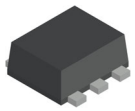
Bipolar Transistor

(–)30 V, (–)3 A, Low V_{CE}(sat) Complementary Dual MCPH6

MCH6541



SC–88FL / MCPH6
CASE 419AS

Features

- Composite Type with a PNP Transistor and an NPN Transistor Contained in One Package Facilitating High–density Mounting
- Ultrasmall Package Permitting Applied Sets to be Small and Slim
- These Devices are Pb–Free and are RoHS Compliant

Applications

- MOSFET Gate Drivers
- Relay Drivers
- Lamp Drivers
- Motor Drivers

Specifications

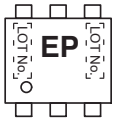
- ( ) : PNP

ABSOLUTE MAXIMUM RATINGS at T_A = 25°C

Parameter	Symbol	Conditions	Value	Unit
Collector–to–Base Voltage	V_{CBO}		(–30)40	V
Collector–to–Emitter Voltage	V_{CEO}		(–)30	V
Emitter–to–Base Voltage	V_{EBO}		(–)5	V
Collector Current	I_C		(–)700	mA
Collector Current (Pulse)	I_{CP}		(–)3	A
Collector Dissipation	P_C	When mounted on ceramic substrate (600 mm^2 x 0.8 mm) 1 unit	0.5	W
Total Power Dissipation	P_T	When mounted on ceramic substrate (600 mm^2 x 0.8 mm)	0.55	W
Junction Temperature	T_J		150	°C
Storage Temperature	Tstg		–55 to +150	°C

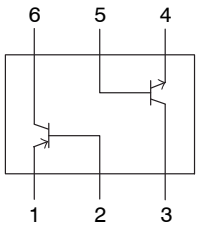
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

MARKING DIAGRAM



EP = Specific Device Code

ELECTRICAL CONNECTION



1 : Emitter1 (PNP TR)
2 : Base1 (PNP TR)
3 : Collector2 (NPN TR)
4 : Emitter2 (NPN TR)
5 : Base2 (NPN TR)
6 : Collector1 (PNP TR)

ORDERING INFORMATION

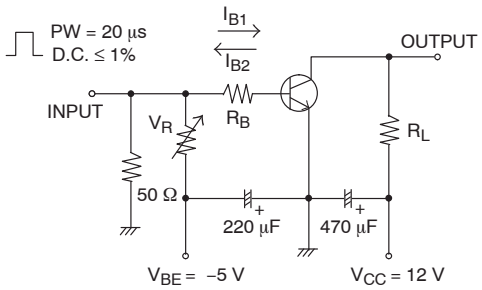
Device	Package	Shipping†
MCH6541–TL–E	MCPH6 / SC–88FL (Pb–Free)	3000 / Tape & Reel

†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} = (−)30 V, I_E = 0 A	−	−	(−)100	nA
Emitter Cutoff Current	I_{EBO}	V_{EB} = (−)4 V, I_C = 0 A	−	−	(−)100	nA
DC Current Gain	h_{FE}	V_{CE} = (−)2 V, I_C = (−10)50 mA	(200) 300	−	(500) 800	
Gain−Bandwidth Product	f_T	V_{CE} = (−)2 V, I_C = (−)50 mA	−	(520) 540	−	MHz
Output Capacitance	Cob	V_{CB} = (−)10 V, f = 1 MHz	−	(4.7) 3.3	−	pF
Collector−to−Emitter Saturation Voltage	V_{CE}(sat)	I_C = (−)200 mA, I_B = (−)10 mA	−	(−110) 85	(−220) 190	mV
Base−to−Emitter Saturation Voltage	V_{BE}(sat)	I_C = (−)200 mA, I_B = (−)10 mA	−	(−)0.9	(−)1.2	V
Collector−to−Base Breakdown Voltage	$V_{(BR)CBO}$	I_C = (−)10 μA, I_E = 0 A	(−30) 40	−	−	V
Collector−to−Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C = (−)1 mA, R_{BE} = ∞	(−)30	−	−	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	−	35	−	ns
Storage Time	t_{stg}		−	(125) 255	−	ns
Fall Time	t_f		−	(25) 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} = 300 mA
For PNP, the polarity is reversed.

