NPIM Shielded Power Inductors

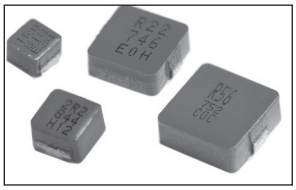
NPIM__A Series

FEATURES
- SHIELDED POWER INDUCTOR
- HIGH TEMPERATURE (+150°C)
- HIGH CURRENT AND LOW DCR
- LOW NOISE GAPLESS CONSTRUCTION
- AEC-Q200 QUALIFIED*

Designed for Automotive Applications

RoHS Compliant
includes all homogeneous materials

*See Part Number System for Details



CHARACTERISTICS (53 ~ 105)

Case Code	53	54	63A	64A	75A	84A	85A	104A	105A	104A...L
Inductance Range (μH)	2.2, 3.3	4.7, 22	0.68, 1.0	10	4.7 ~ 48	100	2.5 ~ 48	97	1.5 ~ 32.5	0.68, 1.0
Operating Temperature Range	-40°C ~ +150°C (Including Self-Heating)									
Inductance Tolerance	±20% (M)									
Operating Voltage**	20Vop max.		35Vop max.							

****Please contact NIC for the operating voltage for individual items.**

Test Item*1	Test Method & Conditions	Specification
High Temperature Endurance	Temperature: 150°C ± 2°C (including self-heating) Applied current: DC 1.0A (0.9A:NPIM54A220MTRQYF) Duration: 2,000 hours	Inductance: Within ±10% of initial value DC Resistance: Within ±5% of intial value Physical: Coils shall not have any abnormality in appearance and construction.
Heat Resistance	Temperature: 150°C ± 2°C Duration: 2,000 hours	
Damp Heat (Loaded)	Temperature/Humidity: 85°C ± 2°C/85%RH Applied current: DC 1.0A Duration: 2,000 hours	
Moisture Resistance	Temperature/Humidity: 85°C ± 2°C/85%RH Duration: 2,000 hours	
Cold Resistance	Temperature: -40“C ± 2°C Duration: 2,000 hours	
Thermal Shock	Temperature: -40“C ± 2°C 10 min., 5 ~ 35°C 0 ~ 5min., 150°C ± 2°C 10 min. Duration: 2,000 cycles	
Vibration Resisitance	Frequency: Log sweep 10 ~ 55 ~ 10Hz/1 min. Amplitude: 1.5mm max in 3 directions (2 hours each) Duration: 6 hours total	No disconnection of coils or mechanical damage.

***NPIM_A series meets the testing requirements of AEC-Q200 Table 5, contact NIC for test data.**

***1 Pre-treatment at +85°C±2°C, 85% RH, 168 hours and reflow aging 3 times.**

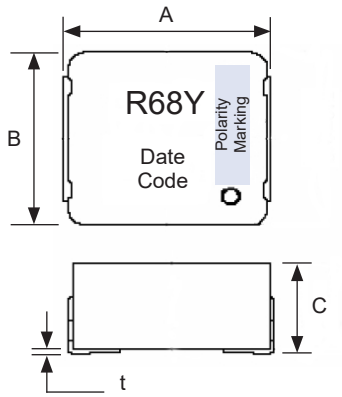
PART NUMBER SYSTEM

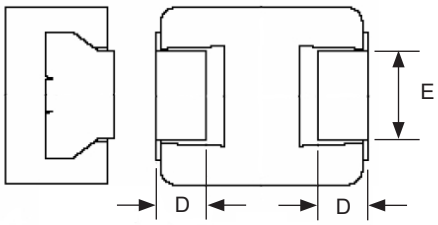
NPIM 75A 4R7 M TR L Q Y F

- F — RoHS Compliant
- Y — "Y" denotes suitable for automotive equipment, sourced to special production and inspection at IATF-16949 certified production site.
- Q = AEC Q-200 Qualified
- L (for low resistance type)
- TR = Tape & Reel Packaging
- Tolerance: M = 20%
- Inductance Value Code: First two characters are signficant figures, 3rd character is multiplier, "R" = decimal point
- Size Code
- Series

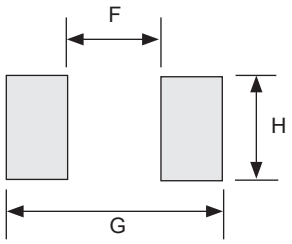
DIMENSIONS (mm)

Series	A	B	C	D	E	t	F	G	H
NPIM53A	5.5 ± 0.4	5.0 ± 0.4	3.0 max.	1.2 ± 0.4	3.0 ± 0.3	0.05 min.	2.2	7.2	3.6
NPIM54A	5.5 ± 0.4	5.0 ± 0.4	4.0 max.	1.2 ± 0.4	3.0 ± 0.3	0.05 min.	2.2	7.2	3.6
NPIM63A	6.5 ± 0.4	6.0 ± 0.4	3.0 max.	1.5 ± 0.4	3.0 ± 0.3	0.05 min.	2.8	10	3.6
NPIM64A	6.5 ± 0.4	6.0 ± 0.4	4.5 max.	1.5 ± 0.4	3.0 ± 0.3	0.05 min.	2.8	10	3.6
NPIM75A	7.5 ± 0.4	7.0 ± 0.4	5.4 max.	2.0 ref.	3.0 ± 0.3	0.10 min.	2.8	10	3.6
NPIM84A	8.5 ± 0.4	8.0 ± 0.4	5.0 max.	2.0 ref.	3.0 ± 0.3	0.1 min.	3.8	12.4	4.0
NPIM85A	8.5 ± 0.4	8.0 ± 0.4	5.4 max.	2.0 ref.	3.0 ± 0.3	0.1 min.	3.8	12.4	4.0
NPIM104A	10.7 ± 0.5	10.0 ± 0.4	5.0 max.	2.0 ref.	4.2 ± 0.3	0.1 min.	6.1	13.7	4.8
NPIM105A	10.7 ± 0.5	10.0 ± 0.4	5.4 max.	2.0 ref.	4.2 ± 0.3	0.1 min.	6.1	13.7	4.8
NPIM104A...L	10.9 ± 0.6	10.0 ± 0.4	5.0 max.	1.8 ref.	7.3 ± 0.3	0.5 min.	6.5	13.9	7.9





