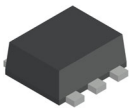
Bipolar Transistor

(–)50 V, (–)1 A, Low V_{CE}(sat), (PNP)NPN Single MCPH6

MCH6103, MCH6203



SC–88FL / MCPH6
CASE 419AS

Features

- Adoption of MBIT Processes
- Low Collector–to–Emitter Voltage
- Ultrasmall Package Facilitates Miniaturization in End Products (Mounting Height: 0.85 mm)
- High Allowable Power Dissipation
- Large Current Capacity
- High–speed Switching
- These Devices are Pb–Free and are RoHS Compliant

Applications

- Relay Drivers
- Lamp Drivers
- Motor Drivers
- Flash

Specifications

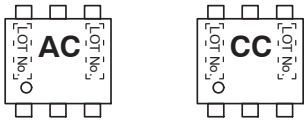
- ( ) : MCH6103

ABSOLUTE MAXIMUM RATINGS at T_A = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Collector–to–Base Voltage	V_{CBO}		(–50) 80	V
Collector–to–Emitter Voltage	V_{CES}		(–50) 80	V
	V_{CEO}		(–)50	V
Emitter–to–Base Voltage	V_{EBO}		(–)5	V
Collector Current	I_C		(–)1.0	A
Collector Current (Pulse)	I_{CP}		(–)3	A
Base Current	I_B		200	mA
Collector Dissipation	P_C	When mounted on ceramic substrate (600 mm^2 x 0.8 mm)	1.0	W
Junction Temperature	T_J		150	°C
Storage Temperature	Tstg		–55 to +150	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

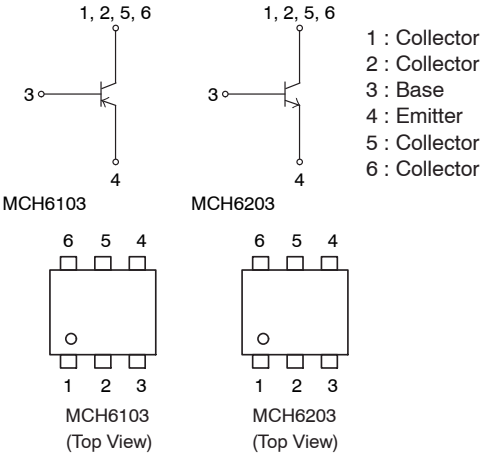
MARKING DIAGRAM



MCH6103 MCH6203

AC / CC = Specific Device Code

ELECTRICAL CONNECTION



ORDERING INFORMATION

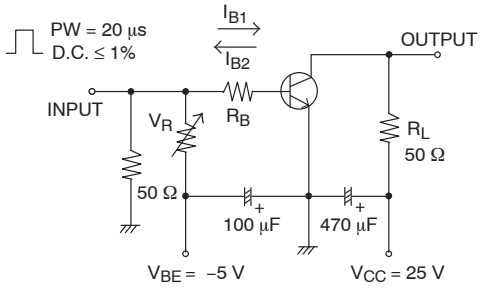
Device	Package	Shipping†
MCH6103–TL–E	MCPH6 / SC–88FL (Pb–Free)	3000 / Tape & Reel
MCH6203–TL–E		

