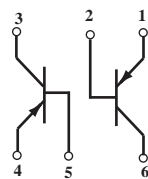
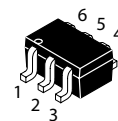


Dual Bias Resistor Transistor PNP Silicon

 Lead(Pb)-Free



PNP+PNP



SOT-363(SC-88)

Maximum Ratings ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CE0}	-50	Vdc
Collector-Base Voltage	V_{CB0}	-50	Vdc
Collector Current-Continuous	I_C	-100	mAdc

Thermal Characteristics

Characteristics	Symbol	Max	Unit
Total Device Dissipation FR-5 Board (1) $T_A=25^{\circ}\text{C}$ Derate above 25°C	P_D	187 1.5	mW mW/ $^{\circ}\text{C}$
Thermal Resistance, Junction to Ambient (1)	$R_{\theta JA}$	670	$^{\circ}\text{C}/\text{W}$
Junction and Storage, Temperature Range	$T_{J,Tstg}$	-55 to +150	$^{\circ}\text{C}$

1.FR-4 @ minimum pad

2.FR-4 @ 1.0×1.0 inch Pad

Device Marking and Resistor Values

Device	Marking	R1(K)	R2(K)	Device	Marking	R1(K)	R2(K)
MUN5111	0A	10	10	MUN5131	0H	2.2	2.2
MUN5112	0B	22	22	MUN5132	0J	4.7	4.7
MUN5113	0C	47	47	MUN5133	0K	4.7	47
MUN5114	0D	10	47	MUN5134	0L	22	47
MUN5115	0E	10	∞	MUN5135	0M	2.2	47
MUN5116	0F	4.7	∞	MUN5136	0N	100	100
MUN5130	0G	1.0	1.0	MUN5137	0P	47	22

Electrical Characteristics (TA=25 °C Unless Otherwise noted)

Characteristics	Symbol	Min	Typ	Max	Unit
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Off Characteristics

Collector-Emitter Breakdown Voltage (IC=-2.0mA, IB=0)	V(BR)CEO	-50	-	-	V
Collector-Base Breakdown Voltage (IC=-10 uA, IE=0)	V(BR)CBO	-50	-	-	V
Collector-Base Cutoff Voltage (VCB=-50 V, IE=0)	ICBO	-	-	-100	nA
Collector-Emitter Cutoff Current (ICE=-50V, IB=0)	ICEO	-	-	-500	nA
Emitter-Base Cutoff Current (VEB=-6.0V, IC=0)	IEBO	-	-	-0.5	mA
MUN5111DW		-	-	-0.2	
MUN5112DW		-	-	-0.1	
MUN5113DW		-	-	-0.2	
MUN5114DW		-	-	-0.9	
MUN5115DW		-	-	-1.9	
MUN5116DW		-	-	-4.3	
MUN5130DW		-	-	-2.3	
MUN5131DW		-	-	-1.5	
MUN5132DW		-	-	-0.18	
MUN5133DW		-	-	-0.13	
MUN5134DW		-	-	-0.2	
MUN5135DW		-	-	-0.05	
MUN5136DW		-	-	-0.13	
MUN5137DW		-	-		

On Characteristics

Collector-Emitter Saturation Voltage (IC=-10mA, IE=-0.3mA) (IC=-10mA, IB=-5mA) MUN5137DW/MUN5131DW (IC=-10mA, IB=-1mA) MUN5115DW/MUN5116DW MUN5132DW/MUN5133DW/MUN5134DW	VCE(sat)	-	-	-0.25	Vdc
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3. Pulse Test: Pulse Width < 300 us, Duty Cycle < 2.0%

Electrical Characteristics (TA=25°C Unless Otherwise noted)

Characteristics	Symbol	Min	Typ	Max	Unit
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On Characteristics (3)

DC Current Gain (VCE=-10V, IC=-5.0mA)	MUN5111DW	h _{FE}	35	60	-		
	MUN5112DW		60	100	-		
	MUN5113DW		80	140	-		
	MUN5114DW		80	140	-		
	MUN5115DW		160	250	-		
	MUN5116DW		160	250	-		
	MUN5130DW		3.0	5.0	-		
	MUN5131DW		8.0	15	-		
	MUN5132DW		15	27	-		
	MUN5133DW		80	140	-		
	MUN5134DW		80	130	-		
	MUN5135DW		80	140	-		
	MUN5136DW		80	150	-		
	MUN5137DW		80	140	-		
Output Voltage(on) (V _{CC} =-5.0V, V _B =-2.5V, R _L =1.0kΩ)	MUN5111DW	V _{OL}	-	-	-0.2	Vdc	
	MUN5112DW		-	-	-0.2		
	MUN5113DW		-	-	-0.2		
	MUN5114DW		-	-	-0.2		
	MUN5115DW		-	-	-0.2		
	MUN5116DW		-	-	-0.2		
	MUN5130DW		-	-	-0.2		
	MUN5131DW		-	-	-0.2		
	MUN5132DW		-	-	-0.2		
	MUN5133DW		-	-	-0.2		
	MUN5134DW		-	-	-0.2		
	(V _{CC} =-5.0V, V _B =-3.5V, R _L =1.0kΩ)		MUN5135DW	-	-		-0.2
	(V _{CC} =-5.0V, V _B =-5.5V, R _L =1.0kΩ)		MUN5136DW	-	-		-0.2
(V _{CC} =-5.0V, V _B =-4.0V, R _L =1.0kΩ)	MUN5137DW	-	-	-0.2			
Output Voltage(off) (V _{CC} =-5.0V, V _B =-0.5V, R _L =1.0kΩ) (V _{CC} =-5.0V, V _B =-0.05V, R _L =1.0kΩ) (V _{CC} =-5.0V, V _B =-0.25V, R _L =1.0kΩ)	MUN5130DW	V _{OH}	-4.9	-	-	Vdc	
	MUN5115DW						
	MUN5116DW						
	MUN5131DW						
	MUN5133DW						

3. Pulse Test: Pulse Width<300 us, Duty Cycle<2.0%

Electrical Characteristics (TA=25°C Unless Otherwise noted)

Characteristics	Symbol	Min	Typ	Max	Unit
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On Characteristics

Input Resistor	MUN5111DW	R1	7.0	10	13	kΩ
	MUN5112DW		15.4	22	28.6	
	MUN5113DW		32.9	47	61.1	
	MUN5114DW		7.0	10	13	
	MUN5115DW		7.0	10	13	
	MUN5116DW		3.3	4.7	6.1	
	MUN5130DW		0.7	1.0	1.3	
	MUN5131DW		1.5	2.2	2.9	
	MUN5132DW		3.3	4.7	6.1	
	MUN5133DW		3.3	4.7	6.1	
	MUN5134DW		15.4	22	28.6	
	MUN5135DW		1.54	2.2	2.86	
	MUN5136DW		70	100	130	
	MUN5137DW		32.9	47	61.1	
Resistor Ratio	MUN5111DW/MUN5112DW	R1/R2	0.8	1.0	1.2	
	MUN5113DW/MUN5136DW		0.17	0.21	0.25	
	MUN5114DW		-	-	-	
	MUN5115DW/MUN5116DW		0.8	1.0	1.2	
	MUN5130DW/MUN5131DW/MUN5132DW		0.055	0.1	0.185	
	MUN5133DW		0.38	0.47	0.56	
	MUN5134DW		0.038	0.047	0.056	
	MUN5135DW		1.7	2.1	2.6	
	MUN5137DW					

