DCX (xxxx) H

COMPLEMENTARY NPN/PNP PRE-BIASED SMALL SIGNAL DUAL SURFACE MOUNT TRANSISTOR

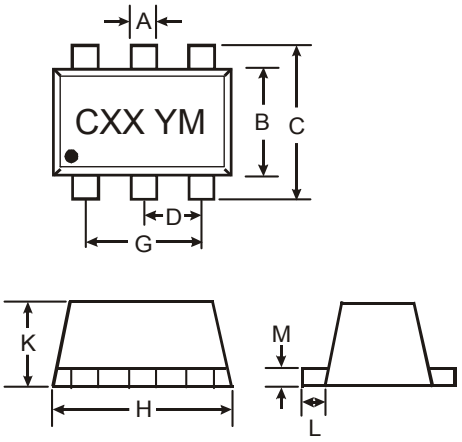
NEW PRODUCT

Features

- Epitaxial Planar Die Construction
- Built-In Biasing Resistors
- **Lead Free By Design/RoHS Compliant (Note 2)**
- **"Green" Device (Note 3 and 4)**

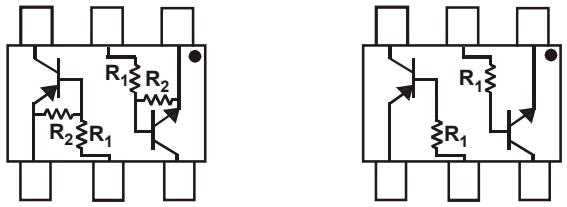
Mechanical Data

- Case: SOT-563
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminals: Finish - Matte Tin annealed over Alloy 42 leadframe. Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram
- Weight: 0.005 grams (approximate)



SOT-563			
Dim	**Min**	**Max**	**Typ**
A	0.15	0.30	0.25
B	1.10	1.25	1.20
C	1.55	1.70	1.60
D		0.50	
G	0.90	1.10	1.00
H	1.50	1.70	1.60
K	0.56	0.60	0.60
L	0.15	0.25	0.20
M	0.10	0.18	0.11
All Dimensions in mm			

P/N	R1	R2	MARKING
DCX124EH	22KΩ	22KΩ	C17
DCX144EH	47KΩ	47KΩ	C20
DCX143EH	4.7KΩ	4.7KΩ	C08
DCX114YH	10KΩ	47KΩ	C14
DCX123JH	2.2KΩ	47KΩ	C06
DCX114EH	10KΩ	10KΩ	C13
DCX143TH	4.7KΩ	—	C07
DCX114TH	10KΩ	—	C12



R_1, R_2 R_1 Only

SCHEMATIC DIAGRAM, TOP VIEW

Maximum Ratings NPN Section

@T_A = 25°C unless otherwise specified

Characteristic		Symbol	Value	Unit
Supply Voltage		V_{CC}	50	V
Input Voltage	DCX124EH DCX144EH DCX143EH DCX114YH DCX123JH DCX114EH DCX143TH DCX114TH	V_{IN}	-10 to +40 -10 to +40 -10 to +30 -6 to +40 -5 to +12 -10 to +40 -5V max -5V max	V
Output Current	DCX124EH DCX144EH DCX143EH DCX114YH DCX123JH DCX114EH DCX143TH DCX114TH	I_O	30 30 100 70 100 50 100 100	mA
Output Current	All	I_C (Max)	100	mA
Power Dissipation	(Total)	P_d	150	mW
Thermal Resistance, Junction to Ambient Air	(Note 1)	$R_{\theta JA}$	833	°C/W
Operating and Storage Temperature Range		T_j, T_{STG}	-55 to +150	°C

Notes:
1. Mounted on FR4 Board with recommended pad layout at http://www.diodes.com/datasheets/ap02001.pdf.
2. No purposefully added lead.
3. Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com/products/lead_free/index.php.
4. Product manufactured with Date Code UO (week 40, 2007) and newer are built with Green Molding Compound. Product manufactured prior to Date Code UO are built with Non-Green Molding Compound and may contain Halogens or Sb2O3 Fire Retardants.

