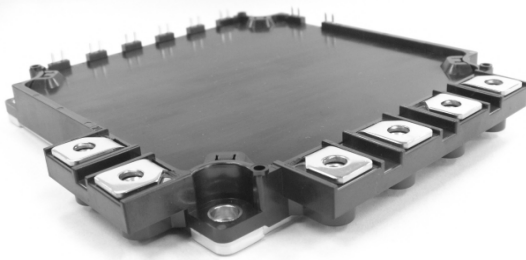


< IGBT MODULES >

# CM150RXL-34SA

HIGH POWER SWITCHING USE  
INSULATED TYPE



**sevenpack (3φ Inverter+Chopper Brake)**

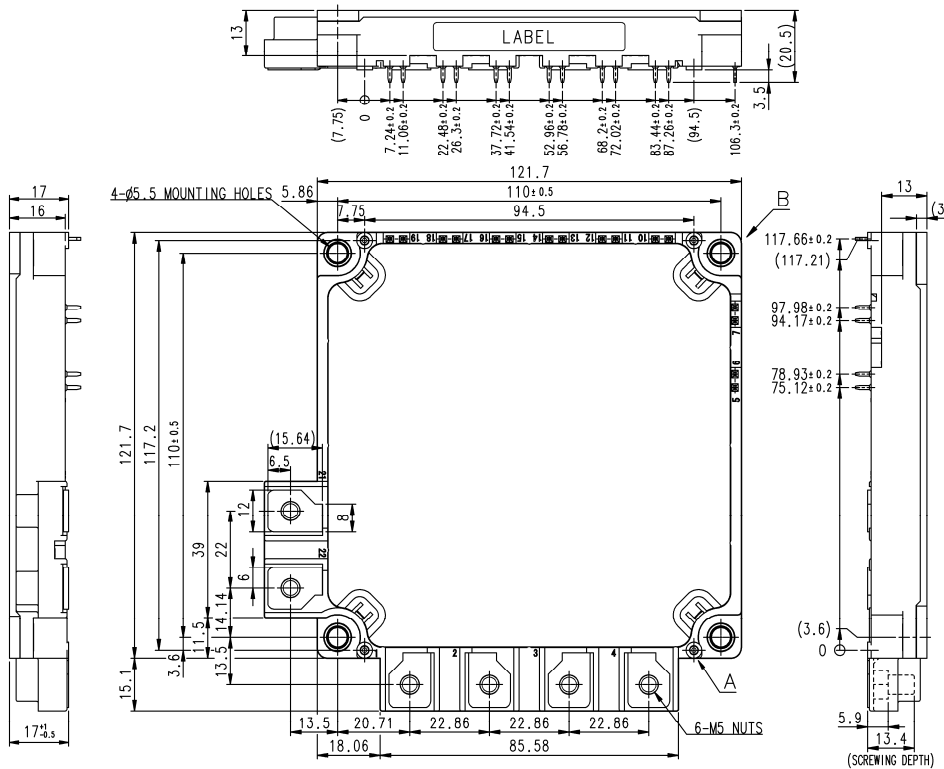
Collector current  $I_C$  ..... **150 A**  
 Collector-emitter voltage  $V_{CES}$  ..... **1700 V**  
 Maximum junction temperature  $T_{jmax}$  ..... **175 °C**

- Flat base Type
- Copper base plate (non-plating)
- Tin plating pin terminals
- RoHS Directive compliant
- Recognized under UL1557, File E323585

## APPLICATION

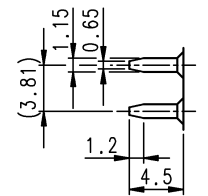
AC Motor Control, Motion/Servo Control, Power supply, etc.

## OUTLINE DRAWING & INTERNAL CONNECTION



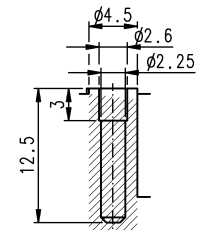
Dimension in mm

TERMINAL

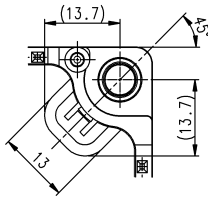


t=0.8

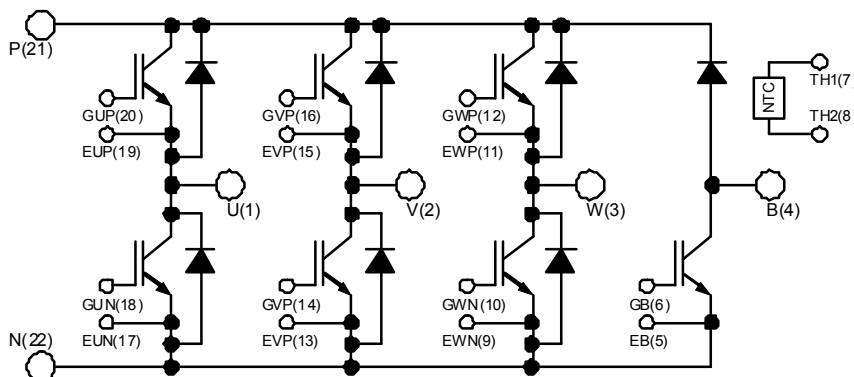
SECTION A



DETAIL B



### INTERNAL CONNECTION



Tolerance otherwise specified

Division of Dimension	Tolerance
0.5 to 3	±0.2
over 3 to 6	±0.3
over 6 to 30	±0.5
over 30 to 120	±0.8
over 120 to 400	±1.2

< IGBT MODULES >

CM150RXL-34SA

HIGH POWER SWITCHING USE  
INSULATED TYPE

ABSOLUTE MAXIMUM RATINGS (T<sub>j</sub>=25 °C, unless otherwise specified)

