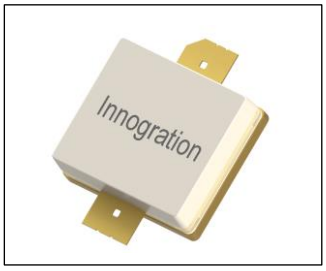
ITGV10120A2C LDMOS TRANSISTOR

Document Number: ITGV10120A2C
Preliminary Datasheet V1.0

60W,HF to UHF ,28V RF LDMOS Transistor



Description

The ITGV10120A2C is 60-watt, high performance, highly rugged, unmatched LDMOS transistor, designed for any general applications at frequencies from HF to UHF, in new generation highly cost effective open cavity package.

- Typical narrow band CW RF performance with device soldered
  Vds=28V, Idq=100mA, no coaxial line transformer

Freq	P1dB	P1dB	P1dB Eff	P1dB Gain	P3dB	P3dB	P3dB Eff
(MHz)	(dBm)	(W)	%	dB	(dBm)	(W)	%
300	48.17	65.6	58.8	22.85	49.23	83.7	64.6
320	48.01	63.3	65.9	23.3	49.02	79.9	70.5
340	47.16	52.0	73.0	22.13	48.05	63.8	77.0

- Typical wideband CW RF performance with device soldered
  Vds=28V, Idq=100mA, with coaxial line transformer

Freq	P1dB	P1dB	P1dB Eff	P1dB Gain	P3dB	P3dB	P3dB Eff
(MHz)	(dBm)	(W)	%	dB	(dBm)	(W)	%
280	48.82	76.2	68.7	20.21	49.21	83.4	70.0
290	48.7	74.2	67.2	20.86	49.19	83.0	68.2
300	48.57	71.9	67.3	21.07	49.12	81.6	69.2
310	48.42	69.5	67.4	21.31	48.98	79.1	68.8
320	48.41	69.4	67.3	21.7	48.9	77.6	68.1
330	48.3	67.6	66.8	21.93	48.79	75.7	67.4
340	48.18	65.7	67.0	22.31	48.7	74.1	67.1
350	48.04	63.6	66.4	22.35	48.58	72.1	66.3
360	47.95	62.3	65.7	22.01	48.53	71.3	65.8
370	47.88	61.4	65.3	21.43	48.56	71.8	66.6
380	47.84	60.8	64.7	20.28	48.69	74.0	67.0

Features

- High Efficiency and Linear Gain Operations
- Integrated ESD Protection
- Excellent thermal stability, low HCI drift
- Large Positive and Negative Gate/Source Voltage Range for Improved Class C Operation
- Pb-free, RoHS-compliant

Suitable Applications

- 30-88MHz (Ground communication)
- 54-88MHz (TV VHF I)
- 88-108MHz (FM)
- 136-174MHz (Commercial ground communication)
- Laser Exciter
- Synchrotron
- MRI
- Plasma generator
- Weather Radar

Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain--Source Voltage	V_{DSS}	+110	Vdc
Gate--Source Voltage	V_{GS}	-10 to +10	Vdc
Operating Voltage	V_{DD}	+55	Vdc
Storage Temperature Range	Tstg	-65 to +150	°C
Case Operating Temperature	T_C	+150	°C
Operating Junction Temperature	T_J	+225	°C

Table 2. Thermal Characteristics

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case T_C= 85°C, T_J=200°C, DC test	RθJC	0.9	°C/W

Table 3. ESD Protection Characteristics

Test Methodology	Class
Human Body Model (per JESD22--A114)	Class 2

Table 4. Electrical Characteristics (T_A = 25 ℃ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
DC Characteristics (per half section)					
Drain-Source Voltage V_{GS}=0, I_{DS}=1.0mA	$V_{(BR)DSS}$		110		V
Zero Gate Voltage Drain Leakage Current (V_{DS} = 75V, V_{GS} = 0 V)	I_{DSS}	——	——	1	μA
Zero Gate Voltage Drain Leakage Current (V_{DS} = 28V, V_{GS} = 0 V)	I_{DSS}	——	——	1	μA
Gate--Source Leakage Current (V_{GS} = 10 V, V_{DS} = 0 V)	I_{GSS}	——	——	1	μA
Gate Threshold Voltage (V_{DS} = 28V, I_D = 600 μA)	$V_{GS(th)}$	——	2.65	——	V
Gate Quiescent Voltage (V_{DD} = 28 V, I_D = 100 mA, Measured in Functional Test)	$V_{GS(Q)}$	——	3.25	——	V

