



YOUSHANG SEMICONDUCTOR

设计研发新型功率器件

各类小信号开关

中低压及高压大电流等场效应管

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Features

- Epitaxial Planar Die Construction
- Complementary NPN Types Available (DDC)
- Built-In Biasing Resistors

Mechanical Data

- Case: SOT363
- Case Material: Molded Plastic, "Green" Molding Compound
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 Ⓢ3
- Weight: 0.006 grams (Approximate)

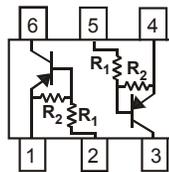
Part Number	R1 (NOM)	R2 (NOM)
NK-DDA124EU	22kΩ	22kΩ
NK-DDA144EU	47kΩ	47kΩ
NK-DDA114YU	10kΩ	47kΩ
NK-DDA123JU	2.2kΩ	47kΩ
NK-DDA114EU	10kΩ	10kΩ

Part Number	R1 Only
NK-DDA113TU	1kΩ
NK-DDA143TU	4.7kΩ
NK-DDA114TU	10kΩ

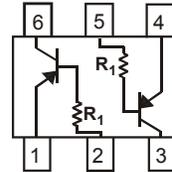
SOT363



Top View



R1, R2



R1 Only

Device Schematic

Absolute Maximum Ratings (@ T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Supply Voltage (1) to (6) and (4) to (3)		V _{CC}	-50	V
Input Voltage (1) to (2) and (4) to (5)	NK-DDA124EU	V _{IN}	+10 to -40	V
	NK-DDA144EU		+10 to -40	
	NK-DDA114YU		+6 to -40	
	NK-DDA123JU		+5 to -12	
	NK-DDA114EU		+10 to -40	
	NK-DDA113TU		+5V Max	
	NK-DDA143TU		+5V Max	
NK-DDA114TU	+5V Max			
Output Current	NK-DDA124EU	I _O	-30	mA
	NK-DDA144EU		-30	
	NK-DDA114YU		-70	
	NK-DDA123JU		-100	
	NK-DDA114EU		-50	
	NK-DDA113TU		-100	
	NK-DDA143TU		-100	
NK-DDA114TU	-100			
Output Current	I _{C(max)}	-100	mA	

Thermal Characteristics (@ T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation (Notes 6, 7)	P _D	200	mW
Thermal Resistance, Junction to Ambient Air (Note 6)	R _{θJA}	625	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

Notes: 6. Mounted on FR-4 PC Board with minimum recommended pad layout.
 7. 150mW per element must not be exceeded.

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic (NK-DDA113TU & NK-DDA143TU & NK-DDA114TU)	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-50	—	—	V	$I_C = -50\mu\text{A}$
Collector-Emitter Breakdown Voltage	BV_{CEO}	-50	—	—	V	$I_C = -1\text{mA}$
Emitter-Base Breakdown Voltage	BV_{EBO}	-5	—	—	V	$I_E = -50\mu\text{A}$
Collector Cutoff Current	I_{CBO}	—	—	-0.5	μA	$V_{CB} = -50\text{V}$
Emitter Cutoff Current	I_{EBO}	—	—	-0.5	μA	$V_{EB} = -4\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	—	—	-0.3	V	$I_C/I_B = -2.5\text{mA} / -0.25\text{mA}$ NK-DDA143TU $I_C/I_B = -1\text{mA} / -0.1\text{mA}$ NK-DDA114TU $I_C/I_B = -10\text{mA} / -1\text{mA}$ NK-DDA113TU
DC Current Transfer Ratio	h_{FE}	100 160	250 —	600 600	—	$I_C = -1\text{mA}, V_{CE} = -5\text{V}$ $I_C = -1\text{mA}, V_{CE} = -5\text{V}$ NK-DDA143TU
Input Resistor (R_1) Tolerance	ΔR_1	-30	—	+30	%	I/Q —
Gain-Bandwidth Product (Note 8)	f_T	—	250	—	MHz	$V_{CE} = -10\text{V}, I_E = 5\text{mA}, f = 100\text{MHz}$