Figure 1. Switching Time Test Circuit

TYPICAL CHARACTERISTICS

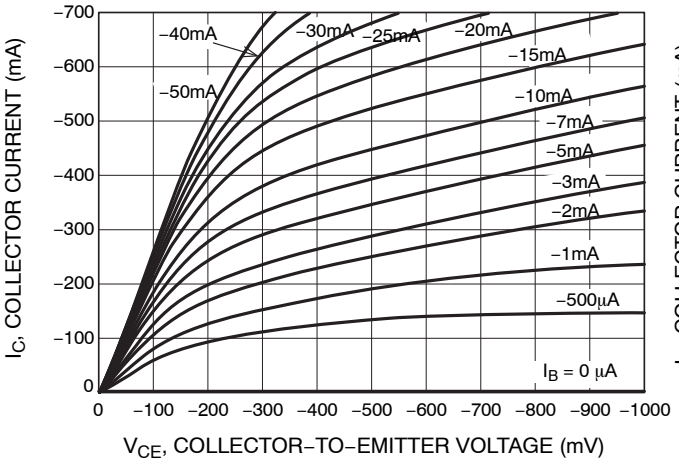


Figure 2. I_C – V_{CE} (PNP)

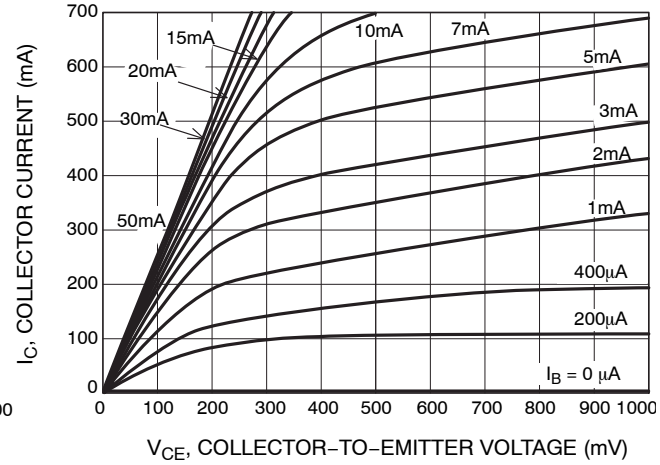


Figure 3. I_C – V_{CE} (NPN)

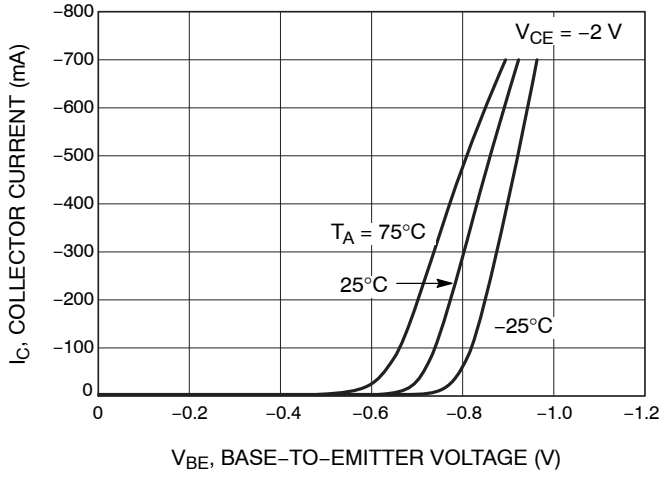


Figure 4. I_C – V_{BE} (PNP)

