



2SC5245A

RF Transistor 10V, 30mA, $f_T=8\text{GHz}$, NPN Single MCP

ON Semiconductor®

<http://onsemi.com>

Features

- Low-noise : $NF=0.9\text{dB typ (}f=1\text{GHz)}$
: $NF=1.4\text{dB typ (}f=1.5\text{GHz)}$
- High gain : $|S_{21e}|^2=10\text{dB typ (}f=1.5\text{GHz)}$
- High cut-off frequency : $f_T=8\text{GHz typ}$
- Low-voltage, low-current operation ($V_{CE}=1\text{V, }I_C=1\text{mA}$)
: $f_T=3.5\text{GHz typ}$
: $|S_{21e}|^2=5.5\text{dB typ (}f=1.5\text{GHz)}$

Specifications

Absolute Maximum Ratings at $T_a=25^\circ\text{C}$

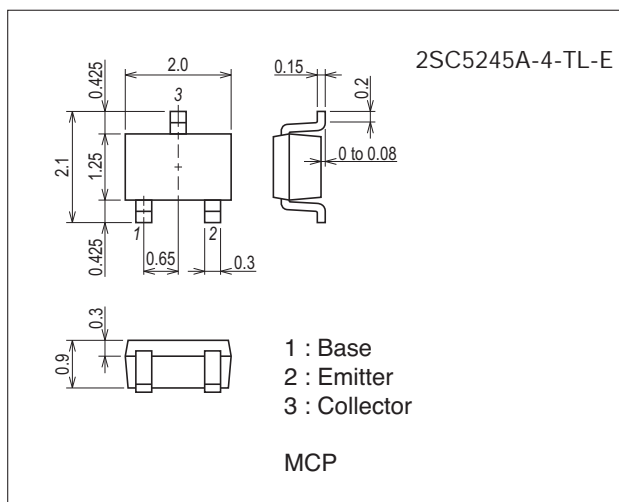
Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		20	V
Collector-to-Emitter Voltage	V_{CEO}		10	V
Emitter-to-Base Voltage	V_{EBO}		1.5	V
Collector Current	I_C		30	mA
Collector Dissipation	P_C		150	mW
Junction Temperature	T_j		150	$^\circ\text{C}$
Storage Temperature	T_{stg}		-55 to +150	$^\circ\text{C}$

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

Package Dimensions

unit : mm (typ)

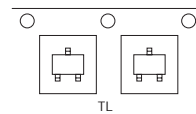
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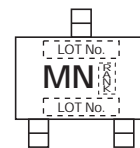
Product & Package Information

- Package : MCP
- JEITA, JEDEC : SC-70, SOT-323
- Minimum Packing Quantity : 3,000 pcs./reel

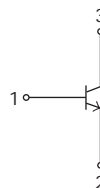
Packing Type: TL



Marking



Electrical Connection



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Electrical Characteristics at Ta=25°C