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

ELECTRICAL CHARACTERISTICS at T_A = 25°C

Parameter	Symbol	Conditions	Ratings			Unit
			Min	Typ	Max	
Collector Cutoff Current	I_{CBO}	V_{CB} = (−)40 V, I_E = 0 A	−	−	(−)0.1	μA
Emitter Cutoff Current	I_{EBO}	V_{EB} = (−)4 V, I_C = 0 A	−	−	(−)0.1	μA
DC Current Gain	h_{FE}	V_{CE} = (−)2 V, I_C = (−)100 mA	200	−	560	
Gain−Bandwidth Product	f_T	V_{CE} = (−)10 V, I_C = (−)300 mA	−	420	−	MHz
Output Capacitance	Cob	V_{CB} = (−)10 V, f = 1 MHz	−	(9) 6	−	pF
Collector−to−Emitter Saturation Voltage	V_{CE}(sat)1	I_C = (−)500 mA, I_B = (−)10 mA	−	(−280) 130	(−430) 190	mV
	V_{CE}(sat)2	I_C = (−)300 mA, I_B = (−)6 mA	−	(−145) 90	(−220) 135	mV
Base−to−Emitter Saturation Voltage	V_{BE}(sat)	I_C = (−)500 mA, I_B = (−)10 mA	−	(−)0.81	(−)1.2	V
Collector−to−Base Breakdown Voltage	$V_{(BR)CBO}$	I_C = (−)10 μA, I_E = 0 A	(−50) 80	−	−	V
Collector−to−Emitter Breakdown Voltage	$V_{(BR)CES}$	I_C = (−)100 μA, R_{BE} = 0 Ω	(−50) 80	−	−	V
	$V_{(BR)CEO}$	I_C = (−)1 mA, R_{BE} = ∞	(−)50	−	−	V
Emitter−to−Base Breakdown Voltage	$V_{(BR)EBO}$	I_E = (−)10 μA, I_C = 0 A	(−)5	−	−	V
Turn−On Time	t_{on}	See specified Test Circuit	−	(36) 38	−	ns
Storage Time	t_{stg}		−	(173) 332	−	ns
Fall Time	t_f		−	(28) 40	−	ns

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.



I_C = 20 I_{B1} = −20 I_{B2} = 500 mA
For PNP, the polarity is reversed.

