2MBI450VX-120-50

IGBT Modules

Power Module (V series)
1200V / 450A / 2-in-1 package

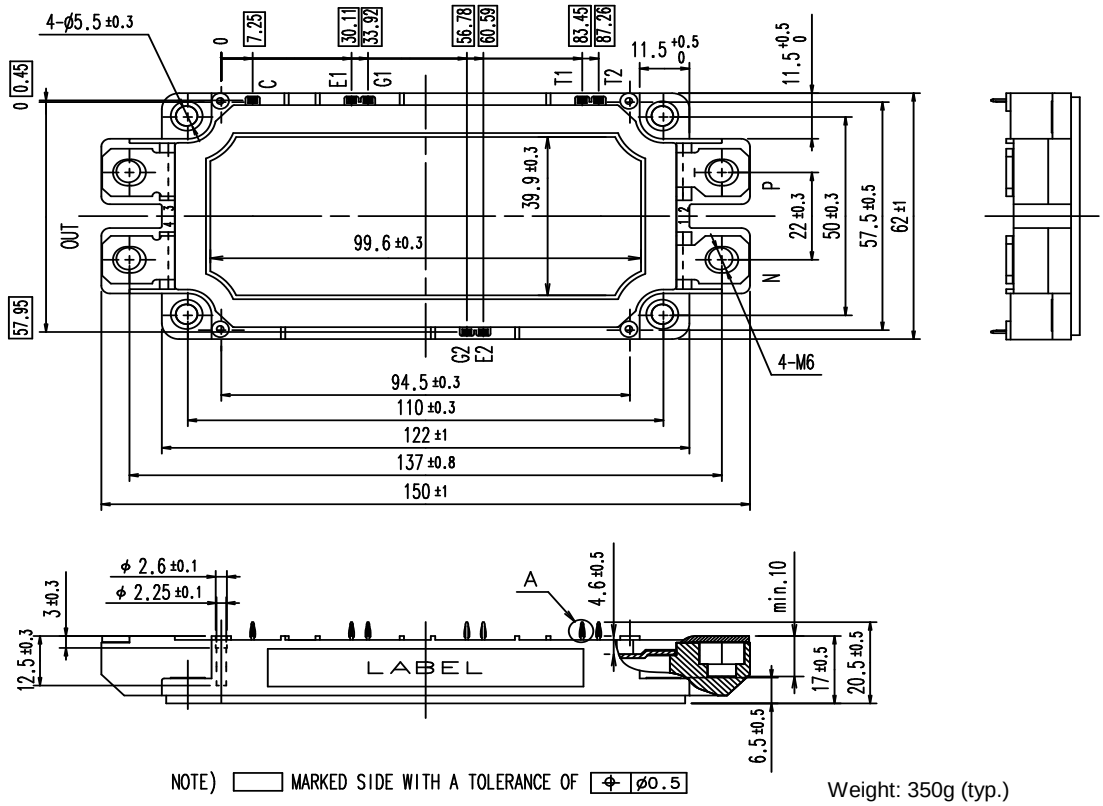
■ Features

Low $V_{CE(sat)}$
Low Inductance Module structure
Solderless press-fit terminals

■ Applications

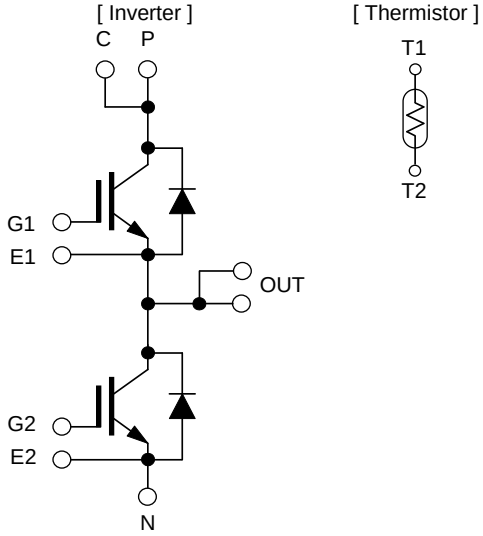
Inverter for Motor Drives, AC and DC Servo Drives
Uninterruptible Power Supply Systems, Wind Turbines, PV Power Conditioning Systems

■ Outline drawing (Unit : mm)



Weight: 350g (typ.)

