

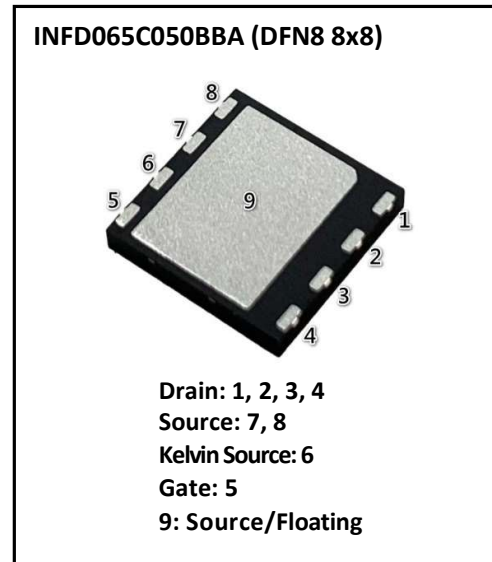
## INFD065C050BBA: DFN8 8x8 Cascode GaN HEMT

### Description

INFD065C050BBA is a normally-off GaN High electron mobility transistor (HEMT) device using the cascode configuration, which provides high breakdown voltage, high current and high operating speed which is suitable for high power applications.

### Key Specifications

Part Number	INFD065C050BBA
$V_{DSS}$ , min.	650V
$V_{(TR)DSS}$ , min.	800V
$R_{DS(ON)}$ , typ.	50m $\Omega$
$Q_G$ , typ.	16nC
Package	DFN8 8 x 8 mm

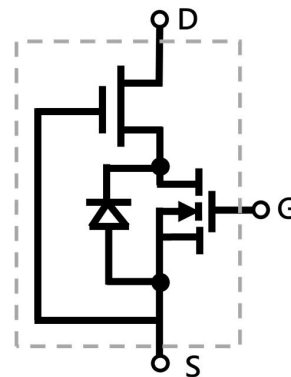


### Features

- Gate drive voltage compatibility (-20V to +20V)
- High operating frequency
- Low  $Q_{rr}$

### Applications

- Switch Mode Power Supplies (SMPS)
- AC-DC/ DC-DC Converters
- Motor Drives



**Cascode Device Structure**

**Table of Contents**

	Description .....	1
	Key Specifications.....	1
	Features .....	1
	Applications.....	1
	Table of Contents .....	2
<b>1</b>	<b>Electrical Characteristics and Parameters . . . . .</b>	<b>3</b>
<b>2</b>	<b>Typical Characteristic Curves.....</b>	<b>4</b>
<b>3</b>	<b>Package Outline Dimensions.....</b>	<b>5</b>
<b>4</b>	<b>Reflow Soldering Profile.....</b>	<b>9</b>
<b>5</b>	<b>Change Log .....</b>	<b>12</b>

## 1- Electrical Characteristics

➤ **Table 1 Absolute maximum ratings**

Symbol	Parameter		Value	Unit
$V_{DSS}$	Drain-source voltage		650	V
$V_{(TR)DSS}$	Transient drain to source voltage <sup>a</sup>		800	V
$V_{GSS}$	Gate- source voltage		-20V ~ +20V	V
$I_D$	Drain current (continuous) at $T_c = 25^\circ\text{C}$ operation		30	A
	Drain current (continuous) at $T_c = 100^\circ\text{C}$ operation		22	A
$I_{DM}$	Pulsed drain current (pulse width: 10 $\mu\text{s}$ )		49	A
$T_c$	Operating temperature	Case	-55 to +150	$^\circ\text{C}$
$T_J$		Junction	-55 to +150	$^\circ\text{C}$
$T_s$	Storage temperature		-55 to +150	$^\circ\text{C}$
$T_{SOLD}$	Soldering peak temperature <sup>b</sup>		260	$^\circ\text{C}$

a. In off-state, spike duty cycle  $D < 0.01$ , spike duration  $< 1\mu\text{s}$

b. For 10 sec., 1.6mm from the case

➤ **Table 2 Thermal Characteristics**

Symbol	Parameter	Value	Unit
$R_{\theta JA}$	Thermal resistance junction-ambient	5.8	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal resistance junction-case	3.1	$^\circ\text{C}/\text{W}$

