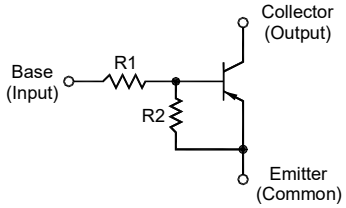
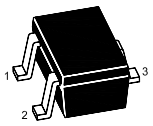
MMDT5110W…MMDT511ZW-AH

PNP Silicon Epitaxial Planar Digital Transistors





1.Base 2.Emitter 3.Collector
SOT-323 Plastic Package

Features

- AEC-Q101 Qualified
- Halogen and Antimony Free(HAF), RoHS compliant

Resistance Values

Type	R1 (KΩ)	R2 (KΩ)	Type	R1 (KΩ)	R2 (KΩ)
MMDT5110W	47	-	MMDT511DW	47	10
MMDT5111W	10	10	MMDT511EW	47	22
MMDT5112W	22	22	MMDT511FW	4.7	10
MMDT5113W	47	47	MMDT511HW	2.2	10
MMDT5114W	10	47	MMDT511LW	4.7	4.7
MMDT5115W	10	-	MMDT511MW	2.2	47
MMDT5116W	4.7	-	MMDT511NW	4.7	47
MMDT5117W	22	-	MMDT511TW	22	47
MMDT5119W	1	10	MMDT511VW	2.2	2.2
			MMDT511ZW	4.7	22

Absolute Maximum Ratings (T_a = 25℃)

Parameter	Symbol	Value	Unit
Collector Base Voltage	$-V_{CBO}$	50	V
Collector Emitter Voltage	$-V_{CEO}$	50	V
Collector Current	$-I_C$	100	mA
Total Power Dissipation	P_{tot}	200	mW
Junction Temperature	T_j	150	℃
Storage Temperature Range	T_{stg}	- 55 to + 150	℃

Thermal Characteristics

Parameter	Symbol	Max.	Unit
Thermal Resistance from Junction to Ambient [1)]	$R_{\theta JA}$	625	℃/W

[1)] Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.

Dated: 07/04/2022 Rev:02

Characteristics at T_a = 25℃

Parameter		Symbol	Min.	Typ.	Max.	Unit
DC Current Gain						
at $-V_{CE}$ = 5 V, $-I_C$ = 10 mA	MMDT511L/511VW	h_{FE}	20	-	-	-
	MMDT5119/511D/511F/511HW		30	-	-	-
	MMDT5111W		35	-	-	-
	MMDT5112/511EW		60	-	-	-
	MMDT511ZW		60	-	200	-
	MMDT5113/5114/511MW		80	-	-	-
	MMDT511N/511TW		80	-	400	-
	MMDT5110/5115/5116/5117W		160	-	460	-
Collector Base Cutoff Current at $-V_{CB}$ = 50 V		$-I_{CBO}$	-	-	100	nA
Emitter Base Cutoff Current at $-V_{EB}$ = 6 V	MMDT5110/5115/5116/5117W	$-I_{EBO}$	-	-	0.01	mA
	MMDT5113W		-	-	0.1	
	MMDT5112/5114/511D/511E/511M/511N/511TW		-	-	0.2	
	MMDT511ZW		-	-	0.4	
	MMDT5111W		-	-	0.5	
	MMDT511F/511HW		-	-	1	
	MMDT5119W		-	-	1.5	
	MMDT511L/511VW		-	-	2	
Collector Base Breakdown Voltage at $-I_C$ = 10 µA		$-V_{(BR)CBO}$	50	-	-	V
Collector Emitter Breakdown Voltage at $-I_C$ = 2 mA		$-V_{(BR)CEO}$	50	-	-	V
Collector Emitter Saturation Voltage at $-I_C$ = 10 mA, $-I_B$ = 0.5 mA		$-V_{CEsat}$	-	-	0.3	V
Input Voltage (ON)						
at $-V_{CE}$ = 0.3 V, $-I_C$ = 20 mA	MMDT511V/511L/5119/511HW	$-V_{I(ON)}$	-	-	3	V
at $-V_{CE}$ = 0.3 V, $-I_C$ = 20 mA	MMDT511FW		-	-	2.5	
at $-V_{CE}$ = 0.3 V, $-I_C$ = 2 mA	MMDT511TW		-	-	2.5	
at $-V_{CE}$ = 0.3 V, $-I_C$ = 2 mA	MMDT511DW		-	-	5	
at $-V_{CE}$ = 0.3 V, $-I_C$ = 2 mA	MMDT511EW		-	-	4	
at $-V_{CE}$ = 0.3 V, $-I_C$ = 10 mA	MMDT5111W		-	-	3	
at $-V_{CE}$ = 0.2 V, $-I_C$ = 5 mA	MMDT5112W		-	-	3	
at $-V_{CE}$ = 0.3 V, $-I_C$ = 2 mA	MMDT5113W		-	-	3	
at $-V_{CE}$ = 0.3 V, $-I_C$ = 5 mA	MMDT511MW		-	-	1.1	
at $-V_{CE}$ = 0.2 V, $-I_C$ = 5 mA	MMDT511ZW		-	-	1.7	
at $-V_{CE}$ = 0.3 V, $-I_C$ = 5 mA	MMDT511NW		-	-	1.3	
at $-V_{CE}$ = 0.3 V, $-I_C$ = 1 mA	MMDT5114W		-	-	1.4	

