

Features

- AEC-Q101 Qualified
- High speed smooth switching device for hard & soft switching
- Positive Temperature Coefficient
- Maximum junction temperature 150 °C
- High ruggedness, temperature stable
- Halogen Free. "Green" Device (Note 1)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant (Note 2) ("P" Suffix Designates RoHS Compliant. See Ordering Information)

Applications

- PTC

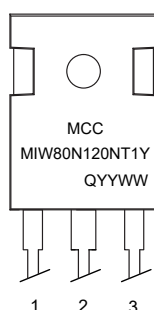
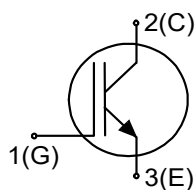
Maximum Ratings

Parameter	Symbol	Rating	Unit
Collector-Emitter Voltage	V_{CE}	1200	V
DC Collector Current (Note 3)	I_C	145	A
		80	
Pulsed Collector Current, $V_{GE}=15V$ (Note 4)	$I_{C,pluse}$	240	A
Turn off Safe Operating Area $V_{CE} \leq 1200V, T_j \leq 150^\circ C$		240	A
Gate-Emitter Voltage	V_{GE}	± 20	V
Transient Gate-Emitter Voltage (Note 5)		± 30	
Power Dissipation	P_D	521	W
		208	

Note:

1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. High Temperature Solder Exemptions Applied, see EU Directive Annex 7a.
3. Limited by T_{jmax} .
4. T_p limited by T_{jmax} .
5. $T_p \leq 10\mu s$, Duty Cycle < 1%

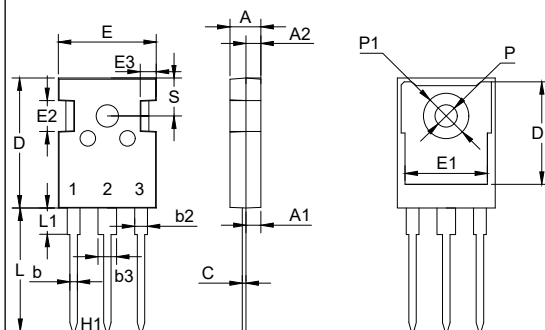
Internal Structure



Device Code: MIW80N120NT1Y
Date Code: QYYWW (Year & Week)

Trench and Field Stop IGBT 1200V 80A

TO-247AB



DIMENSIONS

DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.189	0.205	4.80	5.20	
A1	0.087	0.103	2.21	2.61	
A2	0.073	0.085	1.85	2.15	
b	0.039	0.055	1.00	1.40	
b2	0.075	0.087	1.91	2.21	
C	0.020	0.028	0.50	0.70	
D	0.815	0.839	20.70	21.30	
D1	0.640	0.663	16.25	16.85	
E	0.610	0.634	15.50	16.10	
E1	0.512	0.535	13.00	13.60	
E2	0.189	0.205	4.80	5.20	
E3	0.091	0.106	2.30	2.70	
L	0.772	0.796	19.62	20.22	
L1	-	0.169	-	4.30	
P	0.134	0.150	3.40	3.80	Φ
P1		0.287	-	7.30	Φ
S	0.242		6.15		TYP
H1	0.214		5.44		TYP
b3	0.110	0.126	2.80	3.20	