Figure 1. Switching Time Test Circuit

TYPICAL CHARACTERISTICS

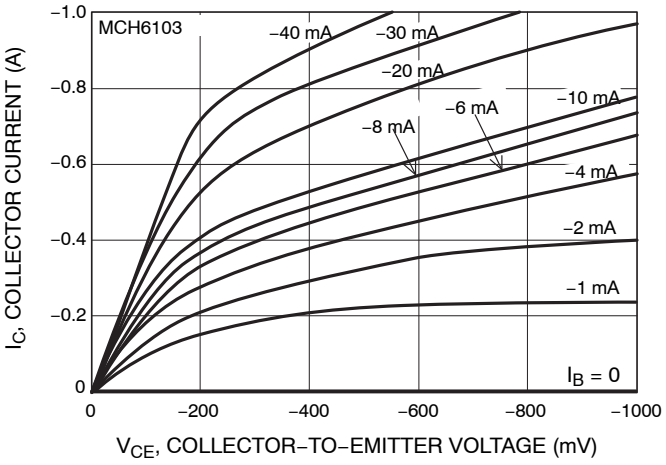


Figure 2. I_C – V_{CE}

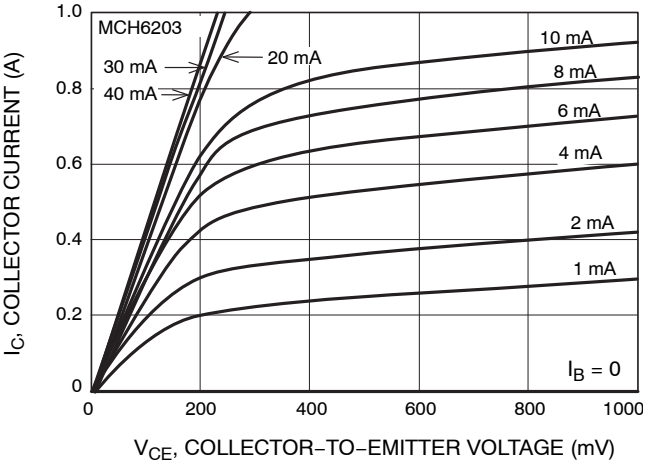


Figure 3. I_C – V_{CE}

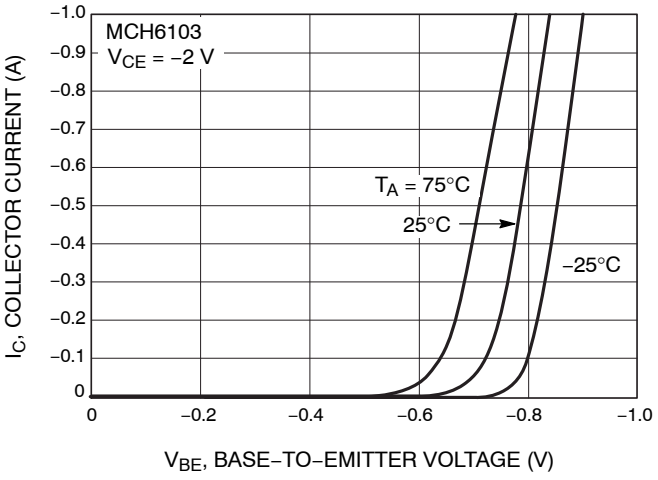


