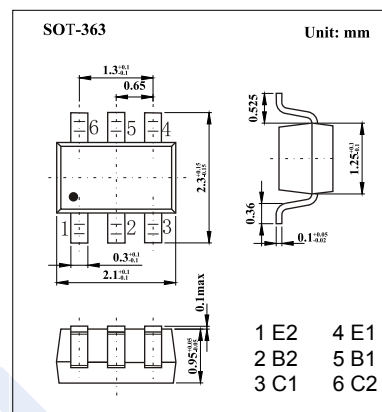
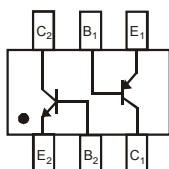


Complementary NPN/PNP Transistors

MMDT2227 (KMDT2227)

■ Features

- Complementary Pairs One 2222A Type (NPN)
One 2907A Type (PNP)
- Ideal for Low Power Amplification and Switching
- Lead Free/RoHS Compliant

■ Absolute Maximum Ratings $T_a = 25^\circ\text{C}$

Parameter	Symbol		Rating	Unit
Collector - Base Voltage	V_{CB0}	NPN	75	V
		PNP	-60	
Collector - Emitter Voltage	V_{CEO}	NPN	40	
		PNP	-60	
Emitter - Base Voltage	V_{EBO}	NPN	6	mA
		PNP	-5	
Collector Current - Continuous	I_C	NPN	600	
		PNP	-600	
Collector Power Dissipation (Note.1)	P_C		0.2	W
Thermal Resistance, Junction to Ambient (Note.1)	$R_{\theta JA}$		625	$^\circ\text{C/W}$
Junction Temperature	T_J		150	$^\circ\text{C}$
Storage Temperature Range	T_{stg}		-65 to 150	

Note.1: Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch; pad layout as shown on Diodes Inc.

Complementary NPN/PNP Transistors

MMDT2227 (KMDT2227)

■ Electrical Characteristics Ta = 25°C (NPN)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector- base breakdown voltage	V _{CB0}	I _C = 100 μA, I _E = 0	75			V
Collector- emitter breakdown voltage	V _{CEO}	I _C = 10 mA, I _B = 0	40			
Emitter - base breakdown voltage	V _{EB0}	I _E = 100 μA, I _C = 0	6			
Collector-base cut-off current	I _{CBO}	V _{CB} = 60 V, I _E = 0			10	nA
		V _{CB} = 60 V, I _E = 0, Ta=150°C			10	μA
Collector- emitter cut-off current	I _{CEX}	V _{CE} = 60 V, V _{EB(OFF)} =3V			10	nA
Base Cutoff Current	I _{BL}	V _{CE} = 60 V, V _{EB(OFF)} =3V			20	
Emitter cut-off current	I _{EBO}	V _{EB} = 4V, I _C =0			10	
Collector-emitter saturation voltage (Note.1)	V _{CE(sat)}	I _C =150 mA, I _B =15mA			0.3	V
		I _C =500 mA, I _B =50mA			1	
Base - emitter saturation voltage (Note.1)	V _{BE(sat)}	I _C = 150 mA, I _B = 15mA	0.6		1.2	
		I _C =500 mA, I _B =50mA			2	
DC current gain (Note.1)	h _{FE(1)}	V _{CE} = 10V, I _C = 100μA	35			
	h _{FE(2)}	V _{CE} = 10V, I _C = 1mA	50			
	h _{FE(3)}	V _{CE} = 10V, I _C = 10mA	75			
	h _{FE(4)}	V _{CE} = 10V, I _C = 150mA	100		300	
	h _{FE(5)}	V _{CE} = 10V, I _C = 500mA	40			
	h _{FE(6)}	V _{CE} = 10V, I _C = 10mA, Ta = -55°C	50			
	h _{FE(7)}	V _{CE} = 1V, I _C = 150mA	35			
Delay Time	t _d	V _{CC} = 30V, I _C = 150mA, V _{BE(off)} = - 0.5V, I _{B1} = 15mA			10	ns
Rise Time	t _r				25	
Storage Time	t _s	V _{CC} = 30V, I _C = 150mA, I _{B1} = I _{B2} = 15mA			225	
Fall Time	t _f				60	
Collector output capacitance	C _{ob}	V _{CB} = 10V, I _E = 0, f=1MHz			8	pF
Collector input capacitance	C _{ib}	V _{EB} = 0.5V, I _C = 0, f=1MHz			25	
Noise Figure	NF	V _{CE} = 10V, I _C = 100μA, R _s = 1.0kΩ, f = 1.0kHz			4	dB
Transition frequency	f _T	V _{CE} = 20V, I _C = 20mA, f=100MHz	300			MHz