Electrical Characteristics of the IGBT @ 25°C (Unless Otherwise Specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
IGBT Static Characteristics						
Collector-Emitter Breakdown Voltage	$V_{(BR)CES}$	$V_{GE}=0V, I_C=1mA$	1200			V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_{GE}=15V, I_C=80A, T_J=25^{\circ}C$	1.45	1.75	2.30	V
		$V_{GE}=15V, I_C=80A, T_J=125^{\circ}C$		2.15		
		$V_{GE}=15V, I_C=80A, T_J=150^{\circ}C$		2.25		
G-E Threshold Voltage	$V_{GE(th)}$	$I_C=2.6mA, V_{CE}=V_{GE}$	5.35	6.0	6.7	V
C-E Leakage Current	I_{CES}	$V_{CE}=1200V, V_{GE}=0V, T_J=25^{\circ}C$			0.25	mA
		$V_{CE}=1200V, V_{GE}=0V, T_J=150^{\circ}C$			1.00	
G-E Leakage Current	I_{GES}	$V_{CE}=0V, V_{GE}=\pm 20V$			± 100	nA
Dynamic Characteristics						
Input Capacitance	C_{ies}	$V_{CE}=25V, V_{GE}=0V, f=1MHz$		7.95		nF
Reverse Transfer Capacitance	C_{res}			0.19		
Gate Charge	Q_g	$V_{CC}=960V, I_C=80A, V_{GE}=15V$		0.65		μC
IGBT Switching Characteristics						
Turn-On Delay Time	$td_{(on)}$	$V_{CC}=600V, I_C=80A,$ $V_{GE}=-5V\sim 15V,$ $R_G=10\Omega, T_J=25^{\circ}C$		33		ns
Rise Time	t_r			85		
Turn-Off Delay Time	$td_{(off)}$			231		
Fall Time	t_f			174		
Turn-On Energy	E_{on}	$V_{CC}=600V, I_C=80A,$ $V_{GE}=-5V\sim 15V,$ $R_G=10\Omega, T_J=25^{\circ}C$		7.5		mJ
Turn-Off Energy	E_{off}			4.6		
Turn-On Delay Time	$td_{(on)}$			30		ns
Rise Time	t_r			79		
Turn-Off Delay Time	$td_{(off)}$			243		
Fall Time	t_f			263		
Turn-On Energy	E_{on}	$V_{CC}=600V, I_C=80A,$ $V_{GE}=-5V\sim 15V,$ $R_G=10\Omega, T_J=125^{\circ}C$		7.8		mJ
Turn-Off Energy	E_{off}			5.5		
Turn-On Delay Time	$td_{(on)}$			28		ns
Rise Time	t_r			74		
Turn-Off Delay Time	$td_{(off)}$			252		
Fall Time	t_f			325		
Turn-On Energy	E_{on}	$V_{CC}=600V, I_C=80A,$ $V_{GE}=-5V\sim 15V,$ $R_G=10\Omega, T_J=150^{\circ}C$		8.0		mJ
Turn-Off Energy	E_{off}			6.2		

Thermal characteristics

Parameter	Symbol	Min	Typ	Max	Units
Operating Junction Temperature Range	T_J	-40		150	°C
Storage Temperature Range	T_{stg}	-55		150	°C
Thermal Resistance from Junction to Case (IGBT)	$R_{th_{J-C}}$			0.24	°C/W
Thermal Resistance from Junction to Ambient	$R_{th_{J-A}}$			40	°C/W

Curve Characteristics

Fig. 1 - Typical Output Characteristic ($T_j = 25^\circ\text{C}$)

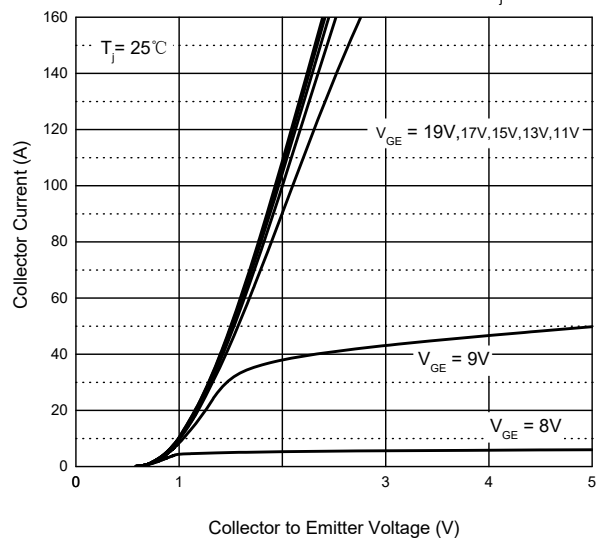


Fig. 2 - Typical Output Characteristic ($T_j = 150^\circ\text{C}$)