■ Equivalent Circuit



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2MBI450VX-120-50

■ Absolute Maximum Ratings (at T_C= 25°C unless otherwise specified)

Items		Symbols	Conditions		Maximum Ratings	Units
Collector-Emitter voltage		V_{CES}			1200	V
Gate-Emitter voltage		V_{GES}			±20	V
Collector current		I_C	Continuous	T_C=25°C	600	A
				T_C=100°C	450	
		I_C pulse	1ms		900	
		$-I_C$			450	
		$-I_C$ pulse	1ms		900	
Collector power dissipation		P_C	1 device		2270	W
Junction temperature		T_j			175	°C
Operating junction temperature (under switching conditions)		T_{jop}			150	
Case temperature		T_c			125	
Storage temperature		T_{stg}			-40 ~ 125	
Isolation voltage	between terminal and copper base (*1)	V_{iso}	AC: 1min.		2500	VAC
	between thermistor and others (*2)					
Screw Torque	Mounting (*3)	-			3.5	N m
	Terminals (*4)	-			4.5	

(*1) All terminals should be connected together during the test.
(*2) Two thermistor terminals should be connected together, other terminals should be connected together and shorted to base plate during the test.
(*3) Recommendable Value : 2.5-3.5 Nm (M5)
(*4) Recommendable Value : 3.5-4.5 Nm (M6)

■ Electrical characteristics (at T_j= 25°C unless otherwise specified)

Items	Symbols	Conditions		Characteristics min.	Characteristics typ.	Characteristics max.	Units
Zero gate voltage Collector current	I_{CES}	V_{GE}=0V, V_{CE}=1200V		-	-	3.0	mA
Gate-Emitter leakage current	I_{GES}	V_{CE}=0V, V_{GE}=±20V		-	-	600	nA
Gate-Emitter threshold voltage	$V_{GE(th)}$	V_{CE}=20V, I_C=450mA		6.0	6.5	7.0	V
Collector-Emitter saturation voltage	$V_{CE(sat)}$ (terminal)	V_{GE} = 15V, I_C= 450A	T_j=25°C	-	2.35	2.80	V
			T_j=125°C	-	2.65	-	
			T_j=150°C	-	2.70	-	
	$V_{CE(sat)}$ (chip)		T_j=25°C	-	1.75	2.20	
			T_j=125°C	-	2.05	-	
			T_j=150°C	-	2.10	-	
Internal gate resistance	$R_{G(int)}$	-		-	1.67	-	Ω
Input capacitance	C_{ies}	V_{CE}=10V, V_{GE}=0V, f=1MHz		-	41	-	nF
Turn-on time	t_{on}	V_{CC}= 600V, V_{GE}= ±15V, L_s= 80nH, I_C= 450A, R_G= 0.52Ω		-	550	-	nsec
	t_r			-	180	-	
	$t_{r(i)}$			-	120	-	
Turn-off time	t_{off}			-	1050	-	
	t_f			-	110	-	
Forward on voltage	V_F (terminal)	V_{GE} = 0V, I_F= 450A	T_j=25°C	-	2.30	2.75	V
			T_j=125°C	-	2.45	-	
			T_j=150°C	-	2.40	-	
	V_F (chip)		T_j=25°C	-	1.70	2.15	
			T_j=125°C	-	1.85	-	
			T_j=150°C	-	1.80	-	
Reverse recovery time	t_{rr}	I_F= 450A		-	200	-	nsec
Thermistor Resistance	R	T=25°C		-	5000	-	Ω
		T=100°C		465	495	520	
Thermistor B value	B	T=25/50°C		3305	3375	3450	K

