—	%
Input Return Loss ( $V_{DS} = 26\text{ V}$ , $P_{out} = 10\text{ W CW}$ , $I_{DQ} = 100\text{ mA}$ , $f = 960\text{ MHz}$ )	IRL	—	—	-9	dB

TYPICAL CHARACTERISTICS

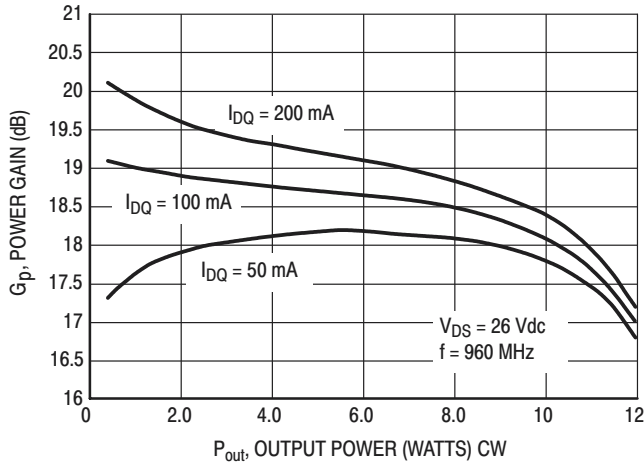


Figure 1. Power Gain versus Output Power

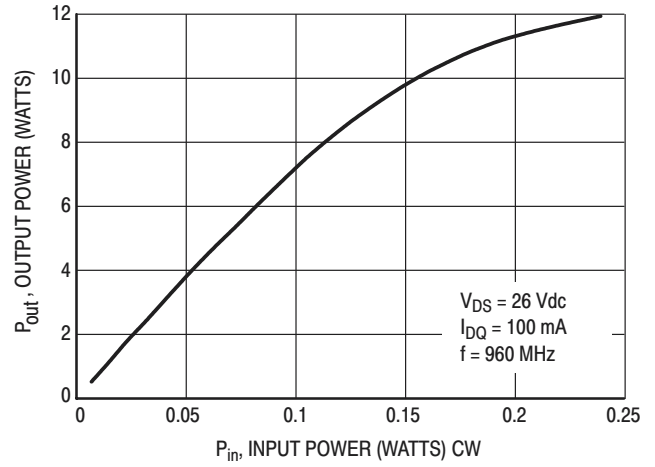


Figure 2. Output Power versus Input Power

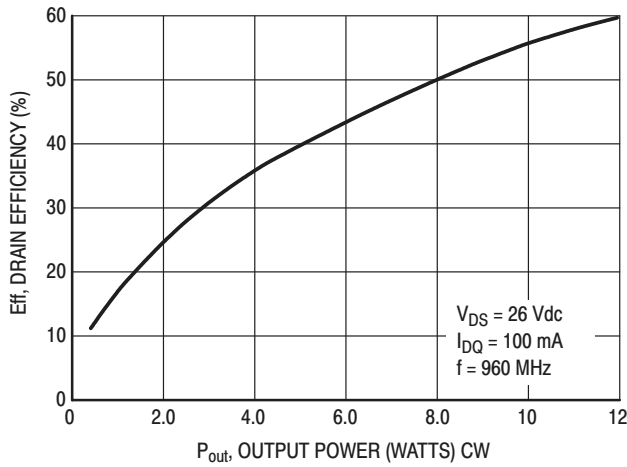


Figure 3. Drain Efficiency versus Output Power

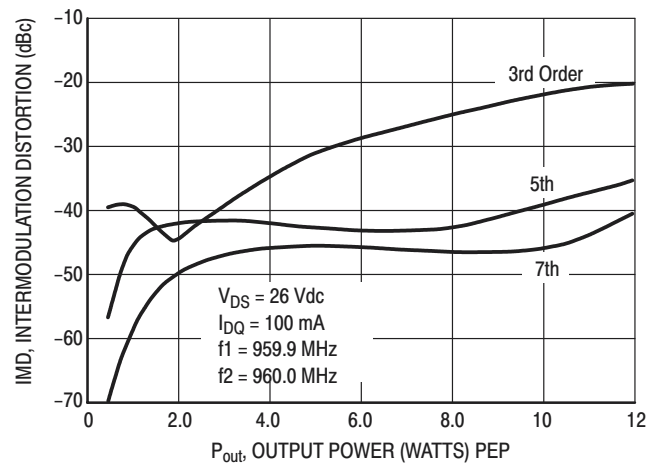
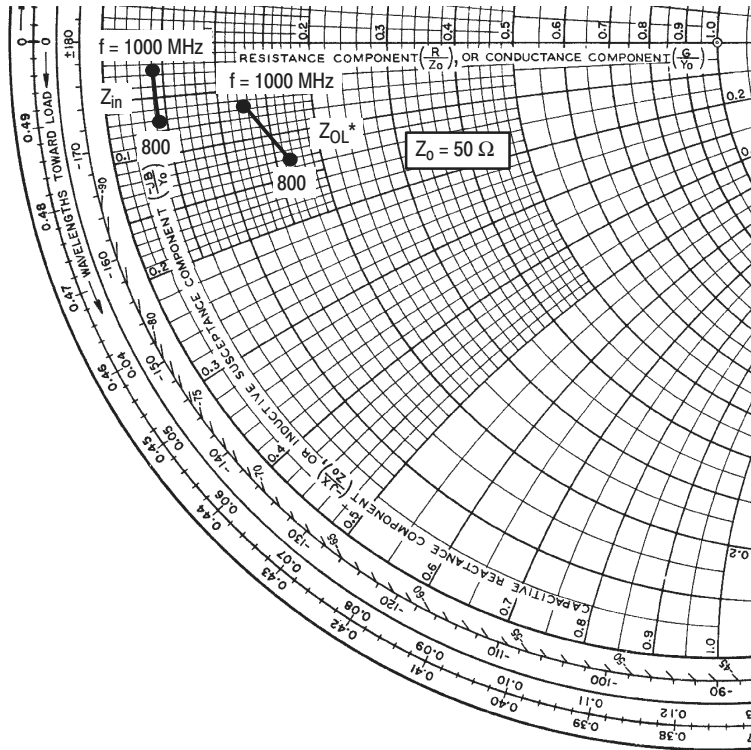


Figure 4. Intermodulation Distortion Products versus Output Power

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f MHz	Z <sub>in</sub> Ohms	Z <sub>OL</sub> <sup>*</sup> Ohms
800	2.20 – j3.00	8.50 – j6.20
825	2.20 – j2.80	8.43 – j6.15
850	2.20 – j2.60	8.35 – j6.10
875	2.20 – j2.40	8.28 – j6.08
900	2.20 – j2.20	8.20 – j6.05
925	2.19 – j1.86	7.95 – j5.70
950	2.13 – j1.68	7.50 – j4.75
975	2.03 – j1.45	6.90 – j3.58
1000	2.00 – j1.00	6.50 – j3.00

Z<sub>in</sub> = Complex conjugate of source impedance.

Z<sub>OL</sub><sup>\*</sup> = Complex conjugate of the optimum load impedance into which the device operates at a given output power, voltage, current and frequency.