INVERTER PART IGBT/DIODE

Symbol	Item	Conditions	Rating	Unit
V <sub>CES</sub>	Collector-emitter voltage	G-E short-circuited	1700	V
V <sub>GES</sub>	Gate-emitter voltage	C-E short-circuited	± 20	V
I <sub>C</sub>	Collector current	DC, T <sub>C</sub> =125 °C (Note2, 4)	150	A
I <sub>CRM</sub>		Pulse, Repetitive (Note3)	300	
P <sub>tot</sub>	Total power dissipation	T <sub>C</sub> =25 °C (Note2, 4)	1500	W
I <sub>E</sub> (Note1)	Emitter current	(Note2)	150	A
I <sub>ERM</sub> (Note1)		Pulse, Repetitive (Note3)	300	

BRAKE PART IGBT/DIODE

Symbol	Item	Conditions	Rating	Unit
V <sub>CES</sub>	Collector-emitter voltage	G-E short-circuited	1700	V
V <sub>GES</sub>	Gate-emitter voltage	C-E short-circuited	± 20	V
I <sub>C</sub>	Collector current	DC, T <sub>C</sub> =125 °C (Note2, 4)	75	A
I <sub>CRM</sub>		Pulse, Repetitive (Note3)	150	
P <sub>tot</sub>	Total power dissipation	T <sub>C</sub> =25 °C (Note2, 4)	830	W
V <sub>RRM</sub>	Repetitive peak reverse voltage	G-E short-circuited	1700	V
I <sub>F</sub>	Forward current	(Note2)	75	A
I <sub>FRM</sub>		Pulse, Repetitive (Note3)	150	

MODULE

Symbol	Item	Conditions	Rating	Unit
V <sub>isol</sub>	Isolation voltage	Terminals to base plate, RMS, f=60 Hz, AC 1 min	4000	V
T <sub>jmax</sub>	Maximum junction temperature	Instantaneous event (overload)	175	°C
T <sub>Cmax</sub>	Maximum case temperature	(Note4)	125	
T <sub>jop</sub>	Operating junction temperature	Continuous operation (under switching)	-40 ~ +150	°C
T <sub>stg</sub>	Storage temperature	-	-40 ~ +125	

ELECTRICAL CHARACTERISTICS (T<sub>j</sub>=25 °C, unless otherwise specified)

INVERTER PART IGBT/DIODE

Symbol	Item	Conditions	Limits			Unit	
			Min.	Typ.	Max.		
I <sub>CES</sub>	Collector-emitter cut-off current	V <sub>CE</sub> =V <sub>CES</sub> , G-E short-circuited	-	-	1.0	mA	
I <sub>GES</sub>	Gate-emitter leakage current	V <sub>GE</sub> =V <sub>GES</sub> , C-E short-circuited	-	-	0.5	µA	
V <sub>GE(th)</sub>	Gate-emitter threshold voltage	I <sub>C</sub> =15 mA, V <sub>CE</sub> =10 V	5.4	6.0	6.6	V	
V <sub>CEsat</sub>	Collector-emitter saturation voltage	I <sub>C</sub> =150 A (Note5), V <sub>GE</sub> =15 V, (Terminal)	T <sub>j</sub> =25 °C	-	2.00	2.5	V
			T <sub>j</sub> =125 °C	-	2.20	-	
			T <sub>j</sub> =150 °C	-	2.25	-	
		I <sub>C</sub> =150 A (Note5), V <sub>GE</sub> =15 V, (Chip)	T <sub>j</sub> =25 °C	-	1.90	2.4	V
			T <sub>j</sub> =125 °C	-	2.10	-	
			T <sub>j</sub> =150 °C	-	2.15	-	
C <sub>ies</sub>	Input capacitance	V <sub>CE</sub> =10 V, G-E short-circuited	-	-	40	nF	
C <sub>oes</sub>	Output capacitance		-	-	3.3		
C <sub>res</sub>	Reverse transfer capacitance		-	-	0.73		
Q <sub>G</sub>	Gate charge	V <sub>CC</sub> =1000 V, I <sub>C</sub> =150 A, V <sub>GE</sub> =15 V	-	828	-	nC	
t <sub>d(on)</sub>	Turn-on delay time	V <sub>CC</sub> =1000 V, I <sub>C</sub> =150 A, V <sub>GE</sub> =±15 V, R <sub>G</sub> =0 Ω, Inductive load	-	-	400	ns	
t <sub>r</sub>	Rise time		-	-	100		
t <sub>d(off)</sub>	Turn-off delay time		-	-	700		
t <sub>f</sub>	Fall time		-	-	600		

< IGBT MODULES >

CM150RXL-34SA

HIGH POWER SWITCHING USE  
INSULATED TYPE

ELECTRICAL CHARACTERISTICS (cont;  $T_j=25\text{ }^\circ\text{C}$ , unless otherwise specified)