5. Thermal resistance characteristics

Items	Symbols	Conditions	Characteristics min.	Characteristics typ.	Characteristics max.	Units
Thermal resistance (1device)	$R_{th(j-c)}$	IGBT	-	-	0.066	°C/W
		FWD	-	-	0.100	
Contact thermal resistance (1device) (*1)	$R_{th(c-f)}$	with thermal compound	-	0.0167	-	

(*1) This is the value which is defined mounting on the additional cooling fin with thermal compound.

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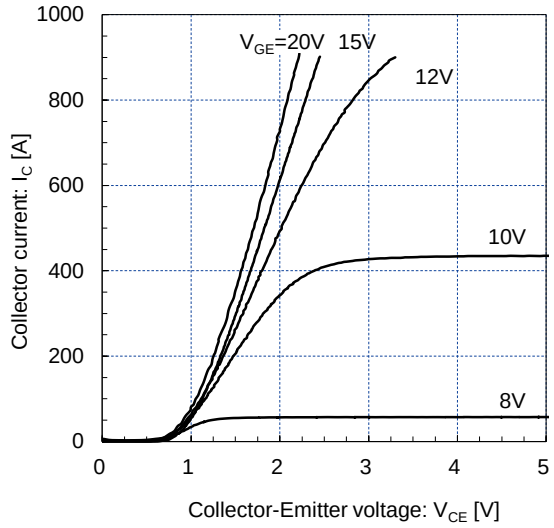
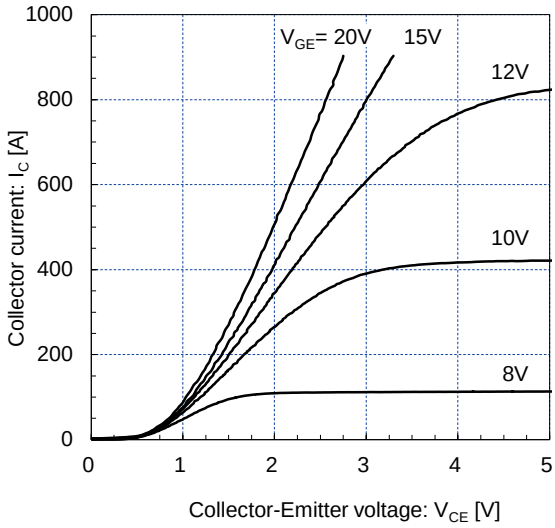
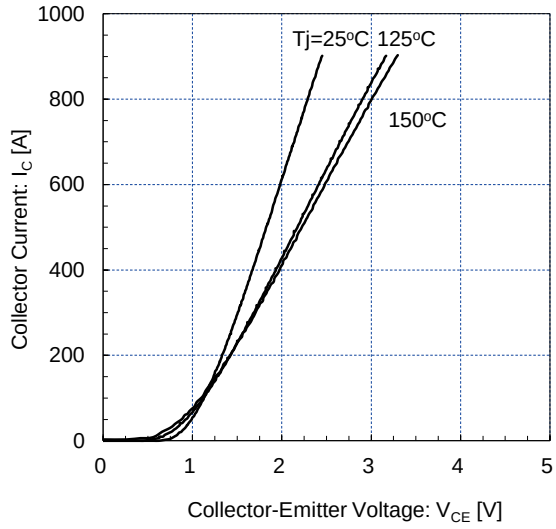
Collector current vs. Collector-Emitter voltage
T_j = 25°C / chip