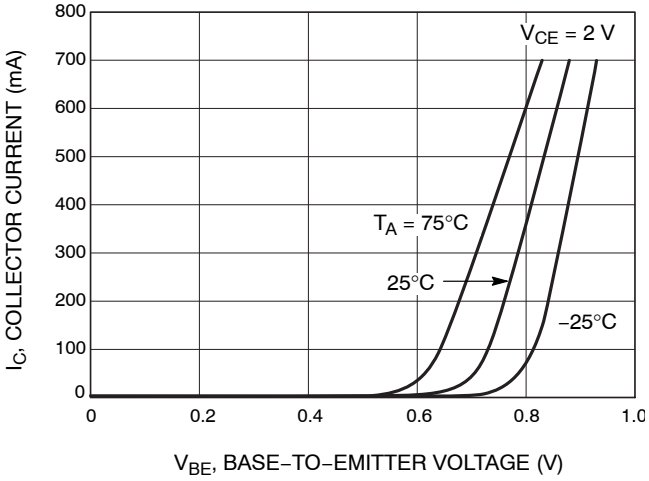


Figure 5. I_C – V_{BE} (NPN)

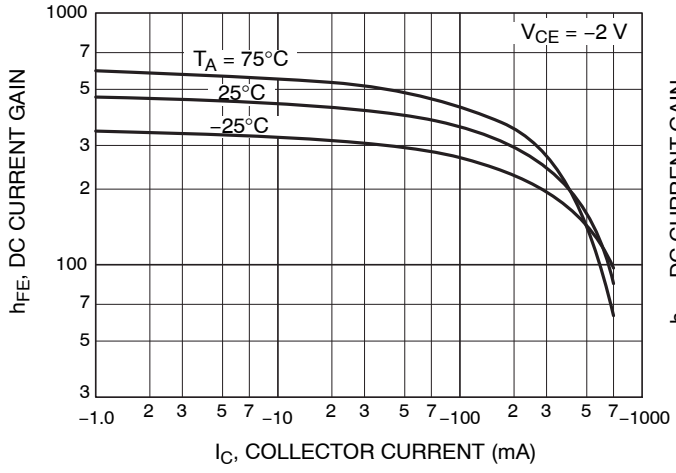


Figure 6. h_{FE} – I_C (PNP)

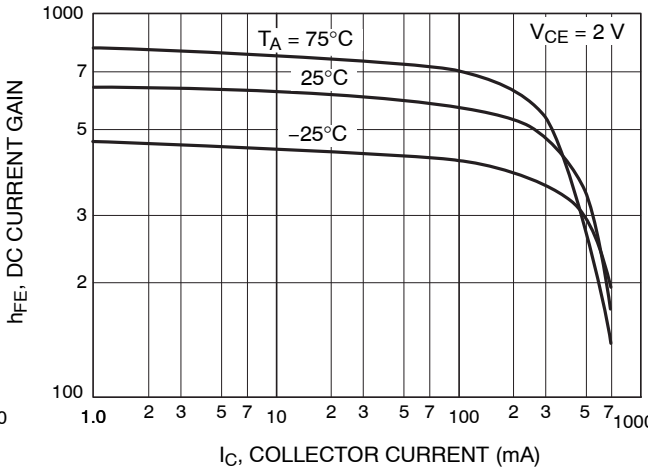


Figure 7. h_{FE} – I_C (NPN)

TYPICAL CHARACTERISTICS (CONTINUED)

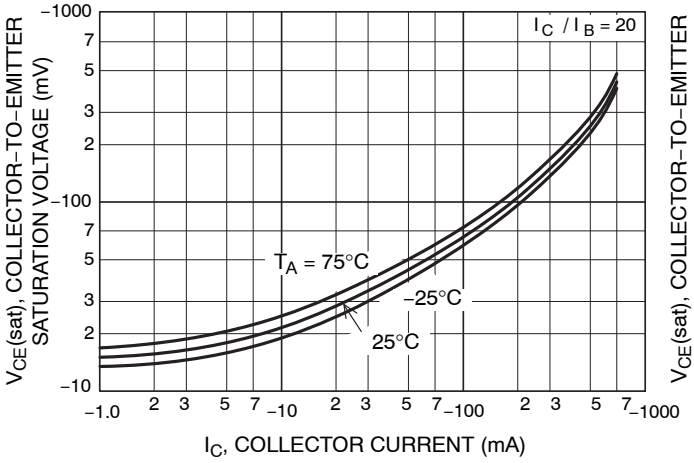


Figure 8. $V_{CE}(sat)$ – I_C (PNP)