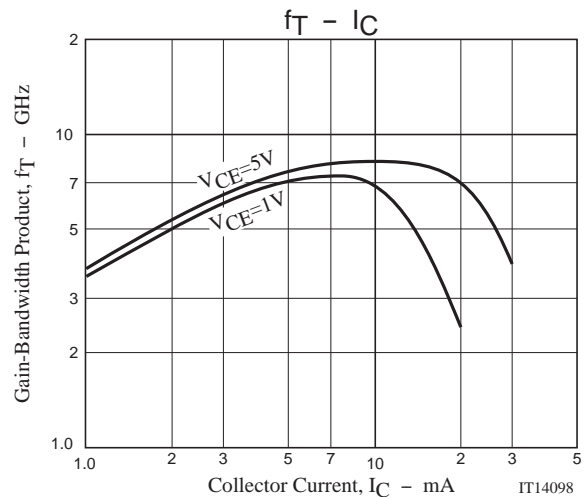
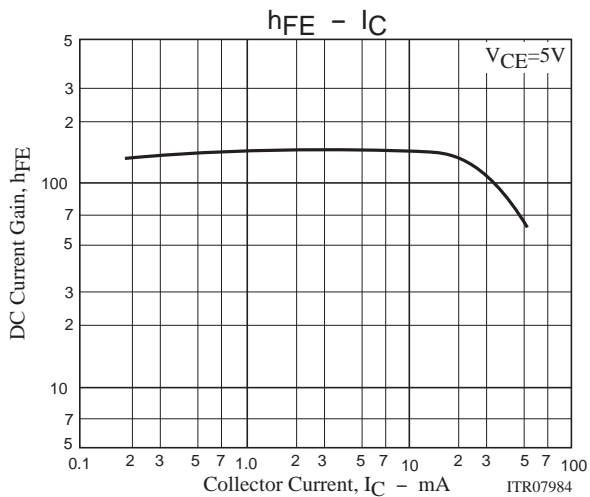
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	$V_{CB}=10V, I_E=0A$			1.0	μA
Emitter Cutoff Current	I_{EBO}	$V_{EB}=1V, I_C=0A$			10	μA
DC Current Gain	h_{FE}	$V_{CE}=5V, I_C=10mA$	60*		270*	
Gain-Bandwidth Product	f_T1	$V_{CE}=5V, I_C=10mA$	5	8		GHz
	f_T2	$V_{CE}=1V, I_C=1mA$		3.5		GHz
Output Capacitance	C_{ob}	$V_{CB}=10V, f=1MHz$		0.45	0.7	pF
Reverse Transfer Capacitance	C_{re}			0.30		pF
Forward Transfer Gain	$ S_{21e} ^{21}$	$V_{CE}=5V, I_C=10mA, f=1.5GHz$	8	10		dB
	$ S_{21e} ^{22}$	$V_{CE}=1V, I_C=1mA, f=1.5GHz$		5.5		dB
Noise Figure	NF1	$V_{CE}=5V, I_C=5mA, f=1.5GHz$		1.4	3.0	dB
	NF2	$V_{CE}=2V, I_C=3mA, f=1GHz$		0.9		dB