Characteristics at T_a = 25℃

Parameter		Symbol	Min.	Typ.	Max.	Unit
Input Voltage (OFF) at $-V_{CE}$ = 5 V, $-I_C$ = 100 μA	MMDT511V/511L/5111/5112/5113W	$-V_{I(OFF)}$	0.5	-	-	V
	MMDT5119/511M/511Z/511NW		0.5	-	-	
	MMDT511H/511F/5114W		0.3	-	-	
	MMDT511TW		0.4	-	-	
	MMDT511DW		1	-	-	
	MMDT511EW		0.8	-	-	
Transition Frequency at $-V_{CB}$ = 10 V, $-I_E$ = 5 mA, f = 100 MHz		f_T	-	250	-	MHz
Input Resistance	MMDT5119W	R1	- 30%	1	+ 30%	KΩ
	MMDT511H/511M/511VW			2.2		
	MMDT5116/511F/511L/511N/511ZW			4.7		
	MMDT5111/5114/5115W			10		
	MMDT5112/5117/511TW			22		
	MMDT5110/5113/511D/511EW			47		
Resistance Ratio	MMDT511MW	R1/R2	-	0.047	-	-
	MMDT511NW		-	0.1	-	-
	MMDT5119W		0.08	0.1	0.12	-
	MMDT511ZW		-	0.21	-	-
	MMDT5114W		0.17	0.21	0.25	-
	MMDT511TW		-	0.47	-	-
	MMDT511FW		0.37	0.47	0.57	-
	MMDT511VW		-	1	-	-
	MMDT5111/5112/5113/511LW		0.8	1	1.2	-
	MMDT511HW		0.17	0.22	0.27	-
	MMDT511EW		1.7	2.14	2.6	-
	MMDT511DW		3.7	4.7	5.7	-

Electrical Characteristics Curves: MMDT5111W

Fig. 1 Output Current vs. $V_{I(ON)}$, Input Voltage

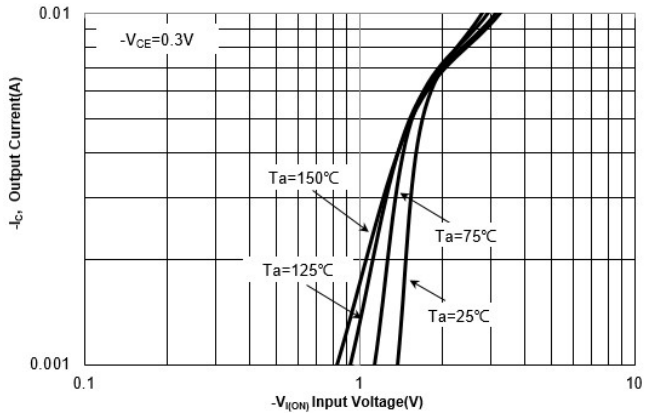


Fig. 2 Output Current vs. $V_{I(OFF)}$, Input Voltage

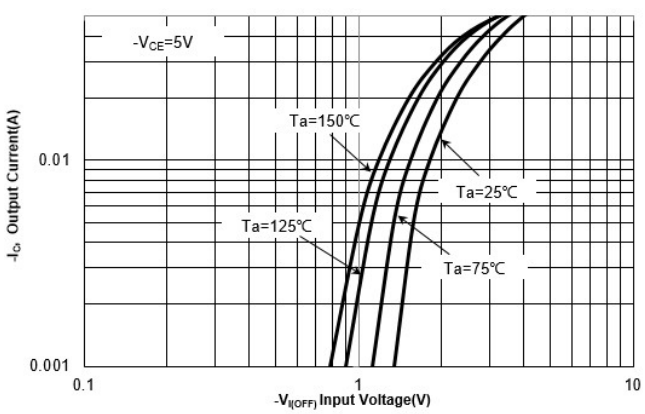


Fig. 3 DC Current Gain vs. Output Current

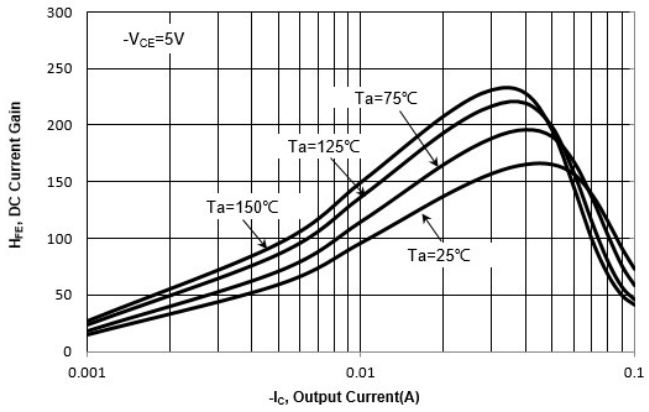
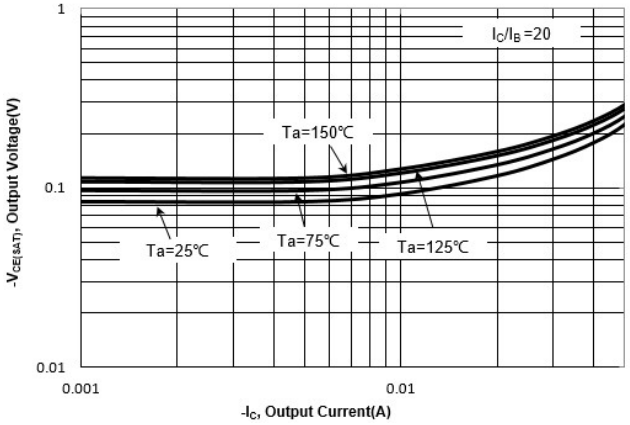