NEW PRODUCT

Maximum Ratings PNP Section

@T_A = 25°C unless otherwise specified

Characteristic		Symbol	Value	Unit
Supply Voltage		V_{CC}	50	V
Input Voltage	DCX124EH	V_{IN}	+10 to -40	V
	DCX144EH		+10 to -40	
	DCX143EH		+10 to -30	
	DCX114YH		+6 to -40	
	DCX123JH		+5 to -12	
	DCX114EH		+10 to -40	
	DCX143TH		+5V max	
	DCX114TH		+5V max	
Output Current	DCX124EH	I_O	-30	mA
	DCX144EH		-30	
	DCX143EH		-100	
	DCX114YH		-70	
	DCX123JH		-100	
	DCX114EH		-50	
	DCX143TH		-100	
	DCX114TH		-100	
Output Current	All	I_C (Max)	-100	mA
Power Dissipation (Total)		P_d	150	mW
Operating and Storage Temperature Range		T_j, T_{STG}	-55 to +150	°C

Electrical Characteristics NPN Section

@T_A = 25°C unless otherwise specified

Characteristic (DDC143TH & DDC114TH only)	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	50	—	—	V	I_C = 50μA
Collector-Emitter Breakdown Voltage	BV_{CEO}	50	—	—	V	I_C = 1mA
Emitter-Base Breakdown Voltage	BV_{EBO}	5	—	—	V	I_E = 50μA
Collector Cutoff Current	I_{CBO}	—	—	0.5	μA	V_{CB} = 50V
Emitter Cutoff Current	I_{EBO}	—	—	0.5	μA	V_{EB} = 4V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	—	—	0.3	V	I_C/I_B = 2.5mA / 0.25mA DCX143TH I_C/I_B = 1mA / 0.1mA DCX114TH
DC Current Transfer Ratio	h_{FE}	100	250	600	—	I_C = 1mA, V_{CE} = 5V
Gain-Bandwidth Product*	f_T	—	250	—	MHz	V_{CE} = 10V, I_E = -5mA, f = 100MHz

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage	DCX124EH	$V_{I(off)}$	0.5	1.1	—	V	V_{CC} = 5V, I_O = 100μA
	DCX144EH		0.5	1.1			
	DCX143EH		0.5	1.1			
	DCX114YH		0.3	—			
	DCX123JH		0.5	—			
	DCX114EH		0.5	1.1			
	DCX124EH	$V_{I(on)}$	—	1.9	3.0		V_O = 0.3V, I_O = 5mA
	DCX144EH			1.9	3.0		V_O = 0.3V, I_O = 2mA
	DCX143EH			1.9	3.0		V_O = 0.3V, I_O = 20mA
	DCX114YH			—	1.4		V_O = 0.3V, I_O = 1mA
	DCX123JH			—	1.1		V_O = 0.3V, I_O = 5mA
	DCX114EH			1.9	3.0		V_O = 0.3V, I_O = 10mA
Output Voltage	DCX124EH	$V_{O(on)}$	—	0.1	0.3	V	I_O/I_I = 10mA / 0.5mA
	DCX144EH						I_O/I_I = 10mA / 0.5mA
	DCX143EH						I_O/I_I = 10mA / 0.5mA
	DCX114YH						I_O/I_I = 5mA / 0.25mA
	DCX123JH						I_O/I_I = 5mA / 0.25mA
	DCX114EH						I_O/I_I = 10mA / 0.5mA
Input Current	DCX124EH	I_I	—	—	0.36	mA	V_I = 5V
	DCX144EH				0.18		
	DCX143EH				1.8		
	DCX114YH				0.88		
	DCX123JH				3.6		
	DCX114EH				0.88		
Output Current		$I_{O(off)}$	—	—	0.5	μA	V_{CC} = 50V, V_I = 0V
DC Current Gain	DCX124EH	G_I	56	—	—	—	V_O = 5V, I_O = 5mA
	DCX144EH		68				V_O = 5V, I_O = 5mA
	DCX143EH		20				V_O = 5V, I_O = 10mA
	DCX114YH		68				V_O = 5V, I_O = 10mA
	DCX123JH		80				V_O = 5V, I_O = 10mA
	DCX114EH		30				V_O = 5V, I_O = 5mA