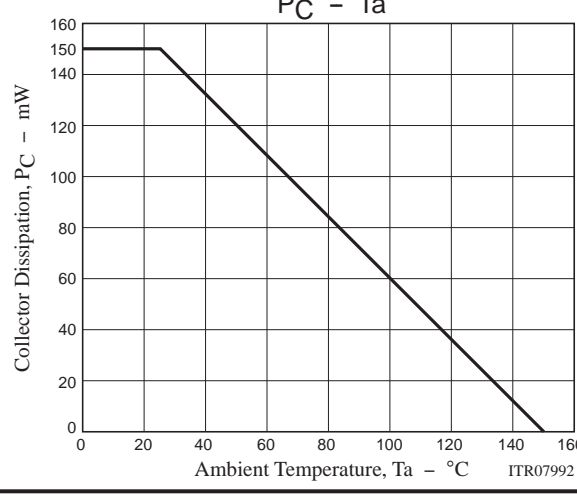
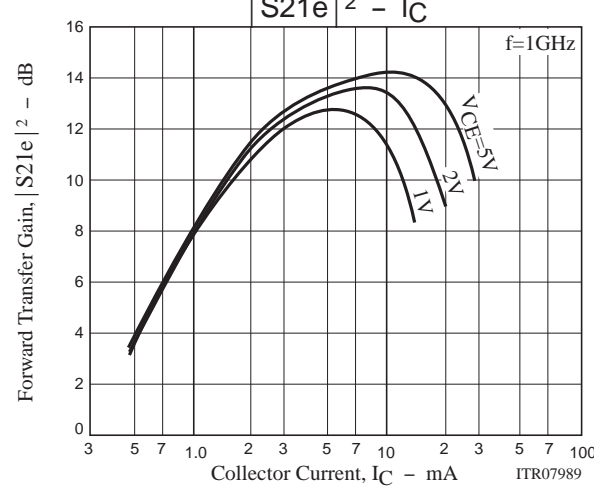
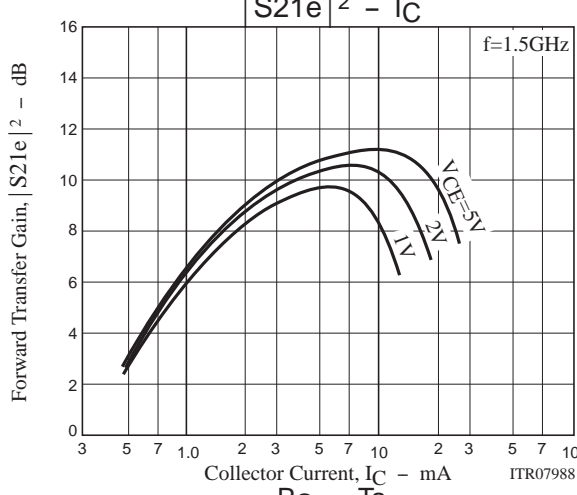
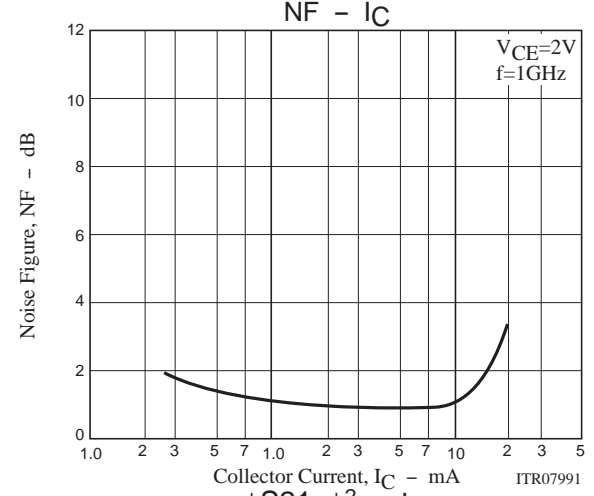
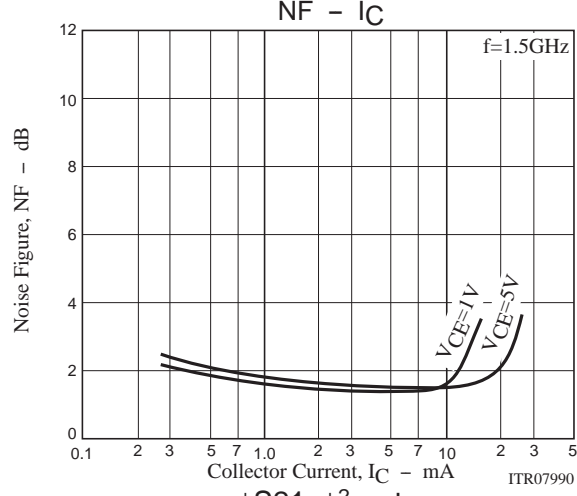
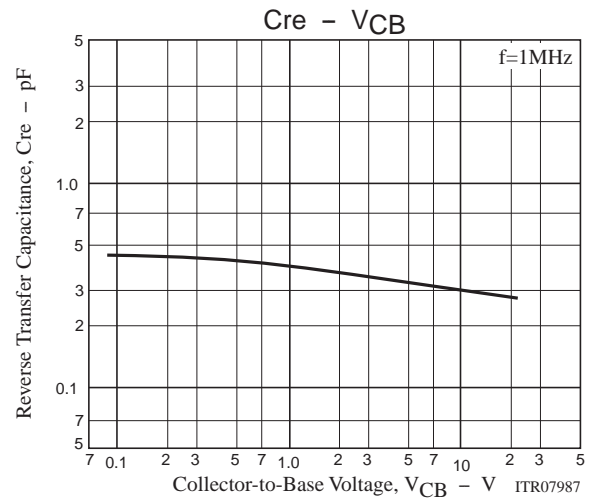
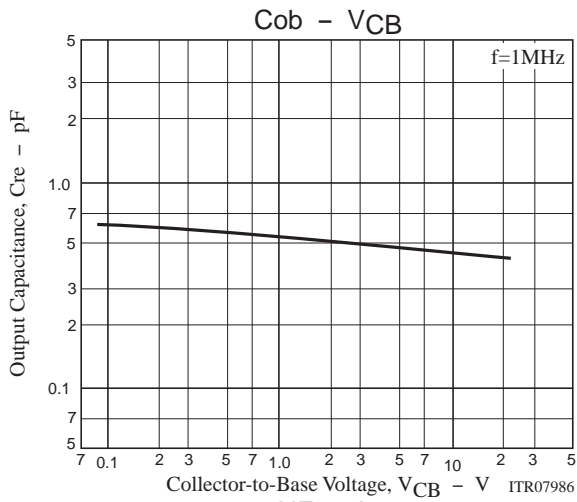
* : The 2SC5245A is classified by 10mA h_{FE} as follows :