Fig. 4 V_{CESAT} vs. Output Current



Electrical Characteristics Curves: MMDT5112W

Fig. 1 Output Current vs. $V_{I(ON)}$, Input Voltage

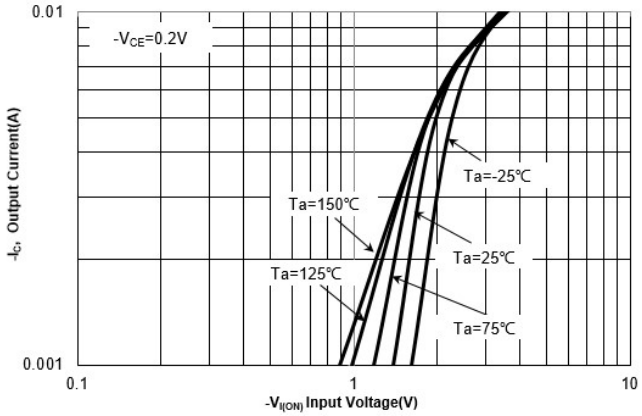


Fig. 2 Output Current vs. $V_{I(OFF)}$, Input Voltage

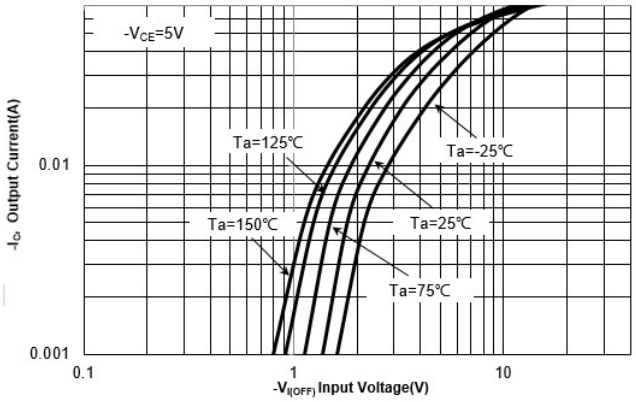


Fig. 3 DC Current Gain vs. Output Current

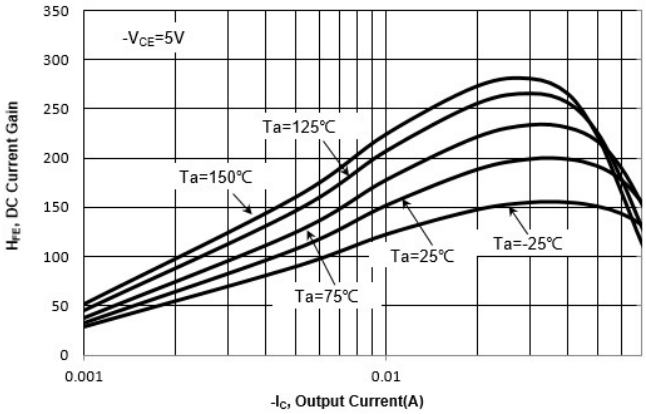
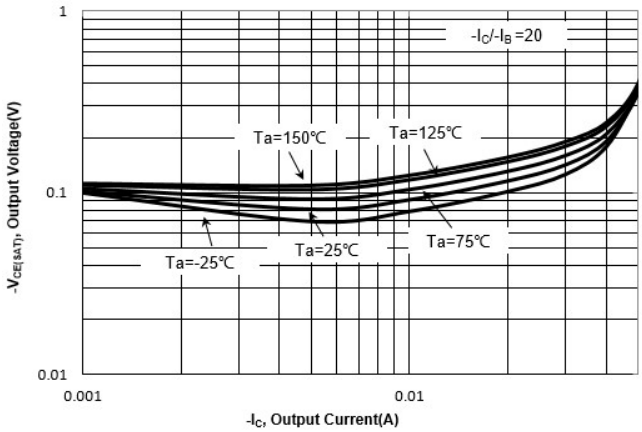