Figure 4. I_C – V_{BE}

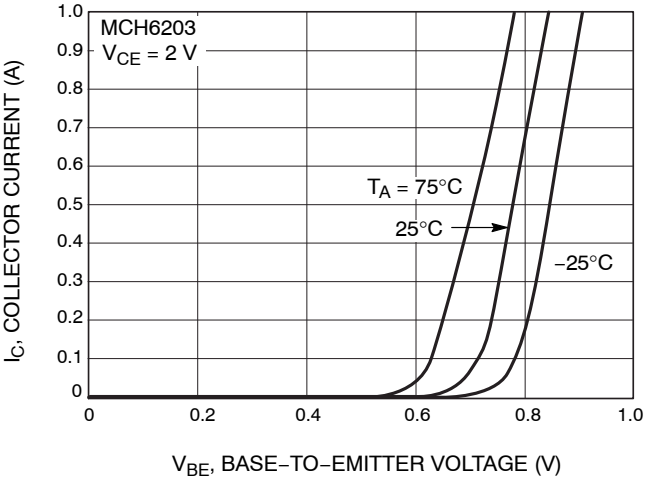


Figure 5. I_C – V_{BE}

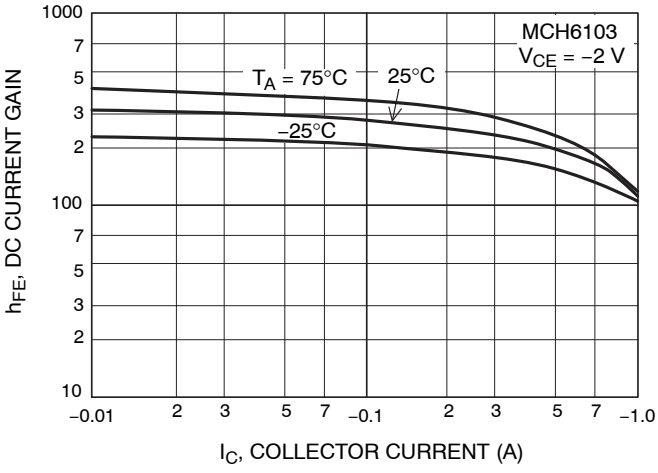


Figure 6. h_{FE} – I_C

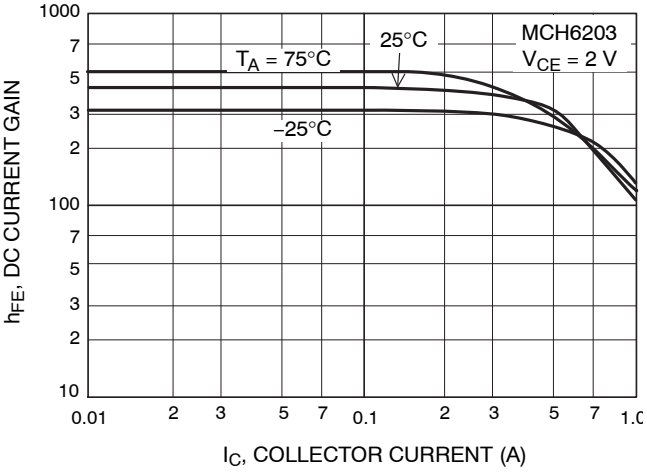


Figure 7. h_{FE} – I_C

TYPICAL CHARACTERISTICS (CONTINUED)