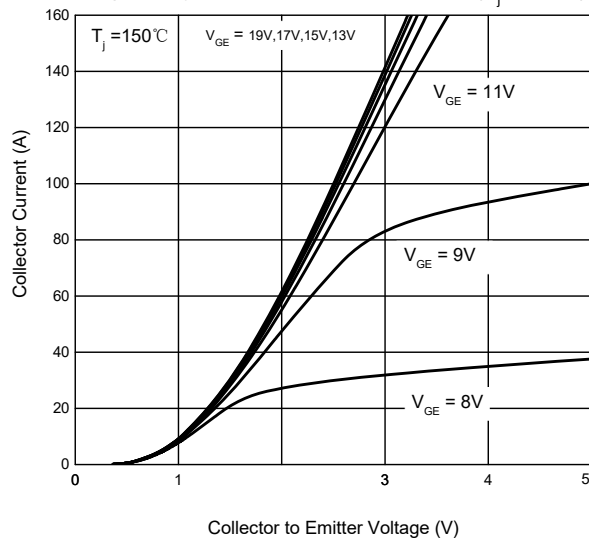


Fig. 3 - Typical Transfer Characteristic

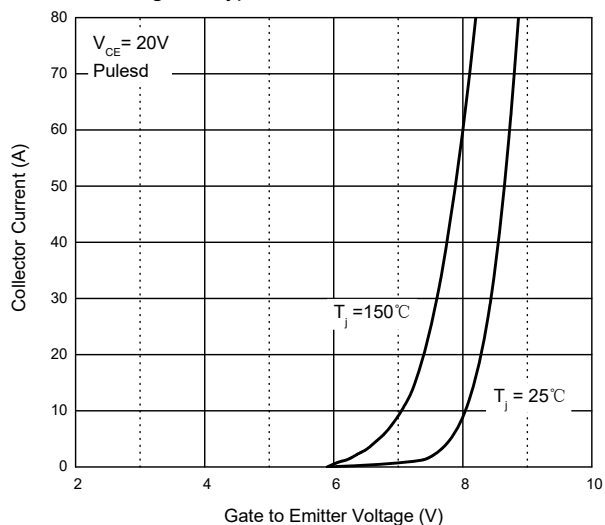


Fig. 4 - Capacitance Characteristics

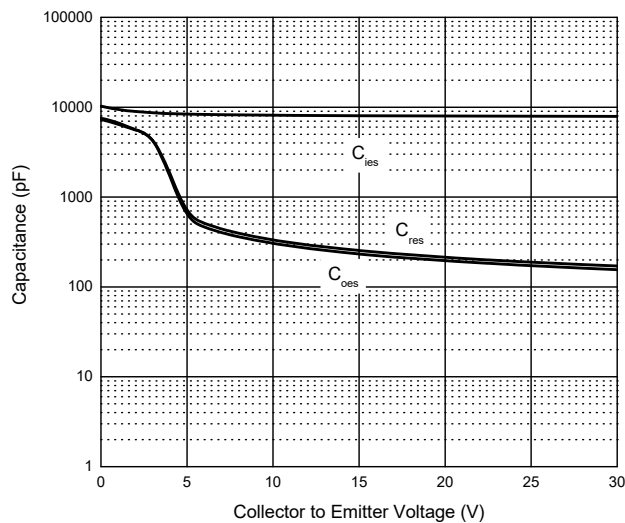


Fig. 5 - IGBT Switching Loss vs. I_C

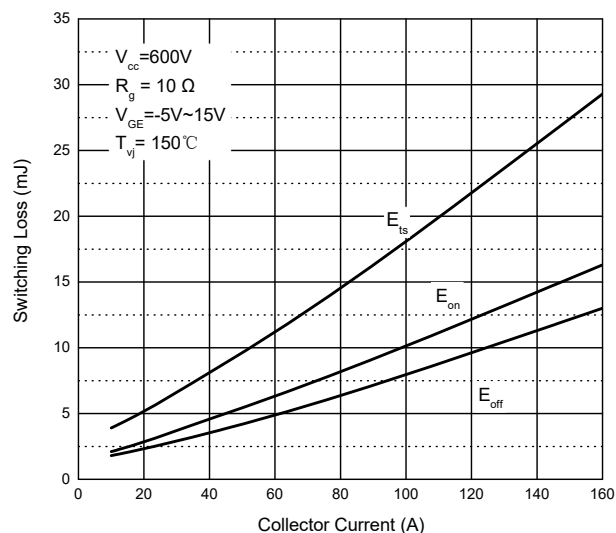
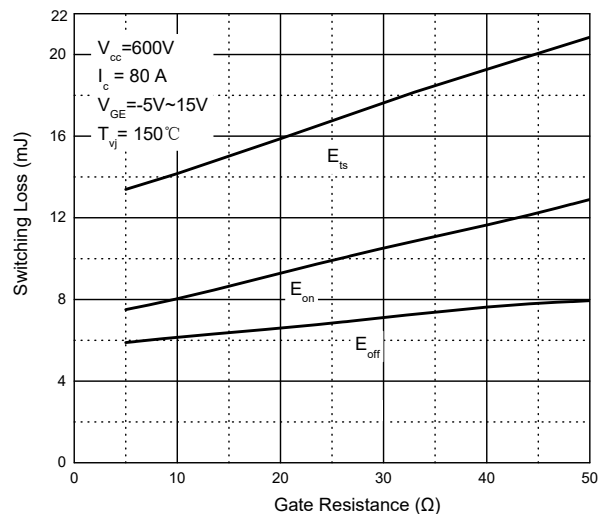