Fig. 4 V_{CESAT} vs. Output Current



Electrical Characteristics Curves: MMDT5113W

Fig. 1 Output Current vs. $V_{I(ON)}$, Input Voltage

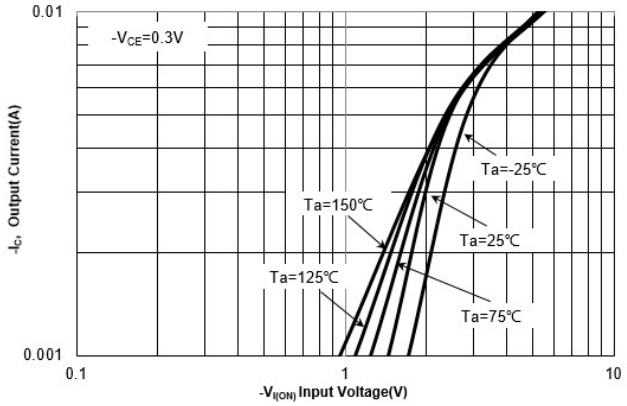


Fig. 2 Output Current vs. $V_{I(OFF)}$, Input Voltage

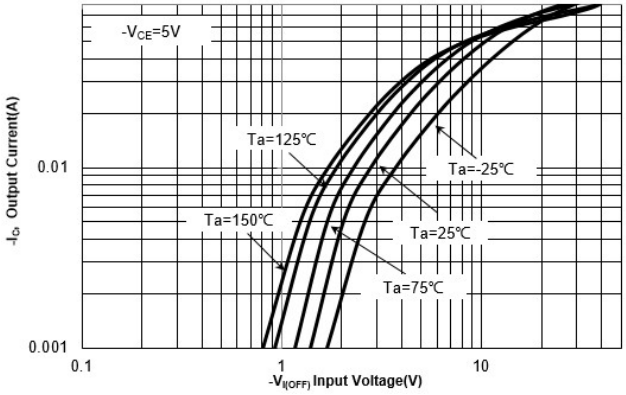


Fig. 3 DC Current Gain vs. Output Current

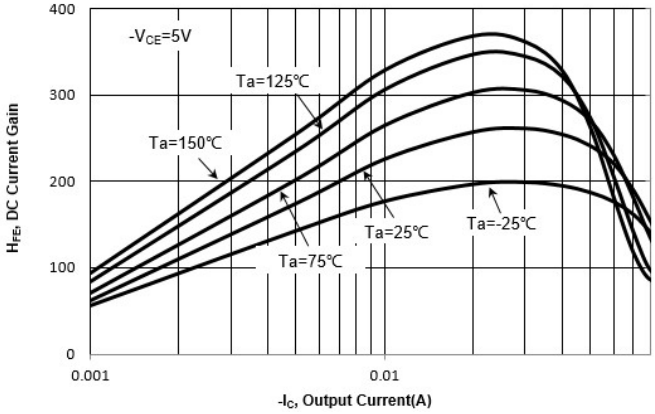
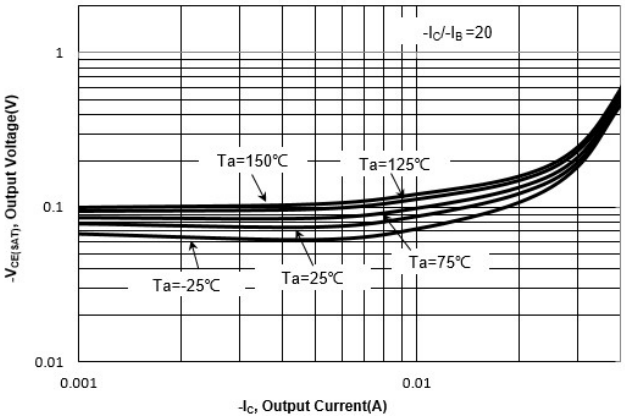


Fig. 4 V_{CESAT} vs. Output Current



Electrical Characteristics Curves: MMDT5114W

Fig. 1 Output Current vs. $V_{I(ON)}$, Input Voltage

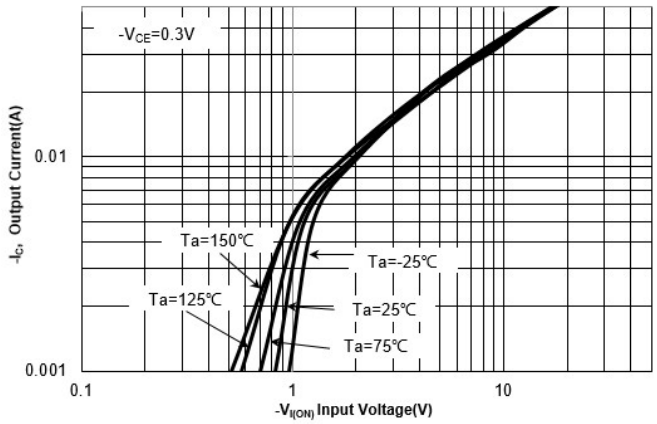


Fig. 2 Output Current vs. $V_{I(OFF)}$, Input Voltage

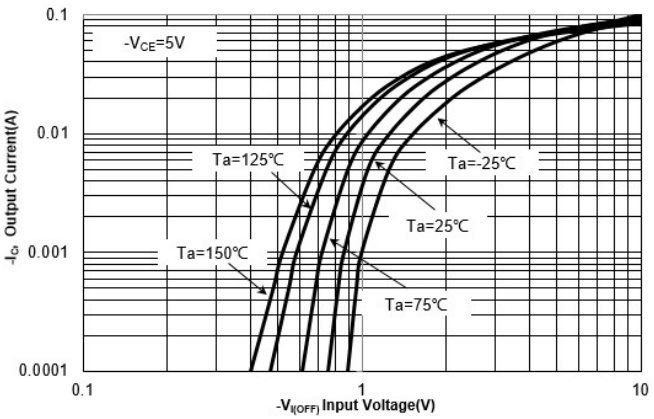


Fig. 3 DC Current Gain vs. Output Current

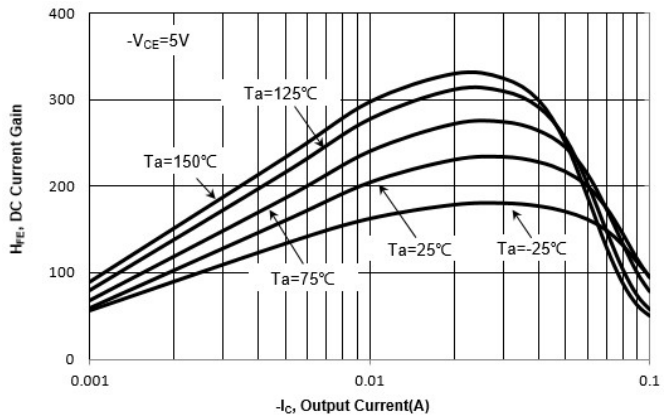
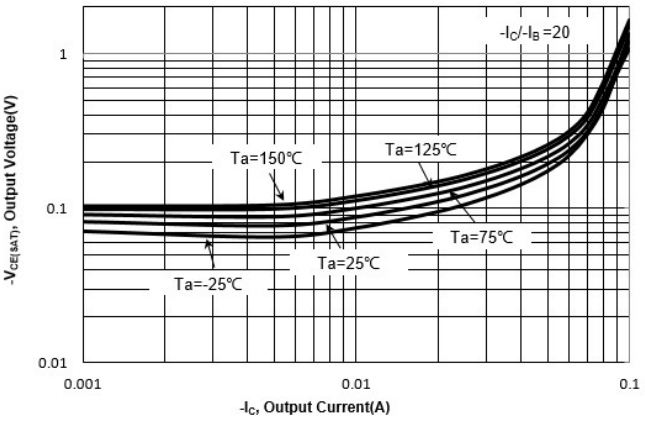