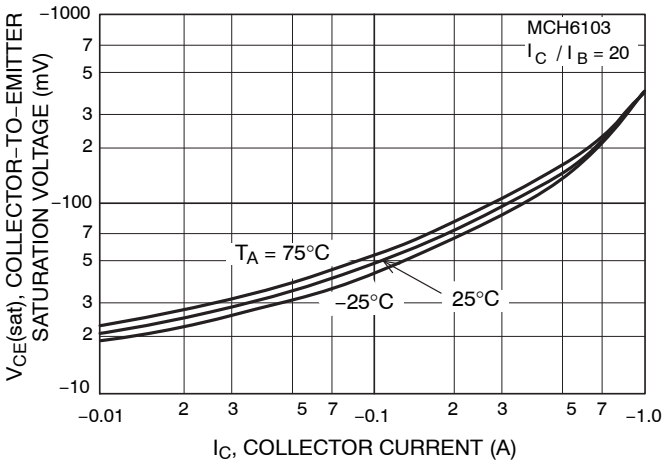


Figure 8. V_{CE}(sat) − I_C

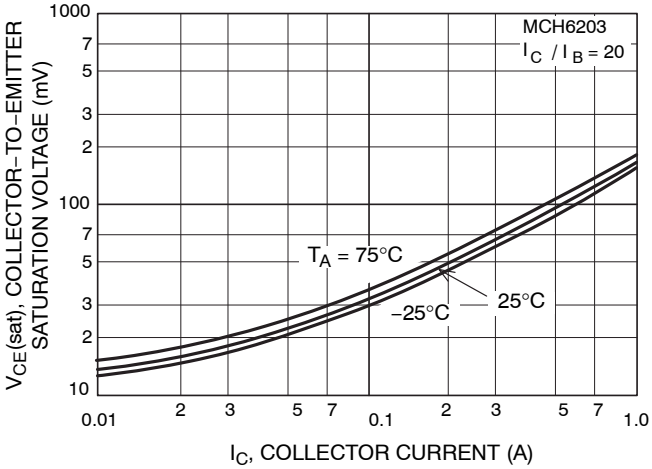


Figure 9. V_{CE}(sat) − I_C

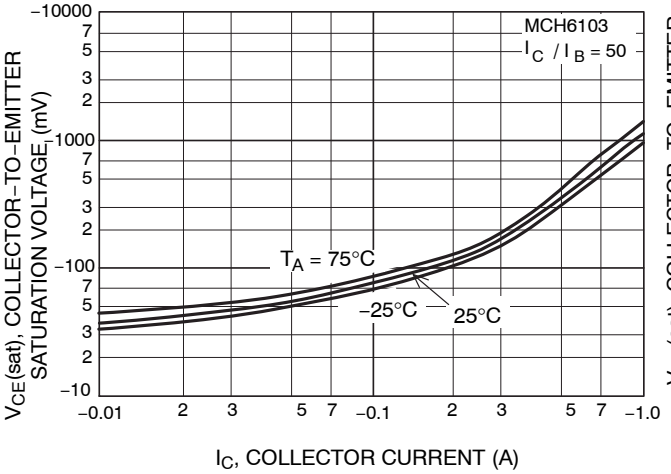


Figure 10. V_{CE}(sat) − I_C

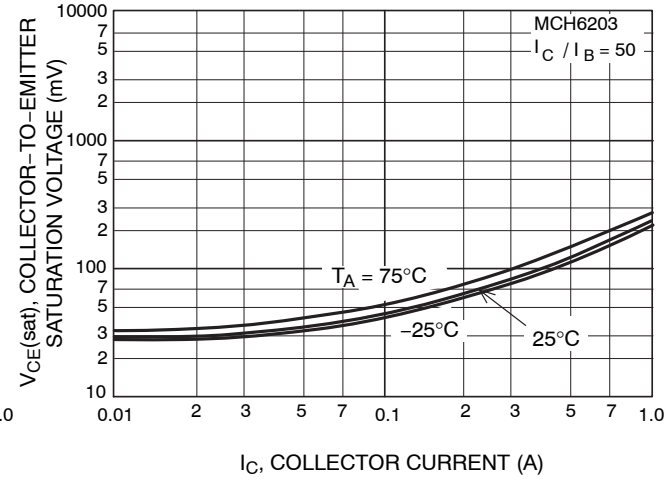


Figure 11. V_{CE}(sat) − I_C

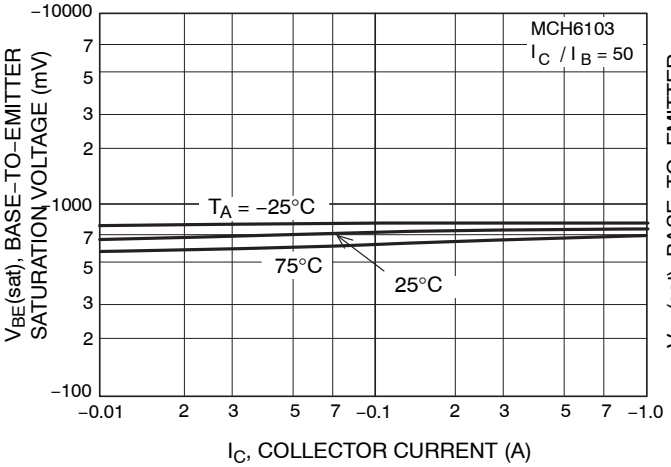


Figure 12. V_{BE}(sat) − I_C

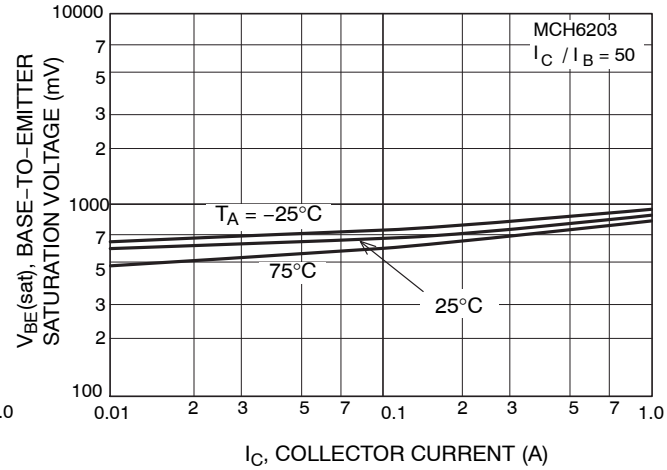


Figure 13. V_{BE}(sat) − I_C

TYPICAL CHARACTERISTICS (CONTINUED)