Note.1:Pulse test: Pulse width ≤ 300μs, duty cycle ≤ 2%.

Complementary NPN/PNP Transistors

MMDT2227 (KMDT2227)

■ Electrical Characteristics Ta = 25°C (PNP)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector- base breakdown voltage	V _{CB0}	I _C = -100 μ A, I _E = 0	-60			V
Collector- emitter breakdown voltage	V _{CEO}	I _C = -10 mA, I _B = 0	-60			
Emitter - base breakdown voltage	V _{EB0}	I _E =-100 μ A, I _C = 0	-5			
Collector-base cut-off current	I _{CBO}	V _{CB} = -50 V, I _E = 0			-10	nA
		V _{CB} = -50 V, I _E = 0, Ta=125°C			-10	μ A
Collector- emitter cut-off current	I _{CEX}	V _{CE} = -30 V, V _{EB(OFF)} =-0.5V			-50	nA
Base Cutoff Current	I _{BL}	V _{CE} = -30 V, V _{EB(OFF)} =-0.5V			-50	
Emitter cut-off current	I _{EBO}	V _{EB} = -4V, I _C =0			-10	
Collector-emitter saturation voltage (Note.1)	V _{CE(sat)}	I _C =-150 mA, I _B =-15mA			-0.4	V
		I _C =-500 mA, I _B =-50mA			-1.6	
Base - emitter saturation voltage (Note.1)	V _{BE(sat)}	I _C =-150 mA, I _B =-15mA			-1.3	
		I _C =-500 mA, I _B =-50mA			-2.6	
DC current gain (Note.1)	h _{FE(1)}	V _{CE} = -10V, I _C = -100 μ A	75			
	h _{FE(2)}	V _{CE} = -10V, I _C = -1mA	100			
	h _{FE(3)}	V _{CE} = -10V, I _C = -10mA	100			
	h _{FE(4)}	V _{CE} = -10V, I _C = -150mA	100		300	
	h _{FE(5)}	V _{CE} = -10V, I _C = -500mA	50			
Turn-on Time	t _{on}				45	ns
Delay Time	t _d	V _{CC} = -30V, I _C = -150mA,			10	
Rise Time	t _r	I _{B1} = -15mA			40	
Turn-off Time	t _{off}				100	
Storage Time	t _s	V _{CC} = -6V, I _C = -150mA,			80	
Fall Time	t _f	I _{B1} = I _{B2} = -15mA			30	
Collector output capacitance	C _{ob}	V _{CB} = -10V, I _E = 0, f=1MHz			8	pF
Collector input capacitance	C _{ib}	V _{EB} = -2V, I _C = 0, f=1MHz			30	
Transition frequency	f _T	V _{CE} = -20V, I _C = -50mA, f=100MHz	200			MHz

Note.1: Short duration pulse test used to minimize self-heating effect.

■ Marking

Marking	K27
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Complementary NPN/PNP Transistors

MMDT2227 (KMDT2227)