4. Pulse Test: Pulse Width < 300 us, Duty Cycle < 2.0 %

MUN5111DW1T1 Series

ALL MUN5111DW1T1 SERIES DEVICES

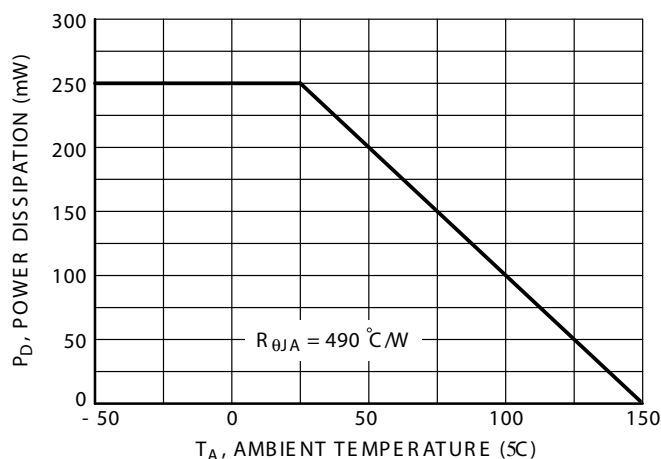


FIG.1 Derating Curve - ALL DEVICES

MUN5111DW Series

TYPICAL ELECTRICAL CHARACTERISTICS- MUN5111DW

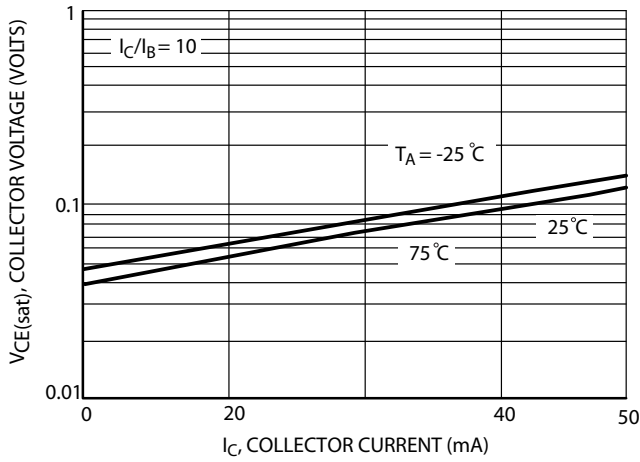


FIG.2 $V_{CE(sat)}$ versus I_C

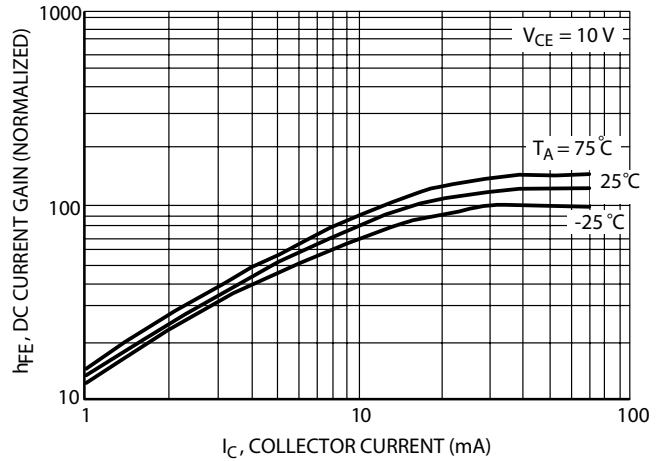


FIG.3 DC Current Gain

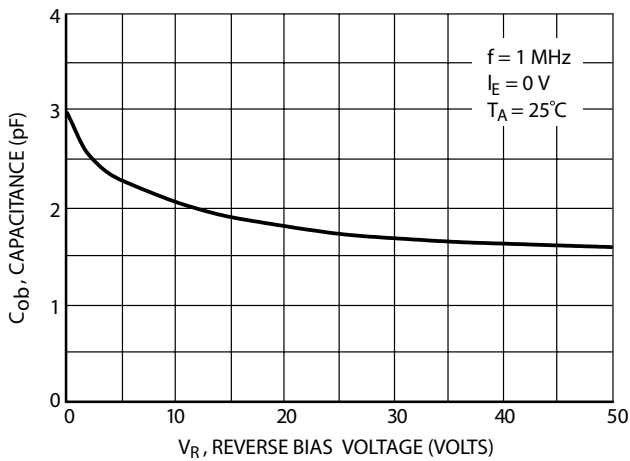


FIG.4 Output Capacitance

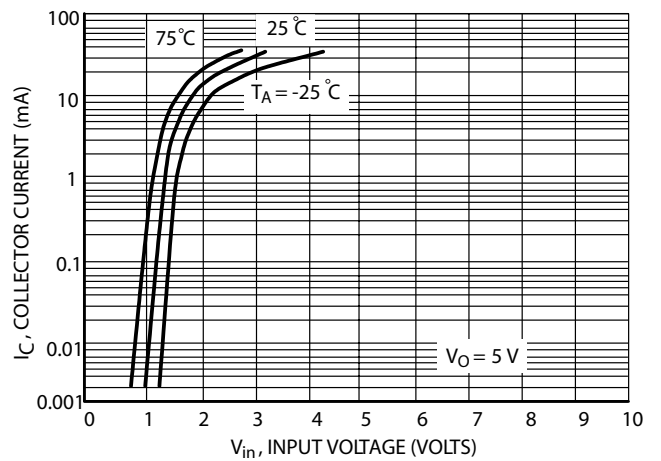


FIG.5 Output Current versus Input Voltage

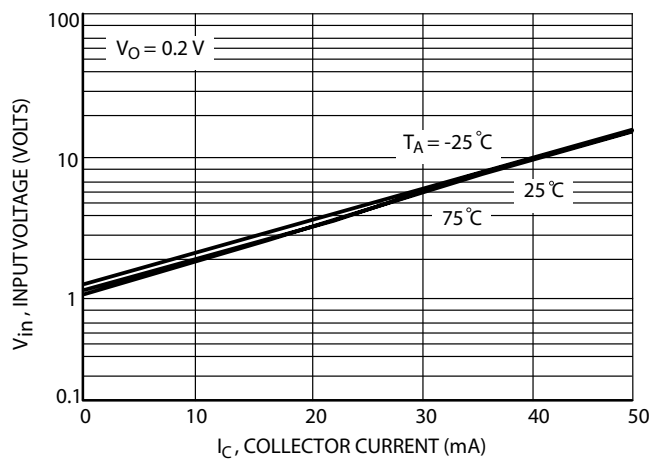


FIG.6 Input Voltage versus Output Current

MUN5111DW Series

TYPICAL ELECTRICAL CHARACTERISTICS-MUN5112DW

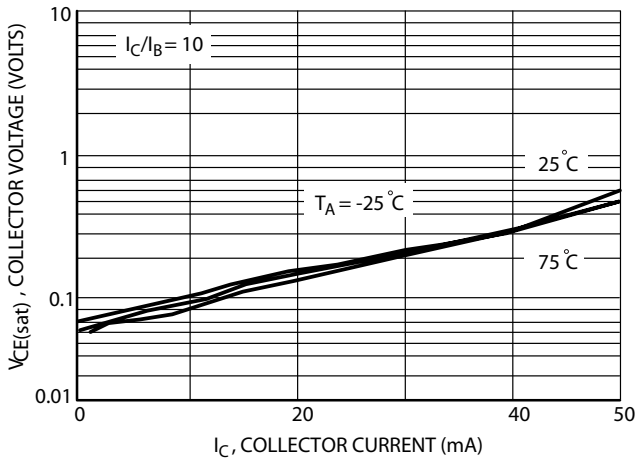


FIG.7 $V_{CE(sat)}$ versus I_C

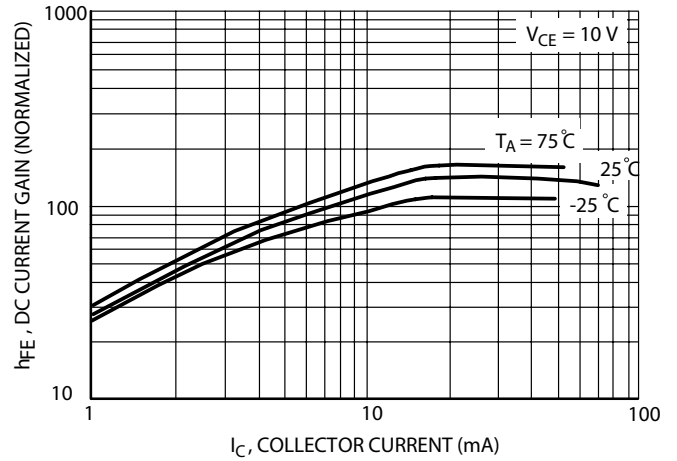


FIG.8 DC Current Gain

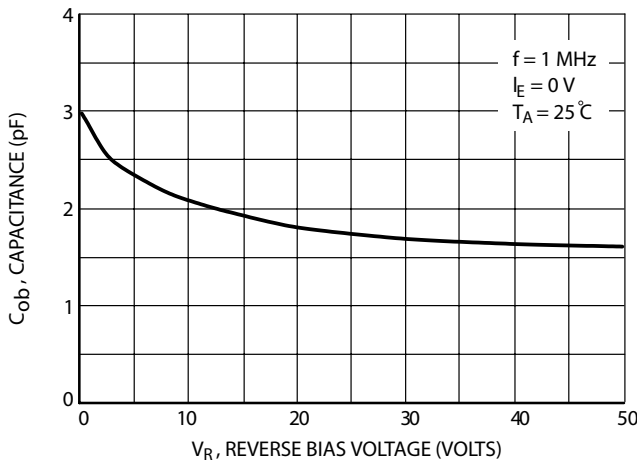


FIG.9 Output Capacitance

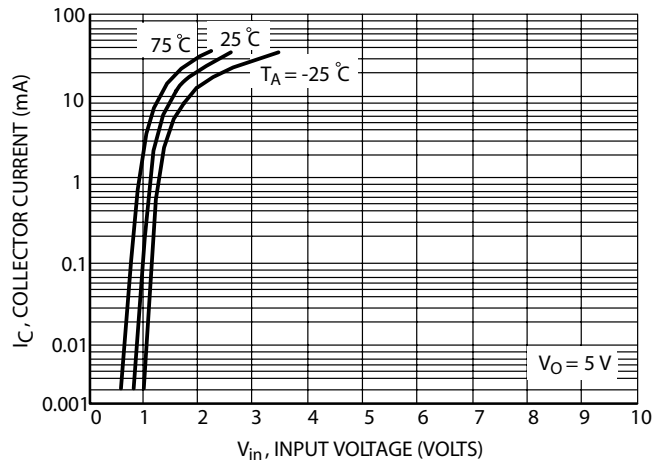