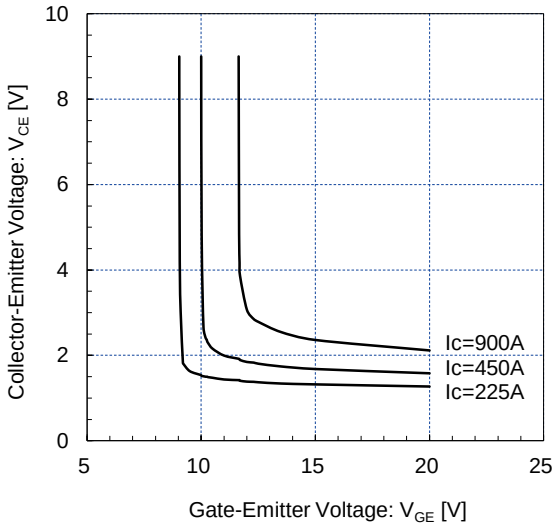
Collector current vs. Collector-Emitter voltage (typ.)
T_j = 150°C / chip



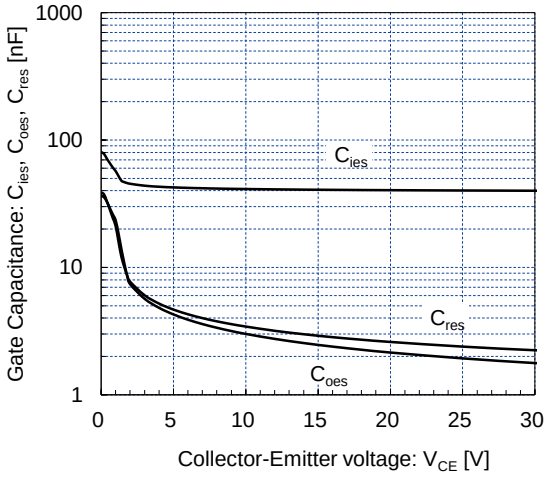
Collector current vs. Collector-Emitter voltage
V_{GE} = 15V / chip



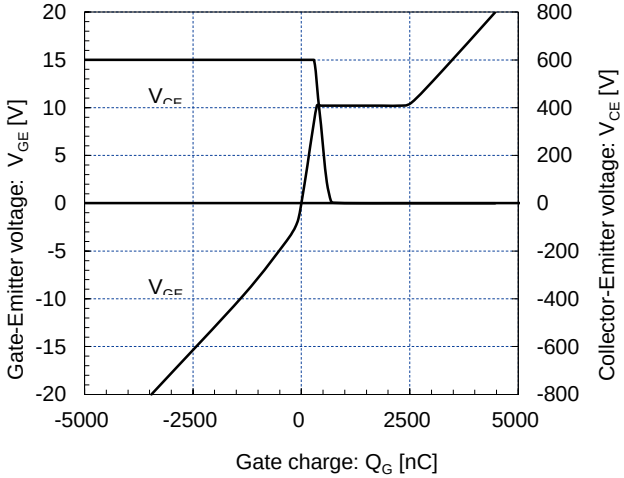
Collector-Emitter voltage vs. Gate-Emitter voltage
T_j = 25°C / chip