■ NPN Typical Characteristics

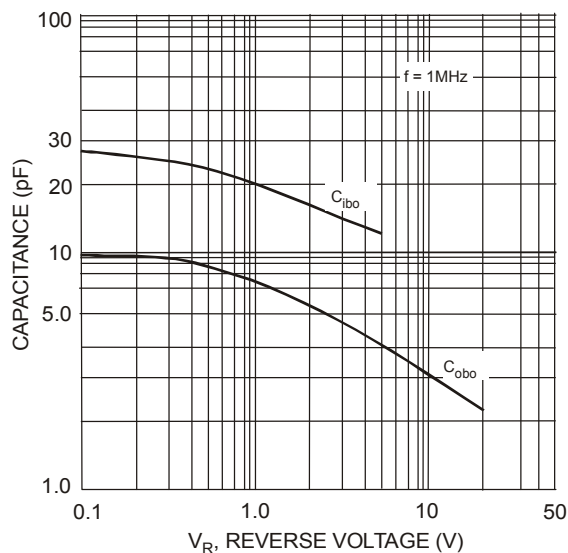
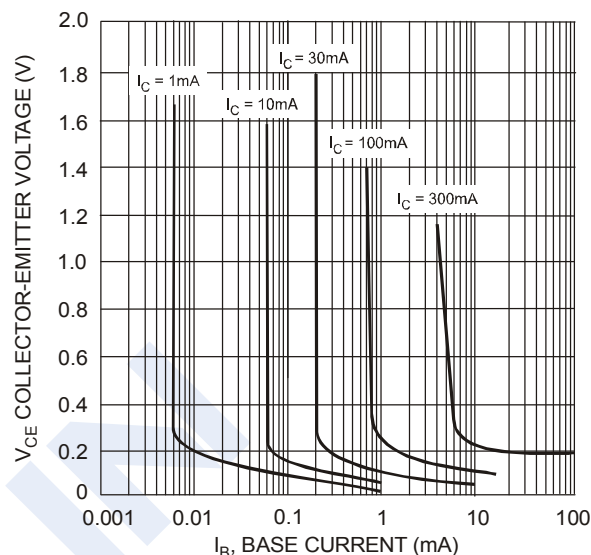


Fig. 1 (2222A) Typical Capacitance

Fig. 2 Typical Collector Saturation Region
(2222A Type - NPN)

■ PNP Typical Characteristics

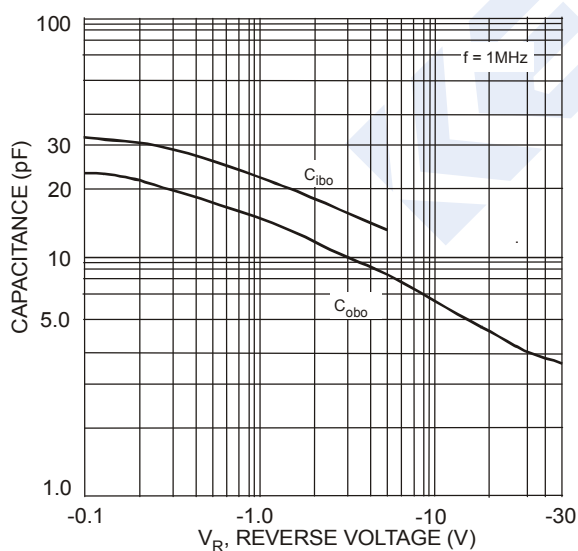
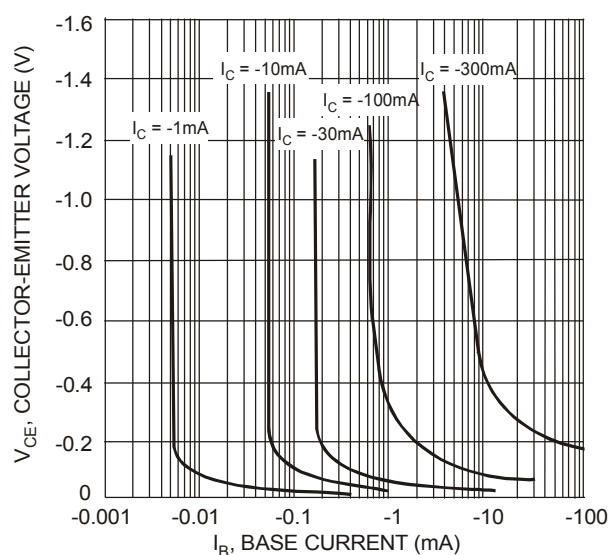


Fig. 3 (2907A) Typical Capacitance

Fig. 4 Typical Collector Saturation Region
(2907A Type - PNP)