FIG.10 Output Current versus Input Voltage

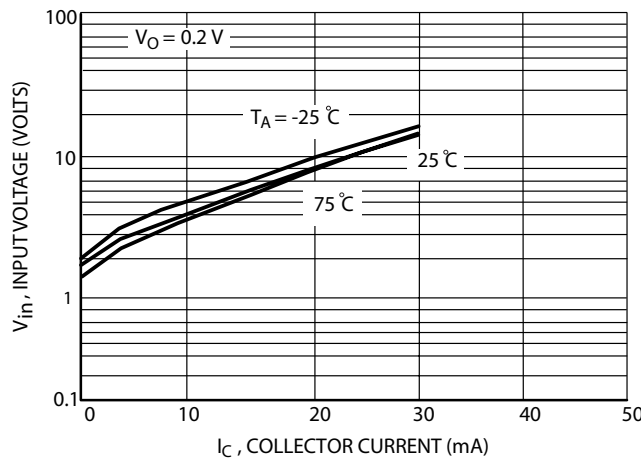


FIG.11 Input Voltage versus Output Current

MUN5111DW Series

TYPICAL ELECTRICAL CHARACTERISTICS-MUN5112DW

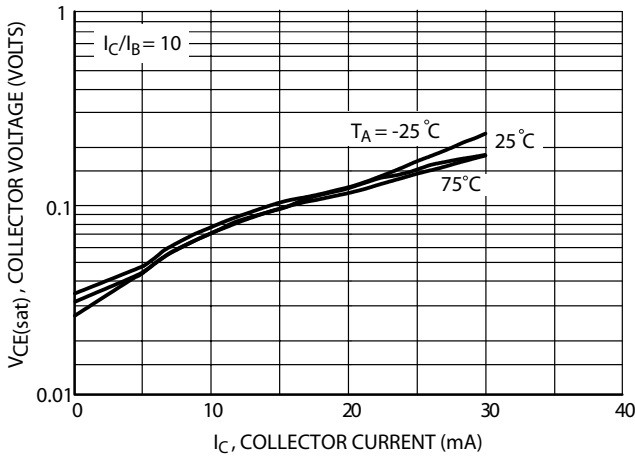


FIG.12 $V_{CE(sat)}$ versus I_C

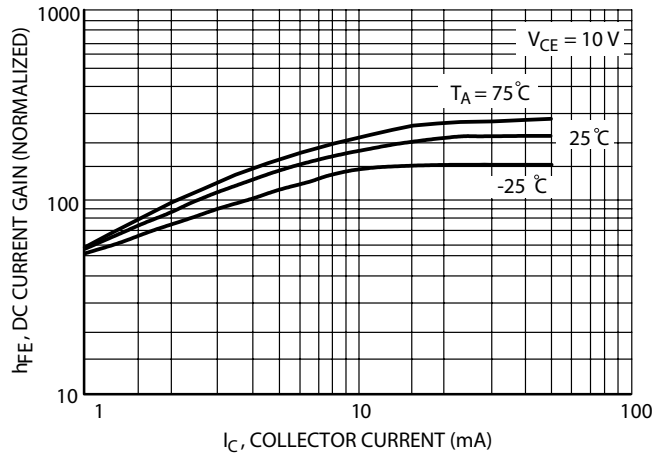


FIG.13 DC Current Gain

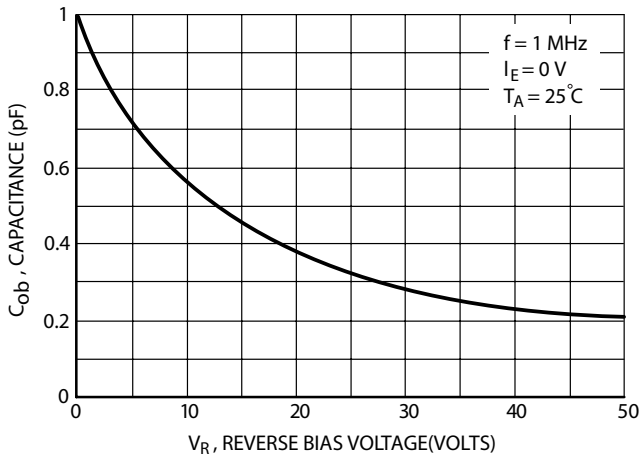


FIG.14 Output Capacitance

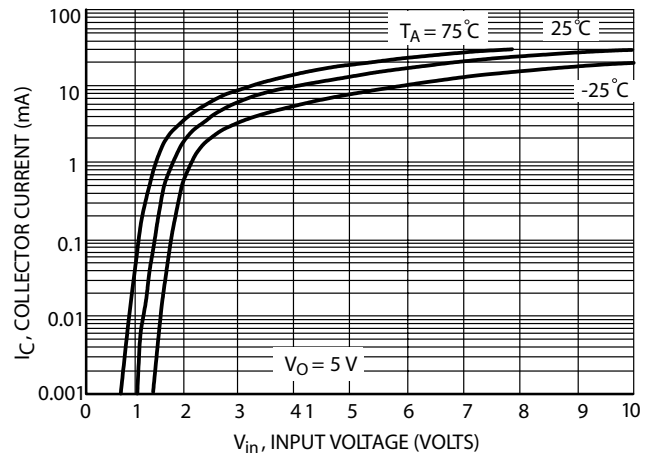


FIG.15 Output Current versus Input Voltage

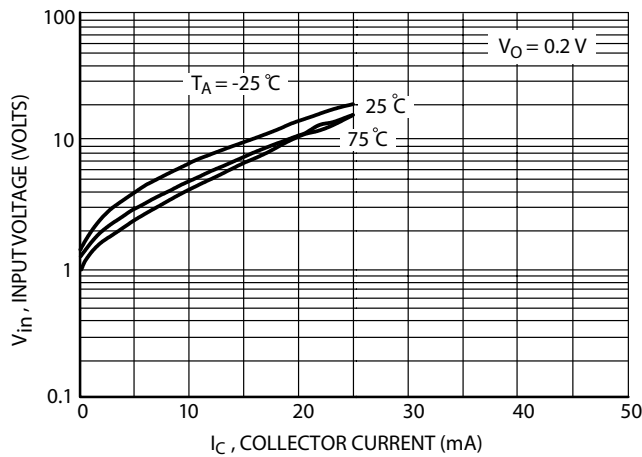


FIG.16 Input Voltage versus Output Current

MUN5111DW Series

TYPICAL ELECTRICAL CHARACTERISTICS-MUN5114DW

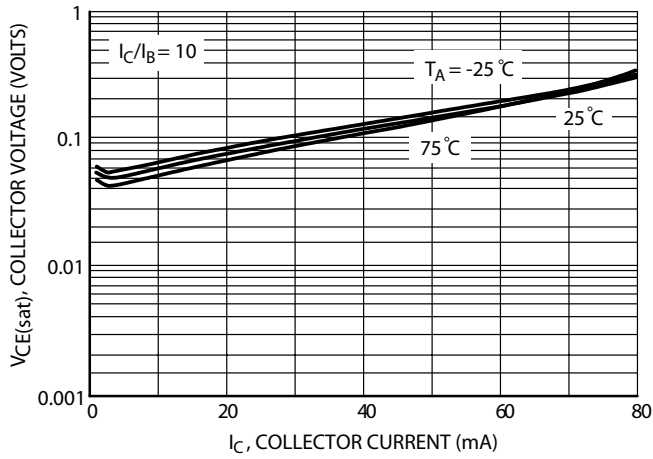


FIG.17 $V_{CE(sat)}$ versus I_C

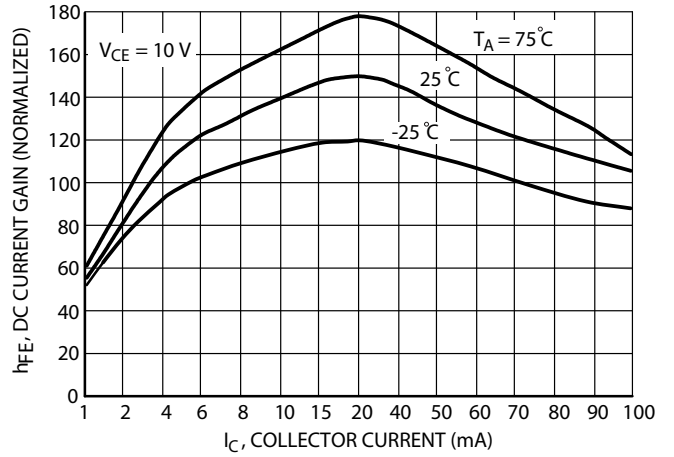


FIG.18 DC Current Gain

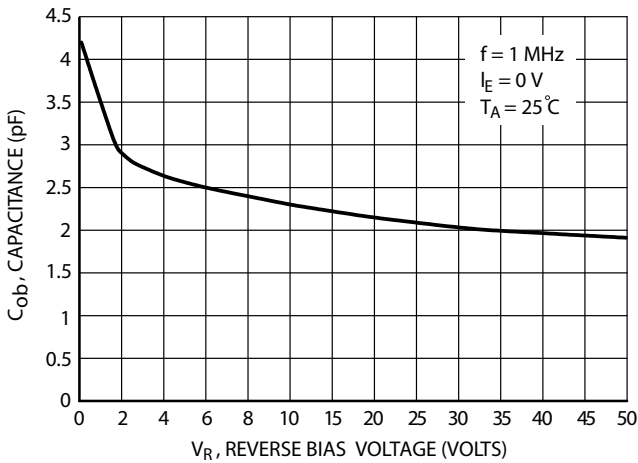


FIG.19 Output Capacitance

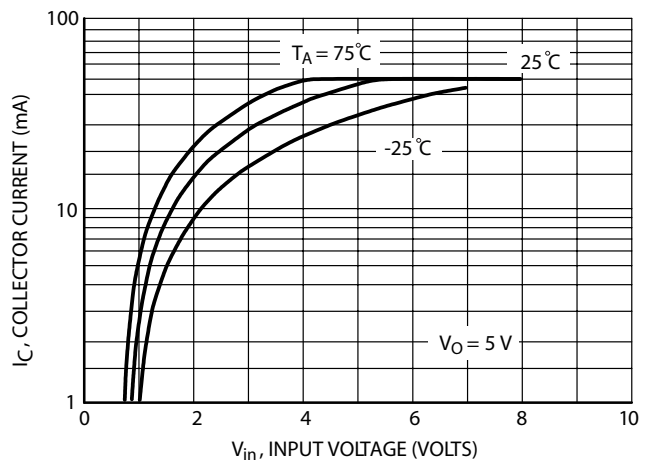


FIG.20 Output Current versus Input Voltage

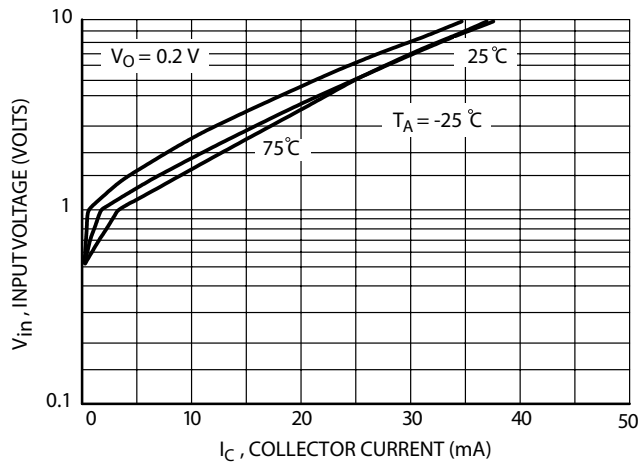