INVERTER PART IGBT/DIODE

Symbol	Item	Conditions	Limits			Unit	
			Min.	Typ.	Max.		
$V_{EC}$ (Note1)	Emitter-collector voltage	$I_E=150\text{ A}$ (Note5), G-E short-circuited, (Terminal)	$T_j=25\text{ }^\circ\text{C}$	-	4.1	5.3	V
			$T_j=125\text{ }^\circ\text{C}$	-	2.9	-	
			$T_j=150\text{ }^\circ\text{C}$	-	2.7	-	
		$I_E=150\text{ A}$ (Note5), G-E short-circuited, (Chip)	$T_j=25\text{ }^\circ\text{C}$	-	4.0	5.2	V
			$T_j=125\text{ }^\circ\text{C}$	-	2.8	-	
			$T_j=150\text{ }^\circ\text{C}$	-	2.6	-	
$t_{rr}$ (Note1)	Reverse recovery time	$V_{CC}=1000\text{ V}$ , $I_E=150\text{ A}$ , $V_{GE}=\pm 15\text{ V}$ ,	-	-	300	ns	
$Q_{rr}$ (Note1)	Reverse recovery charge	$R_G=0\text{ }\Omega$ , Inductive load	-	5.0	-	$\mu\text{C}$	
$E_{on}$	Turn-on switching energy per pulse	$V_{CC}=1000\text{ V}$ , $I_C=I_E=150\text{ A}$ ,	-	26	-	mJ	
$E_{off}$	Turn-off switching energy per pulse	$V_{GE}=\pm 15\text{ V}$ , $R_G=0\text{ }\Omega$ , $T_j=150\text{ }^\circ\text{C}$ ,	-	46	-		
$E_{rr}$ (Note1)	Reverse recovery energy per pulse	Inductive load	-	32	-	mJ	
$R_{CC'+EE'}$	Internal lead resistance	Main terminals-chip, per switch, $T_C=25\text{ }^\circ\text{C}$ (Note4)	-	-	2.0	m $\Omega$	
$r_g$	Internal gate resistance	Per switch	-	3.4	-	$\Omega$	

BRAKE PART IGBT/DIODE

Symbol	Item	Conditions	Limits			Unit	
			Min.	Typ.	Max.		
$I_{CES}$	Collector-emitter cut-off current	$V_{CE}=V_{CES}$ , G-E short-circuited	-	-	1.0	mA	
$I_{GES}$	Gate-emitter leakage current	$V_{GE}=V_{GES}$ , C-E short-circuited	-	-	0.5	$\mu\text{A}$	
$V_{GE(th)}$	Gate-emitter threshold voltage	$I_C=7.5\text{ mA}$ , $V_{CE}=10\text{ V}$	5.4	6.0	6.6	V	
$V_{CESat}$	Collector-emitter saturation voltage	$I_C=75\text{ A}$ (Note5), $V_{GE}=15\text{ V}$ , (Terminal)	$T_j=25\text{ }^\circ\text{C}$	-	2.00	2.5	V
			$T_j=125\text{ }^\circ\text{C}$	-	2.20	-	
			$T_j=150\text{ }^\circ\text{C}$	-	2.25	-	
		$I_C=75\text{ A}$ (Note5), $V_{GE}=15\text{ V}$ , (Chip)	$T_j=25\text{ }^\circ\text{C}$	-	1.90	2.4	V
			$T_j=125\text{ }^\circ\text{C}$	-	2.10	-	
			$T_j=150\text{ }^\circ\text{C}$	-	2.15	-	
$C_{ies}$	Input capacitance	$V_{CE}=10\text{ V}$ , G-E short-circuited	-	-	20	nF	
$C_{oes}$	Output capacitance		-	-	1.6		
$C_{res}$	Reverse transfer capacitance		-	-	0.36		
$Q_G$	Gate charge	$V_{CC}=1000\text{ V}$ , $I_C=75\text{ A}$ , $V_{GE}=15\text{ V}$	-	414	-	nC	
$t_{d(on)}$	Turn-on delay time	$V_{CC}=1000\text{ V}$ , $I_C=75\text{ A}$ , $V_{GE}=\pm 15\text{ V}$ , $R_G=10\text{ }\Omega$ , Inductive load	-	-	200	ns	
$t_r$	Rise time		-	-	100		
$t_{d(off)}$	Turn-off delay time		-	-	700		
$t_f$	Fall time		-	-	600		
$I_{RRM}$	Repetitive peak reverse current	$V_R=V_{RRM}$ , G-E short-circuited	-	-	1.0	mA	
$V_F$	Forward voltage	$I_E=75\text{ A}$ (Note5), G-E short-circuited, (Terminal)	$T_j=25\text{ }^\circ\text{C}$	-	4.1	5.3	V
			$T_j=125\text{ }^\circ\text{C}$	-	2.9	-	
			$T_j=150\text{ }^\circ\text{C}$	-	2.7	-	
		$I_E=75\text{ A}$ (Note5), G-E short-circuited, (Chip)	$T_j=25\text{ }^\circ\text{C}$	-	4.0	5.2	V
			$T_j=125\text{ }^\circ\text{C}$	-	2.8	-	
			$T_j=150\text{ }^\circ\text{C}$	-	2.6	-	
$t_{rr}$	Reverse recovery time	$V_{CC}=1000\text{ V}$ , $I_E=75\text{ A}$ , $V_{GE}=\pm 15\text{ V}$ ,	-	-	200	ns	
$Q_{rr}$	Reverse recovery charge	$R_G=10\text{ }\Omega$ , Inductive load	-	2.0	-	$\mu\text{C}$	
$E_{on}$	Turn-on switching energy per pulse	$V_{CC}=1000\text{ V}$ , $I_C=I_E=75\text{ A}$ ,	-	17.1	-	mJ	
$E_{off}$	Turn-off switching energy per pulse	$V_{GE}=\pm 15\text{ V}$ , $R_G=10\text{ }\Omega$ , $T_j=150\text{ }^\circ\text{C}$ ,	-	23	-		
$E_{rr}$	Reverse recovery energy per pulse	Inductive load	-	15.9	-	mJ	
$r_g$	Internal gate resistance	-	-	0	-	$\Omega$	

< IGBT MODULES >

CM150RXL-34SA

HIGH POWER SWITCHING USE  
INSULATED TYPE

ELECTRICAL CHARACTERISTICS (cont; T<sub>j</sub>=25 °C, unless otherwise specified)