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition	
Input Voltage	$V_{I(off)}$	NK-DDA124EU	-0.5	-1.1	—	V	$V_{CC} = -5\text{V}, I_O = -100\mu\text{A}$
		NK-DDA144EU	-0.5	-1.1	—		
Input Voltage	$V_{I(on)}$	NK-DDA114YU	-0.3	—	—	V	$V_O = -0.3, I_O = -5\text{mA}$ $V_O = -0.3, I_O = -2\text{mA}$ $V_O = -0.3, I_O = -1\text{mA}$ $V_O = -0.3, I_O = -5\text{mA}$ $V_O = -0.3, I_O = -10\text{mA}$
		NK-DDA123JU	-0.5	—	—		
Input Voltage	$V_{I(on)}$	NK-DDA114EU	-0.5	-1.1	—	V	$V_O = -0.3, I_O = -5\text{mA}$ $V_O = -0.3, I_O = -2\text{mA}$ $V_O = -0.3, I_O = -1\text{mA}$ $V_O = -0.3, I_O = -5\text{mA}$ $V_O = -0.3, I_O = -10\text{mA}$
		NK-DDA124EU	—	-1.9	-3.0		
Output Voltage	$V_{O(on)}$	NK-DDA144EU	—	-1.9	-3.0	V	$I_O/I_I = -10\text{mA} / -0.5\text{mA}$ $I_O/I_I = -10\text{mA} / -0.5\text{mA}$ $I_O/I_I = -5\text{mA} / -0.25\text{mA}$ $I_O/I_I = -5\text{mA} / -0.25\text{mA}$ $I_O/I_I = -10\text{mA} / -0.5\text{mA}$
		NK-DDA114YU	—	-1.4	-3.0		
Output Voltage	$V_{O(on)}$	NK-DDA123JU	—	-1.1	-3.0	V	$I_O/I_I = -10\text{mA} / -0.5\text{mA}$ $I_O/I_I = -10\text{mA} / -0.5\text{mA}$ $I_O/I_I = -5\text{mA} / -0.25\text{mA}$ $I_O/I_I = -5\text{mA} / -0.25\text{mA}$ $I_O/I_I = -10\text{mA} / -0.5\text{mA}$
		NK-DDA114EU	—	-1.9	-3.0		
Input Current	I_I	—	—	-0.36 -0.18 -0.88 -3.6 -0.88	mA	$V_I = -5\text{V}$	
Output Current	$I_{O(off)}$	—	—	-0.5	μA	$V_{CC} = -50\text{V}, V_I = -0\text{V}$	
DC Current Gain	G_I	NK-DDA124EU	56	—	—	—	$V_O = -5\text{V}, I_O = -5\text{mA}$ $V_O = -5\text{V}, I_O = -5\text{mA}$ $V_O = -5\text{V}, I_O = -5\text{mA}$ $V_O = -5\text{V}, I_O = -10\text{mA}$ $V_O = -5\text{V}, I_O = -10\text{mA}$ $V_O = -5\text{V}, I_O = -5\text{mA}$
		NK-DDA124EUQ	60	—	—		
DC Current Gain	G_I	NK-DDA144EU	68	—	—	—	$V_O = -5\text{V}, I_O = -5\text{mA}$ $V_O = -5\text{V}, I_O = -5\text{mA}$ $V_O = -5\text{V}, I_O = -5\text{mA}$ $V_O = -5\text{V}, I_O = -10\text{mA}$ $V_O = -5\text{V}, I_O = -10\text{mA}$ $V_O = -5\text{V}, I_O = -5\text{mA}$
		NK-DDA114YU	68	—	—		
DC Current Gain	G_I	NK-DDA123JU	80	—	—	—	$V_O = -5\text{V}, I_O = -5\text{mA}$ $V_O = -5\text{V}, I_O = -5\text{mA}$ $V_O = -5\text{V}, I_O = -5\text{mA}$ $V_O = -5\text{V}, I_O = -10\text{mA}$ $V_O = -5\text{V}, I_O = -10\text{mA}$ $V_O = -5\text{V}, I_O = -5\text{mA}$
		NK-DDA114EU	30	—	—		
Input Resistor (R_1) Tolerance	ΔR_1	-30	—	+30	%	—	
Resistance Ratio Tolerance	R_2/R_1	-20	—	+20	%	—	
Gain-Bandwidth Product (Note 8)	f_T	—	250	—	MHz	$V_{CE} = -10\text{V}, I_E = -5\text{mA}, f = 100\text{MHz}$	

Note: 8. Transistor - For Reference Only.