Fig. 6- IGBT Switching Loss vs. R_g



Curve Characteristics

Fig. 7 - IGBT Switching Loss vs. Junction Temperature

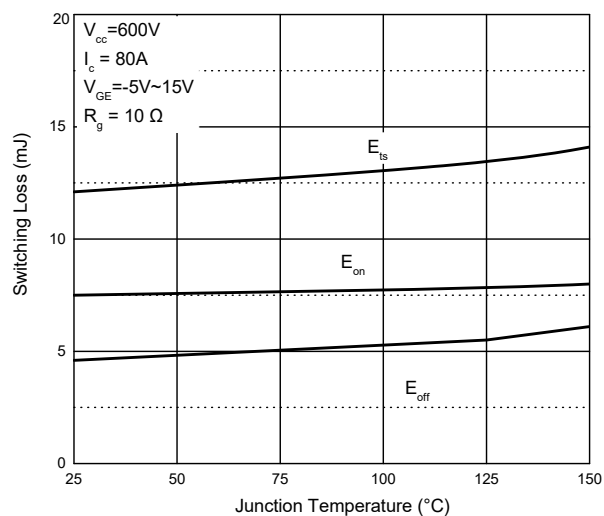


Fig. 8- $V_{GE(th)}$ vs. Junction Temperature

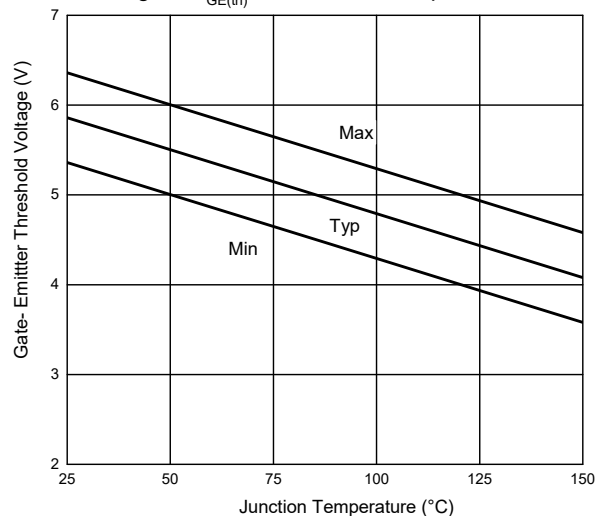


Fig. 9 - Switching Time vs. Collect Current

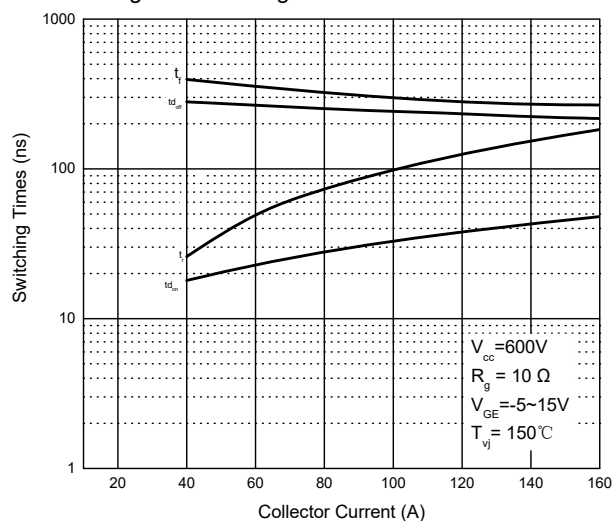


Fig. 10 - Switching Time vs. Gate Resistance

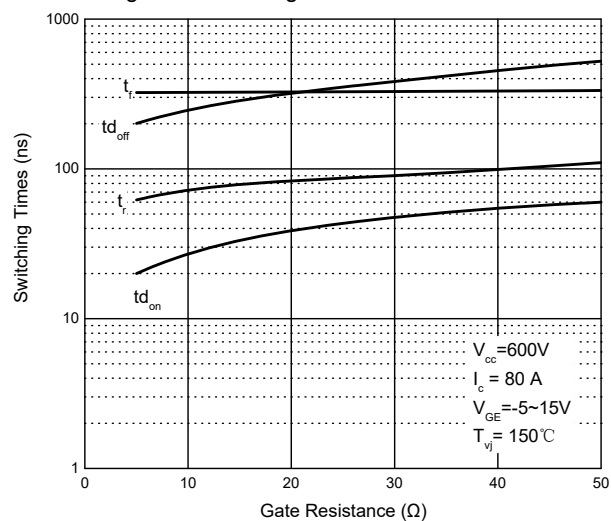