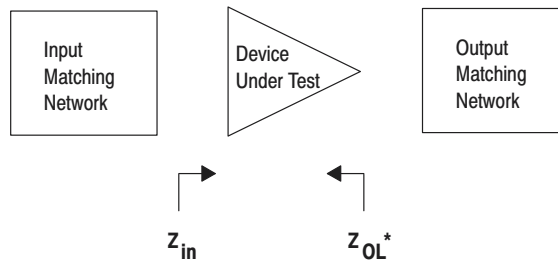


Figure 5. Series Equivalent Input and Output Impedance

**Table 1. Common Source S-Parameters at  $V_{DS} = 12$  Vdc,  $I_D = 100$  mAdc**

f GHz	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	S <sub>11</sub>	∠φ	S <sub>21</sub>	∠φ	S <sub>12</sub>	∠φ	S <sub>22</sub>	∠φ
0.500	0.794	-158	2.77	54	0.050	-29	0.720	-150
0.525	0.800	-159	2.61	52	0.049	-32	0.730	-151
0.550	0.807	-160	2.45	49	0.048	-33	0.738	-152
0.575	0.811	-161	2.31	48	0.047	-35	0.746	-153
0.600	0.816	-162	2.18	46	0.046	-37	0.755	-154
0.625	0.822	-163	2.06	44	0.045	-38	0.763	-155
0.650	0.826	-164	1.95	42	0.043	-40	0.770	-156
0.675	0.832	-165	1.85	40	0.042	-41	0.779	-157
0.700	0.836	-166	1.75	39	0.041	-41	0.785	-158
0.725	0.841	-166	1.66	37	0.040	-42	0.793	-159
0.750	0.846	-167	1.58	35	0.039	-44	0.800	-160
0.775	0.851	-168	1.51	34	0.038	-45	0.805	-161
0.800	0.855	-168	1.44	32	0.037	-46	0.812	-162
0.825	0.858	-169	1.37	31	0.036	-47	0.818	-163
0.850	0.863	-170	1.31	29	0.035	-48	0.824	-164
0.875	0.866	-171	1.25	28	0.034	-49	0.830	-165
0.900	0.869	-172	1.20	27	0.033	-50	0.835	-166
0.925	0.872	-172	1.15	25	0.031	-51	0.840	-166
0.950	0.876	-173	1.10	24	0.030	-52	0.846	-167
0.975	0.879	-174	1.06	23	0.029	-52	0.850	-168
1.000	0.882	-174	1.02	22	0.028	-53	0.853	-169

**Table 2. Common Source S-Parameters at  $V_{DS} = 12$  Vdc,  $I_D = 250$  mAdc**

f GHz	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	S <sub>11</sub>	∠φ	S <sub>21</sub>	∠φ	S <sub>12</sub>	∠φ	S <sub>22</sub>	∠φ
0.500	0.784	-164	3.49	59	0.041	-22	0.690	-158
0.525	0.789	-165	3.29	57	0.040	-25	0.697	-159
0.550	0.794	-166	3.11	55	0.040	-26	0.705	-160
0.575	0.798	-167	2.94	53	0.038	-26	0.711	-160
0.600	0.802	-167	2.79	51	0.037	-28	0.719	-161
0.625	0.806	-168	2.65	50	0.037	-30	0.726	-162
0.650	0.811	-169	2.52	48	0.036	-31	0.732	-162
0.675	0.814	-169	2.40	46	0.035	-32	0.740	-163
0.700	0.819	-170	2.28	45	0.034	-32	0.747	-164
0.725	0.823	-171	2.18	43	0.034	-34	0.753	-164
0.750	0.827	-171	2.08	42	0.032	-36	0.760	-165
0.775	0.831	-172	1.99	40	0.032	-36	0.765	-166
0.800	0.834	-172	1.90	39	0.031	-36	0.772	-166
0.825	0.838	-173	1.82	37	0.031	-38	0.778	-167
0.850	0.842	-174	1.74	36	0.029	-38	0.783	-168
0.875	0.845	-174	1.67	35	0.028	-39	0.790	-169
0.900	0.850	-175	1.61	33	0.028	-39	0.797	-169
0.925	0.852	-175	1.54	32	0.027	-41	0.801	-170
0.950	0.854	-176	1.48	31	0.027	-42	0.807	-170
0.975	0.859	-176	1.43	30	0.025	-41	0.810	-171
1.000	0.861	-177	1.38	28	0.025	-42	0.815	-171