Typical Curves – NK-DDA123JU (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

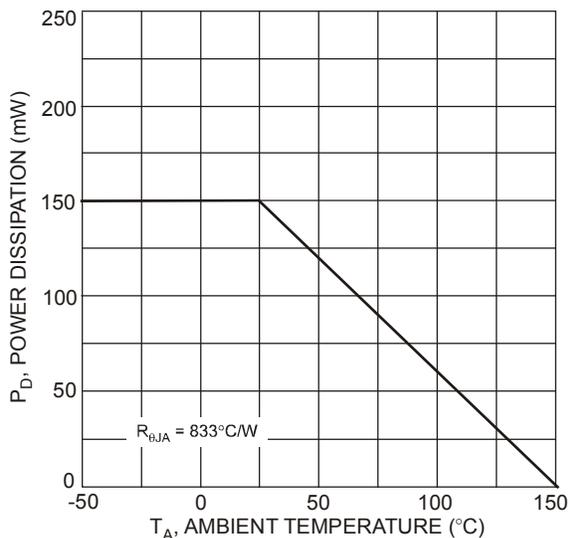


Fig. 1 Power Dissipation vs. Ambient Temperature

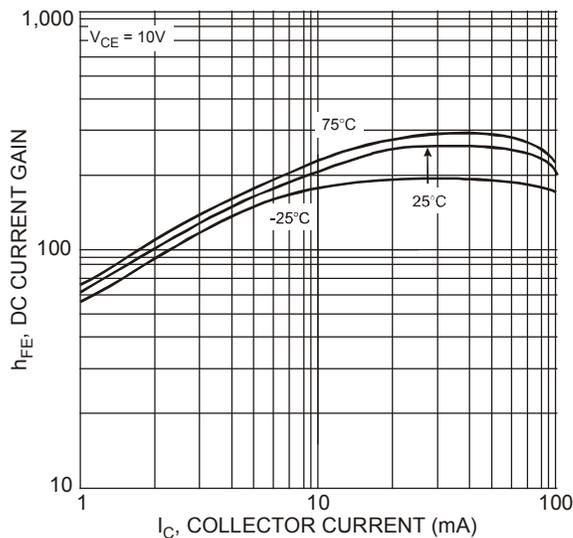


Fig. 2 Typical DC Current Gain vs. Collector Current

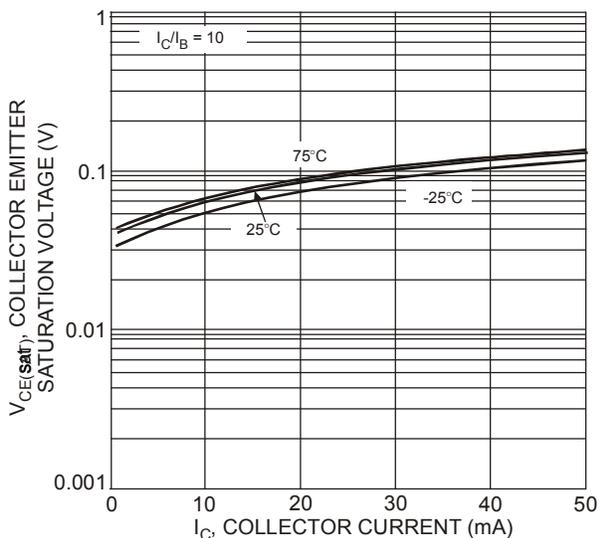


Fig. 3 Typical Collector Emitter Saturation Voltage vs. Collector Current