LAND PATTERN



Part Number	STANDARD VALUES - CASE SIZE 53A (5.4 x 5.0 x 3.0mm)					
	Inductance Value (µH)	DC Resistance (mΩ) max.	DC Current Irms (Amps)[1]		DC Current Isat (Amps)[2]	Test Frequency
			Condition A	Condition B		
NPIM53A2R2MTRQYF	2.2	24.8	4.8	5.8	10.9	100KHz, 1Vrms
NPIM53A3R3MTRQYF	3.3	34.4	4.1	5.0	8.6	

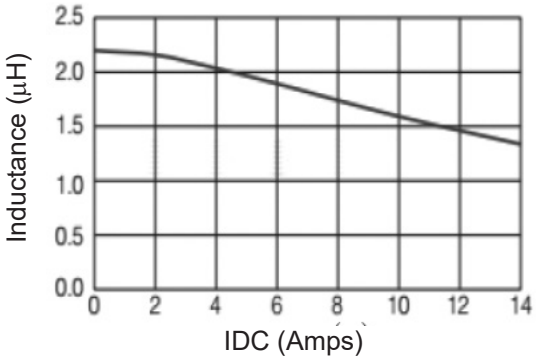
Note 1 - DC Current (Irms) is current which causes a maximum temperature rise of 40°C:
Condition A = 4-layer PWB (1.6t, FR4)
Condition B = PWB with high dissipation performance, heat radiation constant is approximately 52K/W measured for 5.5mm x 5.0mm x 3.0mm case size.

Note 2 - DC Current (Isat) is current which causes a decrease in inductance of 30%.

Note 3 - Highest operating temperature should be within +150°C including temperature rise due to self-heating.

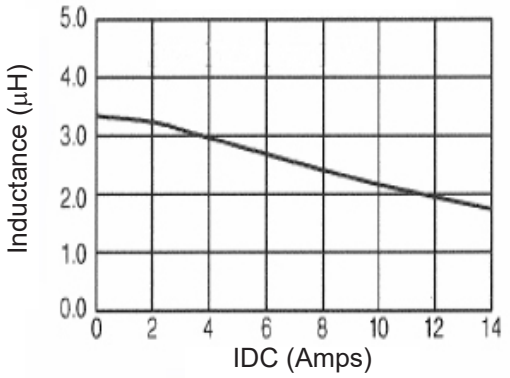
Inductance vs. DC Current

NPIM53A2R2MTRQYF



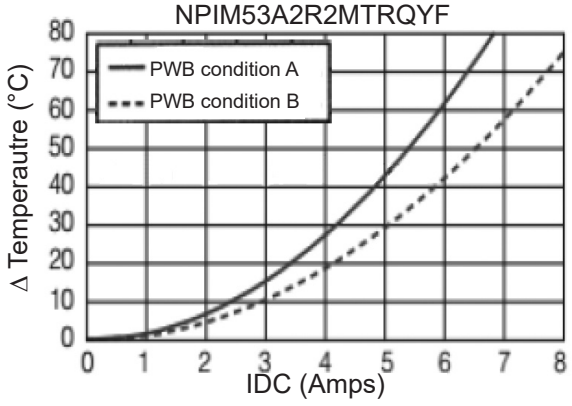
Inductance vs. DC Current

NPIM53A3R3MTRQYF



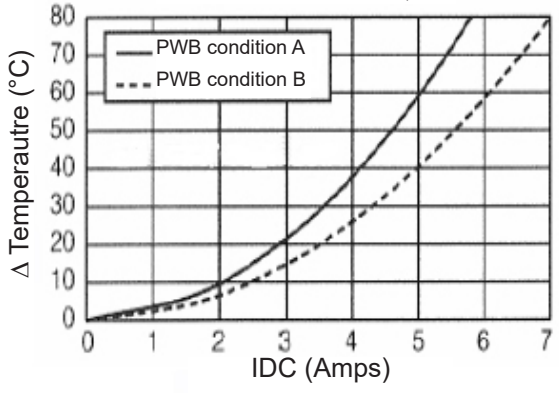
Temperature vs. DC Current

NPIM53A2R2MTRQYF



Temperature vs. DC Current

NPIM53A3R3MTRQYF



Part Number	STANDARD VALUES - CASE SIZE 54A (5.4 x 5.0 x 4.0mm)					
	Inductance Value (µH)	DC Resistance (mΩ) max.	DC Current Irms (Amps)[1]		DC Current Isat (Amps)[2]	Test Frequency
			Condition A	Condition B		
NPIM54A4R7MTRQYF	4.7	39.6	4.0	4.8	7.7	100KHz, 1Vrms
NPIM54A220MTRQYF	22	179	1.9	2.3	3.1	

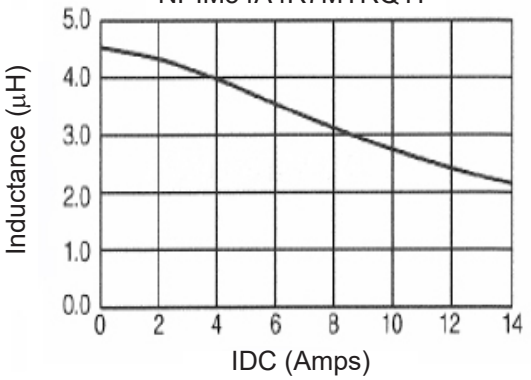
Note 1 - DC Current (Irms) is current which causes a maximum temperature rise of 40°C:
Condition A = 4-layer PWB (1.6t, FR4)
Condition B = PWB with high dissipation performance, heat radiation constant is approximately 44K/W measured for 5.5mm x 5.0mm x 4.0mm case size.