FIG.21 Input Voltage versus Output Current

MUN5111DW Series

TYPICAL ELECTRICAL CHARACTERISTICS-MUN5115DW

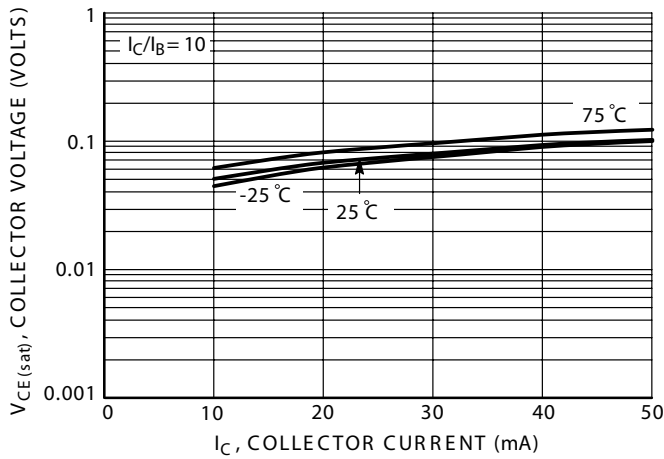


FIG.22 $V_{CE(sat)}$ versus I_C

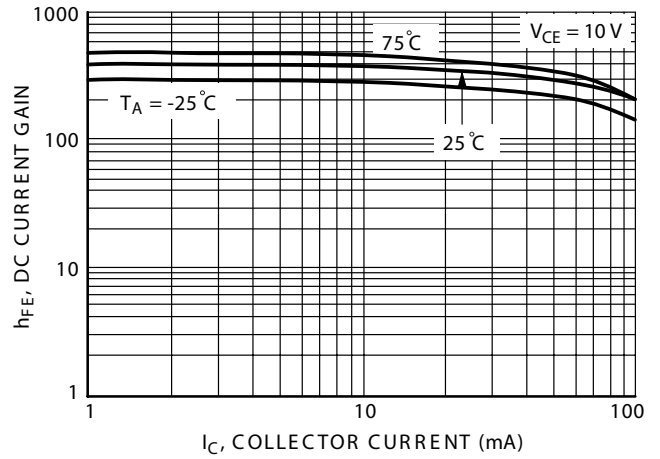


FIG.23 DC Current Gain

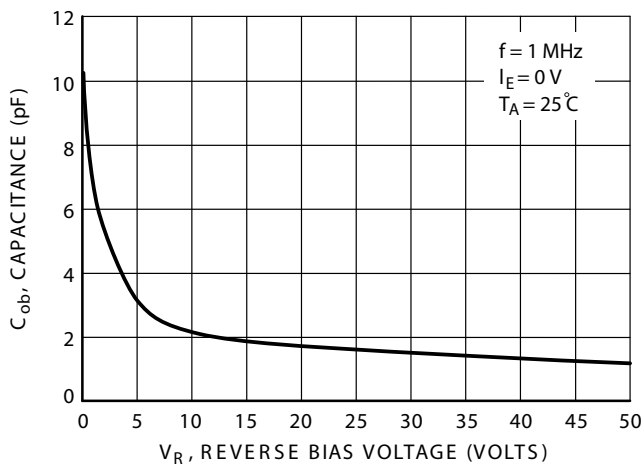


FIG.24 Output Capacitance

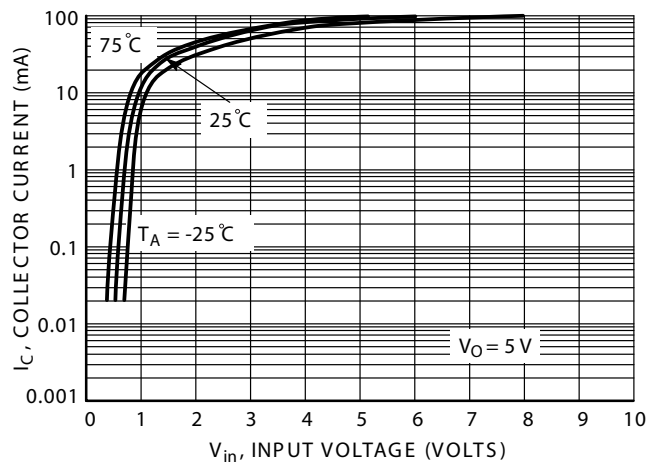


FIG.25 Output Current versus Input Voltage

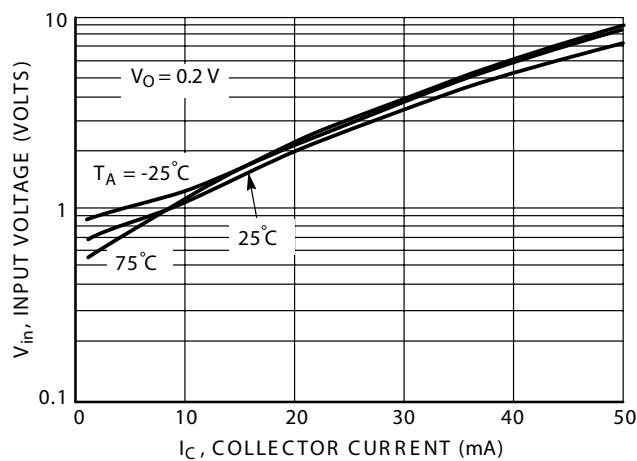


FIG.26 Input Voltage versus Output Current

MUN5111DW Series

TYPICAL ELECTRICAL CHARACTERISTICS-MUN5116DW

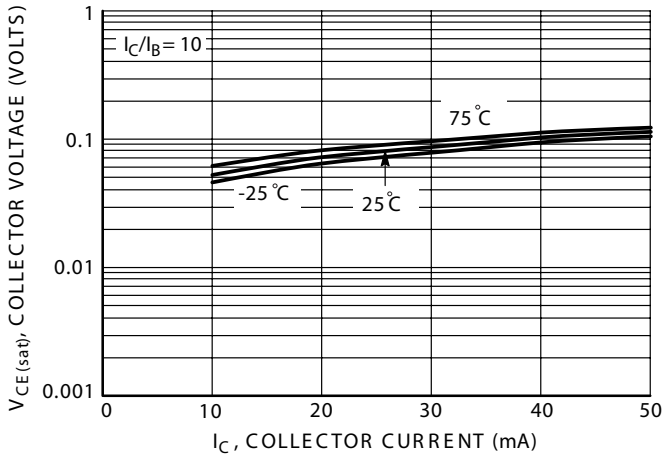


FIG.27 $V_{CE(sat)}$ versus I_C

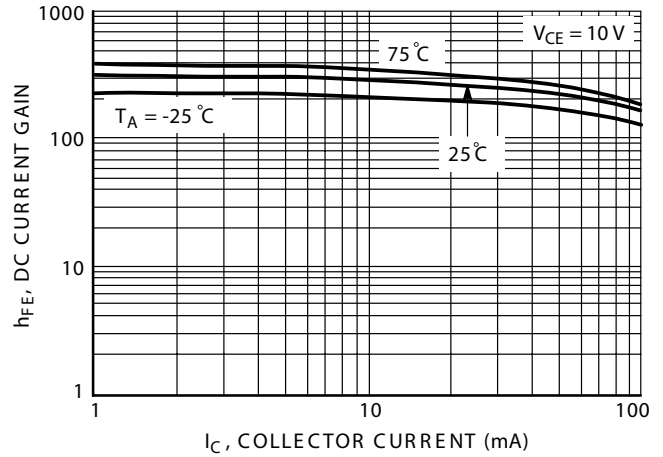


FIG.28 DC Current Gain

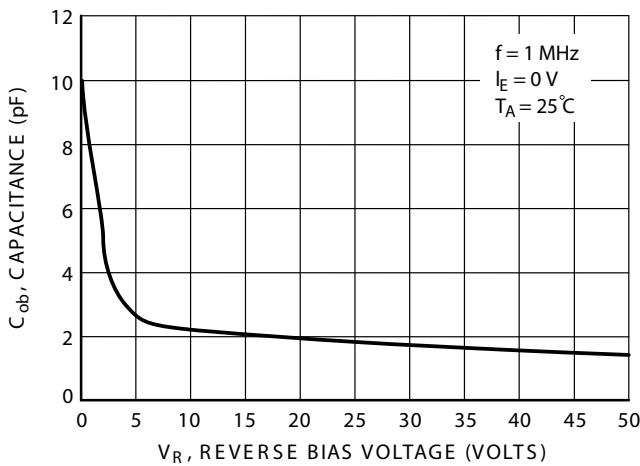


FIG.29 Output Capacitance

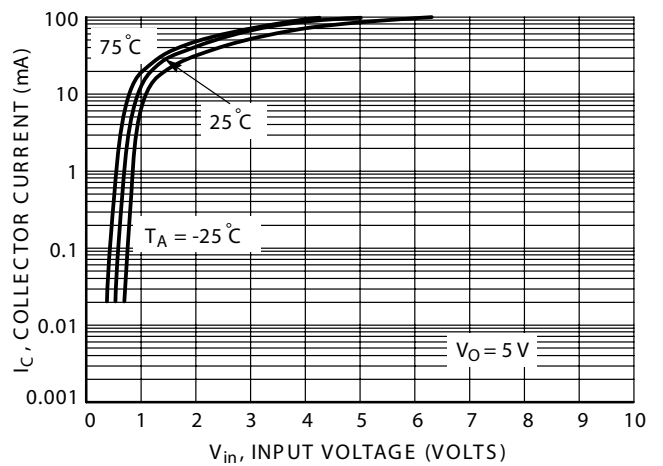


FIG.30 Output Current versus Input Voltage

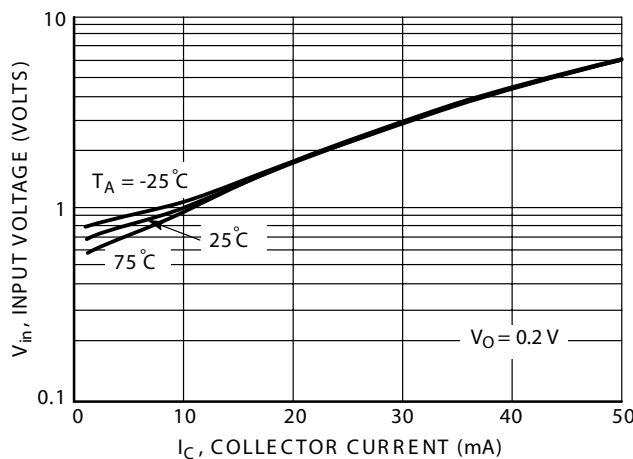


FIG.31 Input Voltage versus Output Current

MUN5111DW Series