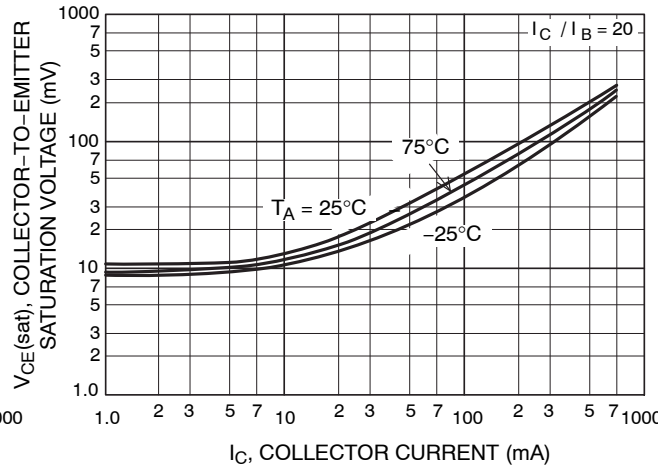


Figure 9. $V_{CE}(sat)$ – I_C (NPN)

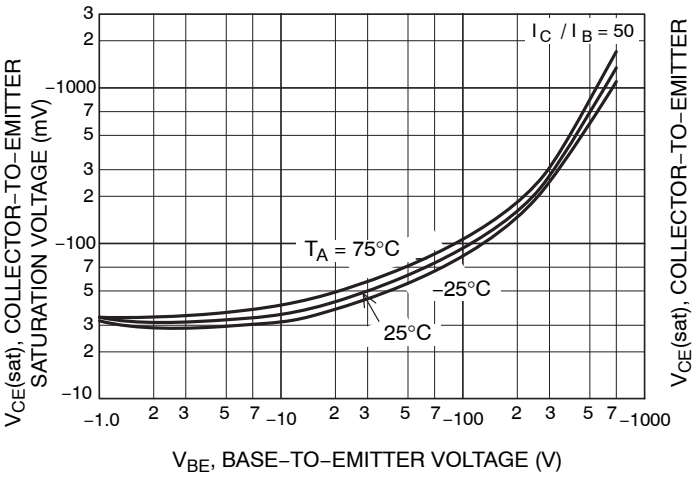


Figure 10. $V_{CE}(sat)$ – I_C (PNP)

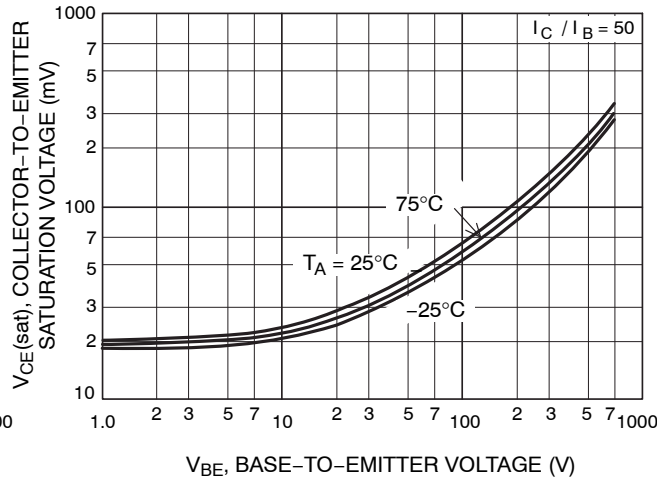


Figure 11. $V_{CE}(sat)$ – I_C (NPN)