Note 2 - DC Current (Isat) is current which causes a decrease in inductance of 30%.

Note 3 - Highest operating temperature should be within +150°C including temperature rise due to self-heating.

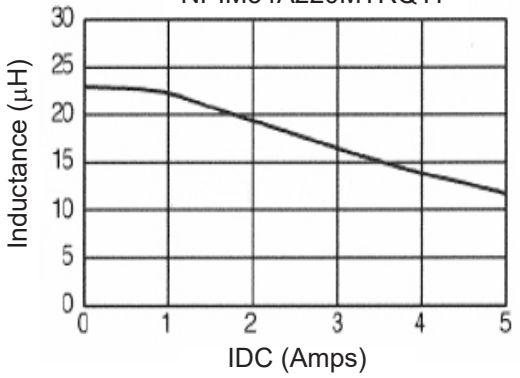
Inductance vs. DC Current

NPIM54A4R7MTRQYF



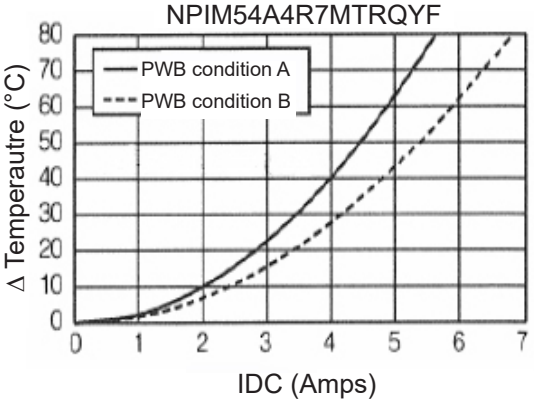
Inductance vs. DC Current

NPIM54A220MTRQYF



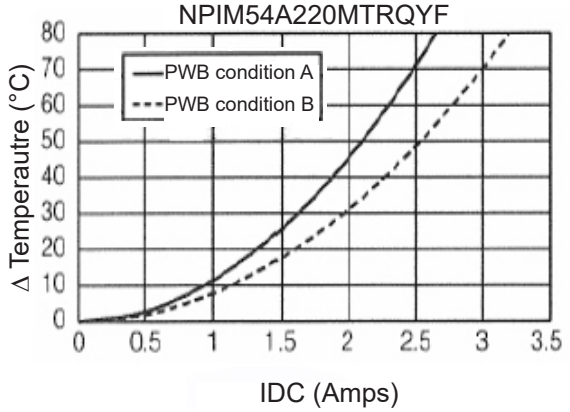
Temperature vs. DC Current

NPIM54A4R7MTRQYF



Temperature vs. DC Current

NPIM54A220MTRQYF



Part Number	STANDARD VALUES - CASE SIZE 63A (6.5 x 6.0 x 3.0mm)					
	Inductance Value (µH)	DC Resistance (mΩ) max.	DC Current Irms (Amps)[1]		DC Current Isat (Amps)[2]	Test Frequency
			Condition A	Condition B		
NPIM63AR68MTRQYF	0.68	6.9	9.8	12.0	24.0	100KHz, 1Vrms
NPIM63A1R0MTRQYF	1.0	8.7	8.8	10.7	20.0	

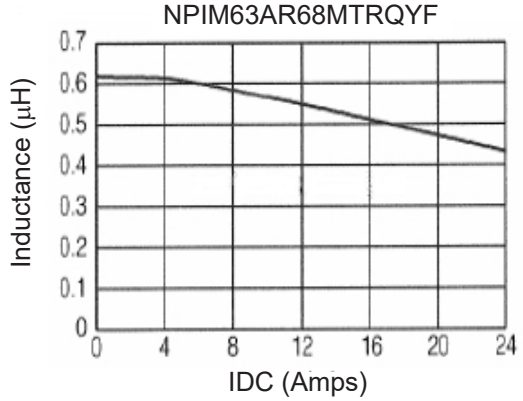
Note 1 - DC Current (Irms) is current which causes a maximum temperature rise of 40°C:
Condition A = 4-layer PWB (1.6t, FR4)
Condition B = PWB with high dissipation performance, heat radiation constant is approximately 44K/W measured for 6.5mm x 6.0mm x 3.0mm case size.

Note 2 - DC Current (Isat) is current which causes a decrease in inductance of 30%.

Note 3 - Highest operating temperature should be within +150°C including temperature rise due to self-heating.