Capacitance vs. Collector-Emitter Voltage
V_{GE}= 0V, f= 1MHz, T_j= 25°C



Dynamic Gate Charge (typ.)
Vcc=600V, Ic=450A, Tj= 25°C



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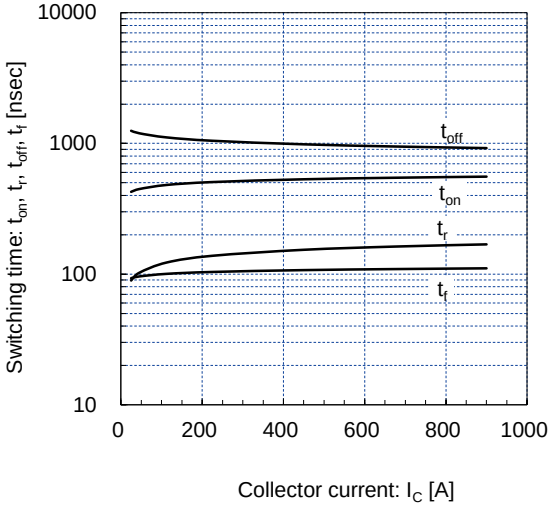
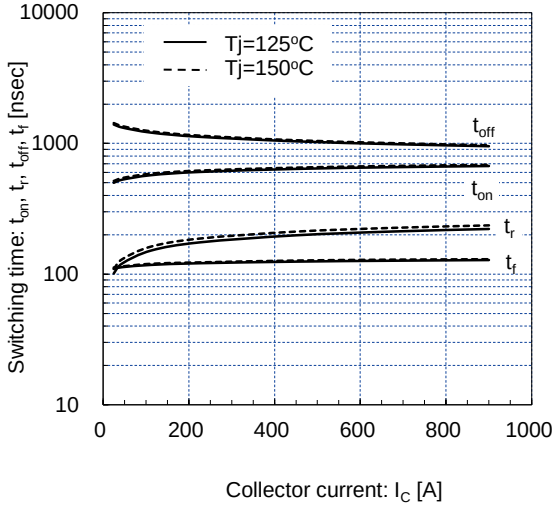
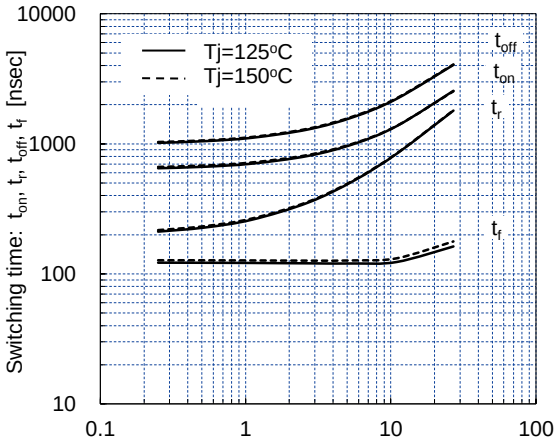
Switching time vs. Collector current (typ.)
Vcc=600V, VGE=±15V, Rg=0.52Ω, Tj=25°C



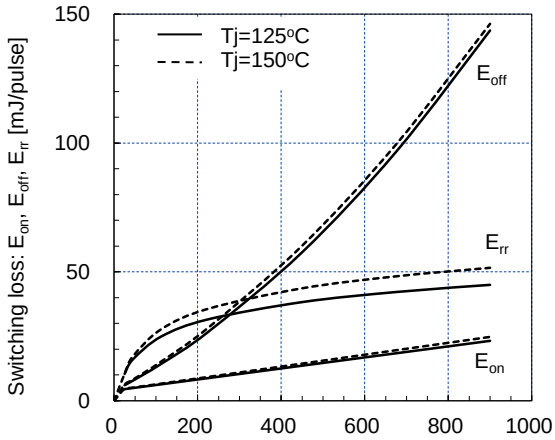
Switching time vs. Collector current (typ.)
Vcc=600V, VGE=±15V, Rg=0.52Ω, Tj=125°C, 150°C



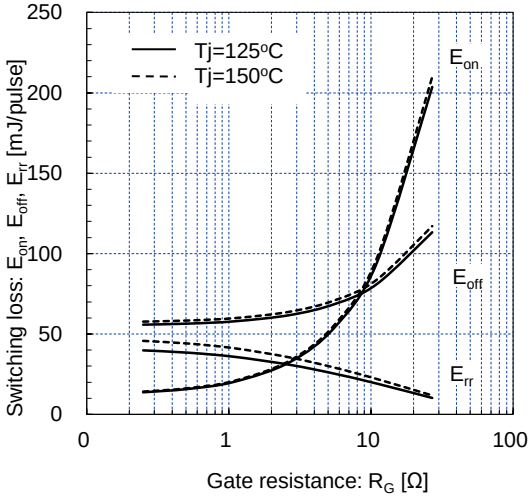
Switching time vs. Gate resistance (typ.)
/cc=600V, Ic=450A, VGE=±15V, Tj=125°C, 150°(