* Transistor - For Reference Only

NEW PRODUCT

Electrical Characteristics PNP Section

@T_A = 25°C unless otherwise specified

Characteristic (DCX143TH & DCX114TH only)	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-50	—	—	V	I_C = -50μA
Collector-Emitter Breakdown Voltage	BV_{CEO}	-50	—	—	V	I_C = -1mA
Emitter-Base Breakdown Voltage	BV_{EBO}	-5	—	—	V	I_E = -50μA
Collector Cutoff Current	I_{CBO}	—	—	-0.5	μA	V_{CB} = -50V
Emitter Cutoff Current	I_{EBO}	—	—	-0.5	μA	V_{EB} = -4V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	—	—	-0.3	V	I_C/I_B = 2.5mA / 0.25mA DCX143TH I_C/I_B = 1mA / 0.1mA DCX114TH
DC Current Transfer Ratio	h_{FE}	100	250	600	—	I_C = -1mA, V_{CE} = -5V
Gain-Bandwidth Product*	f_T	—	250	—	MHz	V_{CE} = -10V, I_E = 5mA, f = 100MHz

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage	DCX124EH DCX144EH DCX143EH DCX114YH DCX123JH DCX114EH	$V_{I(off)}$	-0.5 -0.5 -0.5 -0.3 -0.5 -0.5	-1.1 -1.1 -1.1 — — –1.1	—	V	V_{CC} = -5V, I_O = -100μA
	DCX124EH DCX144EH DCX143EH DCX114YH DCX123JH DCX114EH	$V_{I(on)}$	—	-1.9 -1.9 -1.9 — — -1.9	-3.0 -3.0 -3.0 -1.4 -1.1 -3.0		V_O = -0.3V, I_O = -5mA V_O = -0.3V, I_O = - 2mA V_O = -0.3V, I_O = -20mA V_O = -0.3V, I_O = -1mA V_O = -0.3V, I_O = -5mA V_O = -0.3V, I_O = -10mA
Output Voltage	DCX124EH DCX144EH DCX143EH DCX114YH DCX123JH DCX114EH	$V_{O(on)}$	—	-0.1	-0.3	V	I_O/I_I = -10mA / -0.5mA I_O/I_I = -10mA / -0.5mA I_O/I_I = -10mA / -0.5mA I_O/I_I = -5mA / -0.25mA I_O/I_I = -5mA / -0.25mA I_O/I_I = -10mA / -0.5mA
Input Current	DCX124EH DCX144EH DCX143EH DCX114YH DCX123JH DCX114EH	I_I	—	—	-0.36 -0.18 -1.8 -0.88 -3.6 -0.88	mA	V_I = -5V
Output Current		$I_{O(off)}$	—	—	-0.5	μA	V_{CC} = 50V, V_I = 0V
DC Current Gain	DCX124EH DCX144EH DCX143EH DCX114YH DCX123JH DCX114EH	G_I	56 68 20 68 80 30	—	—	—	V_O = -5V, I_O = -5mA V_O = -5V, I_O = -5mA V_O = -5V, I_O = -10mA V_O = -5V, I_O = -10mA V_O = -5V, I_O = -10mA V_O = -5V, I_O = -5mA
Gain-Bandwidth Product*		f_T	—	250	—	MHz	V_{CE} = -10V, I_E = -5mA, f = 100MHz