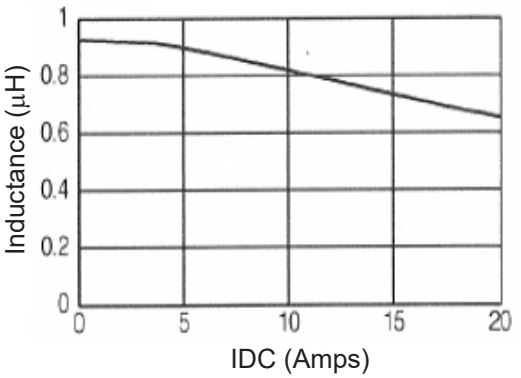
Inductance vs. DC Current

NPIM63AR68MTRQYF



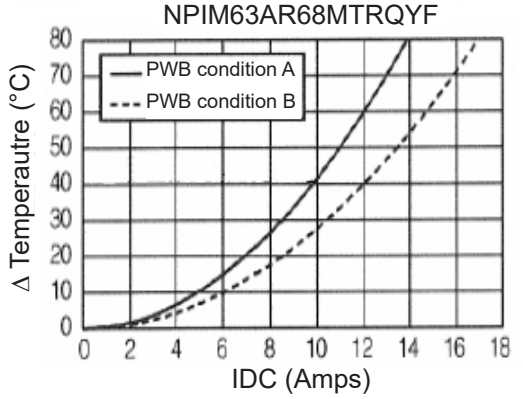
Inductance vs. DC Current

NPIM63A1R0MTRQYF



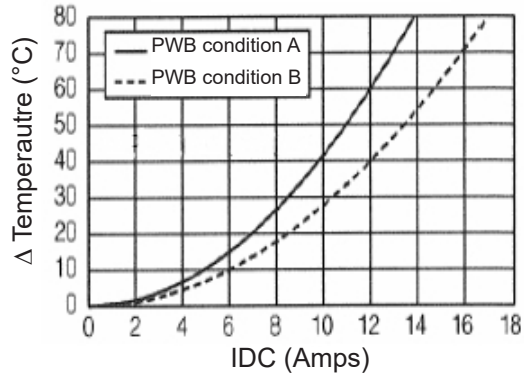
Temperature vs. DC Current

NPIM63AR68MTRQYF



Temperature vs. DC Current

NPIM63A1R0MTRQYF



Part Number	STANDARD VALUES - CASE SIZE 64A (6.5 x 6.0 x 4.5mm)					
	Inductance Value (µH)	DC Resistance (mΩ) max.	DC Current Irms (Amps)[1]		DC Current Isat (Amps)[2]	Test Frequency
			Condition A	Condition B		
NPIM64A100MTRQYF	10	59.6	3.6	4.5	8.3	100KHz, 1Vrms

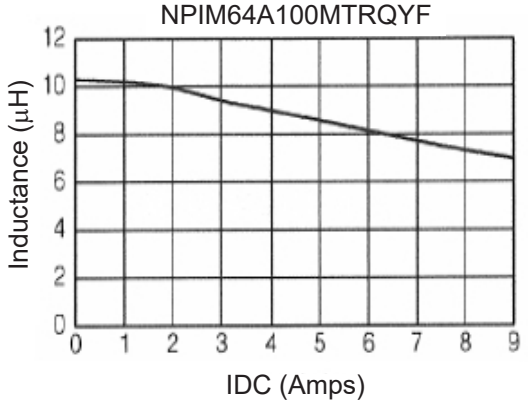
Note 1 - DC Current (Irms) is current which causes a maximum temperature rise of 40°C:
Condition A = 4-layer PWB (1.6t, FR4)
Condition B = PWB with high dissipation performance, heat radiation constant is approximately 37K/W measured for 6.5mm x 6.0mm x 4.5mm case size.

Note 2 - DC Current (Isat) is current which causes a decrease in inductance of 30%.

Note 3 - Highest operating temperature should be within +150°C including temperature rise due to self-heating.

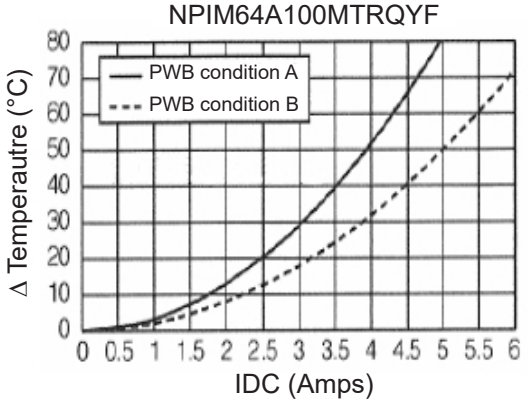
Inductance vs. DC Current

NPIM64A100MTRQYF



Temperature vs. DC Current

NPIM64A100MTRQYF



Part Number	STANDARD VALUES - CASE SIZE 75A (7.5 x 7.0 x 5.4mm)					
	Inductance Value (µH)	DC Resistance (mΩ) max.	DC Current Irms (Amps)[1]		DC Current Isat (Amps)[2]	Test Frequency
			Condition A	Condition B		
NPIM75A4R7MTRQYF	4.7	23	6.3	8.0	13.1	100KHz, 1Vrms
NPIM75A220MTRQYF	22	102	3.0	3.7	5.8	
NPIM75A330MTRQYF	33	132	2.6	3.3	4.8	
NPIM75A470MTRQYF	48	172	2.3	2.9	4.1	

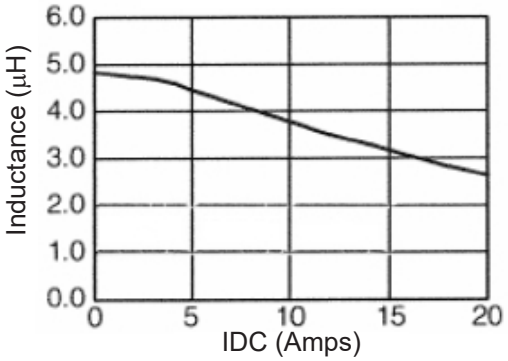
Note 1 - DC Current (Irms) is current which causes a maximum temperature rise of 40°C:
Condition A = 4-layer PWB (1.6t, FR4)
Condition B = PWB with high dissipation performance, heat radiation constant is approximately 31K/W measured for 7.5mm x 7.0mm x 5.4mm case size.

Note 2 - DC Current (Isat) is current which causes a decrease in inductance of 30%.

Note 3 - Highest operating temperature should be within +150°C including temperature rise due to self-heating.