**Table 3. Common Source S-Parameters at  $V_{DS} = 26$  Vdc,  $I_D = 100$  mAdc**

f GHz	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	S <sub>11</sub>	∠φ	S <sub>21</sub>	∠φ	S <sub>12</sub>	∠φ	S <sub>22</sub>	∠φ
0.500	0.832	-155	4.05	56	0.033	-25	0.687	-135
0.525	0.836	-156	3.81	54	0.033	-27	0.697	-137
0.550	0.841	-157	3.58	51	0.034	-28	0.707	-138
0.575	0.845	-159	3.38	49	0.032	-31	0.718	-140
0.600	0.849	-160	3.19	47	0.031	-32	0.728	-141
0.625	0.853	-161	3.02	45	0.030	-34	0.737	-143
0.650	0.856	-162	2.86	43	0.029	-35	0.746	-144
0.675	0.861	-163	2.71	42	0.028	-37	0.755	-145
0.700	0.865	-164	2.57	40	0.028	-37	0.762	-147
0.725	0.868	-165	2.44	38	0.026	-38	0.771	-148
0.750	0.871	-166	2.32	37	0.025	-40	0.779	-149
0.775	0.875	-166	2.21	35	0.025	-41	0.786	-150
0.800	0.877	-167	2.11	33	0.023	-41	0.793	-151
0.825	0.880	-168	2.02	32	0.022	-43	0.800	-152
0.850	0.884	-169	1.92	30	0.022	-43	0.808	-154
0.875	0.886	-170	1.84	29	0.021	-44	0.815	-155
0.900	0.889	-171	1.76	27	0.020	-43	0.820	-156
0.925	0.892	-171	1.68	26	0.020	-46	0.826	-157
0.950	0.894	-172	1.61	24	0.019	-45	0.832	-158
0.975	0.897	-173	1.55	23	0.018	-47	0.837	-159
1.000	0.899	-173	1.49	22	0.017	-48	0.842	-160