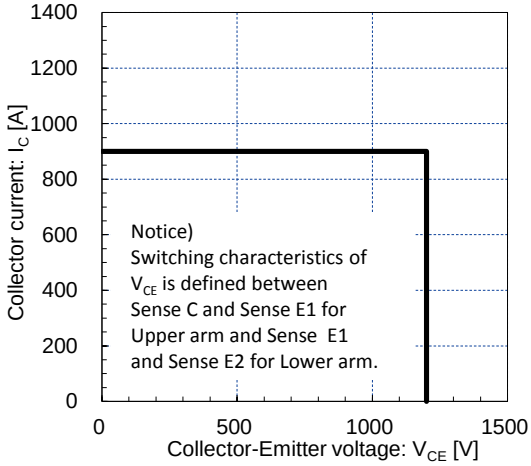
Switching loss vs. Collector current (typ.)
Vcc=600V, VGE=±15V, Rg=0.52Ω, Tj=125°C, 150°C



Switching loss vs. Gate resistance (typ.)
/cc=600V, Ic=450A, VGE=±15V, Tj=125°C, 150°(



Reverse bias safe operating area (max.)
+VGE=15V, -VGE=15V, Rg=0.52Ω, Tj=150°C



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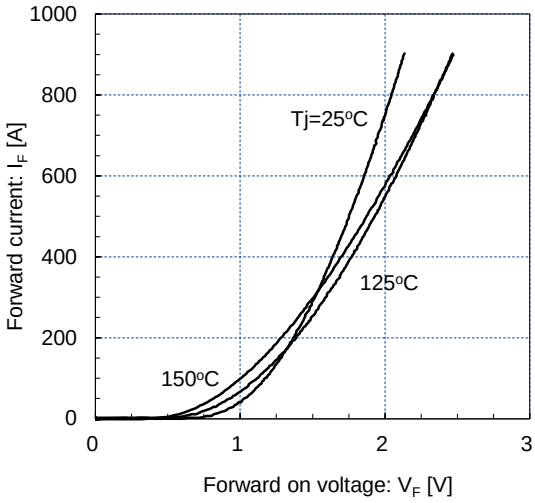
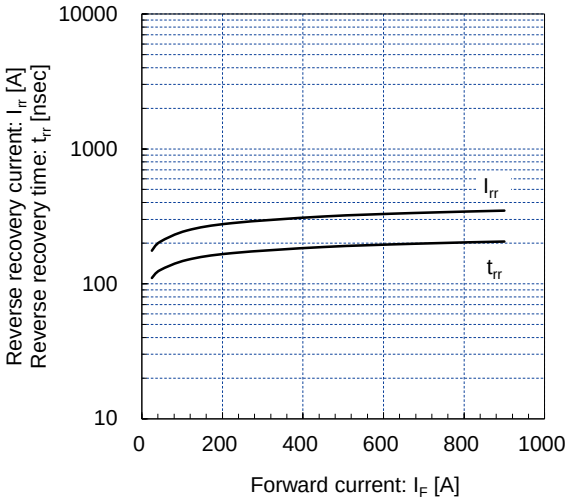
IGBT Modules

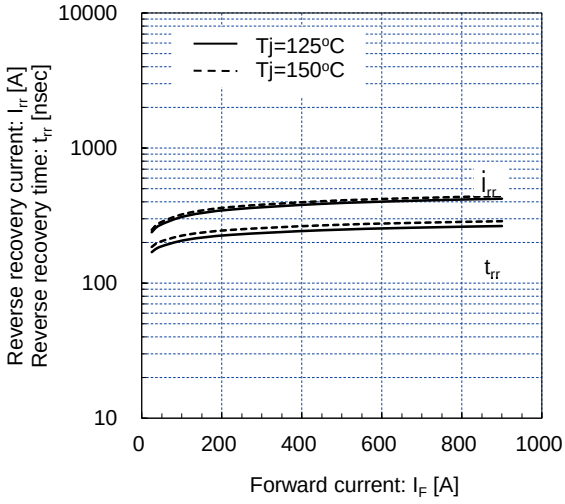
Forward current vs. Forward vltage (typ.)
chip