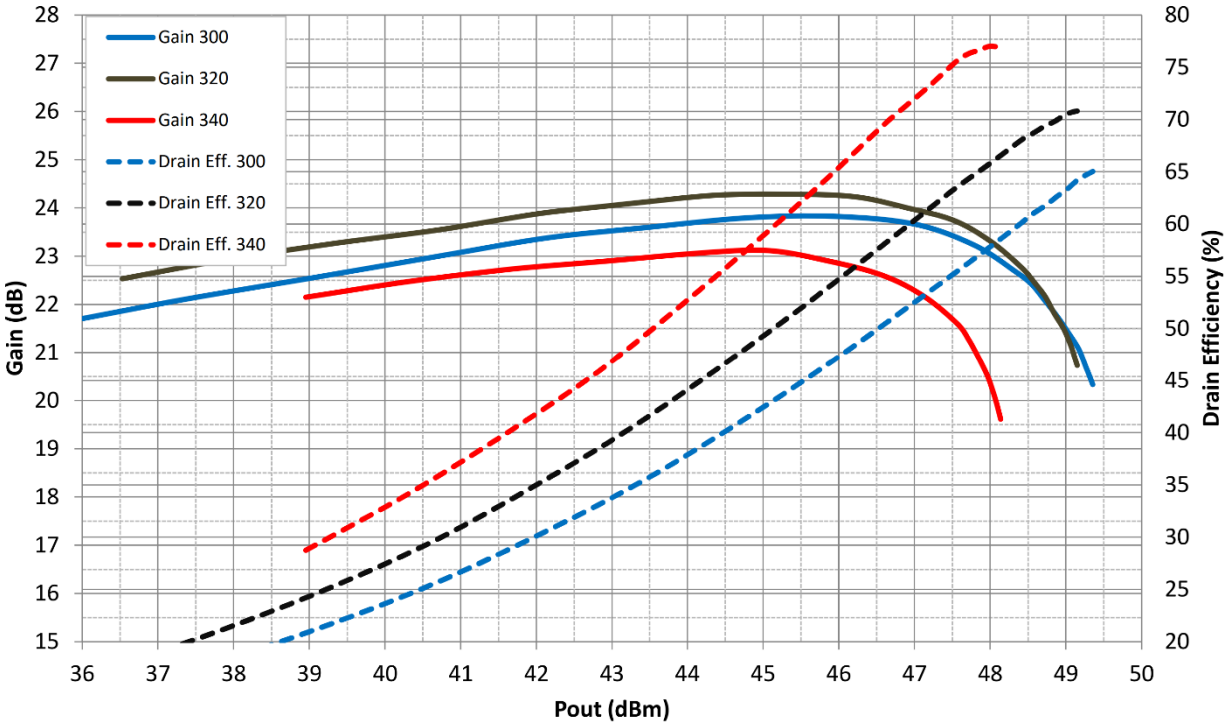
Load Mismatch (In Innogration Test Fixture, 50 ohm system): V_{DD} = 28 Vdc, I_{DQ} = 100 mA, f =700MHz, pulse width:100us, duty cycle:10%