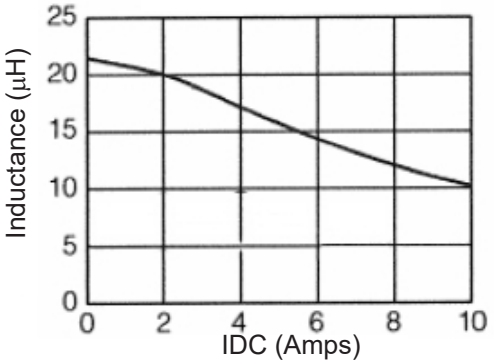
Inductance vs. DC Current

NPIM75A4R7MTRQYF



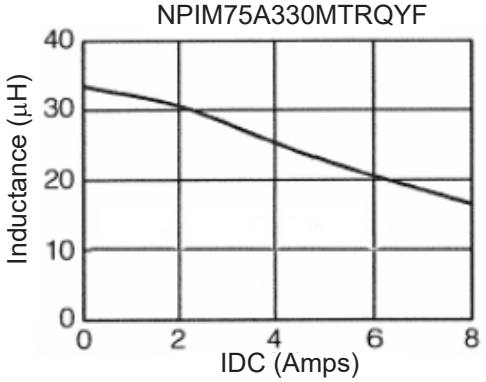
Inductance vs. DC Current

NPIM75A220MTRQYF



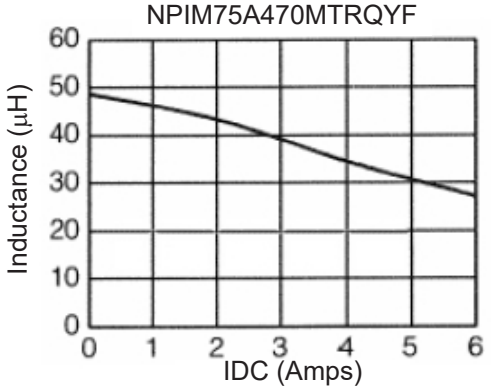
Inductance vs. DC Current

NPIM75A330MTRQYF



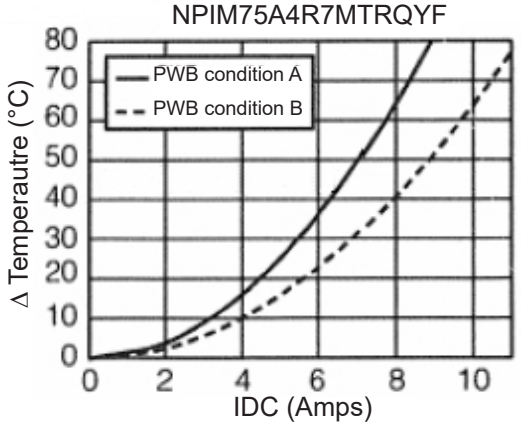
Inductance vs. DC Current

NPIM75A470MTRQYF



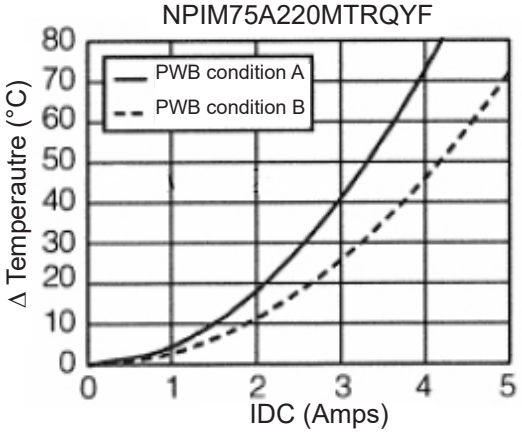
Temperature vs. DC Current

NPIM75A4R7MTRQYF



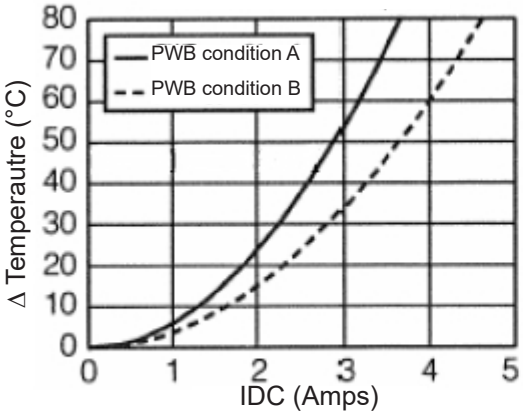
Temperature vs. DC Current

NPIM75A220MTRQYF



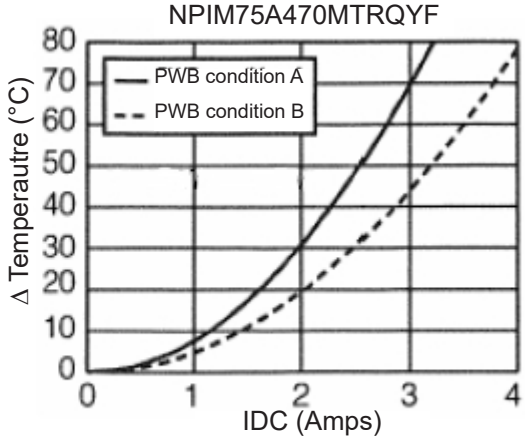
Temperature vs. DC Current

NPIM75A330MTRQYF



Temperature vs. DC Current

NPIM75A470MTRQYF



Part Number	STANDARD VALUES - CASE SIZE 84A (8.5 x 8.0 x 5.0mm)					
	Inductance Value (µH)	DC Resistance (mΩ) max.	DC Current Irms (Amps)[1]		DC Current Isat (Amps)[2]	Test Frequency
			Condition A	Condition B		
NPIM84A101MTRQYF	100	333	1.7	2.1	3.0	100KHz, 1Vrms

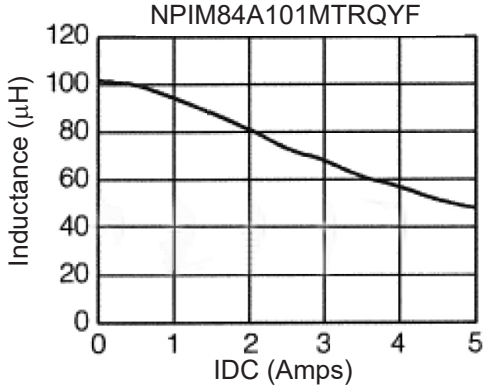
Note 1 - DC Current (Irms) is current which causes a maximum temperature rise of 40°C:
Condition A = 4-layer PWB (1.6t, FR4)
Condition B = PWB with high dissipation performance, heat radiation constant is approximately 29K/W measured for 8.5mm x 8.0mm x 5.0mm case size.

Note 2 - DC Current (Isat) is current which causes a decrease in inductance of 30%.