TYPICAL ELECTRICAL CHARACTERISTICS-MUN5130DW

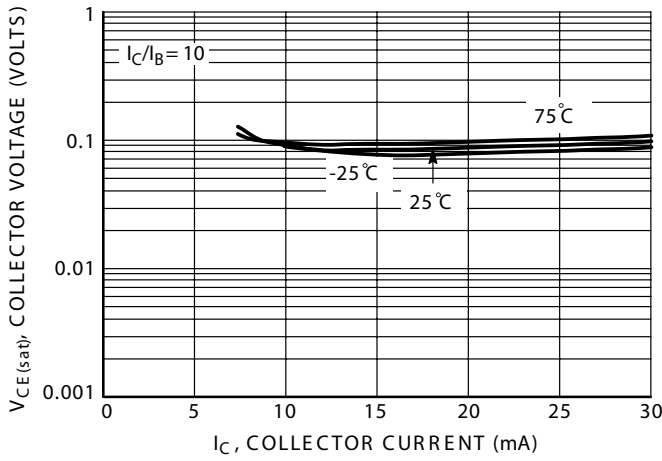


FIG.32 $V_{CE(sat)}$ versus I_C

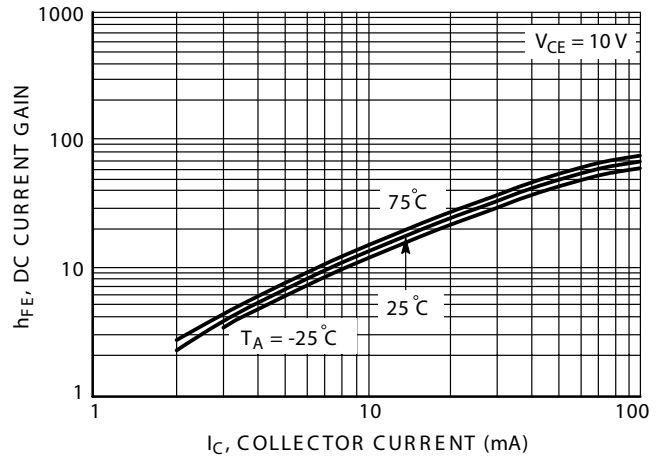


FIG.33 DC Current Gain

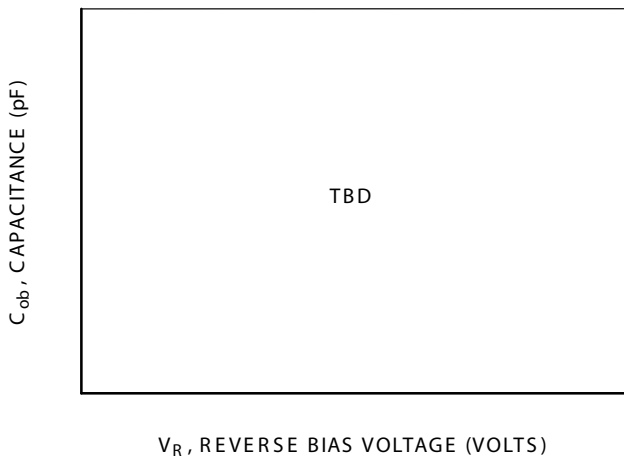


FIG.34 Output Capacitance

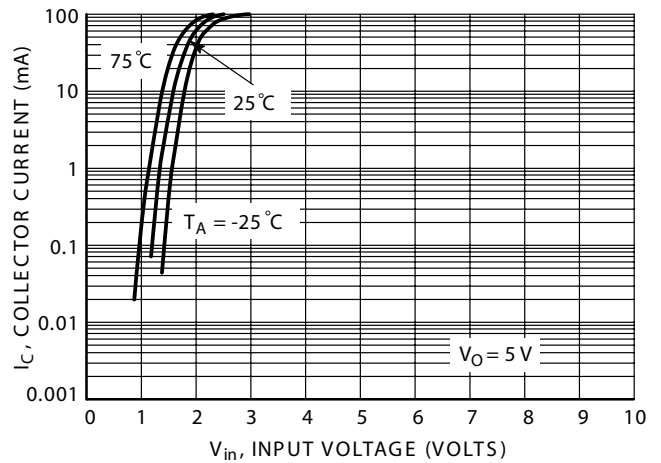


FIG.35 Output Current versus Input Voltage

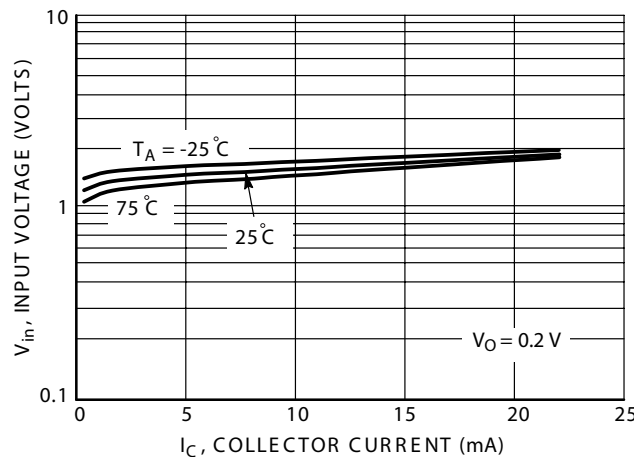


FIG.36 Input Voltage versus Output Current

MUN5111DW Series

TYPICAL ELECTRICAL CHARACTERISTICS-MUN5131DW

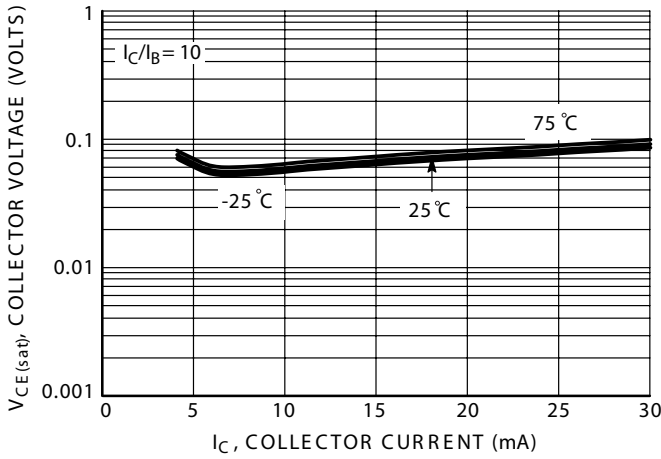


FIG. 37 $V_{CE(sat)}$ versus I_C

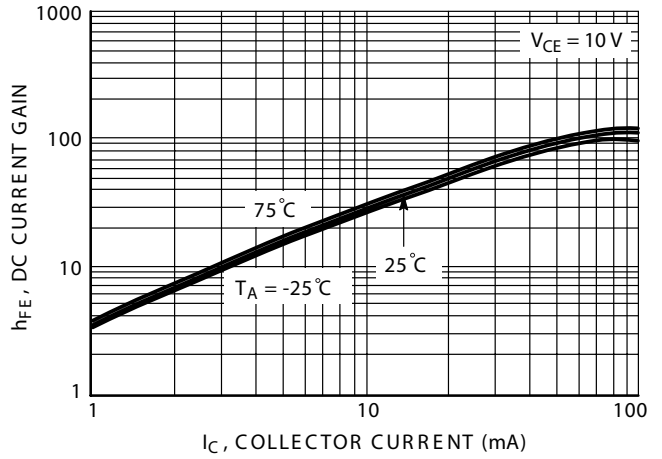


FIG.38 DC Current Gain

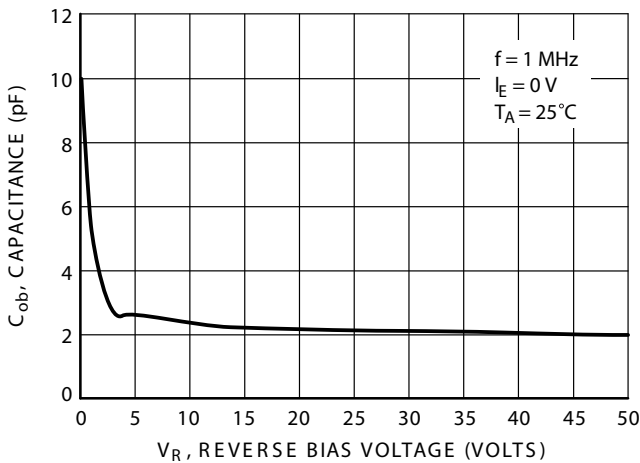


FIG.39 Output Capacitance

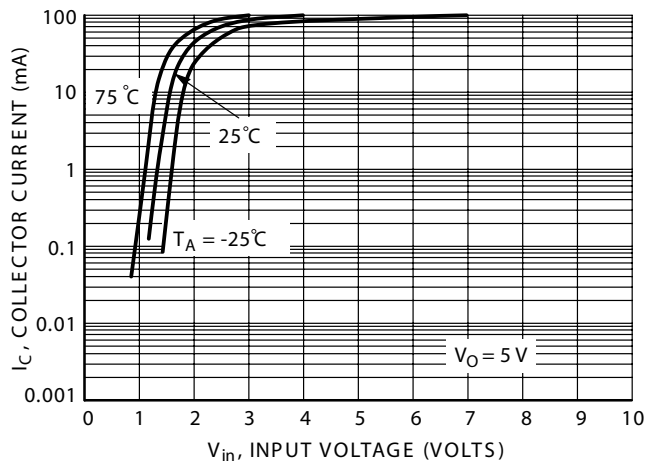


FIG.40 Output Current versus Input Voltage

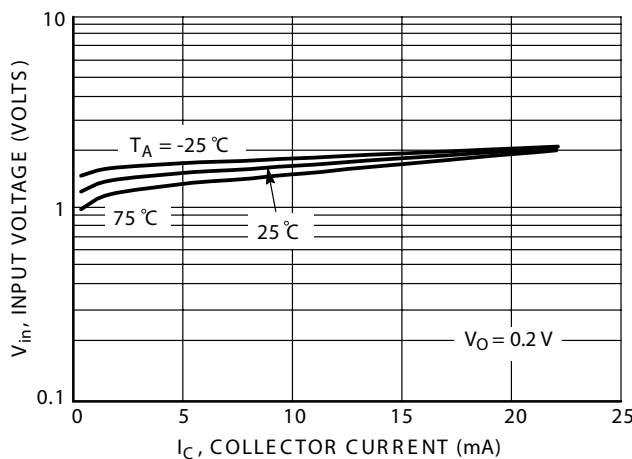


FIG.41 Input Voltage versus Output Current

MUN5111DW Series

TYPICAL ELECTRICAL CHARACTERISTICS-MUN5132DW

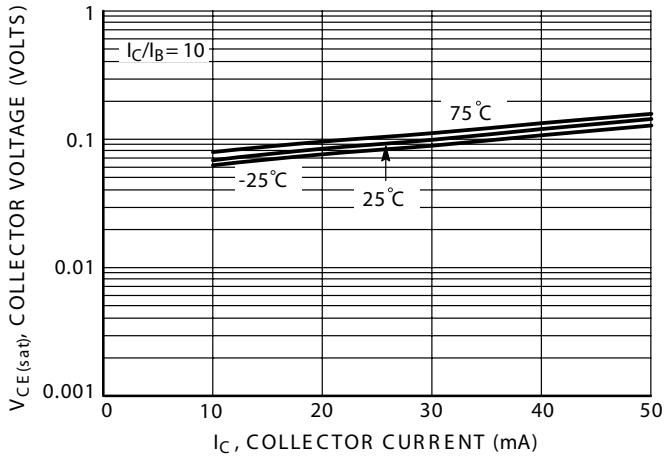