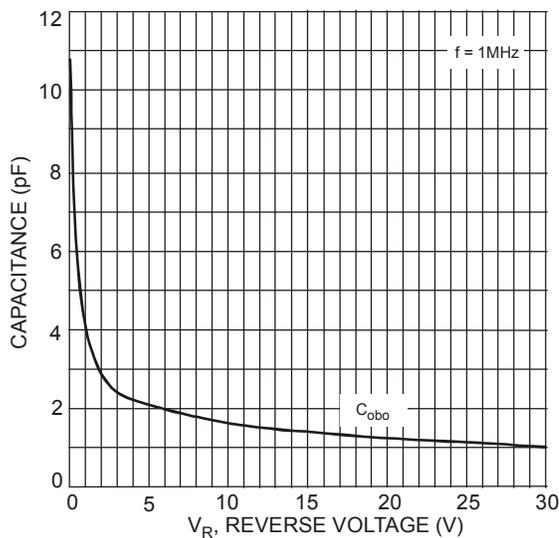


Fig. 4 Typical Capacitance Characteristics

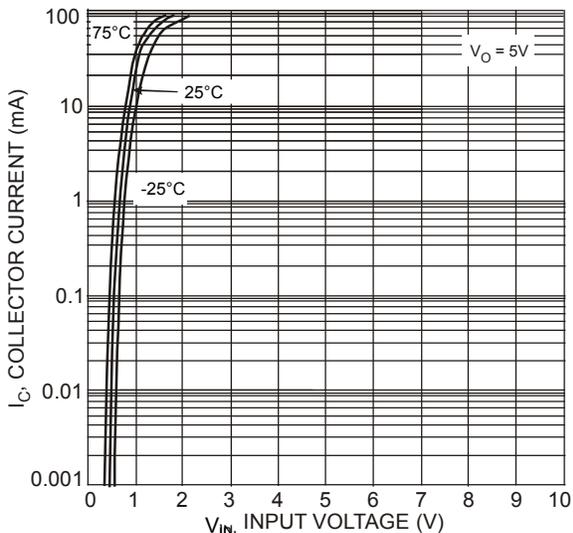


Fig. 5 Collector Current vs. Input Voltage

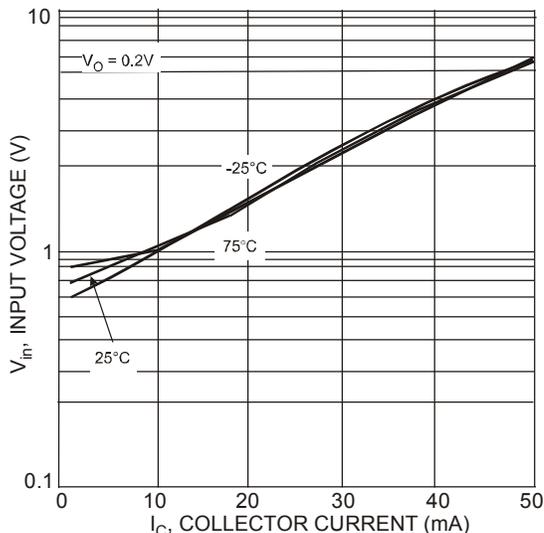


Fig. 6 Input Voltage vs. Collector Current

Typical Curves – NK-DDA114TU (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