Note 3 - Highest operating temperature should be within +150°C including temperature rise due to self-heating.

Inductance vs. DC Current

NPIM84A101MTRQYF



Part Number	STANDARD VALUES - CASE SIZE 85A (8.5 x 8.0 x 5.4mm)					
	Inductance Value (µH)	DC Resistance (mΩ) max.	DC Current Irms (Amps)[1]		DC Current Isat (Amps)[2]	Test Frequency
			Condition A	Condition B		
NPIM85A2R5MTRQYF	2.5	8.4	11.9	14.0	20.1	100KHz, 1Vrms
NPIM85A100MTRQYF	10	37	5.7	6.7	13.0	
NPIM85A220MTRQYF	22	70	4.1	4.8	6.9	
NPIM85A470MTRQYF	48	138	2.9	3.4	5.4	

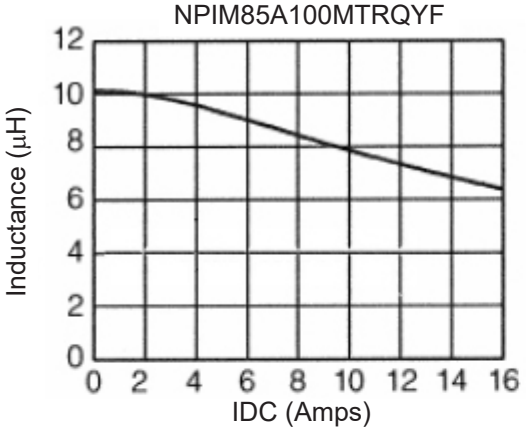
Note 1 - DC Current (Irms) is current which causes a maximum temperature rise of 40°C:
Condition A = 4-layer PWB (1.6t, FR4)
Condition B = PWB with high dissipation performance, heat radiation constant is approximately 27K/W measured for 8.5mm x 8.0mm x 5.4mm case size.

Note 2 - DC Current (Isat) is current which causes a decrease in inductance of 30%.

Note 3 - Highest operating temperature should be within +150°C including temperature rise due to self-heating.

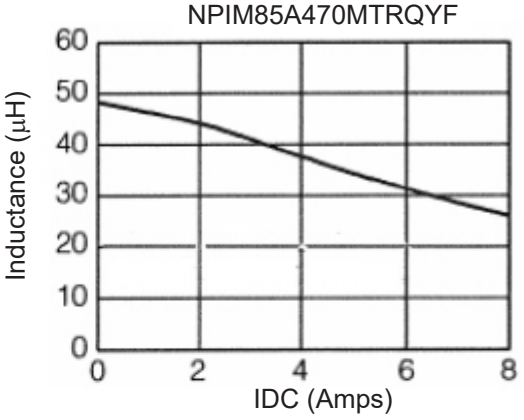
Inductance vs. DC Current

NPIM85A100MTRQYF



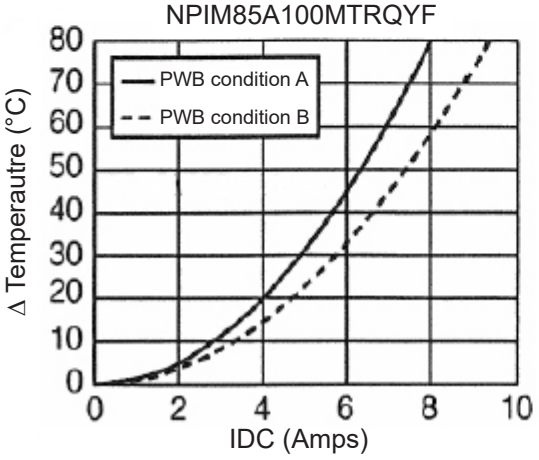
Inductance vs. DC Current

NPIM85A470MTRQYF



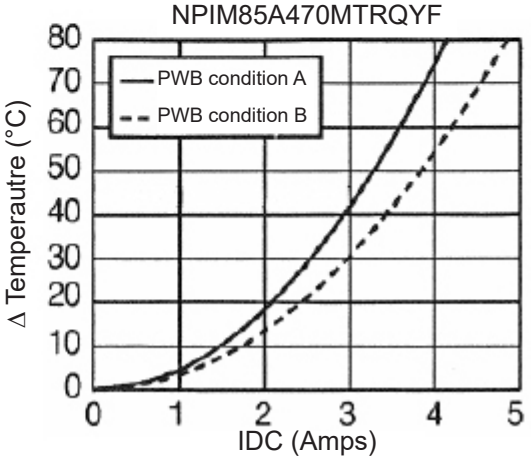
Temperature vs. DC Current

NPIM85A100MTRQYF



Temperature vs. DC Current

NPIM85A470MTRQYF



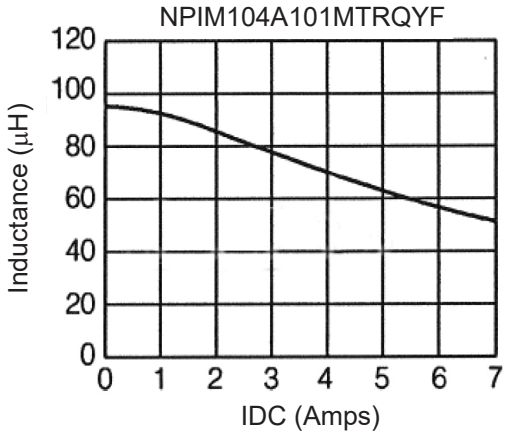
Part Number	STANDARD VALUES - CASE SIZE 104A (10.7 x 10.0 x 5.0mm)					
	Inductance Value (µH)	DC Resistance (mΩ) max.	DC Current Irms (Amps)[1]		DC Current Isat (Amps)[2]	Test Frequency
			Condition A	Condition B		
NPIM104A101MTRQYF	97.0	229	2.2	2.7	3.0	100KHz, 1Vrms

Note 1 - DC Current (Irms) is current which causes a maximum temperature rise of 40°C:
Condition A = 4-layer PWB (1.6t, FR4)
Condition B = PWB with high dissipation performance, heat radiation constant is approximately 26K/W measured for 10.7mm x 10.0mm x 5.0mm case size.