NTC THERMISTOR PART

Symbol	Item	Conditions	Limits			Unit
			Min.	Typ.	Max.	
R <sub>25</sub>	Zero-power resistance	T <sub>C</sub> =25 °C (Note4)	4.85	5.00	5.15	kΩ
ΔR/R	Deviation of resistance	R <sub>100</sub> =493 Ω, T <sub>C</sub> =100 °C (Note4)	-7.3	-	+7.8	%
B <sub>(25/50)</sub>	B-constant	Approximate by equation (Note6)	-	3375	-	K
P <sub>25</sub>	Power dissipation	T <sub>C</sub> =25 °C (Note4)	-	-	10	mW

THERMAL RESISTANCE CHARACTERISTICS

Symbol	Item	Conditions	Limits			Unit
			Min.	Typ.	Max.	
R <sub>th(j-c)Q</sub>	Thermal resistance (Note4)	Junction to case, per Inverter IGBT	-	-	0.10	K/W
R <sub>th(j-c)D</sub>		Junction to case, per Inverter DIODE	-	-	0.16	
R <sub>th(j-c)Q</sub>		Junction to case, per Brake IGBT	-	-	0.18	K/W
R <sub>th(j-c)D</sub>		Junction to case, per Brake DIODE	-	-	0.27	
R <sub>th(c-s)</sub>	Contact thermal resistance (Note4)	Case to heat sink, per 1 module, Thermal grease applied (Note7)	-	7	-	K/kW

MECHANICAL CHARACTERISTICS

Symbol	Item	Conditions	Limits			Unit
			Min.	Typ.	Max.	
M <sub>t</sub>	Mounting torque	Main terminals M 5 screw	2.5	3.0	3.5	N·m
M <sub>s</sub>	Mounting torque	Mounting to heat sink M 5 screw	2.5	3.0	3.5	N·m
d <sub>s</sub>	Creepage distance	Terminal to terminal	16.3	-	-	mm
		Terminal to base plate	16.8	-	-	
d <sub>a</sub>	Clearance	Terminal to terminal	10	-	-	mm
		Terminal to base plate	10	-	-	
m	Weight	-	-	690	-	g
e <sub>c</sub>	Flatness of base plate	On the centerline X, Y (Note8)	±0	-	+100	μm

Note1. Represent ratings and characteristics of the anti-parallel, emitter-collector free wheeling diode (DIODE).

- Junction temperature (T<sub>j</sub>) should not increase beyond T<sub>jmax</sub> rating.
- Pulse width and repetition rate should be such that the device junction temperature (T<sub>j</sub>) dose not exceed T<sub>jmax</sub> rating.
- Case temperature (T<sub>C</sub>) and heat sink temperature (T<sub>s</sub>) are defined on the each surface (mounting side) of base plate and heat sink just under the chips. Refer to the figure of chip location.
- Pulse width and repetition rate should be such as to cause negligible temperature rise. Refer to the figure of test circuit.

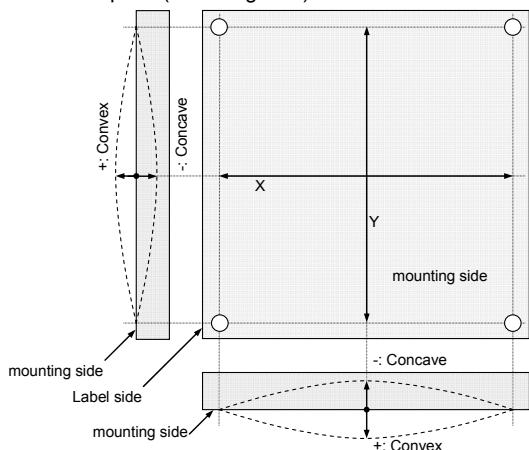
$$6. B_{(25/50)} = \ln\left(\frac{R_{25}}{R_{50}}\right) / \left(\frac{1}{T_{25}} - \frac{1}{T_{50}}\right),$$

R<sub>25</sub>: resistance at absolute temperature T<sub>25</sub> [K]; T<sub>25</sub>=25 [°C]+273.15=298.15 [K]

R<sub>50</sub>: resistance at absolute temperature T<sub>50</sub> [K]; T<sub>50</sub>=50 [°C]+273.15=323.15 [K]