Rank	3	4	5
h_{FE}	60 to 120	90 to 180	135 to 270

Ordering Information

Device	Package	Shipping	memo
2SC5245A-4-TL-E	MCP	3,000pcs./reel	Pb Free

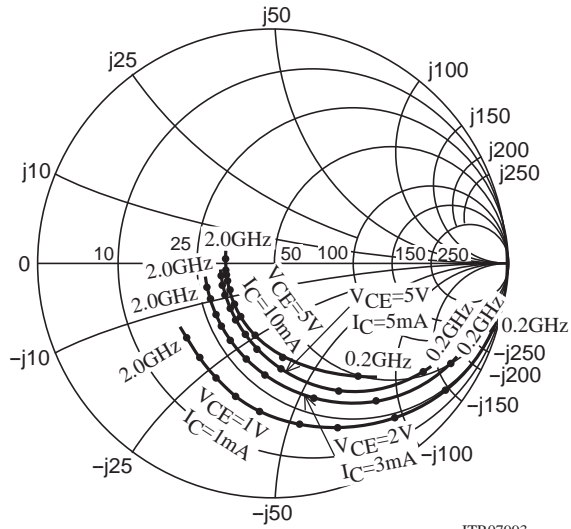




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S11e

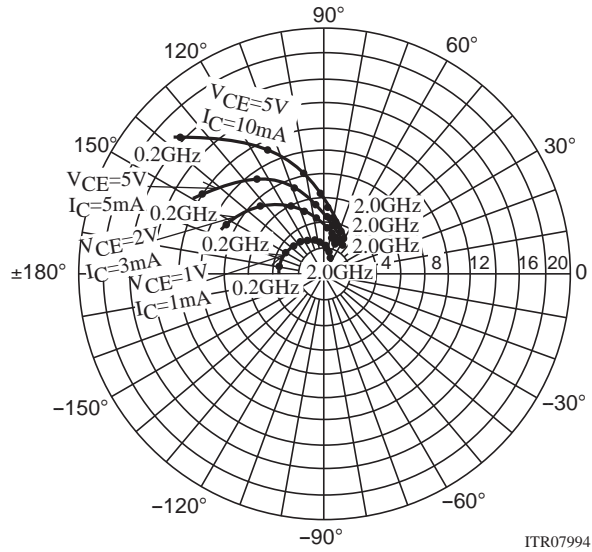
f=200MHz to 2000MHz(200MHz Step)



ITR07993

S21e

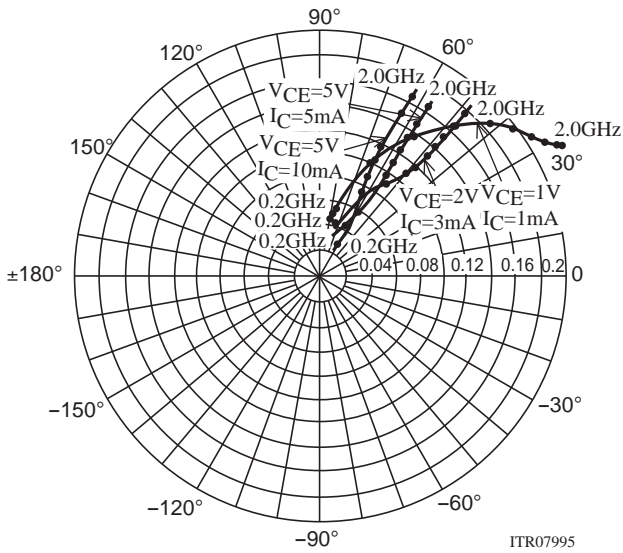
f=200MHz to 2000MHz(200MHz Step)



ITR07994

S12e

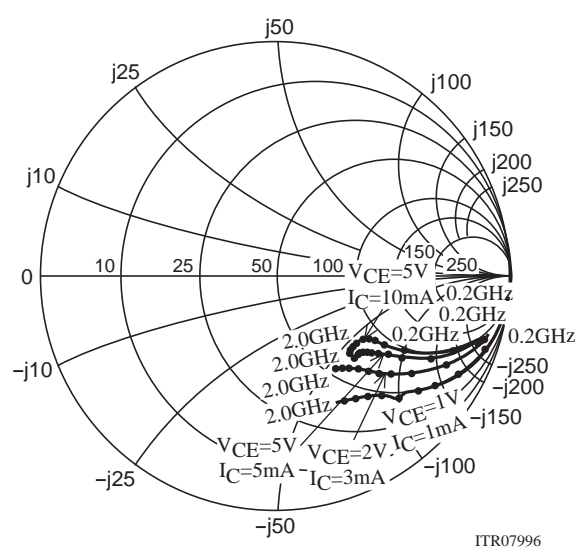
f=200MHz to 2000MHz(200MHz Step)