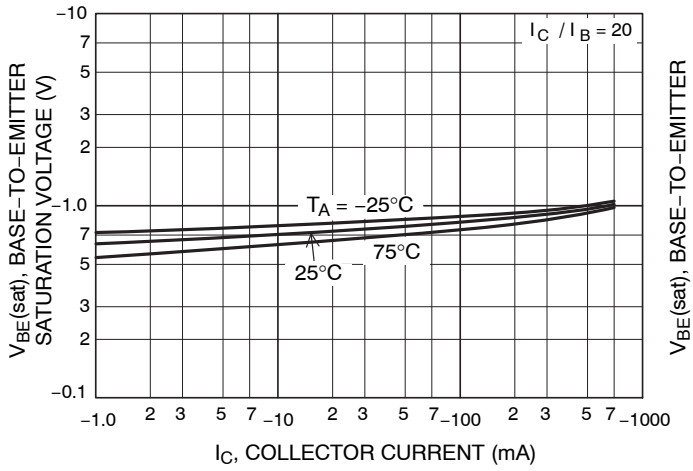


Figure 12. $V_{BE}(sat)$ – I_C (PNP)

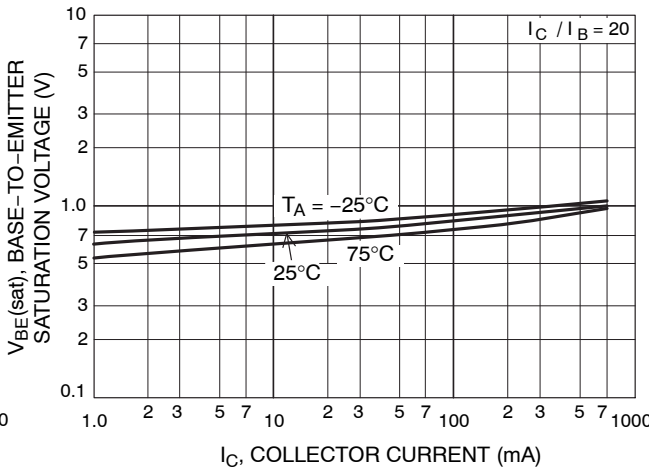


Figure 13. $V_{BE}(sat)$ – I_C (NPN)

TYPICAL CHARACTERISTICS (CONTINUED)

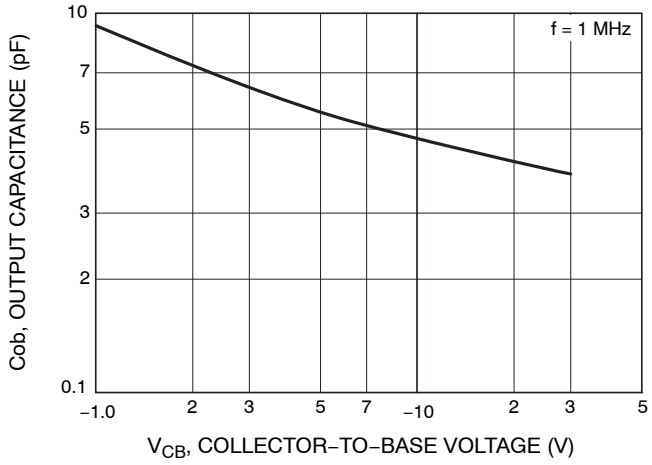


Figure 14. Cob – V_{CB} (PNP)