FIG.42 $V_{CE(sat)}$ versus I_C

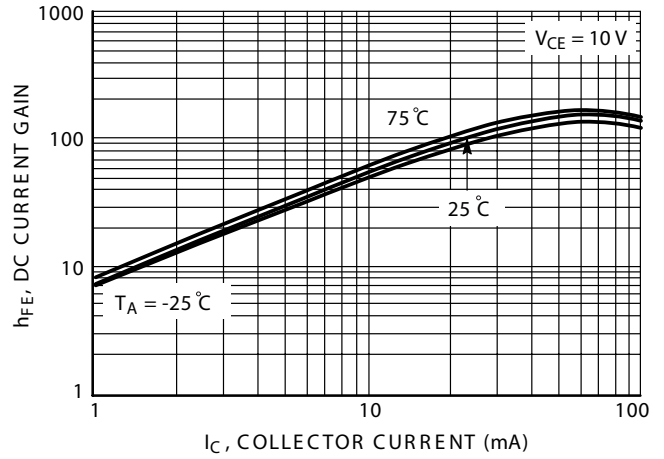


FIG.43 DC Current Gain

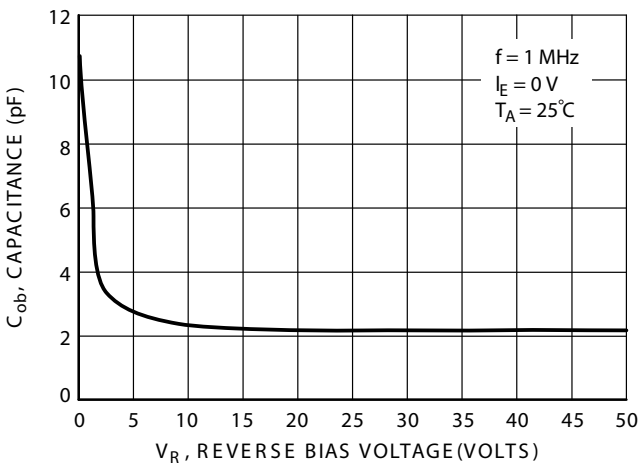


FIG.44 Output Capacitance

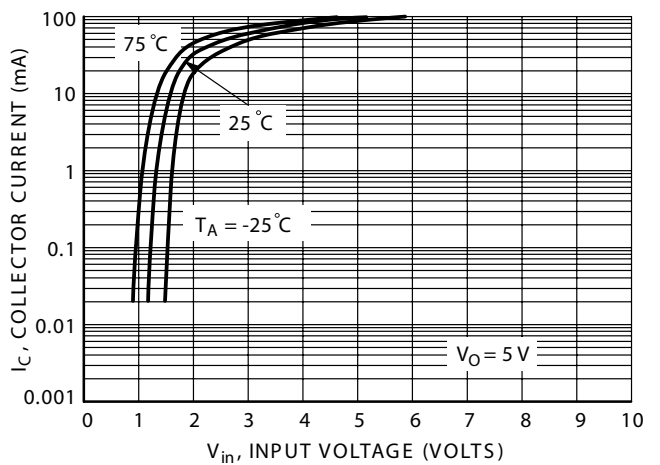


FIG.45 Output Current versus Input Voltage

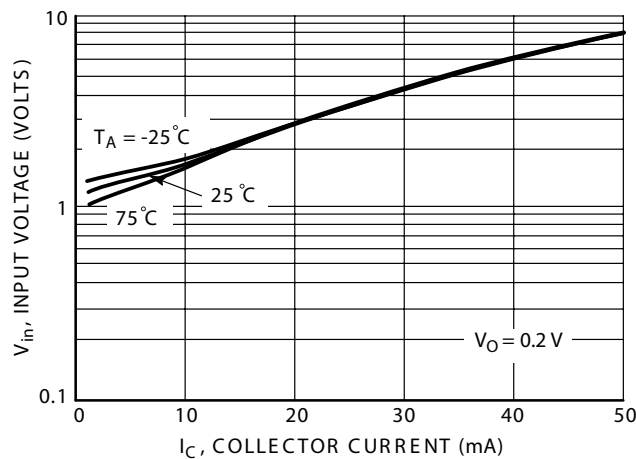


FIG.46 Input Voltage versus Output Current

MUN5111DW Series

TYPICAL ELECTRICAL CHARACTERISTICS-MUN5133DW

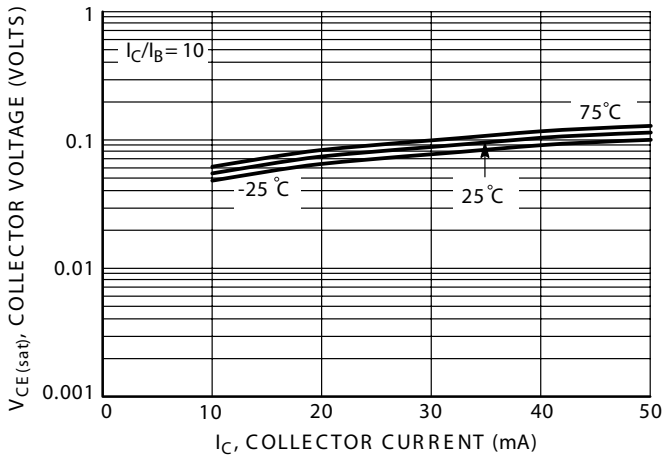


FIG.47. $V_{CE(sat)}$ versus I_C

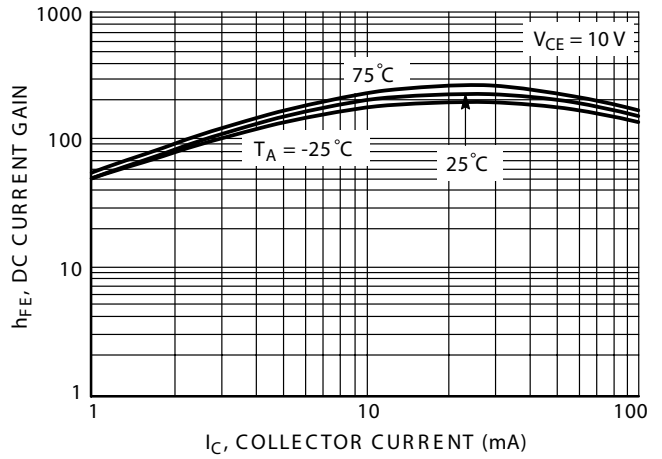


FIG.48 DC Current Gain

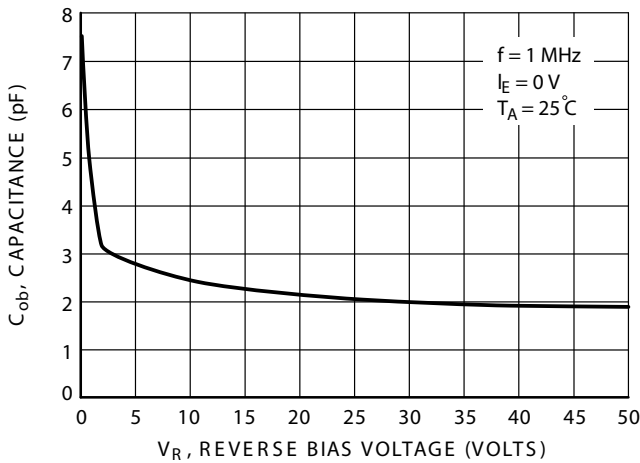


FIG.49 Output Capacitance

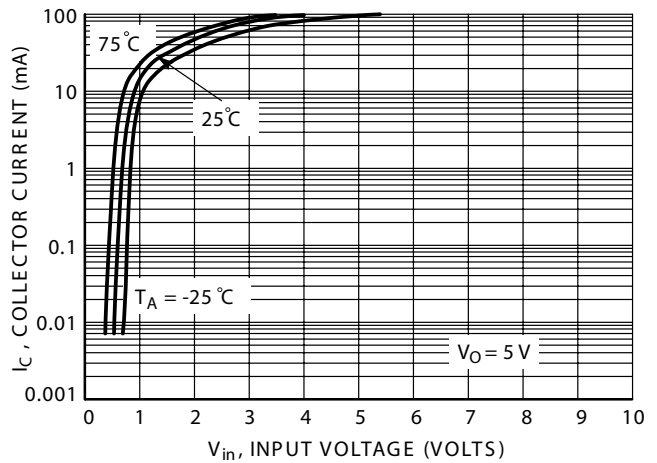


FIG.50 Output Current versus Input Voltage

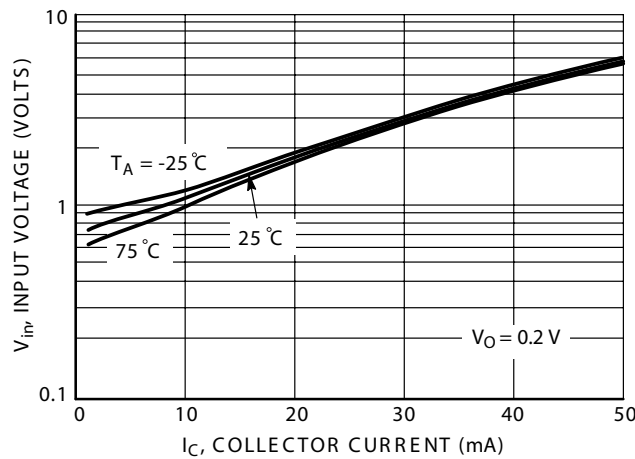


FIG.51 Input Voltage versus Output Current

MUN5111DW Series

TYPICAL ELECTRICAL CHARACTERISTICS-MUN5134DW

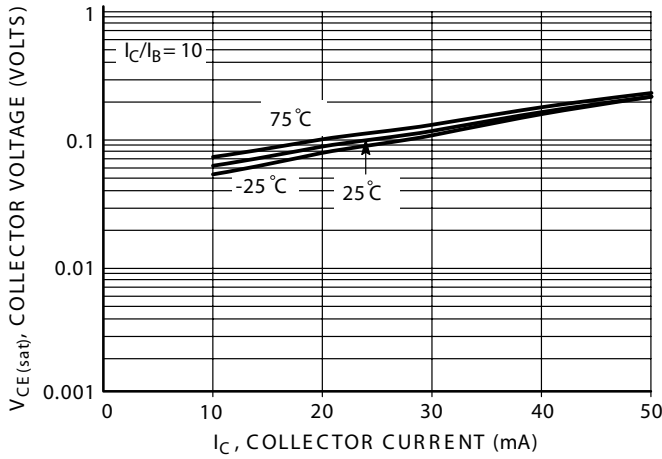


FIG.52 $V_{CE(sat)}$ versus I_C

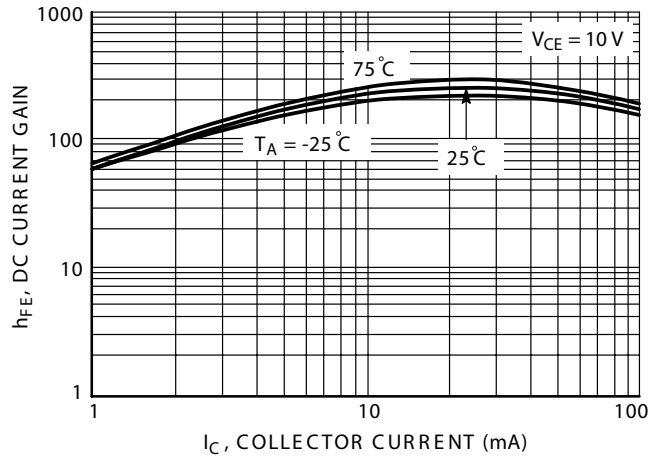