ITR07995

S22e

f=200MHz to 2000MHz(200MHz Step)



ITR07996

2SC5245A

S Parameters (Common emitter)

$V_{CE}=5V, I_C=5mA, Z_O=50\Omega$

Freq(MHz)	S11	$\angle S11$	S21	$\angle S21$	S12	$\angle S12$	S22	$\angle S22$
200	0.763	-37.5	11.926	146.9	0.036	70.7	0.892	-19.1
400	0.590	-65.4	9.202	124.3	0.058	60.9	0.740	-29.1
600	0.456	-85.5	7.173	109.4	0.073	57.4	0.631	-33.7
800	0.374	-102.0	5.743	98.7	0.086	56.7	0.566	-35.8
1000	0.323	-115.0	4.785	90.5	0.098	56.7	0.528	-37.2
1200	0.288	-127.5	4.105	83.6	0.110	57.2	0.505	-38.4
1400	0.264	-137.7	3.599	77.5	0.123	57.7	0.488	-39.6
1600	0.248	-147.4	3.213	71.3	0.136	57.6	0.476	-41.2
1800	0.239	-156.9	2.905	66.4	0.150	57.6	0.466	-43.3
2000	0.235	-165.7	2.651	61.3	0.165	57.2	0.462	-45.4

$V_{CE}=5V, I_C=10mA, Z_O=50\Omega$

Freq(MHz)	S11	$\angle S11$	S21	$\angle S21$	S12	$\angle S12$	S22	$\angle S22$
200	0.605	-52.6	16.354	136.2	0.031	67.5	0.804	-23.9
400	0.417	-84.6	11.011	113.3	0.048	62.4	0.622	-30.5
600	0.319	-106.3	8.026	100.5	0.062	62.2	0.533	-32.0
800	0.266	-124.6	6.250	91.3	0.076	63.4	0.491	-32.4
1000	0.238	-136.5	5.115	84.7	0.090	64.3	0.469	-33.2
1200	0.225	-148.9	4.336	78.8	0.104	64.4	0.458	-34.6
1400	0.215	-158.3	3.813	73.4	0.119	64.5	0.449	-35.8
1600	0.213	-167.3	3.365	68.1	0.135	63.8	0.443	-37.7
1800	0.212	-175.6	3.030	63.5	0.150	63.1	0.436	-39.6
2000	0.216	-177.5	2.754	58.9	0.166	62.5	0.438	-41.9