* Transistor - For Reference Only

Typical Curves – DCX143EH NPN Section

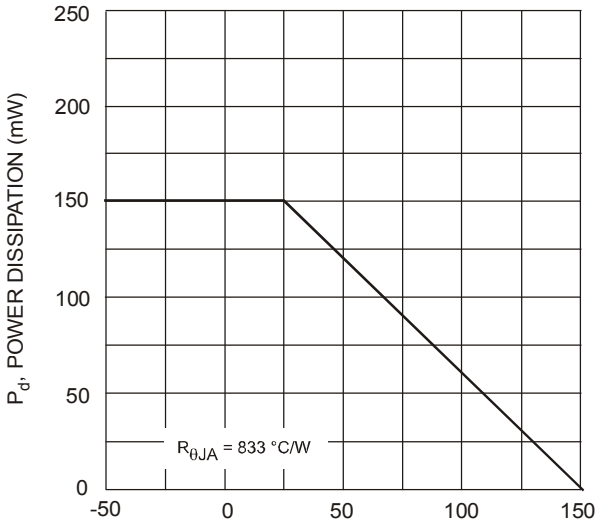


Fig. 1 Derating Curve - Total

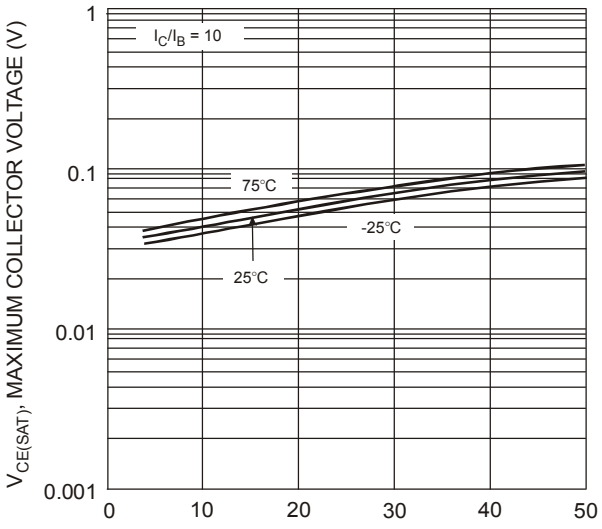


Fig. 2 $V_{CE(SAT)}$ vs. I_C

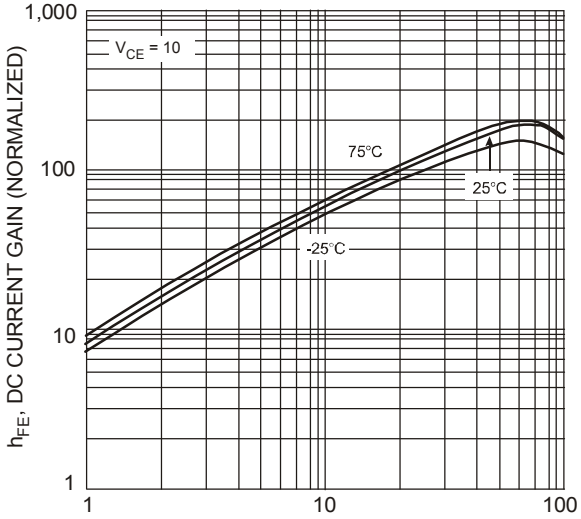


Fig. 3 DC Current Gain

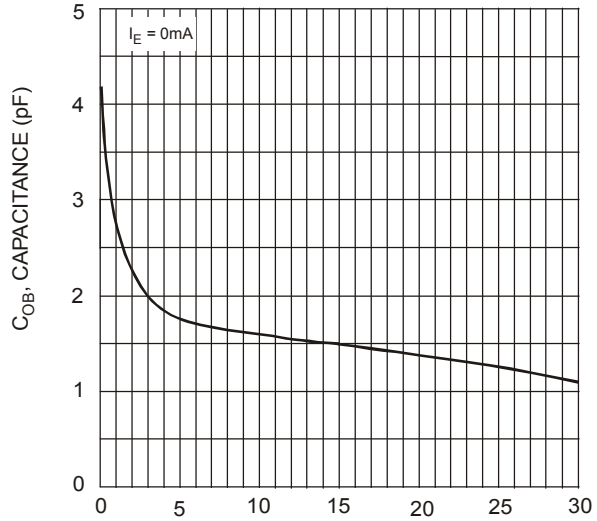


Fig. 4 Output Capacitance

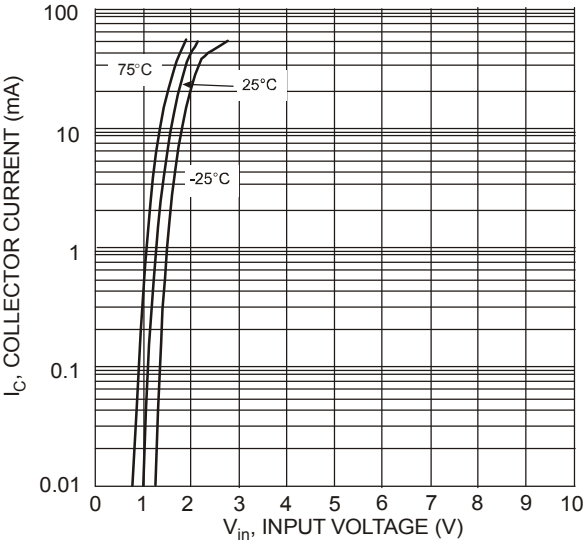


Fig. 5 Collector Current vs. Input Voltage

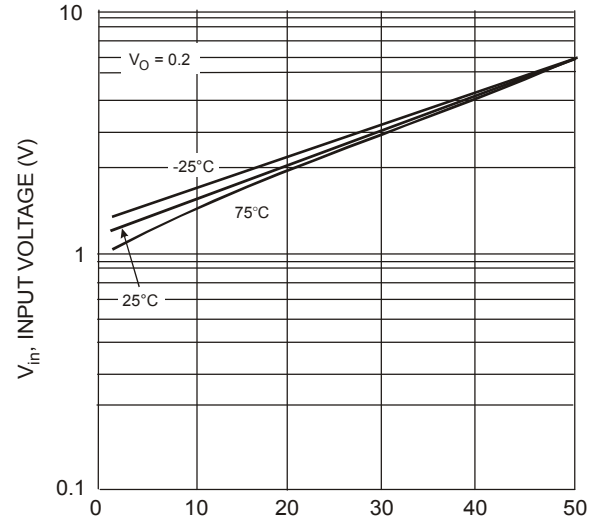


Fig. 6 Input Voltage vs. Collector Current

Typical Curves – DCX143EH PNP Section