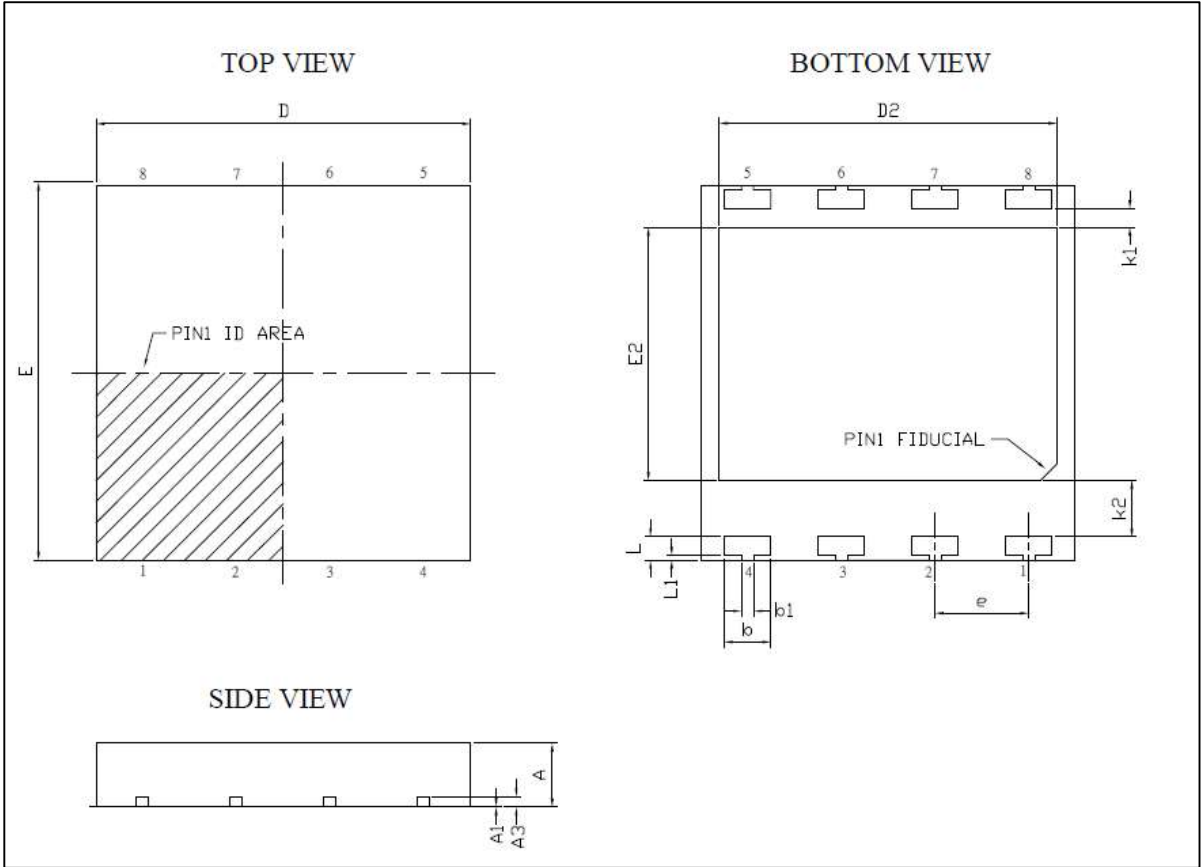
**➤ Table 3 Electrical Characteristics** ( $T_{CASE} = 25\text{ °C}$  unless otherwise stated)