$V_{CE}=2V, I_C=3mA, Z_O=50\Omega$

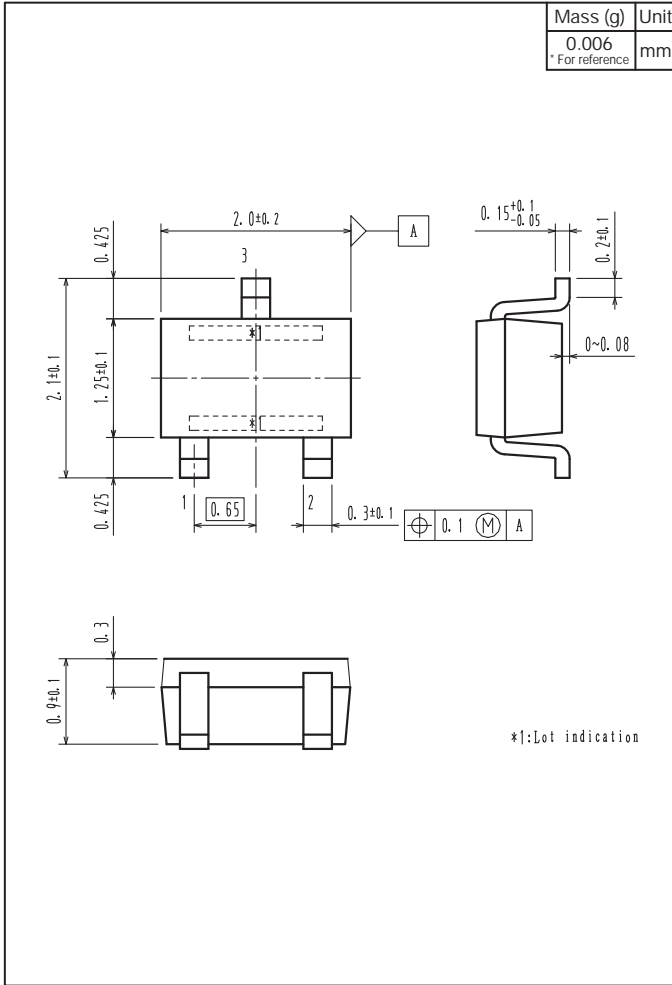
Freq(MHz)	S11	$\angle S11$	S21	$\angle S21$	S12	$\angle S12$	S22	$\angle S22$
200	0.842	-30.7	8.491	153.0	0.044	72.5	0.931	-17.1
400	0.704	-56.3	7.161	131.9	0.075	60.9	0.808	-28.8
600	0.579	-76.1	5.879	116.3	0.095	54.1	0.696	-36.2
800	0.480	-93.1	4.882	104.2	0.109	51.0	0.615	-40.6
1000	0.417	-106.3	4.154	95.0	0.121	49.3	0.564	-43.5
1200	0.376	-119.6	3.597	87.1	0.132	48.7	0.526	-45.8
1400	0.343	-130.2	3.212	80.2	0.143	48.6	0.496	-47.5
1600	0.319	-140.5	2.875	73.4	0.154	48.7	0.475	-49.6
1800	0.303	-150.0	2.604	67.7	0.166	48.6	0.461	-51.6
2000	0.298	-160.0	2.383	62.1	0.179	48.9	0.451	-52.9

$V_{CE}=1V, I_C=1mA, Z_O=50\Omega$

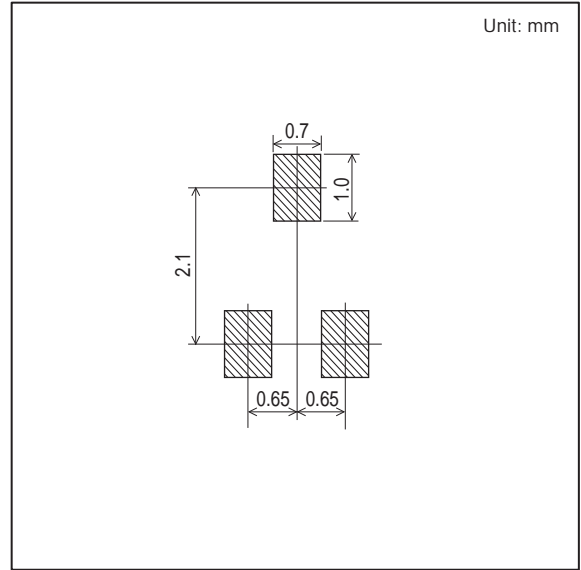
Freq(MHz)	S11	$\angle S11$	S21	$\angle S21$	S12	$\angle S12$	S22	$\angle S22$
200	0.945	-18.9	3.296	162.5	0.054	77.2	0.980	-11.0
400	0.884	-37.3	3.206	145.9	0.102	65.9	0.934	-20.5
600	0.810	-53.6	2.942	131.2	0.139	56.3	0.870	-29.0
800	0.728	-69.4	2.711	117.8	0.166	48.6	0.811	-35.5
1000	0.667	-82.5	2.449	107.0	0.187	42.5	0.763	-40.9
1200	0.605	-95.8	2.252	96.9	0.199	37.3	0.715	-45.7
1400	0.561	-106.1	2.061	88.1	0.207	33.5	0.673	-49.4
1600	0.518	-117.2	1.909	79.5	0.212	30.6	0.638	-53.4
1800	0.492	-127.5	1.766	72.2	0.215	28.6	0.611	-56.5
2000	0.465	-137.9	1.658	65.2	0.217	27.6	0.592	-59.9

2SC5245A

Outline Drawing 2SC5245A-4-TL-E



Land Pattern Example



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