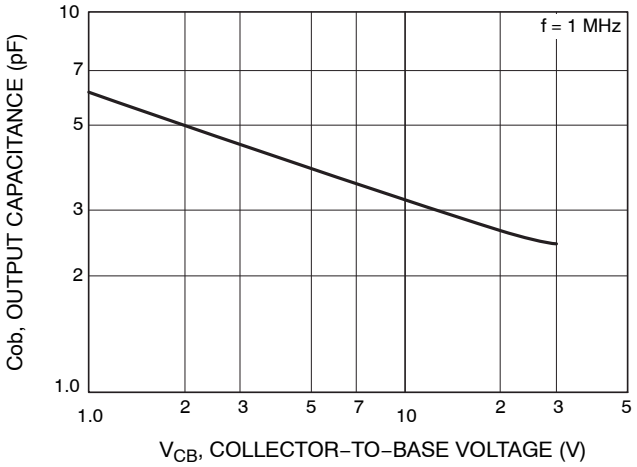


Figure 15. Cob – V_{CB} (NPN)

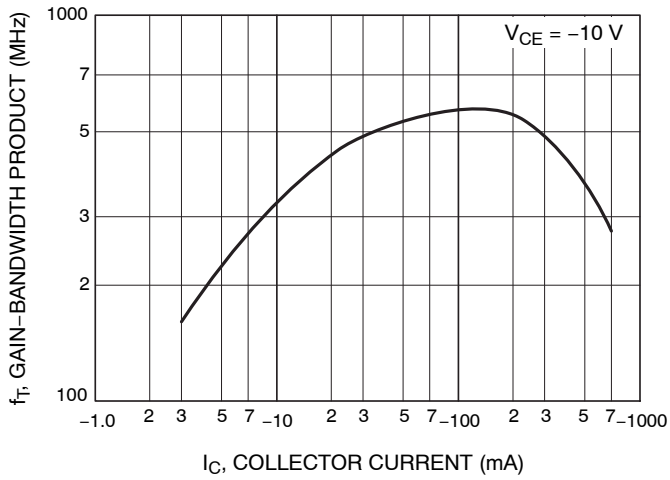


Figure 16. f_T – I_C (PNP)

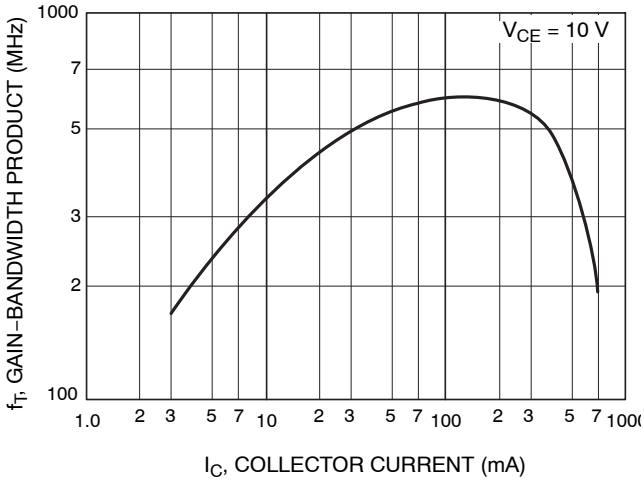


Figure 17. f_T – I_C (NPN)

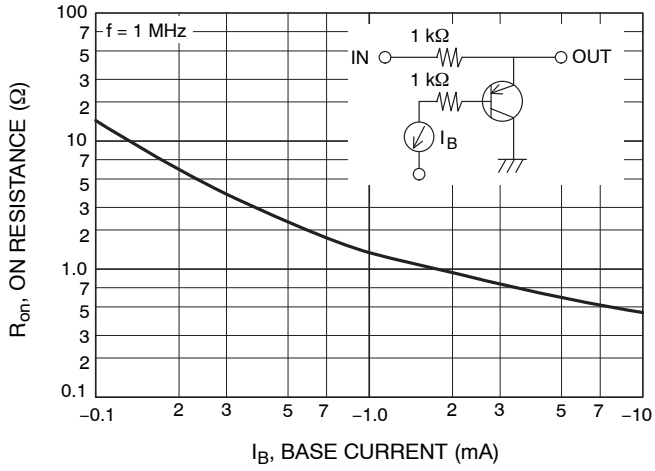


Figure 18. R_{on} – I_B (PNP)