FIG.53 DC Current Gain

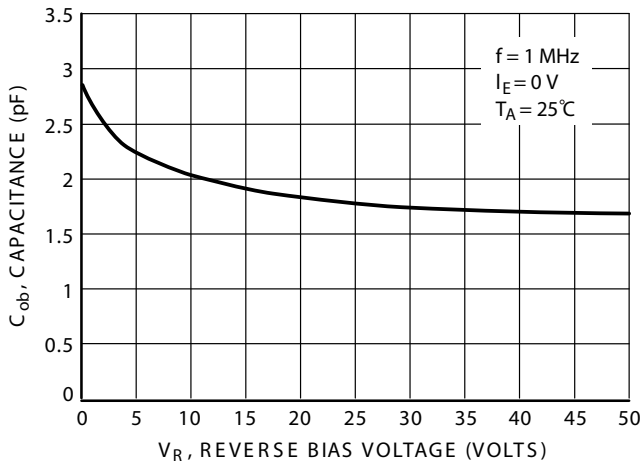


FIG.54 Output Capacitance

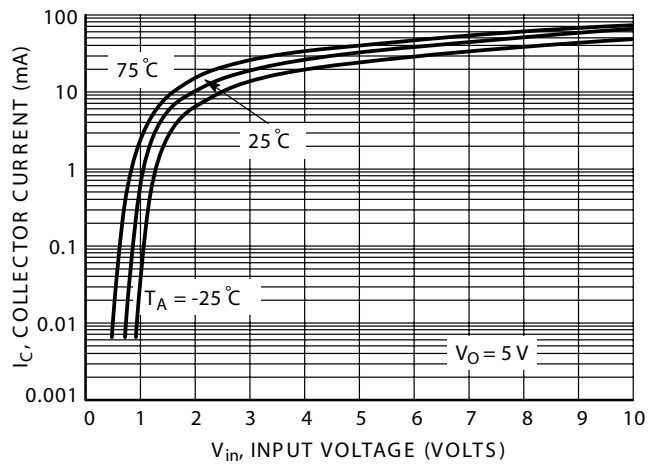


FIG.55 Output Current versus Input Voltage

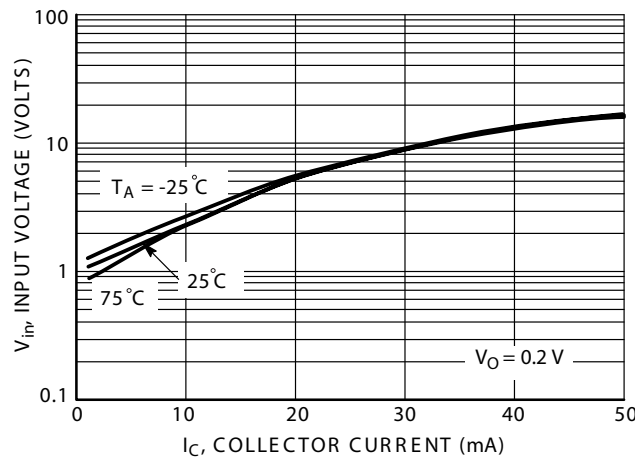


FIG.56 Input Voltage versus Output Current

MUN5111DW Series

TYPICAL ELECTRICAL CHARACTERISTICS-MUN5135DW

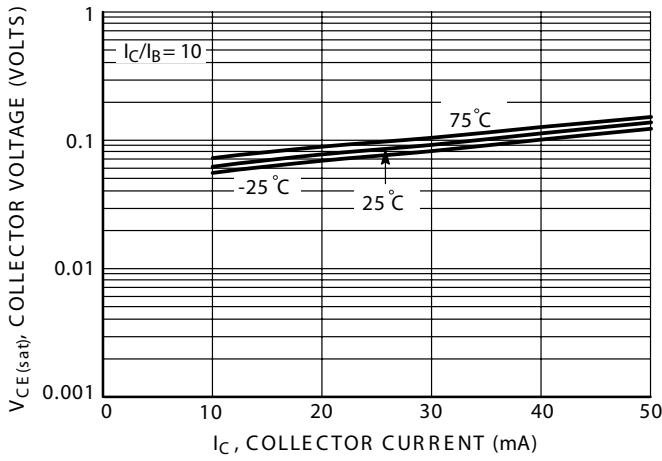


FIG.57 $V_{CE(sat)}$ versus I_C

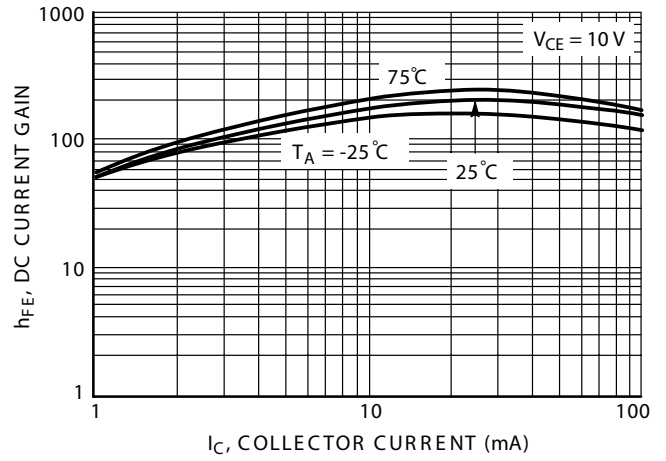


FIG.58 DC Current Gain

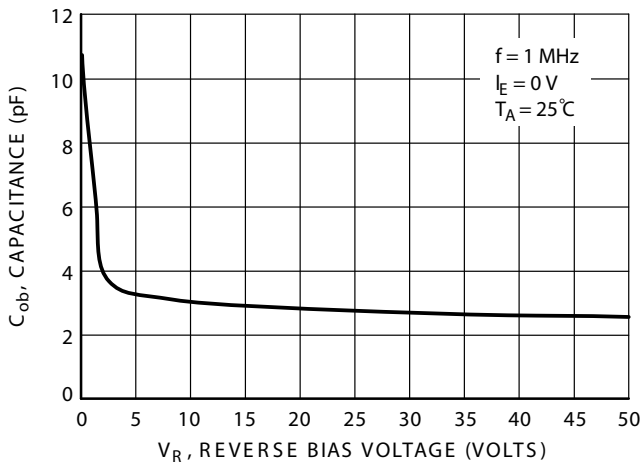


FIG.59 Output Capacitance

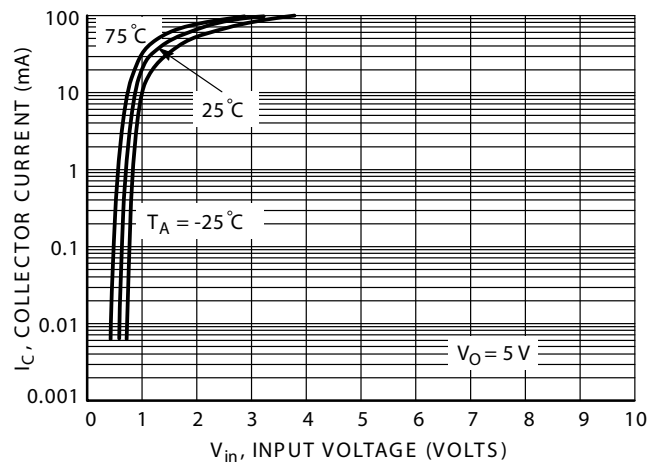


FIG.60 Output Current versus Input Voltage

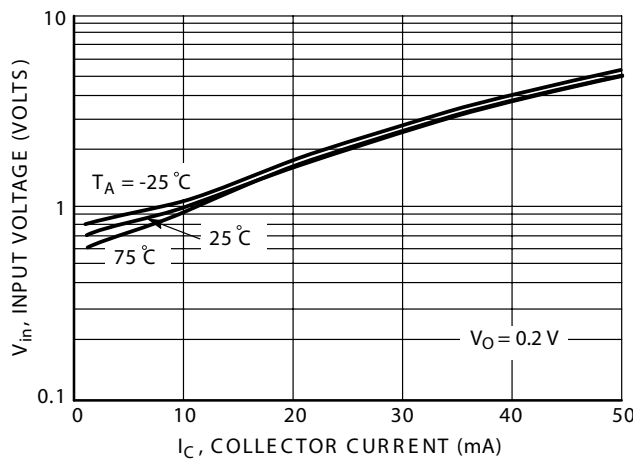


FIG.61 Input Voltage versus Output Current

MUN5111DW Series

TYPICAL ELECTRICAL CHARACTERISTICS-MUN5136DW

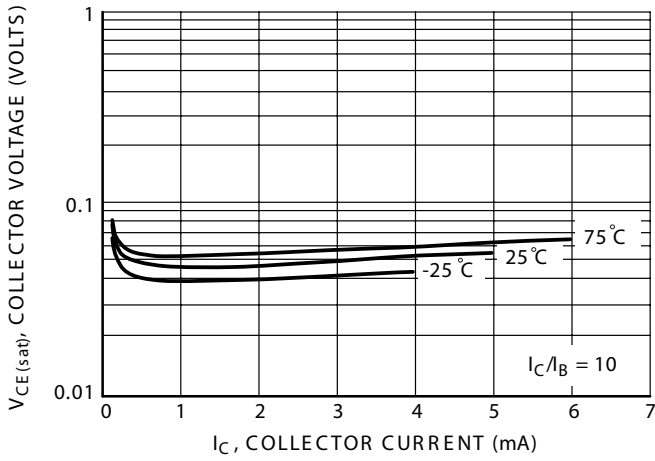


FIG.62 $V_{CE(sat)}$ versus I_C

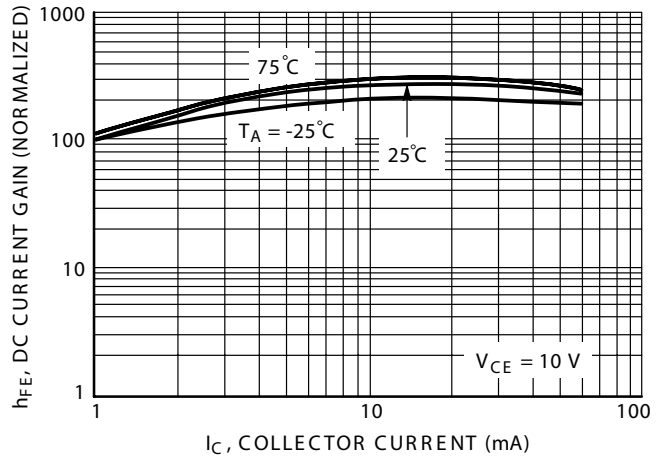


FIG.63 DC Current Gain

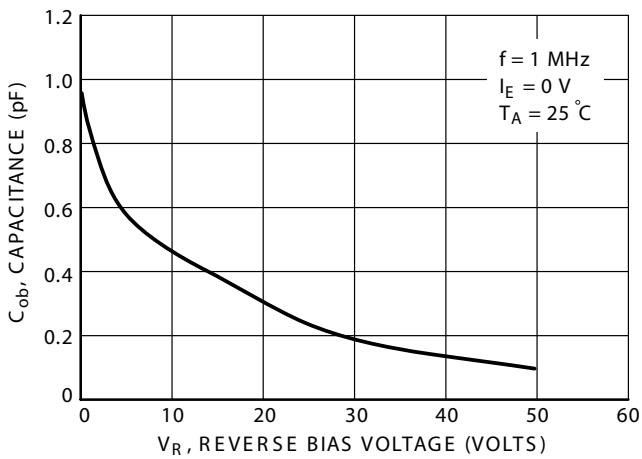