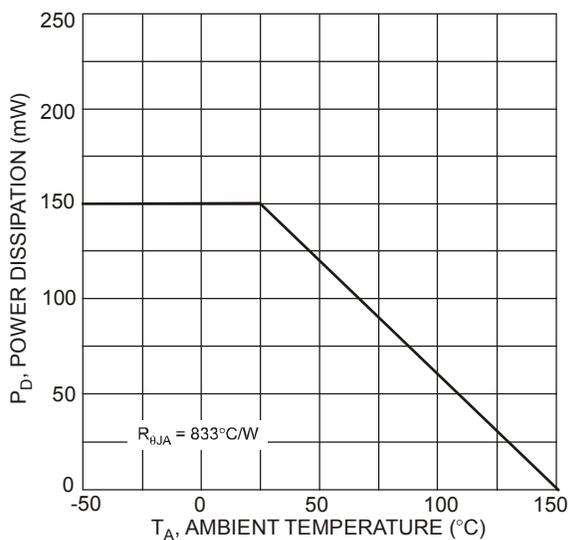


Fig. 7 Power Dissipation vs. Ambient Temperature

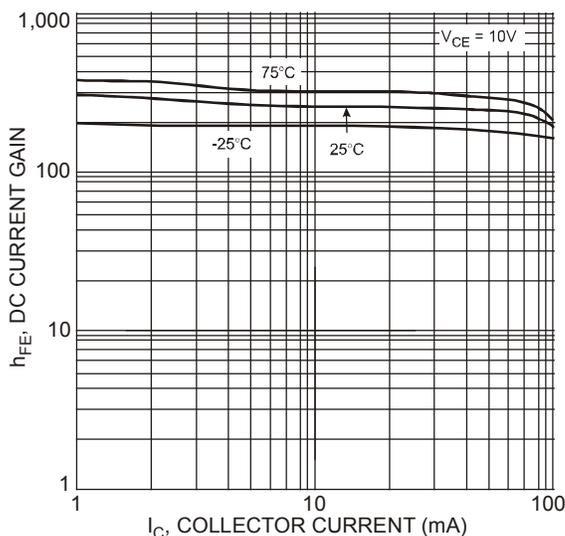


Fig. 8 Typical DC Current Gain vs. Collector Current

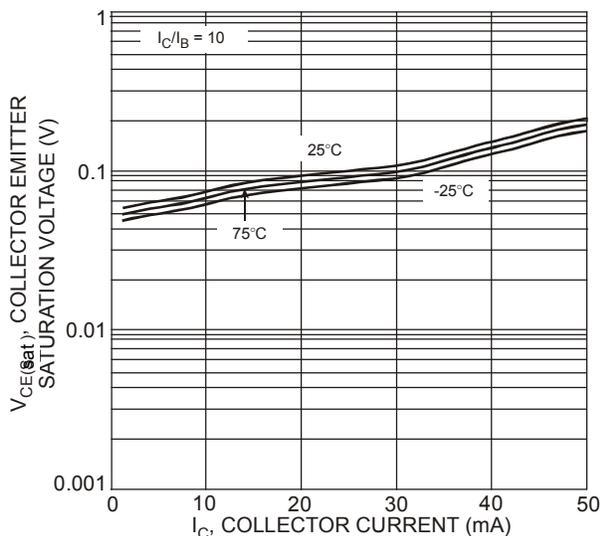


Fig. 9 Typical Collector Emitter Saturation Voltage vs. Collector Current

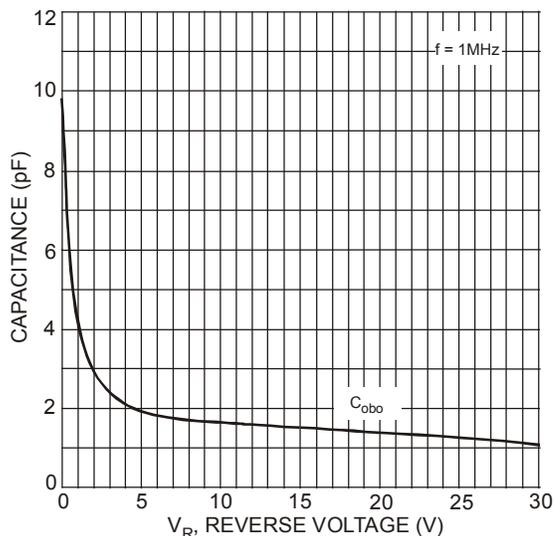


Fig. 10 Typical Capacitance Characteristics

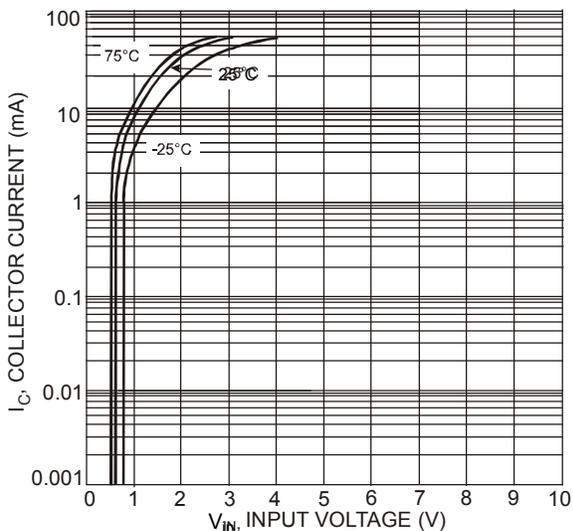


Fig. 11 Collector Current vs. Input Voltage