Fig. 11 - Collector Current vs. Case Temperature

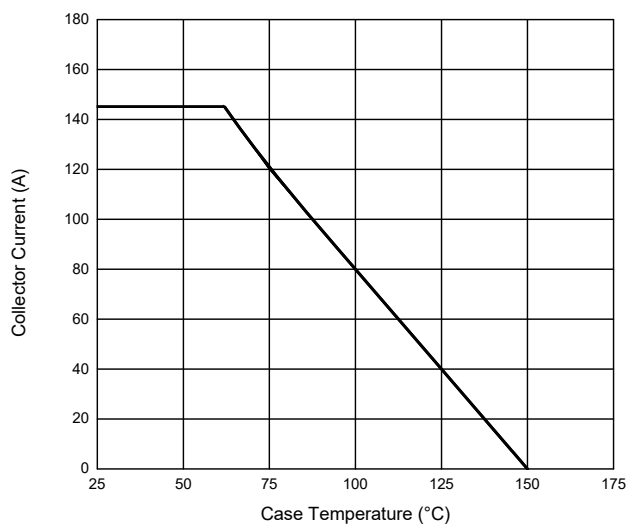
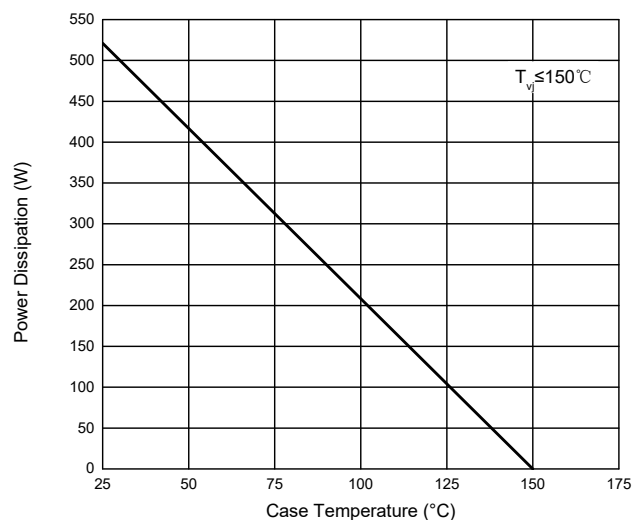
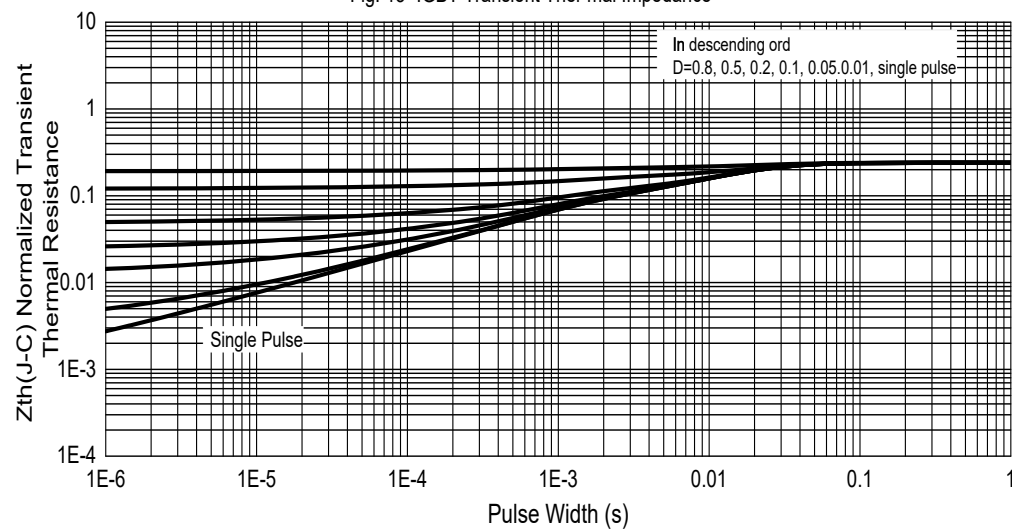


Fig. 12 - Power Derating



Curve Characteristics

Fig. 13 -IGBT Transient Thermal Impedance



Ordering Information

Device	Packing
Part Number-BP	Tube: 30pcs/Tube, 360pcs/Box, 1800pcs/Ctn

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