7. Typical value is measured by using thermally conductive grease of λ=0.9 W/(m·K).

8. The base plate (mounting side) flatness measurement points (X, Y) are as follows of the following figure.



< IGBT MODULES >

CM150RXL-34SA

HIGH POWER SWITCHING USE  
INSULATED TYPE

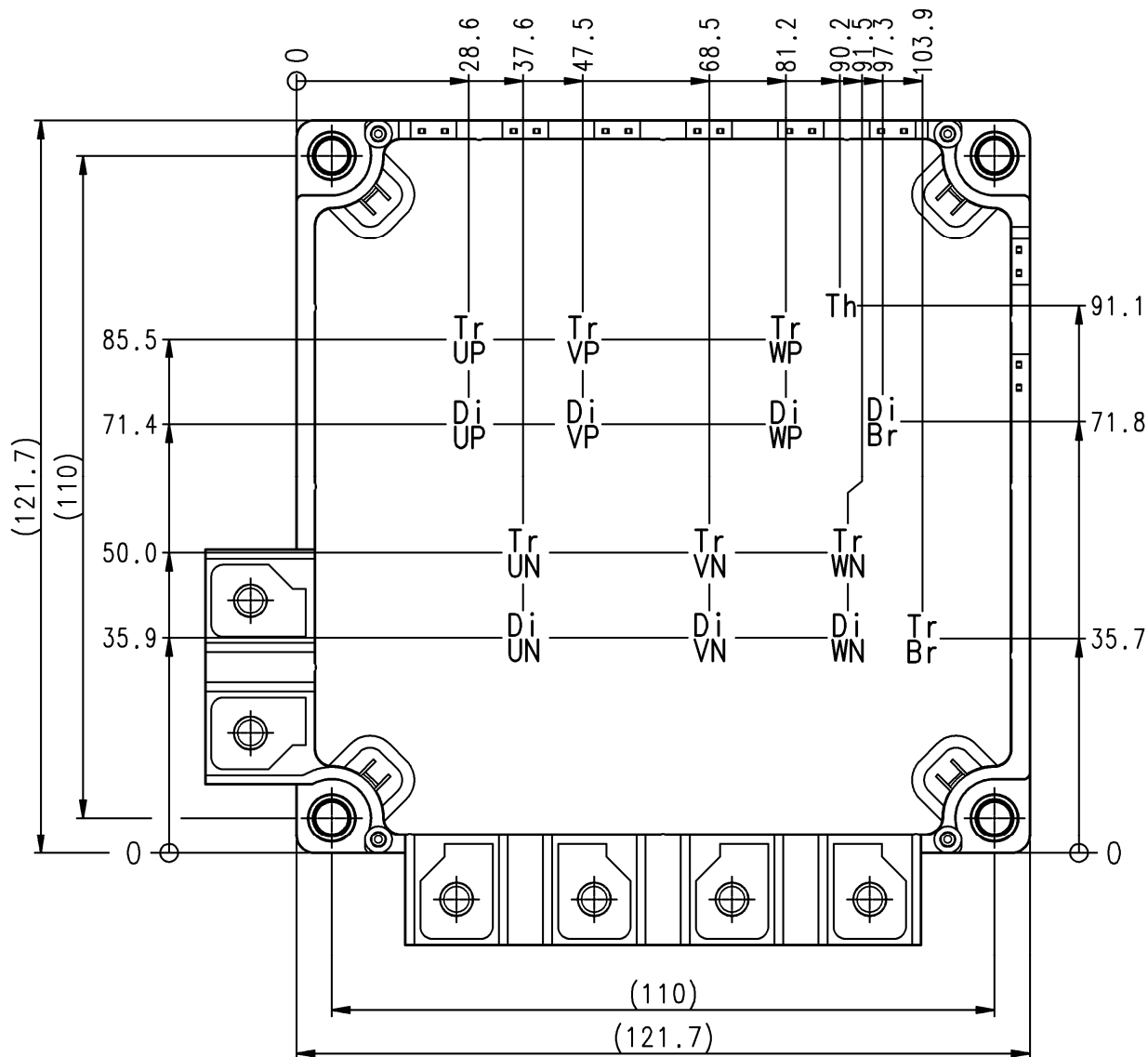
9. Use the following screws when mounting the printed circuit board (PCB) on the stand offs.  
"ST2.6×10 or ST2.6×12 self tapping screw"  
The length of the screw depends on the thickness of the PCB.

RECOMMENDED OPERATING CONDITIONS

Symbol	Item	Conditions	Limits			Unit	
			Min.	Typ.	Max.		
V <sub>CC</sub>	(DC) Supply voltage	Applied across P-N terminals	-	1000	1200	V	
V <sub>GEon</sub>	Gate (-emitter drive) voltage	Applied across GB-EB/ G*P-E*P/G*N-E*N(*=U, V, W) terminals	13.5	15.0	16.5	V	
R <sub>G</sub>	External gate resistance	Per switch	Inverter IGBT	0	-	50	Ω
			Brake IGBT	10	-	100	

CHIP LOCATION (Top view)

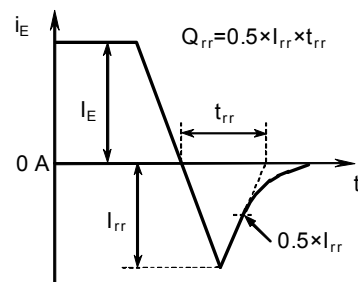
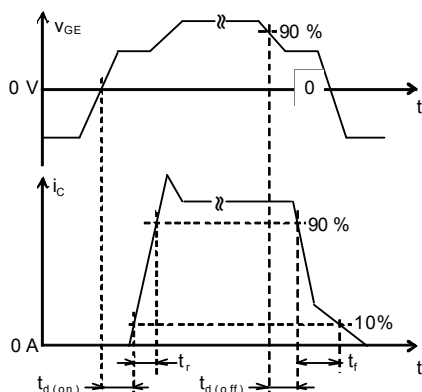
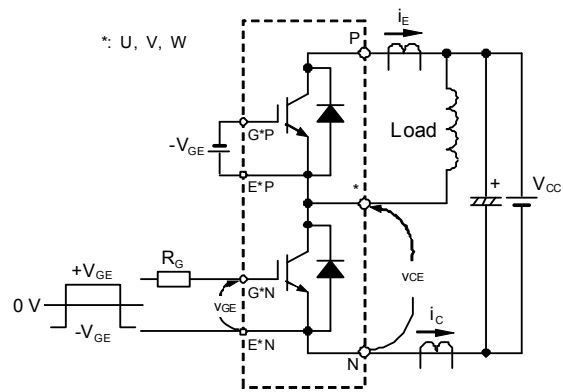
Dimension in mm, tolerance: ±1 mm



Tr\*P/Tr\*N/TrBr: IGBT, Di\*P/Di\*N: DIODE (\*=U/V/W), DiBr: BRAKE DIODE, Th: NTC thermistor

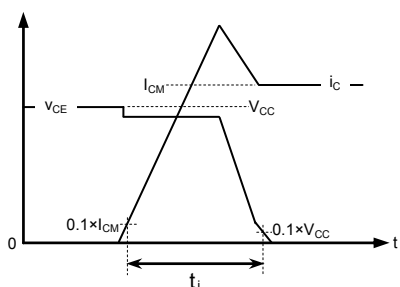
< IGBT MODULES >  
**CM150RXL-34SA**  
 HIGH POWER SWITCHING USE  
 INSULATED TYPE