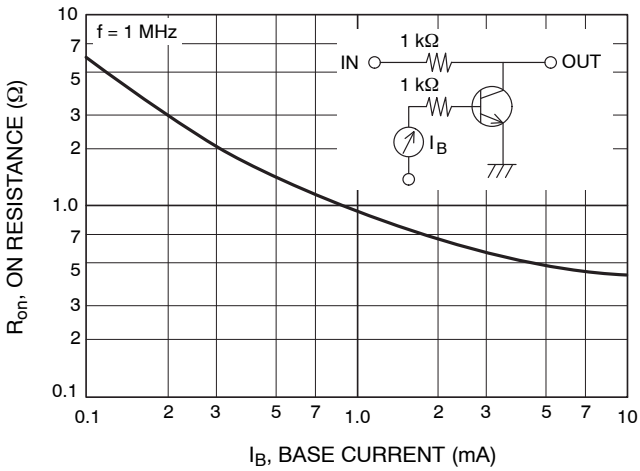


Figure 19. R_{on} – I_B (NPN)

TYPICAL CHARACTERISTICS (CONTINUED)

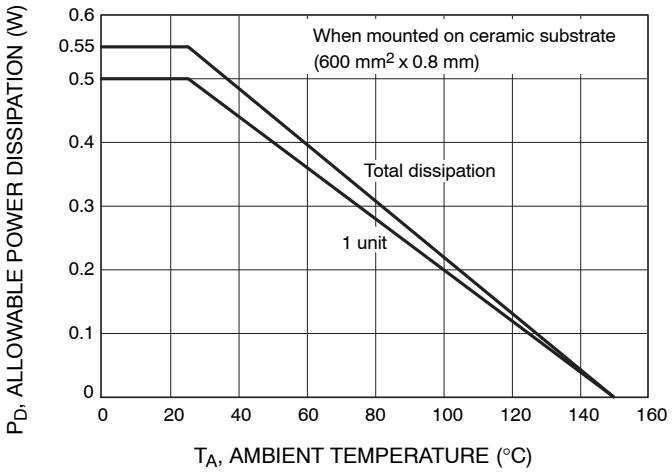


Figure 20. P_D – T_A (PNP/NPN)

LAND PATTERN EXAMPLE

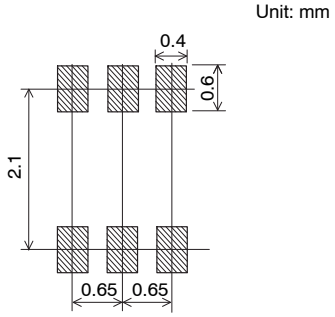
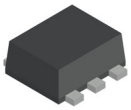


Figure 21. Land Pattern Example



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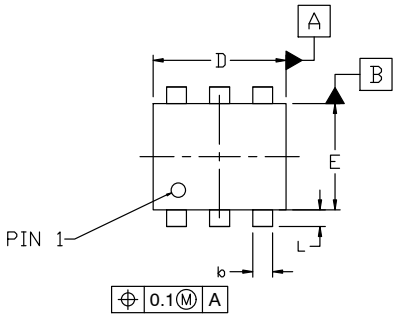
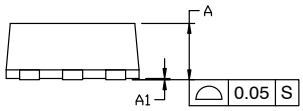
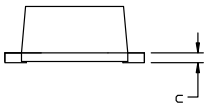


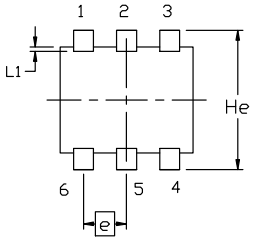
TOP VIEW



SIDE VIEW



FRONT VIEW



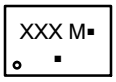
BOTTOM VIEW

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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