Symbol	Parameter	Conditions	Values			Unit
			min.	typ.	max.	
$V_{(BL)DSS}$	Drain-source voltage	$V_{GS}=0V$	650	-	-	V
$V_{GS(th)}$	Gate threshold voltage	$V_{DS}=10V, I_D=0.5mA$	1.2	1.6	2.0	V
$R_{D(on)}$	Static drain-source on-resistance	$V_{GS}=10V, I_D=22A, T_J=25\text{ °C}$	-	80	96	mΩ
		$V_{GS}=10V, I_D=22A, T_J=150\text{ °C}$	-	165	-	
$I_{DSS}$	Drain-source leakage current	$V_{GS}=0V, V_{DS}=650V, T_J=25\text{ °C}$	-	2	25	μA
		$V_{GS}=0V, V_{DS}=650V, T_J=150\text{ °C}$	-	29.9	-	
$I_{GSS}$	Gate-to-source forward leakage current	$V_{GS}=20V$	-	-	100	nA
	Gate-to-source reverse leakage current	$V_{GS}=-20V$	-	-	-100	
$C_{ISS}$	Input capacitance	$V_{GS}=0V, V_{DS}=400V, f=1MHz$	-	2120	-	pF
$C_{OSS}$	Output capacitance		-	57.1	-	
$C_{RSS}$	Reverse transfer capacitance		-	3.3	-	
$Q_G$	Gate charge	$V_{GS}=0\sim 10V, V_{DS}=400V, I_{DS}=22A$	-	16	-	nC
$Q_{GS}$	Gate-source charge		-	5.7	-	
$Q_{OSS}$	Output charge	$V_{GS}=0V, V_{DS}=0\sim 400V$	-	130	-	nC
$t_{D(on)}$	Turn-on delay time	$V_{DS}=400V, V_{GS}=0\text{ to }10V, I_{DS}=2A, R_G=25\Omega$	-	55	-	ns
$t_{D(off)}$	Turn-off delay time		-	91	-	