**TEST CIRCUIT AND WAVEFORMS**

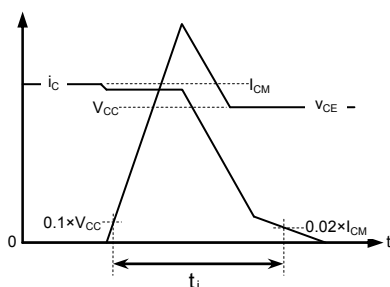


**Switching characteristics test circuit and waveforms**

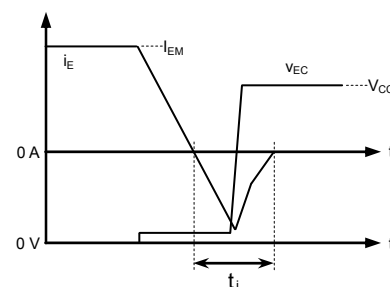
**$t_{rr}$ ,  $Q_{rr}$  characteristics test waveform**



**IGBT Turn-on switching energy**



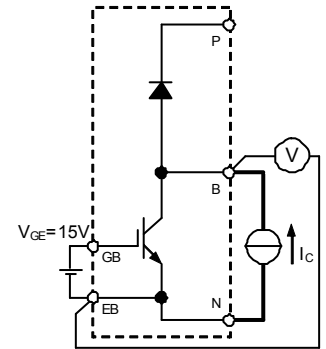
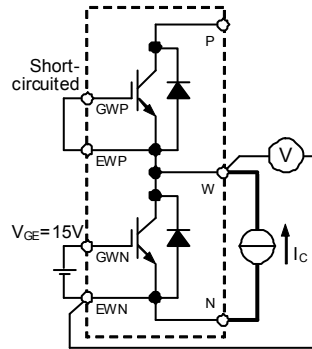
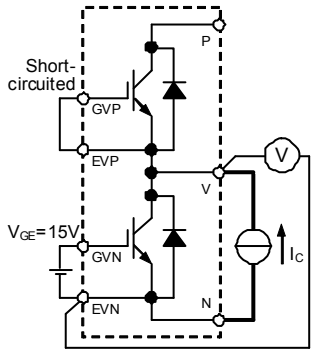
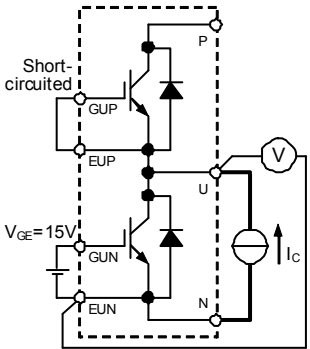
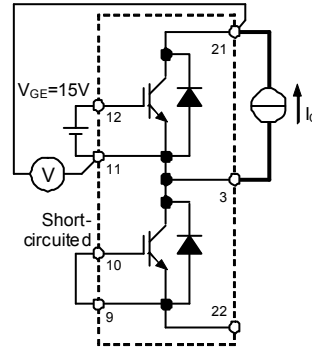
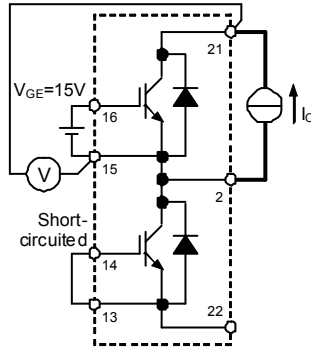
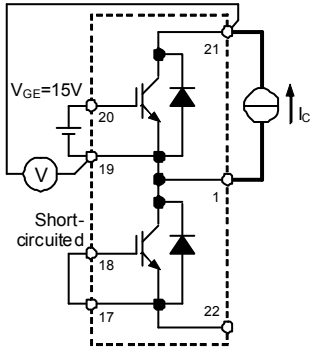
**IGBT Turn-off switching energy**