**Table 4. Common Source S-Parameters at  $V_{DS} = 26$  Vdc,  $I_D = 250$  mAdc**

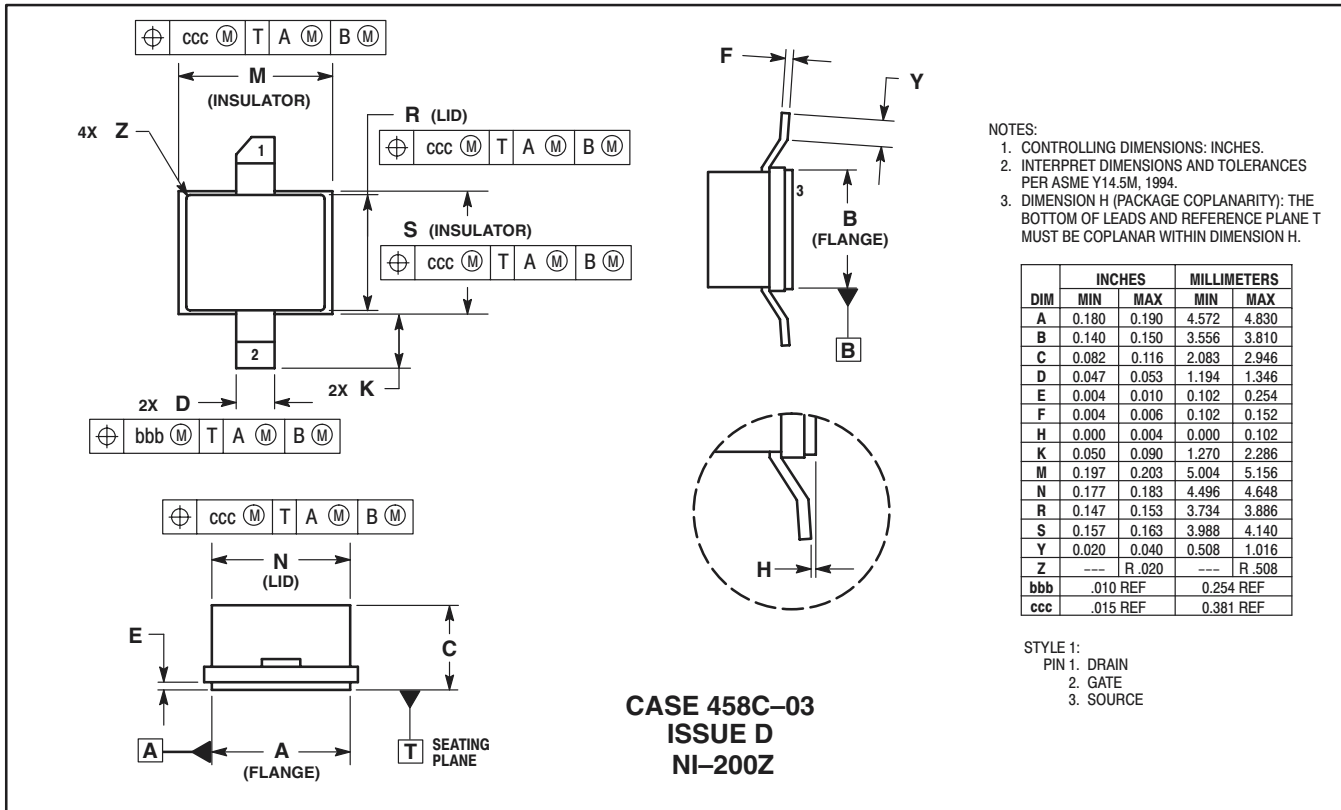
f GHz	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	S <sub>11</sub>	∠φ	S <sub>21</sub>	∠φ	S <sub>12</sub>	∠φ	S <sub>22</sub>	∠φ
0.500	0.824	-160	5.02	59	0.029	-21	0.627	-143
0.525	0.828	-161	4.74	57	0.027	-22	0.638	-144
0.550	0.832	-162	4.47	55	0.026	-22	0.648	-145
0.575	0.835	-163	4.23	53	0.027	-24	0.658	-146
0.600	0.838	-164	4.01	51	0.025	-26	0.669	-147
0.625	0.842	-165	3.81	50	0.025	-26	0.678	-148
0.650	0.844	-166	3.61	48	0.024	-25	0.687	-150
0.675	0.848	-167	3.43	46	0.023	-28	0.697	-150
0.700	0.851	-168	3.27	44	0.023	-30	0.706	-151
0.725	0.855	-168	3.12	43	0.022	-30	0.714	-152
0.750	0.858	-169	2.97	41	0.021	-31	0.723	-153
0.775	0.861	-170	2.84	39	0.021	-31	0.731	-154
0.800	0.863	-170	2.72	38	0.020	-32	0.738	-155
0.825	0.866	-171	2.60	36	0.019	-33	0.746	-156
0.850	0.870	-172	2.49	35	0.018	-34	0.754	-157
0.875	0.871	-173	2.38	33	0.018	-34	0.763	-158
0.900	0.875	-173	2.29	32	0.017	-35	0.768	-159
0.925	0.877	-174	2.20	30	0.016	-36	0.776	-160
0.950	0.879	-175	2.11	29	0.016	-36	0.782	-161
0.975	0.883	-175	2.03	28	0.016	-34	0.787	-161
1.000	0.885	-176	1.95	27	0.015	-34	0.793	-162