## 2- Typical Characteristic Curves

**3- Package Outline Dimensions**

**INFD065C050BBA (DFN8 8x8)**

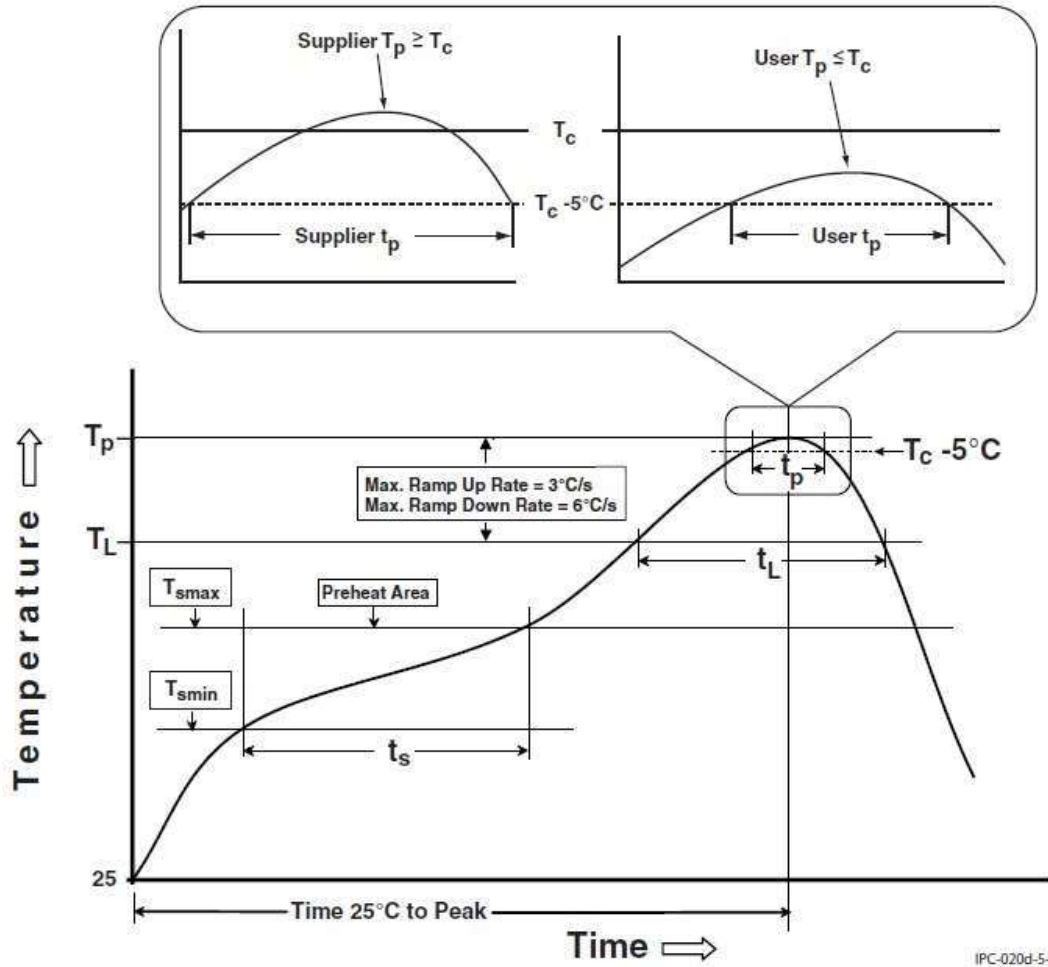


&gt; Table 5 Dimension of INFD065C050BBA

Symbol	DIMENSION (MM)			Symbol	DIMENSION (MM)		
	MIN.	NOM.	MAX.		MIN.	NOM.	MAX.
<b>A</b>	1.20	1.25	1.30	<b>b</b>	0.90	1.00	1.10
<b>A1</b>	0	0.02	0.05	<b>b1</b>	0.25 REF		
<b>A3</b>	0.203 REF			<b>L</b>	0.40	0.50	0.60
<b>D</b>	7.90	8.00	8.10	<b>L1</b>	0.10 REF		
<b>E</b>	7.90	8.00	8.10	<b>K1</b>	0.30		
<b>D2</b>	7.10	7.20	7.30	<b>K2</b>	1.10	1.20	1.30
<b>E2</b>	5.30	5.40	5.50	<b>e</b>	2.00 BSC		

**4- Reflow Soldering Profile**

Recommended Reflow Soldering Condition (IPC/JEDEC J-STD-020D.1)



IPC-020d-5-1



➤ **Table 6 Recommended Reflow Soldering Condition**

Profile Feature	Pb-Free Assembly
<b>Preheat/Soak</b>	
Temperature Min ( $T_{smin}$ )	150°C
Temperature Max ( $T_{smax}$ )	200°C
Time ( $t_s$ ) from ( $T_{smin}$ to $T_{smax}$ )	60-120 seconds
Ramp-up rate ( $T_L$ to $T_P$ )	3°C/second max.
Liquidous temperature ( $T_L$ )	217°C
Time ( $t_L$ ) maintained above $T_L$	60-150 seconds
Time ( $t_p$ )* within 5°C of the specified classification temperature ( $T_c$ )**; see Reflow Soldering Profile above.	30* seconds
Ramp-down rate ( $T_P$ to $T_L$ )	6°C/second max.
Time 25°C to peak temperature	8 minutes max.

**( $t_p$ )\*** The highest temperature that an individual package body reaches during MSL classification.

**( $T_c$ )\*\*** The maximum body temperature at which the component manufacturer guarantees the component MSL as noted on the caution and/or bar code label (per J-STD-033).

**30\* seconds** Reflow profiles in this document are for classification/preconditioning and are not meant to specify board assembly profiles. Actual board assembly profiles should be developed based on specific process needs and board designs and should not exceed the parameters in **Table 5**.

For example, if  $T_c$  is 260 °C and time  $t_p$  is 30 seconds, this means the following for the supplier and the user.

For a supplier: The peak temperature must be at least 260 °C. The time above 255 °C must be at least 30 seconds. For a user: The peak temperature must not exceed 260 °C. The time above 255 °C must not exceed 30 seconds

## 5- Change Log

Version	Date	Description
01	Mar 15, 2024	Initial version

- **Note:** iINFINITYrf Communication reserves the right to revise products and/or specifications without notice.