**DIODE Reverse recovery energy**

**Turn-on / Turn-off switching energy and Reverse recovery energy test waveforms (Integral time instruction drawing)**

TEST CIRCUIT



Gate-emitter GVP-EVP, GVN-EVN,  
short-circuited GWP-EWP, GWN-EWN,  
GB-EB

UP / UN IGBT

Gate-emitter GUP-EUP, GUN-EUN,  
short-circuited GVP-EVP, GVN-EVN,  
GB-EB

VP / VN IGBT

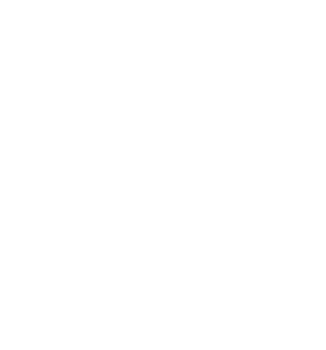
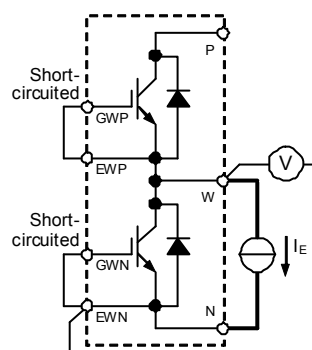
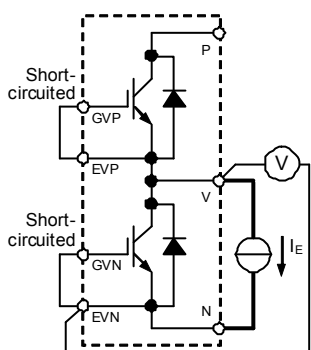
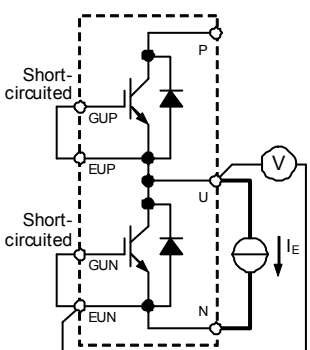
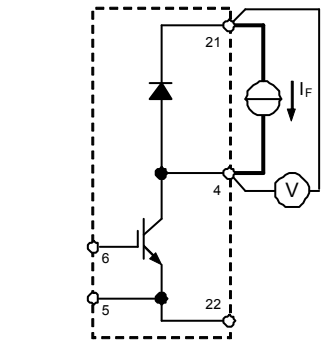
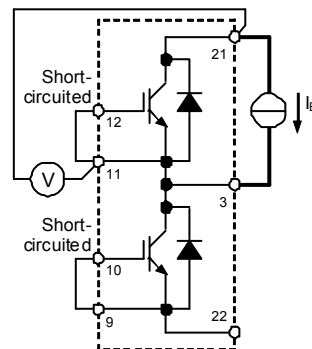
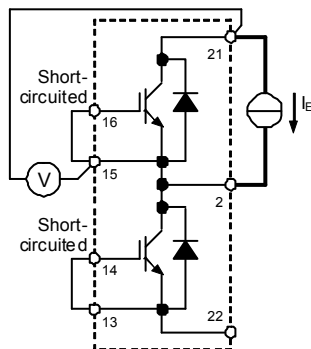
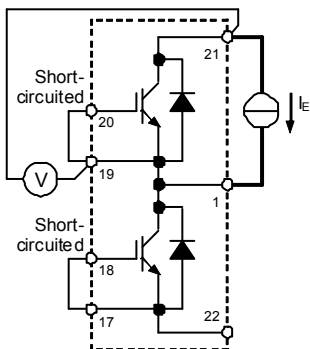
Gate-emitter GUP-EUP, GUN-EUN,  
short-circuited GVP-EVP, GVN-EVN,  
GB-EB

WP / WN IGBT

Gate-emitter GUP-EUP, GUN-EUN,  
short-circuited GVP-EVP, GVN-EVN,  
GWP-EWP, GWN-EWN

Brake IGBT

$V_{CEsat}$  characteristics test circuit



Gate-emitter GVP-EVP, GVN-EVN,  
short-circuited GWP-EWP, GWN-EWN,  
GB-EB

UP / UN DIODE

Gate-emitter GUP-EUP, GUN-EUN,  
short-circuited GVP-EVP, GVN-EVN,  
GB-EB

VP / VN DIODE

Gate-emitter GUP-EUP, GUN-EUN,  
short-circuited GVP-EVP, GVN-EVN,  
GB-EB

WP / WN DIODE

Gate-emitter GUP-EUP, GUN-EUN,  
short-circuited GVP-EVP, GVN-EVN,  
GWP-EWP, GWN-EWN

Brake DIODE

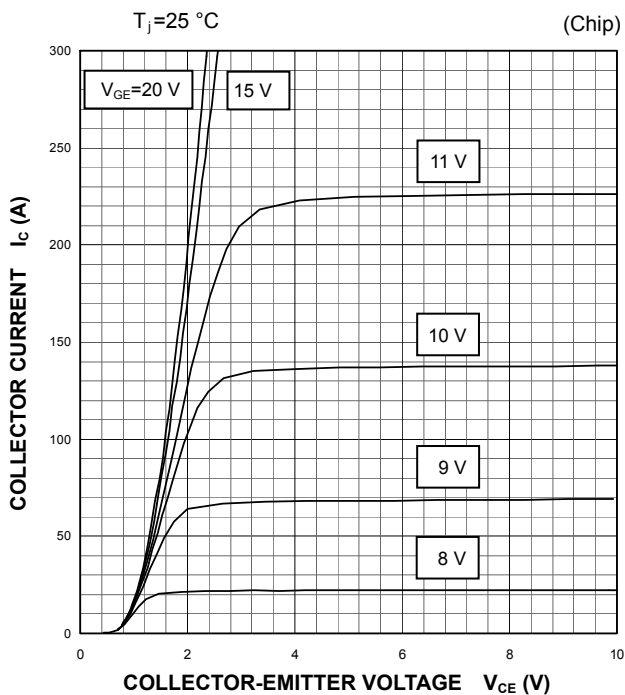
$V_{EC} / V_F$  characteristics test circuit