Load 10:1 All phase angles, at 60W Pulsed CW Output Power	No Device Degradation

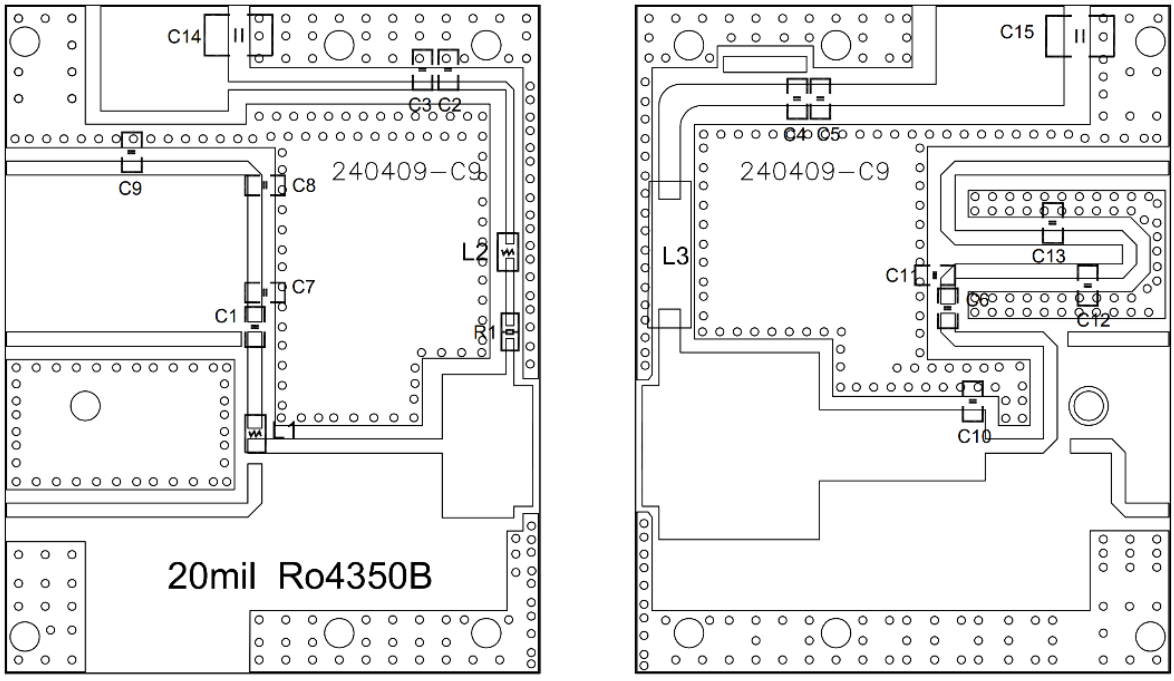
300-340MHz

TYPICAL CHARACTERISTICS

Figure 1: CW Gain and Power Efficiency as a Function of Pout at 300-340MHz



Reference Circuit of Test Fixture Assembly Diagram



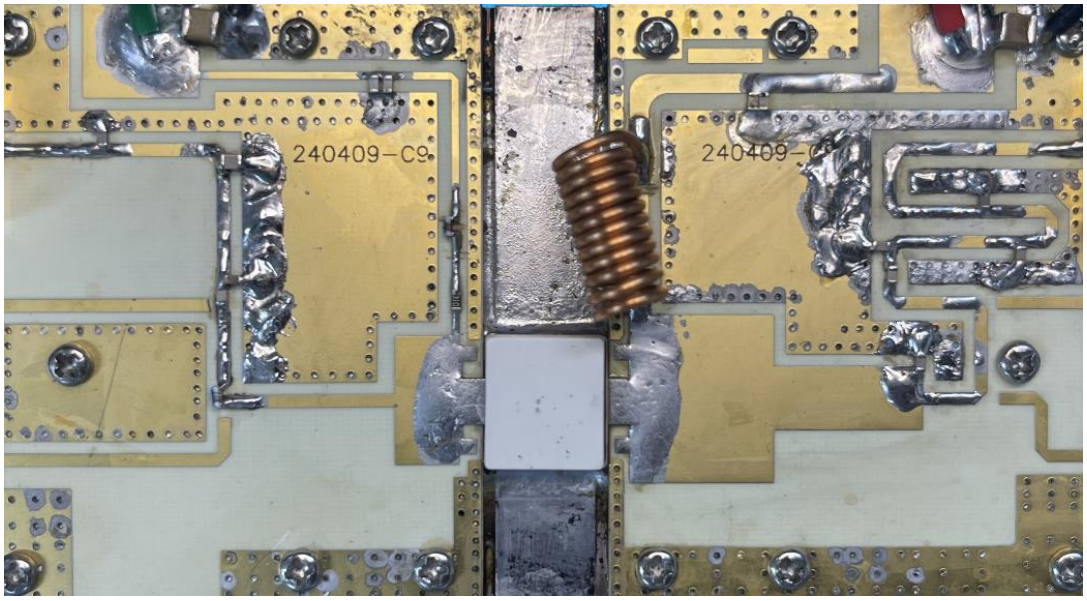


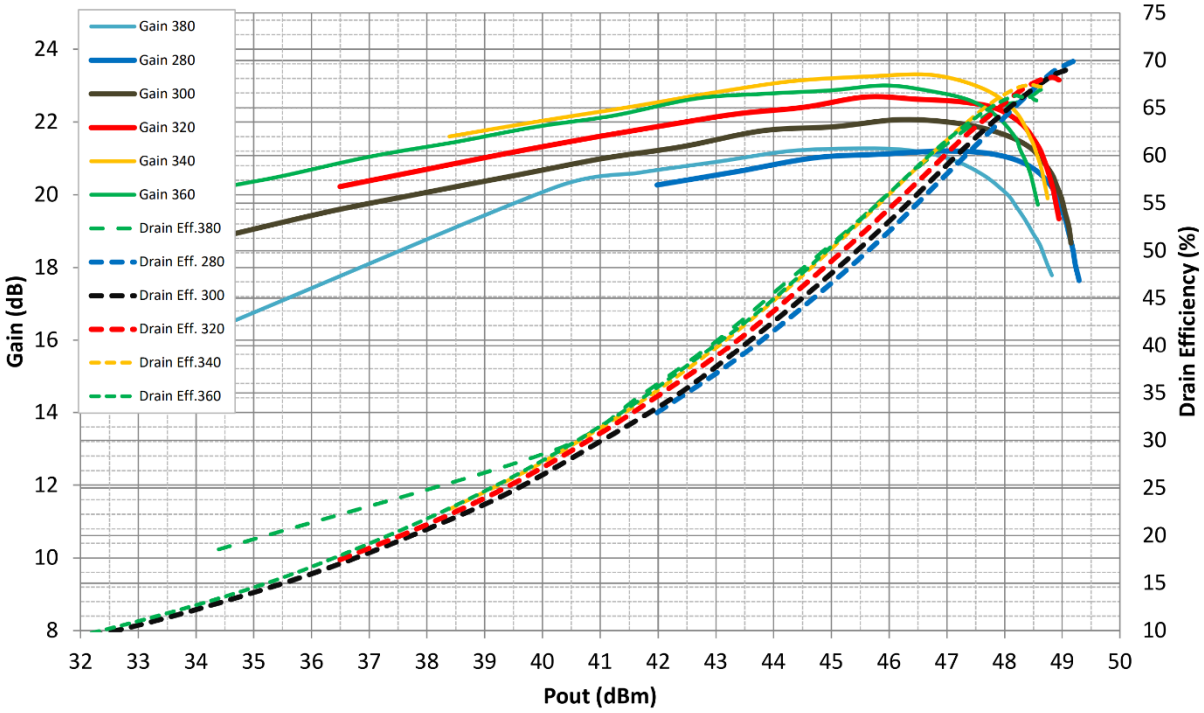
Table 5. Test Circuit Component Designations and Values

Reference	Footprint	Value	Quantity
C1, C2, C3, C4, C5, C6	0603	100pF/250V	6
L1	0603	8.2nH	1
L2	0603	18nH	1
C7, C13	0603	8.2pF/250V	2
C8	0603	12pF/250V	1
C9	0603	5.6pF/250V	1
C10, C11, C12	0603	10pF/250V	3
C14, C15	1210	10uF/100V	2
L3		1.1mm wire, 4.1mm inner diameter, 12 turns	
R1	0603	10R	1
		ITGV10120A2C	1