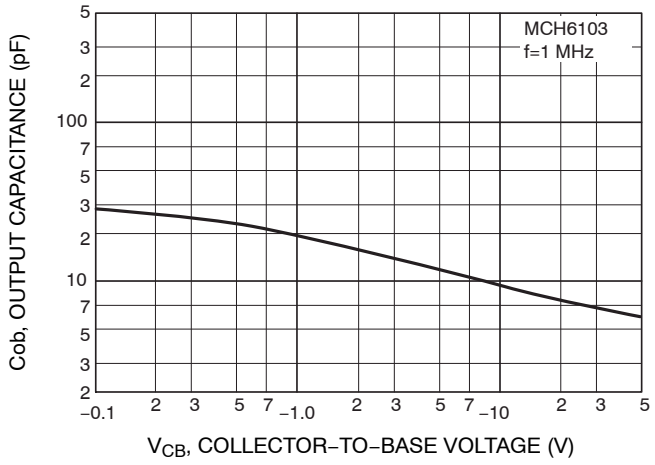


Figure 14. Cob – V_{CB}

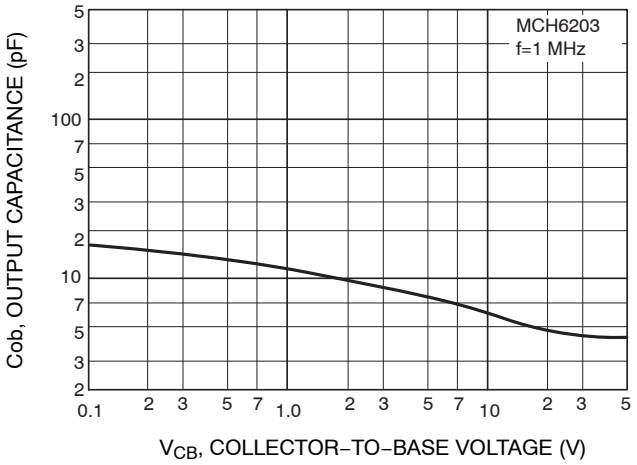


Figure 15. Cob – V_{CB}

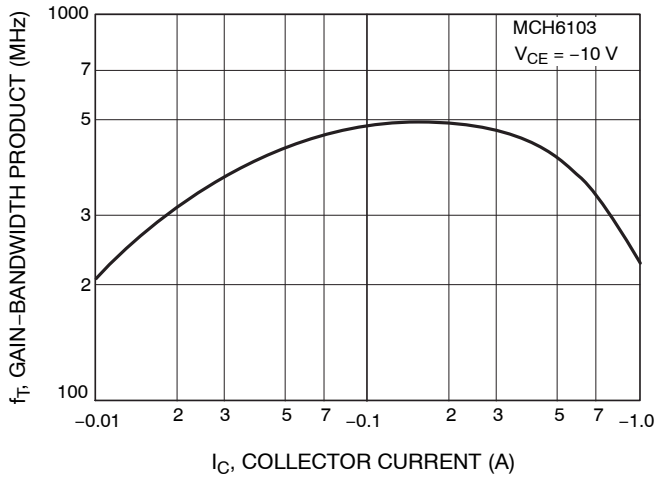


Figure 16. f_T – I_C

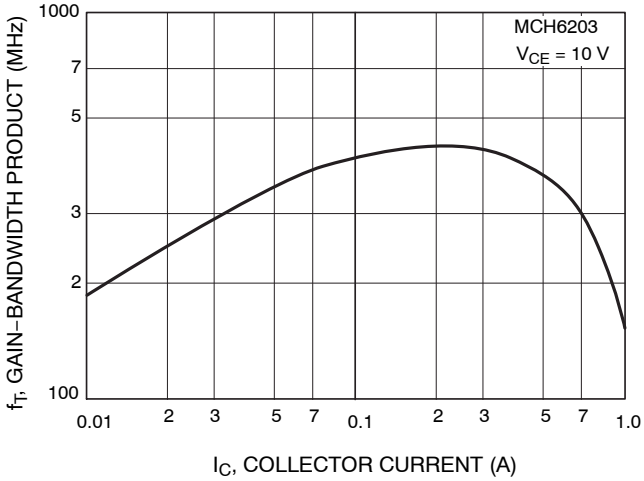


Figure 17. f_T – I_C

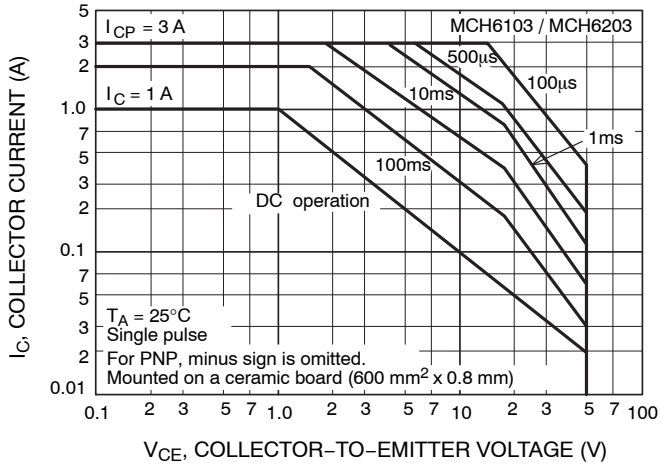


Figure 18. ASO

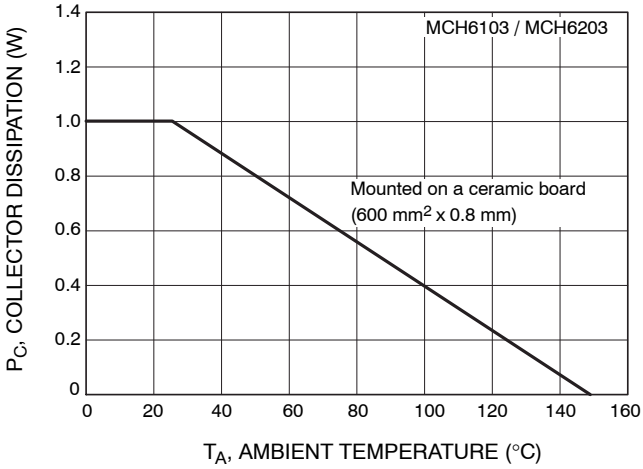


Figure 19. P_C – T_A

LAND PATTERN EXAMPLE

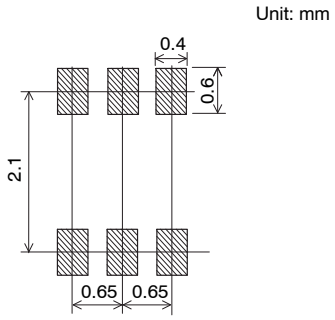
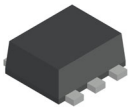


Figure 20. Land Pattern Example



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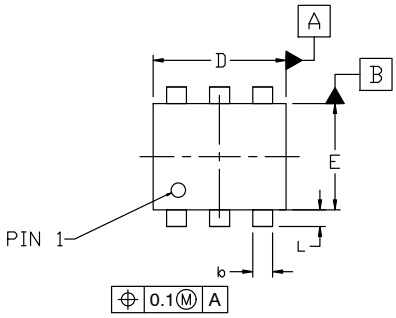
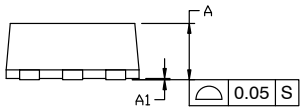
ISSUE A

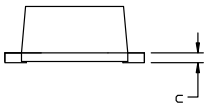
DATE 28 SEP 2022



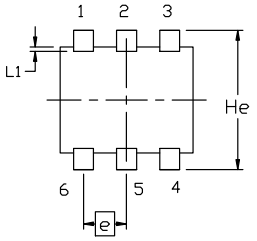
TOP VIEW



SIDE VIEW



FRONT VIEW



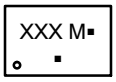
BOTTOM VIEW

NOTES:

1. NO INDUSTRY STANDARD APPLIES TO THIS PACKAGE.
2. ALL DIMENSIONS ARE IN MILLIMETERS.
3. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND THE BAR PROTRUSIONS.

DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.80	0.85	0.90
A1	0.00	---	0.02
b	0.25	0.30	0.40
c	0.12	0.15	0.25
D	1.94	2.00	2.06
E	1.54	1.60	1.66
He	2.05	2.10	2.15
L	0.19	0.25	0.31
L1	0.00	0.07	0.12
e	0.65 BSC		

GENERIC
MARKING DIAGRAM*



XXX = Specific Device Code
M = Date Code
▪ = Pb−Free Package

(Note: Microdot may be in either location)

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “▪”, may or may not be present. Some products may not follow the Generic Marking.

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DESCRIPTION:	**SC−88FL / MCPH6**		**PAGE 1 OF 1**

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