Fig. 4 V_{CESAT} vs. Output Current



Electrical Characteristics Curves: MMDT511EW

Fig. 1 Output Current vs. $V_{I(ON)}$, Input Voltage

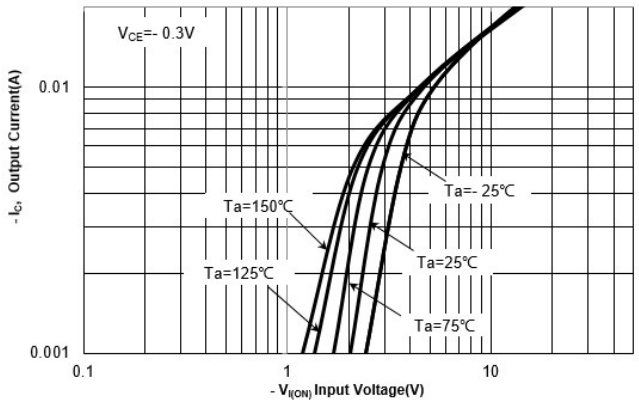


Fig. 2 Output Current vs. $V_{I(OFF)}$, Input Voltage

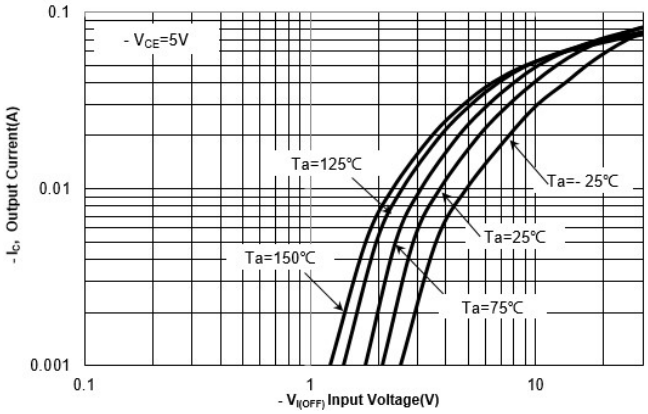


Fig. 3 DC Current Gain vs. Output Current

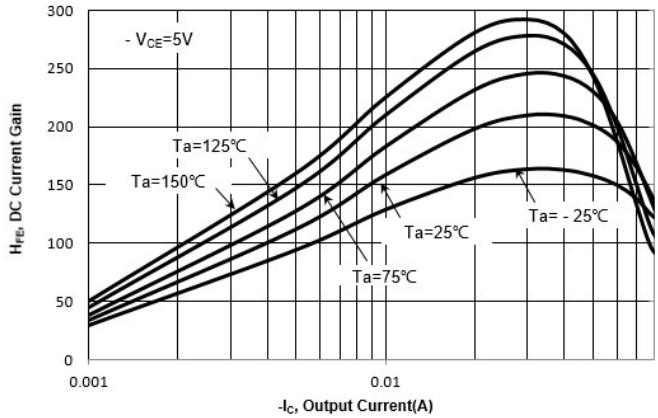
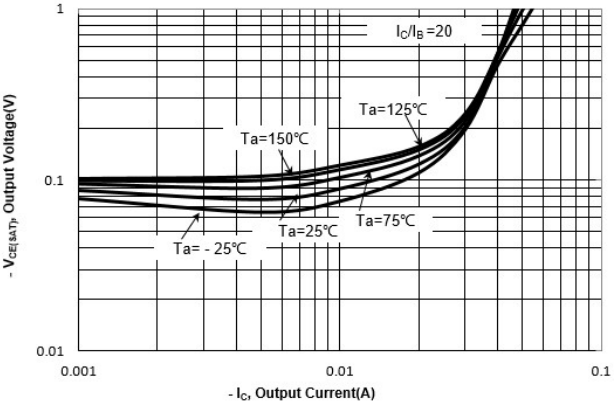