Table 5. Common Source S-Parameters at  $V_{DS} = 26$  Vdc,  $I_D = 500$  mAdc

f GHz	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	S <sub>11</sub>	∠φ	S <sub>21</sub>	∠φ	S <sub>12</sub>	∠φ	S <sub>22</sub>	∠φ
0.500	0.832	-162	5.08	60	0.025	-17	0.612	-145
0.525	0.834	-162	4.80	58	0.025	-20	0.624	-146
0.550	0.838	-164	4.53	56	0.024	-21	0.635	-147
0.575	0.840	-164	4.29	54	0.024	-21	0.644	-148
0.600	0.844	-165	4.07	52	0.023	-23	0.655	-149
0.625	0.847	-166	3.86	50	0.023	-24	0.664	-150
0.650	0.849	-167	3.66	48	0.022	-25	0.673	-151
0.675	0.852	-168	3.48	46	0.021	-27	0.682	-152
0.700	0.856	-169	3.32	45	0.021	-28	0.690	-153
0.725	0.858	-170	3.17	43	0.020	-28	0.701	-154
0.750	0.861	-170	3.02	41	0.019	-30	0.709	-154
0.775	0.864	-171	2.89	40	0.019	-29	0.716	-155
0.800	0.866	-172	2.76	38	0.018	-29	0.723	-156
0.825	0.869	-172	2.65	37	0.017	-29	0.733	-157
0.850	0.872	-173	2.53	35	0.017	-31	0.742	-158
0.875	0.874	-174	2.43	34	0.016	-31	0.751	-159
0.900	0.878	-175	2.33	32	0.015	-31	0.757	-160
0.925	0.879	-175	2.24	31	0.015	-32	0.763	-161
0.950	0.881	-176	2.15	29	0.014	-31	0.770	-161
0.975	0.884	-176	2.07	28	0.014	-31	0.775	-162
1.000	0.886	-177	2.00	27	0.013	-30	0.781	-163

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PACKAGE DIMENSIONS



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