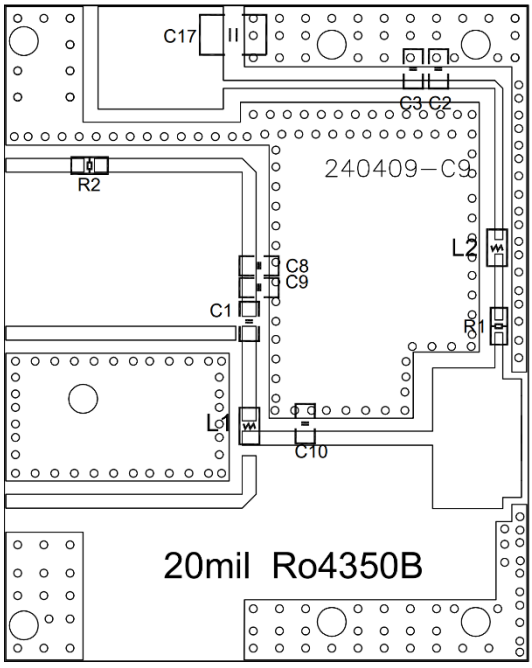
280-380MHz

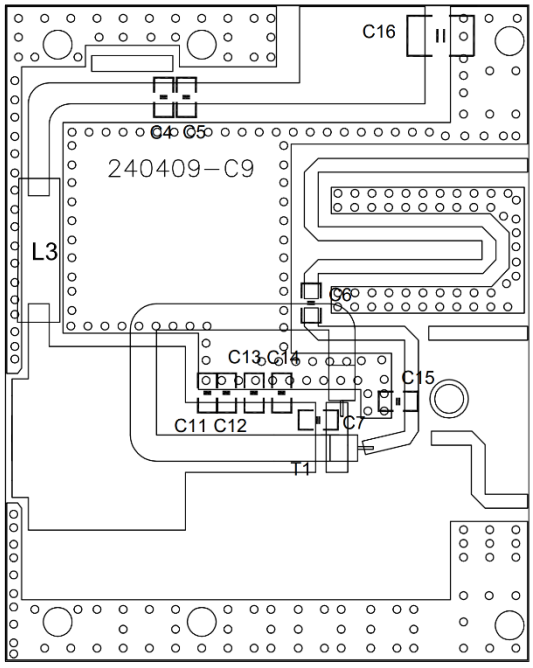
TYPICAL CHARACTERISTICS

Figure 2: CW Gain and Power Efficiency as a Function of Pout at 280-380MHz



Reference Circuit of Test Fixture Assembly Diagram





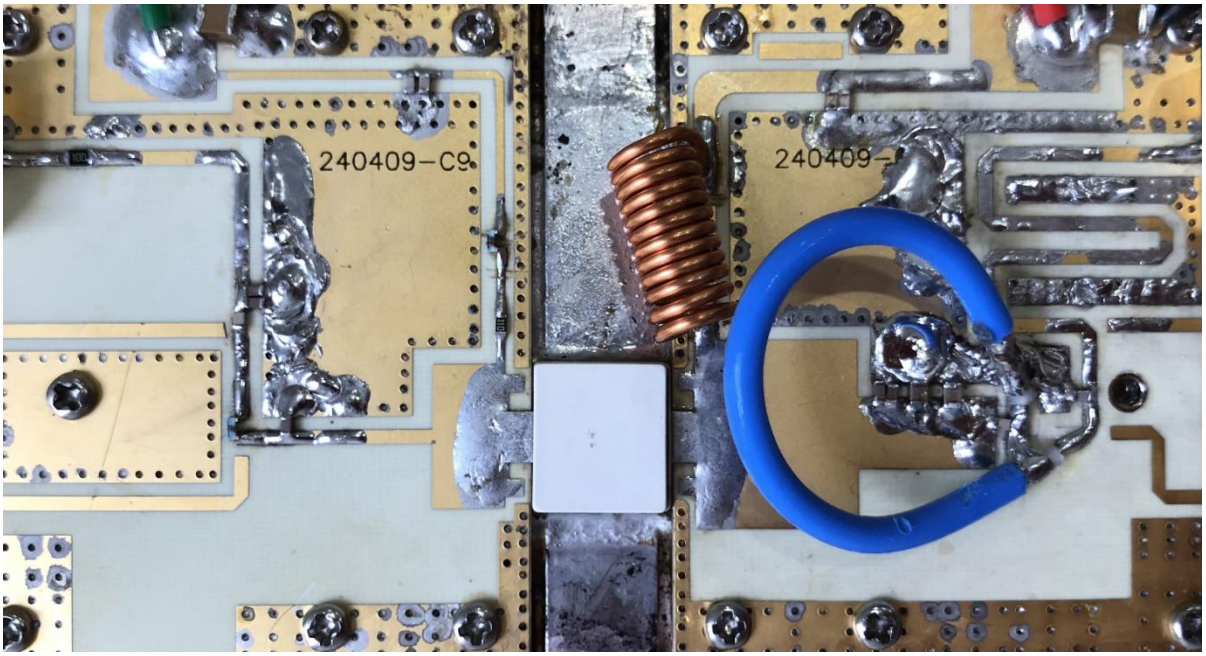
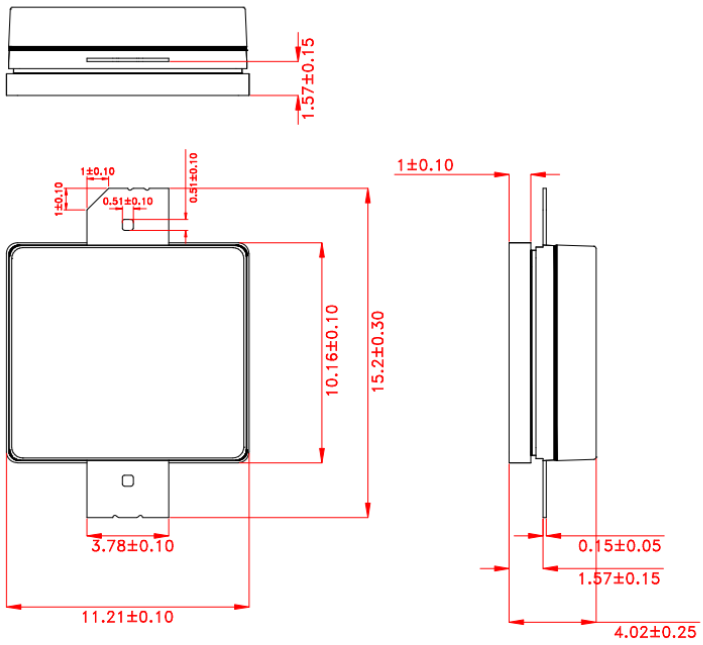
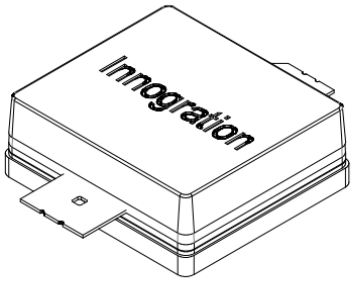


Table 6. Test Circuit Component Designations and Values

Reference	Footprint	Value	Quantity
C1, C2, C3, C4, C5, C6, C7	0603	100pF/250V	7
L1	0603	6.8nH	1
L2	0603	18nH	1
C8, C9, C10, C11, C12	0603	8.2pF/250V	5
C13, C14	0603	12pF/250V	2
C15	0603	3.3pF/250V	1
T1		50ohm Coaxial line, length=70mm	1
C16, C17	1210	10uF/100V	2
L3		1.1mm wire, 4.1mm inner diameter, 12 turns	
R1	0603	10R	1
		ITGV10120A2C	1

Package Dimensions





Unit:mm

Tolerance ±0.10mm,Except as Noted.

Revision history

Table 7. Document revision history

Date	Revision	Datasheet Status
2024/9/5	Rev 1.0	Preliminary Datasheet

Application data based on ZBB-24-33/34

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