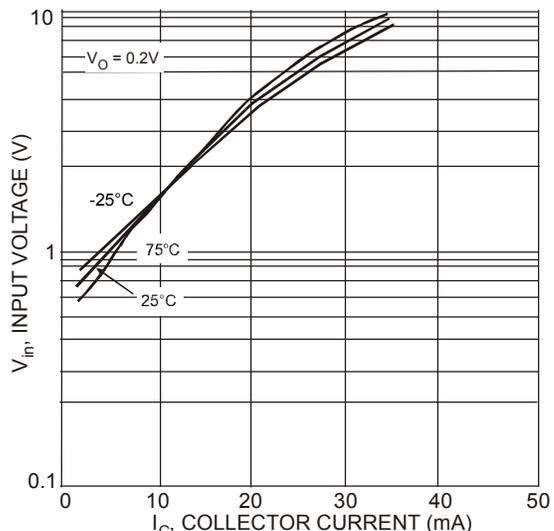
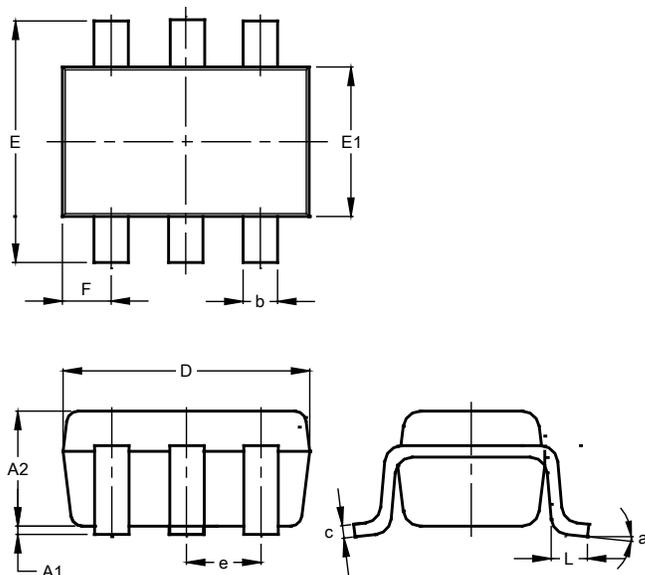


Fig. 12 Input Voltage vs. Collector Current

Package Outline Dimensions

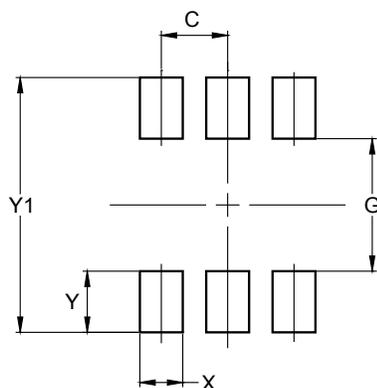
SOT363



SOT363			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.10	0.30	0.25
c	0.10	0.22	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
F	0.40	0.45	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

SOT363



Dimensions	Value (in mm)
C	0.650
G	1.300
X	0.420
Y	0.600
Y1	2.500