FIG.64 Output Capacitance

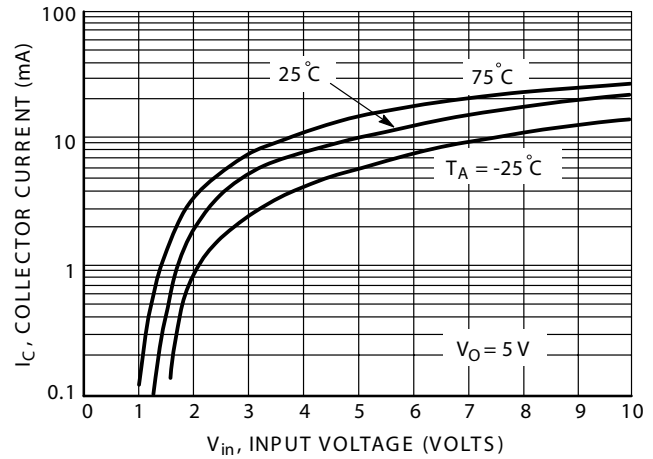


FIG.65 Output Current versus Input Voltage

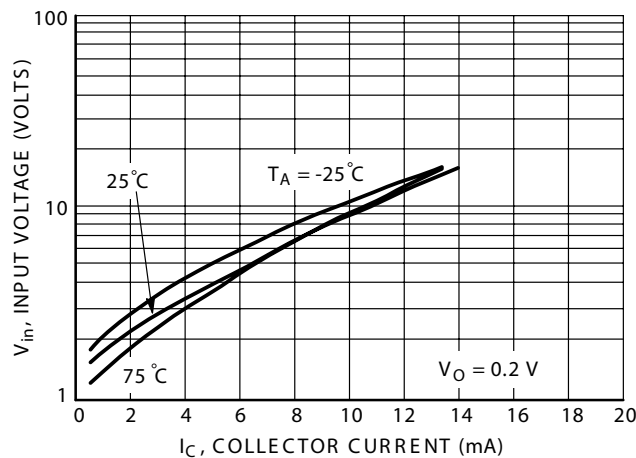


FIG.66 Input Voltage versus Output Current

MUN5111DW Series

TYPICAL ELECTRICAL CHARACTERISTICS-MUN5137DW

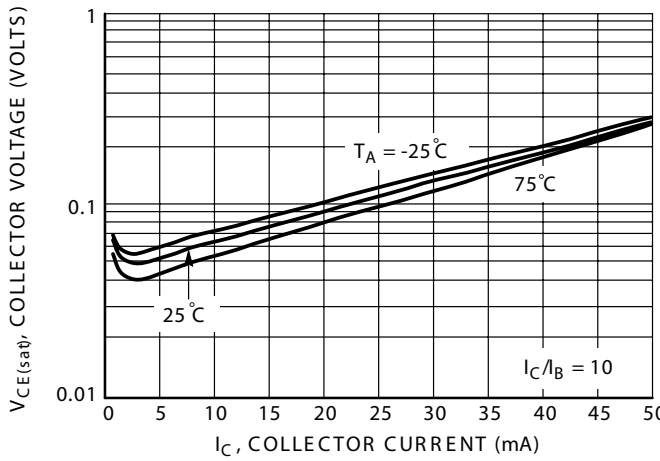


FIG.67 $V_{CE(sat)}$ versus I_C

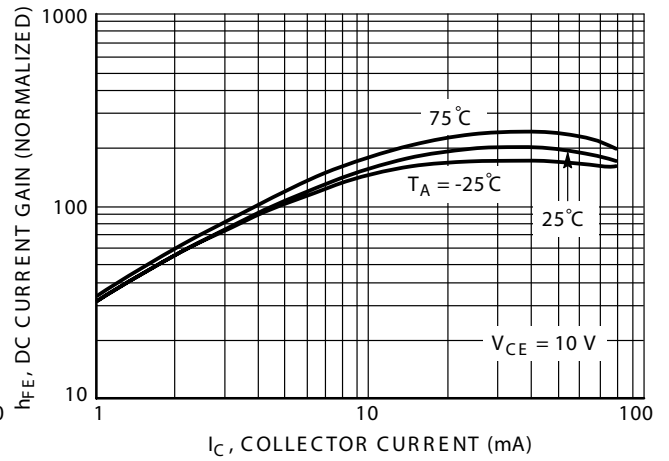


FIG.68 DC Current Gain

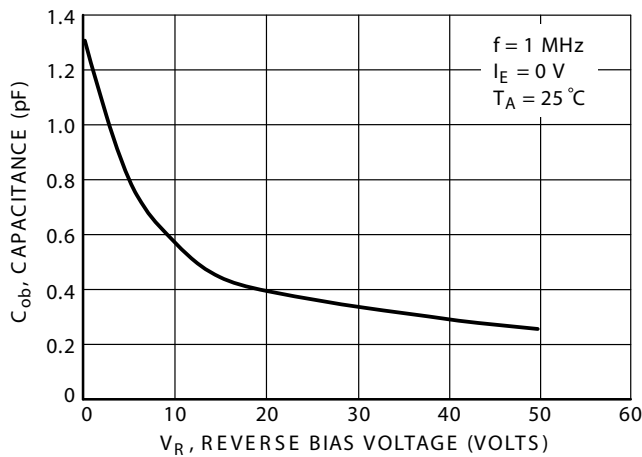


FIG. 69 Output Capacitance

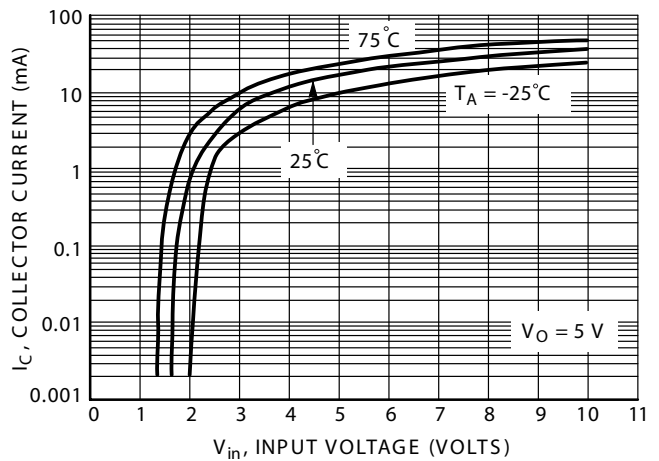


FIG.70 Output Current versus Input Voltage

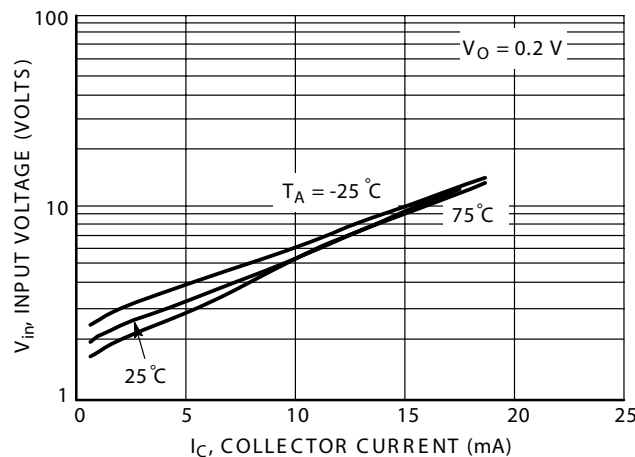
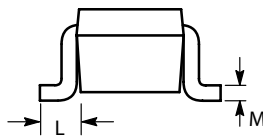
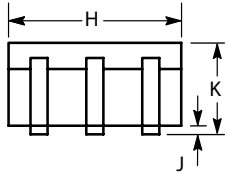
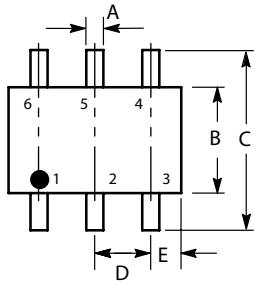


FIG.71 Input Voltage versus Output Current

SOT-363 Package Outline Dimensions

Unit:mm



SOT-363		
Dim	Min	Max
A	0.10	0.30
B	1.15	1.35
C	2.00	2.20
D	0.65 REF	
E	0.30	0.40
H	1.80	2.20
J	-	0.10
K	0.80	1.10
L	0.25	0.40
M	0.10	0.25