Fig. 4 V_{CESAT} vs. Output Current



Electrical Characteristics Curves: MMDT511FW

Fig. 1 Output Current vs. $V_{I(ON)}$, Input Voltage

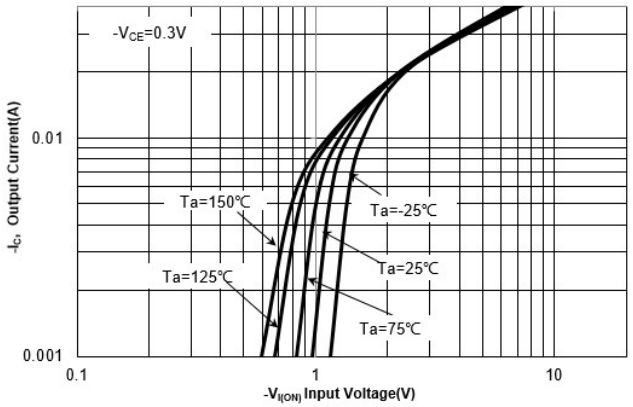


Fig. 2 Output Current vs. $V_{I(OFF)}$, Input Voltage

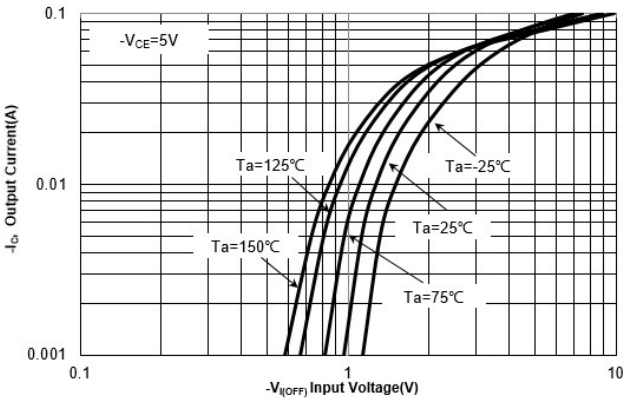


Fig. 3 DC Current Gain vs. Output Current

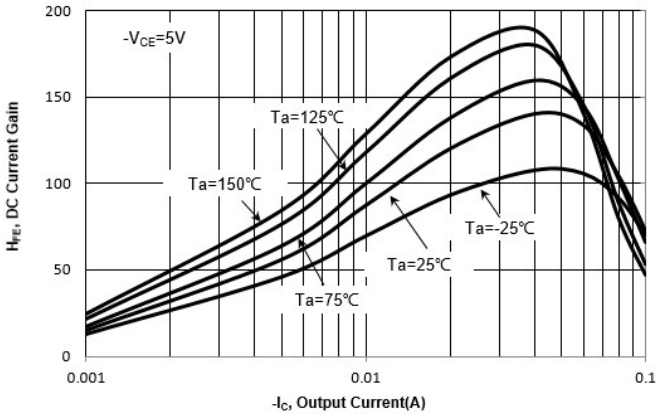
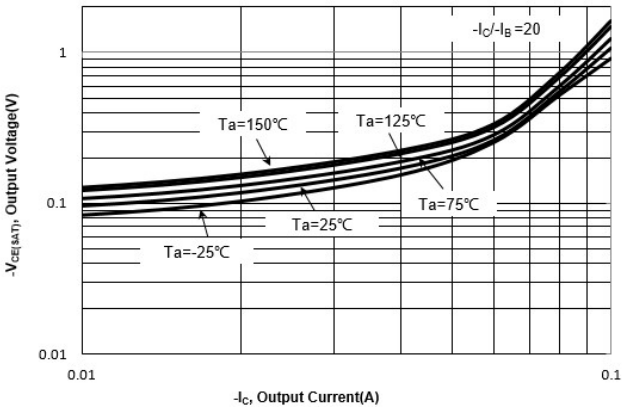


Fig. 4 V_{CESAT} vs. Output Current



Electrical Characteristics Curves: MMDT511LW

Fig. 1 Output Current vs. $V_{I(ON)}$, Input Voltage

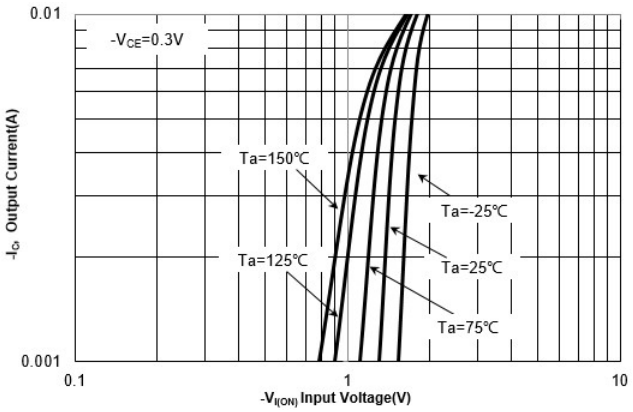


Fig. 2 Output Current vs. $V_{I(OFF)}$, Input Voltage

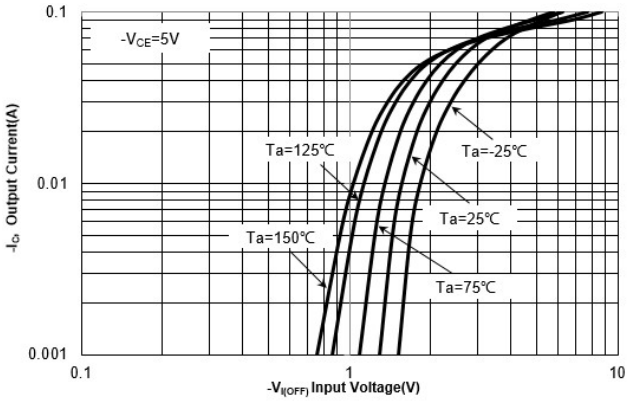


Fig. 3 DC Current Gain vs. Output Current

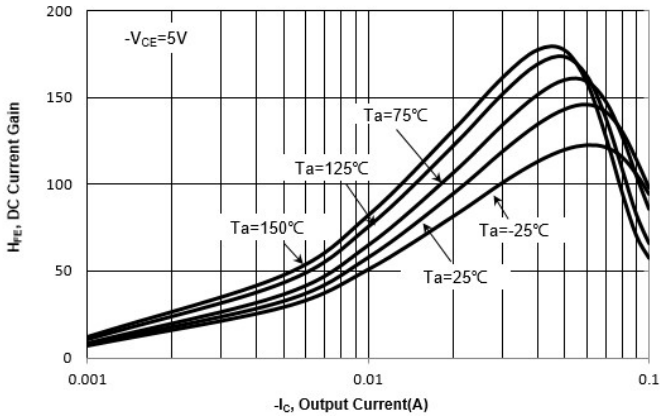
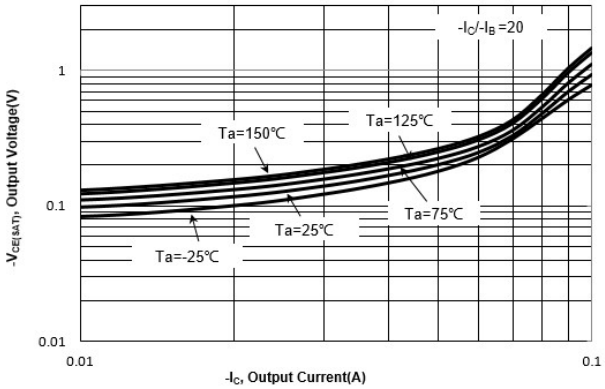