Note 2 - DC Current (Isat) is current which causes a decrease in inductance of 30%.

Note 3 - Highest operating temperature should be within +150°C including temperature rise due to self-heating.

Inductance vs. DC Current



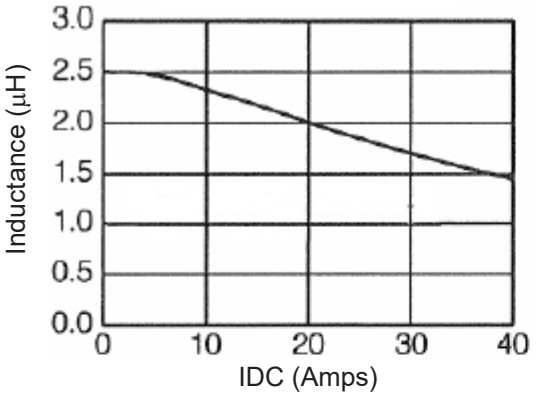
Part Number	STANDARD VALUES - CASE SIZE 105A (10.7 x 10.0 x 5.4mm)					
	Inductance Value (µH)	DC Resistance (mΩ) max.	DC Current Irms (Amps)[1]		DC Current Isat (Amps)[2]	Test Frequency
			Condition A	Condition B		
NPIM105A1R5MTRQYF	1.5	4.2	17.9	21.4	35.1	100KHz, 1Vrms
NPIM105A2R5MTRQYF	2.5	5.9	15.1	18.1	27.2	
NPIM105A3R3MTRQYF	3.3	7.9	13.1	15.7	22.7	
NPIM105A4R7MTRQYF	4.7	11.3	10.9	13.1	20.0	
NPIM105A100MTRQYF	10	26.2	7.1	8.5	10.7	
NPIM105A220MTRQYF	22	50	5.2	6.2	8.8	
NPIM105A330MTRQYF	32.5	75.4	4.2	5.0	7.6	

Note 1 - DC Current (Irms) is current which causes a maximum temperature rise of 40°C:
Condition A = 4-layer PWB (1.6t, FR4)
Condition B = PWB with high dissipation performance, heat radiation constant is approximately 23K/W measured for 10.7mm x 10.0mm x 5.4mm case size.

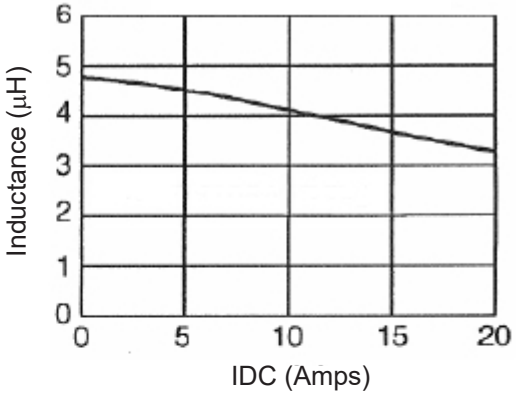
Note 2 - DC Current (Isat) is current which causes a decrease in inductance of 30%.

Note 3 - Highest operating temperature should be within +150°C including temperature rise due to self-heating.

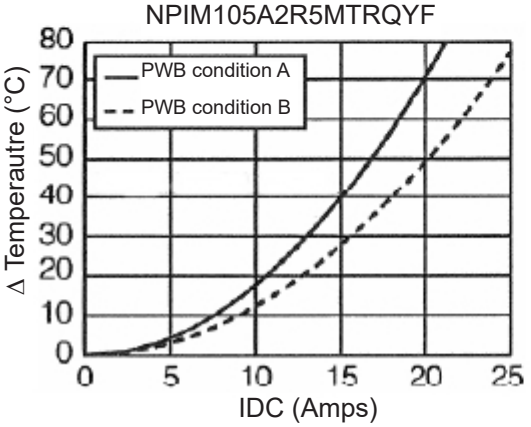
Inductance vs. DC Current
NPIM105A2R5MTRQYF



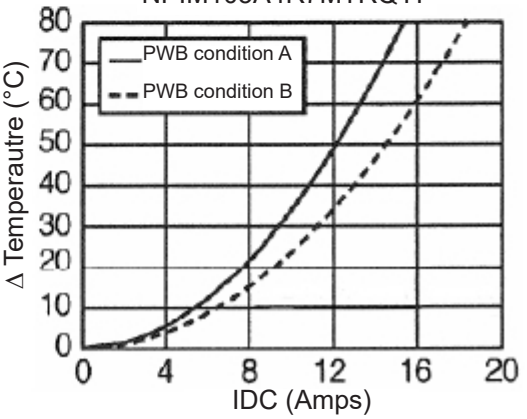
Inductance vs. DC Current
NPIM105A4R7MTRQYF



Temperature vs. DC Current
NPIM105A2R5MTRQYF



Temperature vs. DC Current
NPIM105A4R7MTRQYF



Part Number	STANDARD VALUES - CASE SIZE 104A...L (10.9 x 10.0 x 5.0mm)					
	Inductance Value (µH)	DC Resistance (mΩ)	DC Current Irms (Amps)[1]		DC Current Isat (Amps)[2]	Test Frequency
			Condition A	Condition B		
NPIM104AR68MTRLQYF	0.68	1.93 max.	26.3	31.5	42.0	100KHz, 1Vrms
NPIM104A1R0MTRLQYF	1.0	2.3 typ.	23.0	-	34.0	