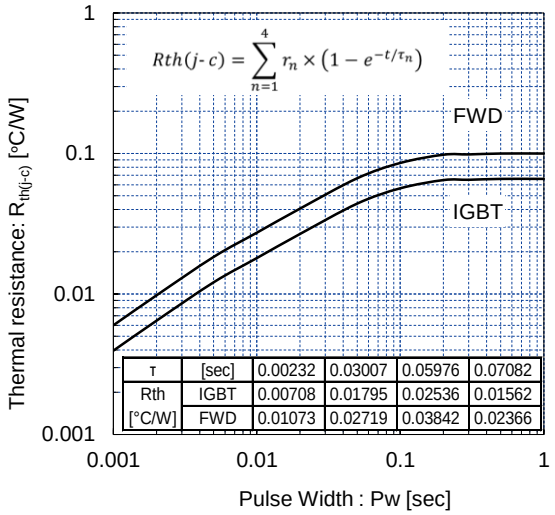
Reverse recovery characteristics (typ.)
Vcc=600V, VGE=±15V, Rg=0.52Ω, Tj=25°C



Reverse Recovery Characteristics (typ.)
Tj=125℃,150℃

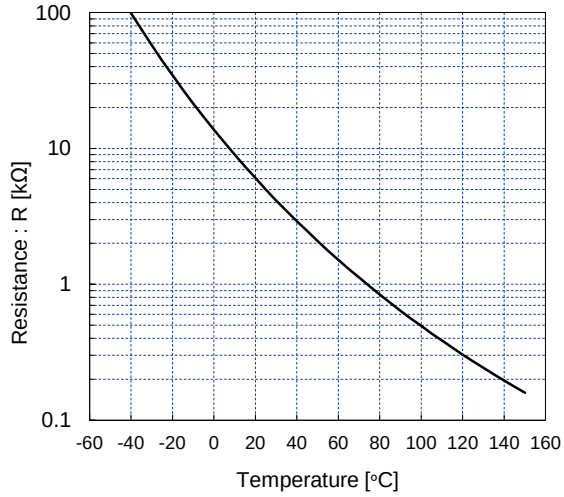


Transient Thermal Resistance (max.)

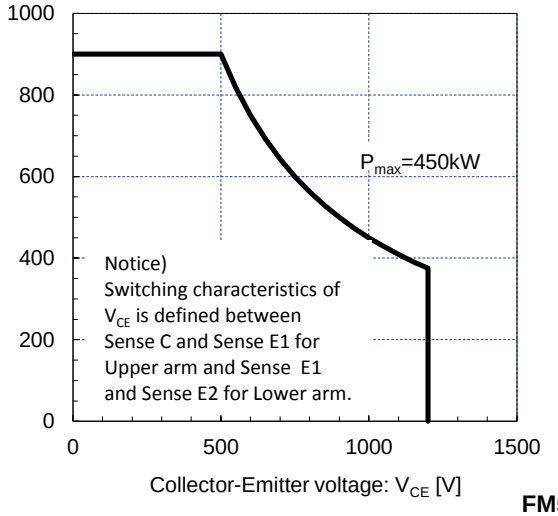


τ	[sec]	0.00232	0.03007	0.05976	0.07082
Rth	IGBT	0.00708	0.01795	0.02536	0.01562
[°C/W]	FWD	0.01073	0.02719	0.03842	0.02366

[THERMISTOR]
Temperature characteristic (typ.)



FWD safe operating area (max.)
Tj=150°C



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