Fig. 4 V_{CESAT} vs. Output Current



Electrical Characteristics Curves: MMDT511MW

Fig. 1 Output Current vs. $V_{I(ON)}$, Input Voltage

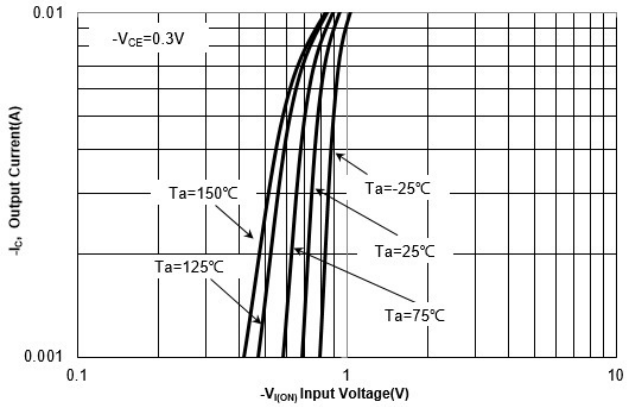


Fig. 2 Output Current vs. $V_{I(OFF)}$, Input Voltage

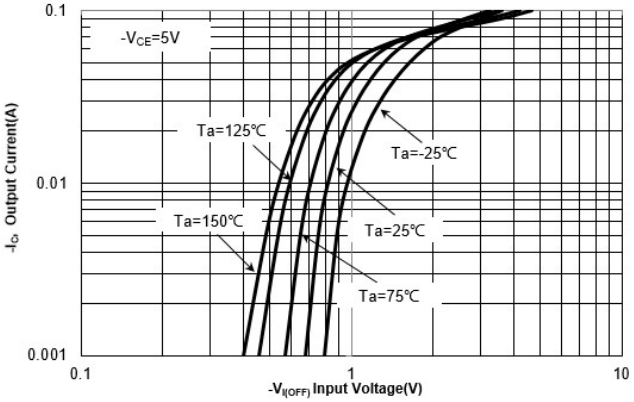


Fig. 3 DC Current Gain vs. Output Current

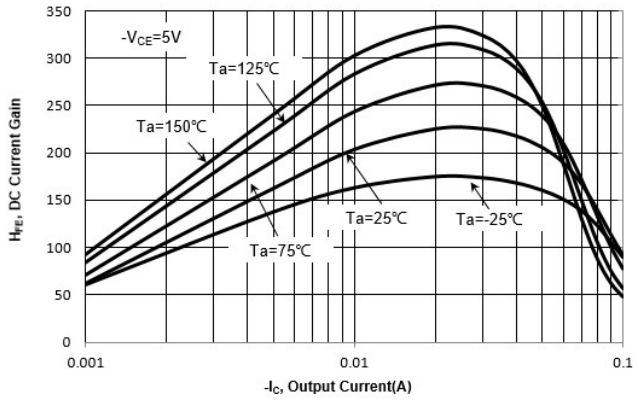
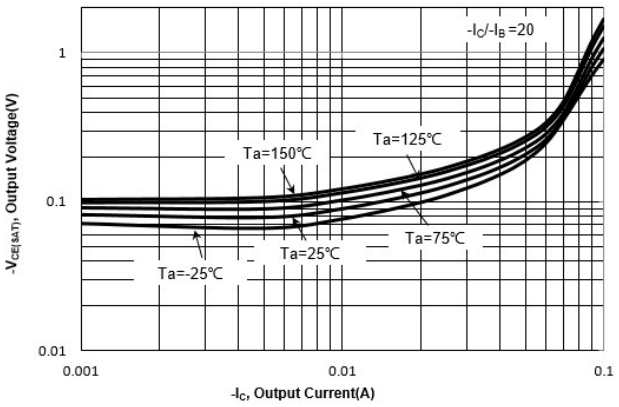