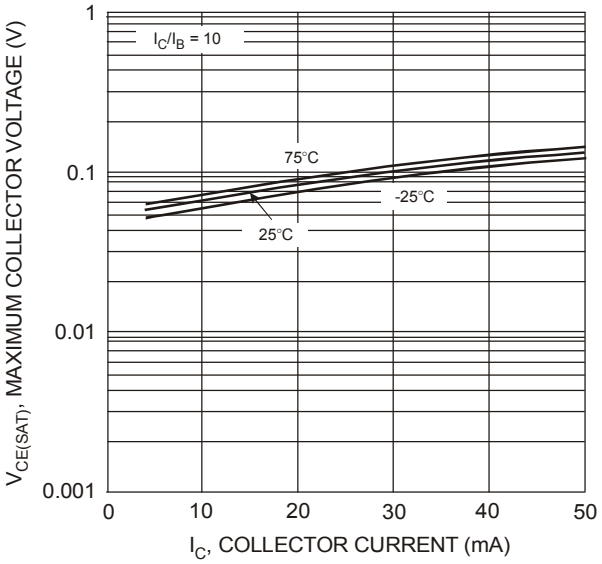


Fig. 7 $V_{CE(SAT)}$ vs. I_C

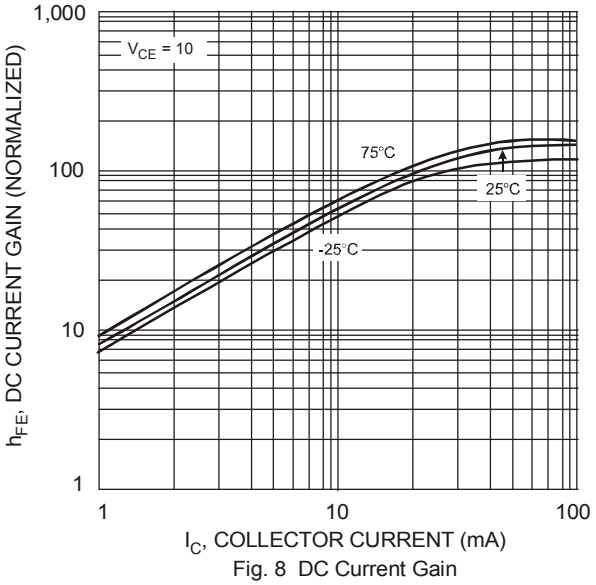


Fig. 8 DC Current Gain

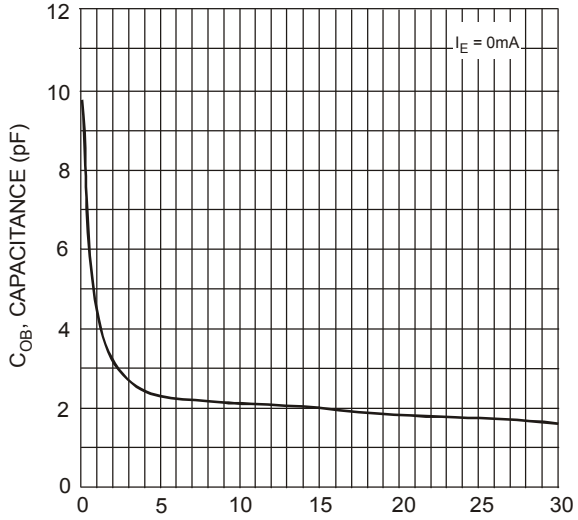


Fig. 9 Output Capacitance

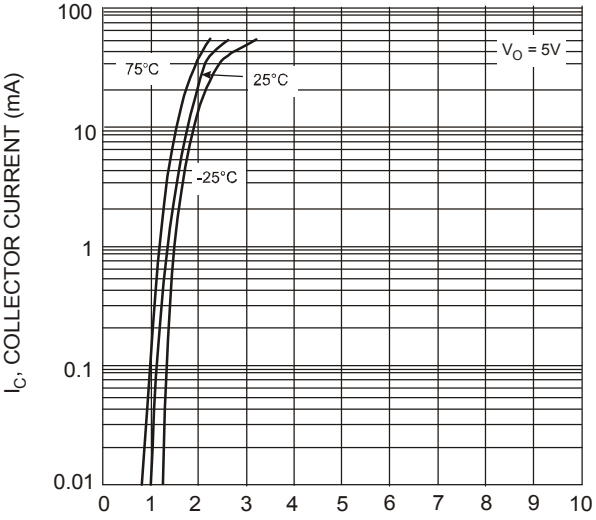


Fig. 10 Collector Current vs. Input Voltage

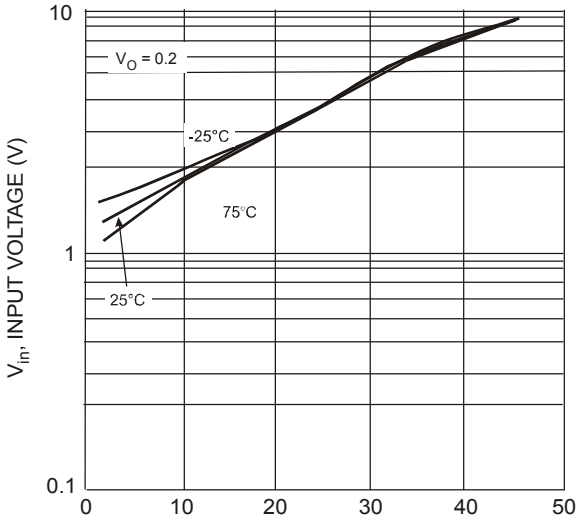


Fig. 11 Input Voltage vs. Collector Current

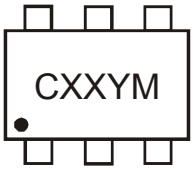
NEW PRODUCT

Ordering Information (Note 5)

Device	Packaging	Shipping
DCX124EH-7	SOT-563	3000/Tape & Reel
DCX144EH-7	SOT-563	3000/Tape & Reel
DCX143EH-7	SOT-563	3000/Tape & Reel
DCX114YH-7	SOT-563	3000/Tape & Reel
DCX123JH-7	SOT-563	3000/Tape & Reel
DCX114EH-7	SOT-563	3000/Tape & Reel
DCX143TH-7	SOT-563	3000/Tape & Reel
DCX114TH-7	SOT-563	3000/Tape & Reel

Notes: 5. For packaging details, go to our website at http://www.diodes.com/datasheets/ap02007.pdf.

Marking Information



CXX = Product Type Marking Code (See Page 1)
YM = Date Code Marking
Y = Year ex: P = 2003
M = Month ex: 9 = September

Date Code Key

Year	2006	2007	2008	2009	2010	2011	2012
Code	T	U	V	W	X	Y	Z

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D