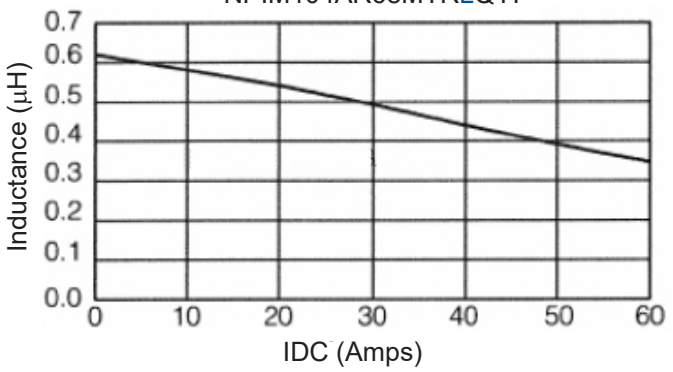
Note 1 - DC Current (Irms) is current which causes a maximum temperature rise of 40°C:
Condition A = 4-layer PWB (1.6t, FR4)
Condition B = PWB with high dissipation performance, heat radiation constant is approximately 23K/W measured for 10.9mm x 10.0mm x 5.0mm case size.

Note 2 - DC Current (Isat) is current which causes a decrease in inductance of 30%.

Note 3 - Highest operating temperature should be within +150°C including temperature rise due to self-heating.

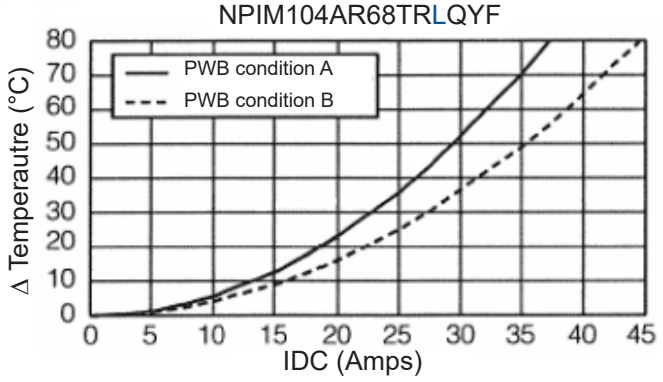
Inductance vs. DC Current

NPIM104AR68MTRLQYF



Temperature vs. DC Current

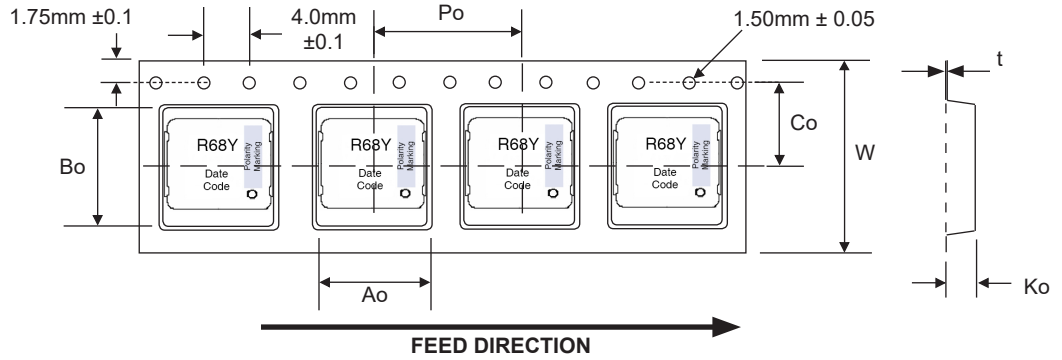
NPIM104AR68TRLQYF



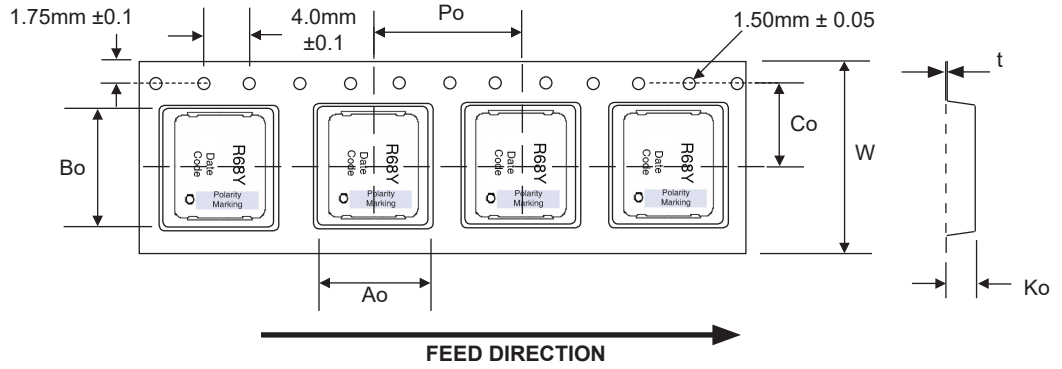
CARRIER TAPE DIMENSIONS (mm)

Series	Part Thickness	Ao	Bo	Co	Po	Ko	t	W
NPIM53A	3.0	5.6	6.1	7.5	12.0	3.3	0.4	16.0
NPIM54A	4.0	5.6	6.1			4.3		
NPIM63A	3.0	7.1	6.6			3.3		
NPIM64A	4.5	7.1	6.6			5.0		
NPIM75A	5.4	8.1	7.6			6.0		
NPIM84A	5.0	9.1	8.6					
NPIM85A	5.4	9.1	8.6					
NPIM104A	5.0	10.7	11.9	11.5	16.0	6.3	0.5	24.0
NPIM105A	5.4	10.7	11.9					
NPIM104A...L	5.0	10.7	11.9					

COMPONENT ORIENTATION (NPIM63A, 64A, 75A, 84A and 85A)



COMPONENT ORIENTATION (NPIM53A, 54A, 104A, 105A and 104AL)



REEL QUANTITY

Series	Qty/Reel
NPIM53A	1,000
NPIM54A	1,000
NPIM63A	1,000
NPIM64A	500
NPIM75A	500
NPIM84A	500
NPIM85A	500
NPIM104A	500
NPIM105A	500
NPIM104A...L	500