Fig. 4 V_{CESAT} vs. Output Current



Electrical Characteristics Curves: MMDT511NW

Fig. 1 Output Current vs. $V_{I(ON)}$, Input Voltage

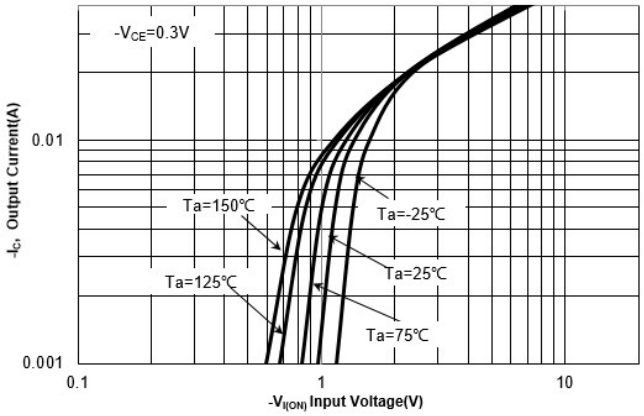


Fig. 2 Output Current vs. $V_{I(OFF)}$, Input Voltage

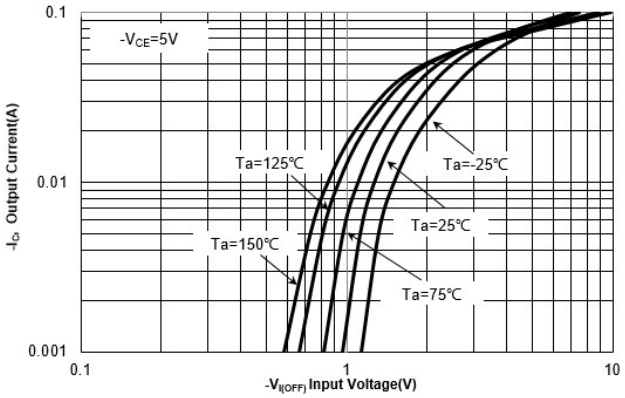


Fig. 3 DC Current Gain vs. Output Current

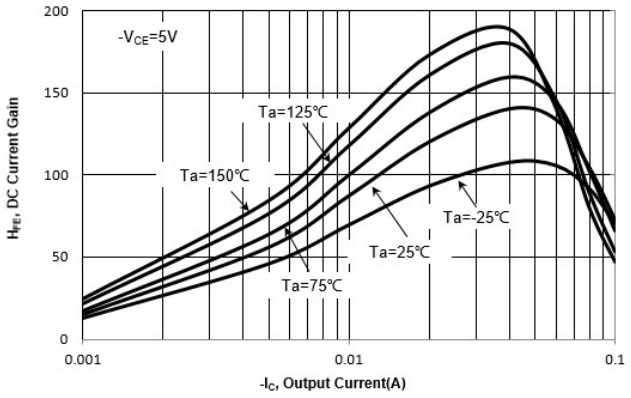
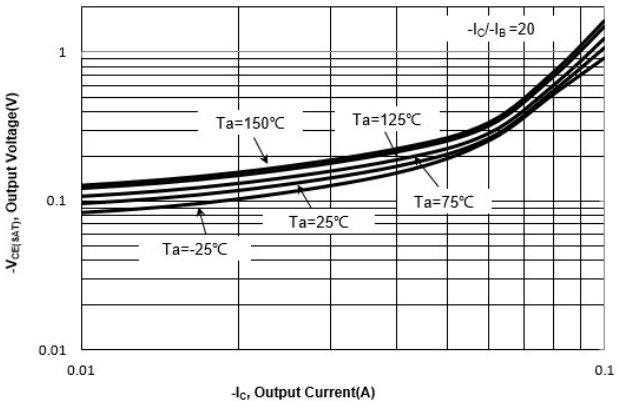
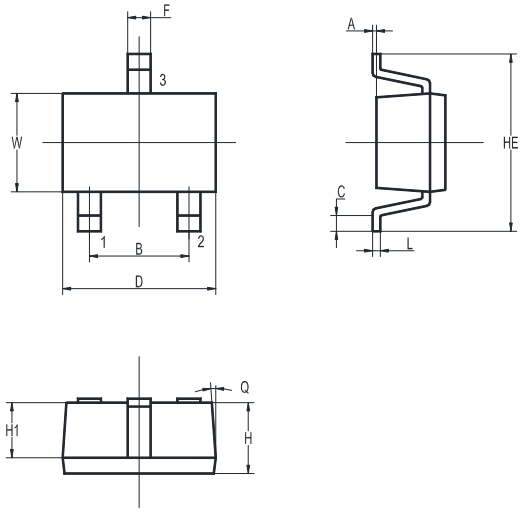


Fig. 4 V_{CESAT} vs. Output Current

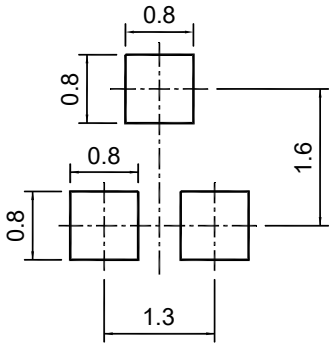


PACKAGE OUTLINE(Dimensions in mm) SOT-323



UNIT	A	B	C	D	H	H1	HE	F	L	W	Q
mm	0.1 MAX.	1.3 1.2	0.2 MIN.	2.1 1.9	1.0 0.8	0.7 TYP.	2.4 2.0	0.35 0.25	0.15 0.05	1.35 1.15	5° MAX.

Recommended Soldering Footprint



Packing information

Package	Tape Width (mm)	Pitch		Reel Size		Per Reel Packing Quantity
		mm	inch	mm	inch	
SOT-323	8	4 ± 0.1	0.157 ± 0.004	178	7	3,000

Marking information

" ** " = Part No.

Type	Marking	Type	Marking	Type	Marking	Type	Marking
MMDT5110W	AA	MMDT5115W	AF	MMDT511DW	AN	MMDT511MW	AZ
MMDT5111W	AB	MMDT5116W	AH	MMDT511EW	AP	MMDT511NW	BA
MMDT5112W	AC	MMDT5117W	AJ	MMDT511FW	AR	MMDT511TW	BB
MMDT5113W	AD	MMDT5119W	AM	MMDT511HW	AX	MMDT511VW	BC
MMDT5114W	AE			MMDT511LW	AY	MMDT511ZW	BD

" • " = HAF (Halogen and Antimony Free)

" YM " = Date Code Marking

" Y " = Year

" M " = Month

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