< IGBT MODULES >  
**CM150RXL-34SA**  
 HIGH POWER SWITCHING USE  
 INSULATED TYPE

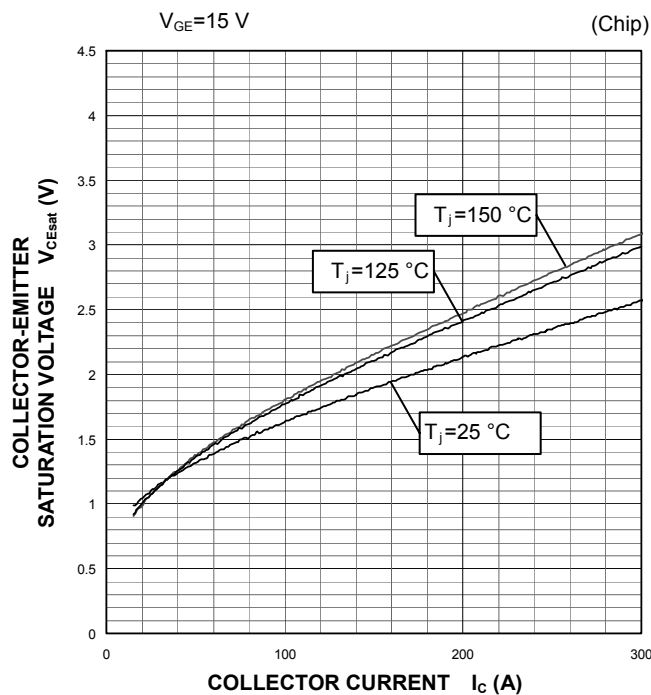
PERFORMANCE CURVES

INVERTER PART

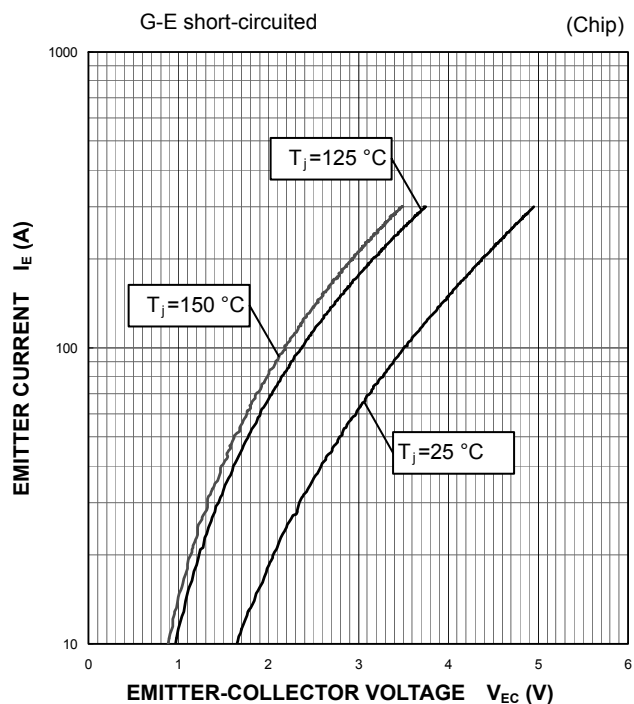
OUTPUT CHARACTERISTICS  
 (TYPICAL)



COLLECTOR-EMITTER SATURATION VOLTAGE  
 CHARACTERISTICS  
 (TYPICAL)



FREE WHEELING DIODE  
 FORWARD CHARACTERISTICS  
 (TYPICAL)





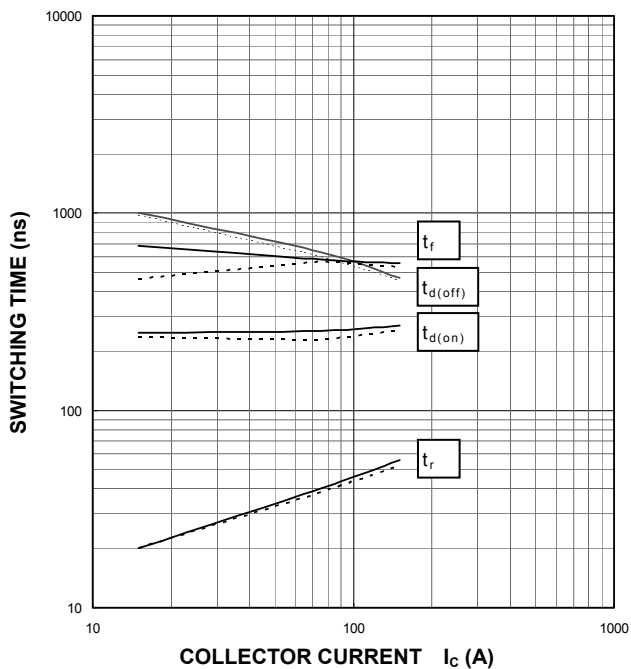
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**CM150RXL-34SA**  
 HIGH POWER SWITCHING USE  
 INSULATED TYPE

PERFORMANCE CURVES

INVERTER PART

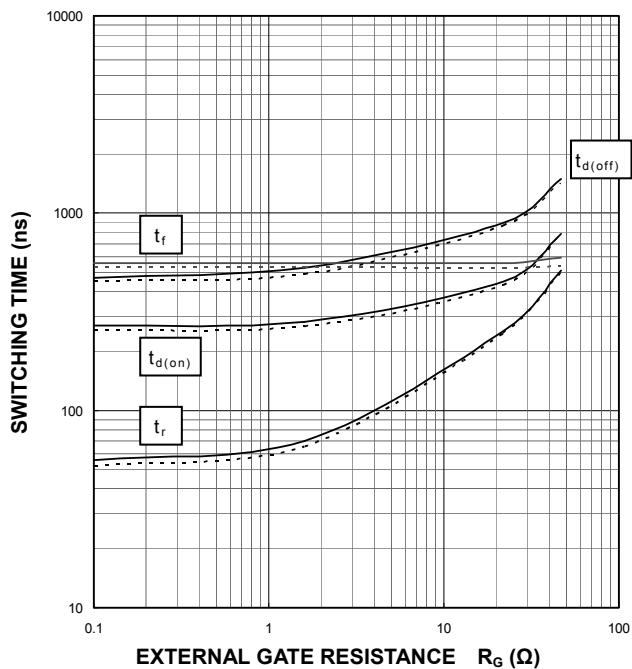
HALF-BRIDGE  
 SWITCHING CHARACTERISTICS  
 (TYPICAL)

$V_{CC}=1000\text{ V}$ ,  $V_{GE}=\pm 15\text{ V}$ ,  $R_G=0\ \Omega$ , INDUCTIVE LOAD  
 —:  $T_j=150\text{ }^\circ\text{C}$ , - - - -:  $T_j=125\text{ }^\circ\text{C}$



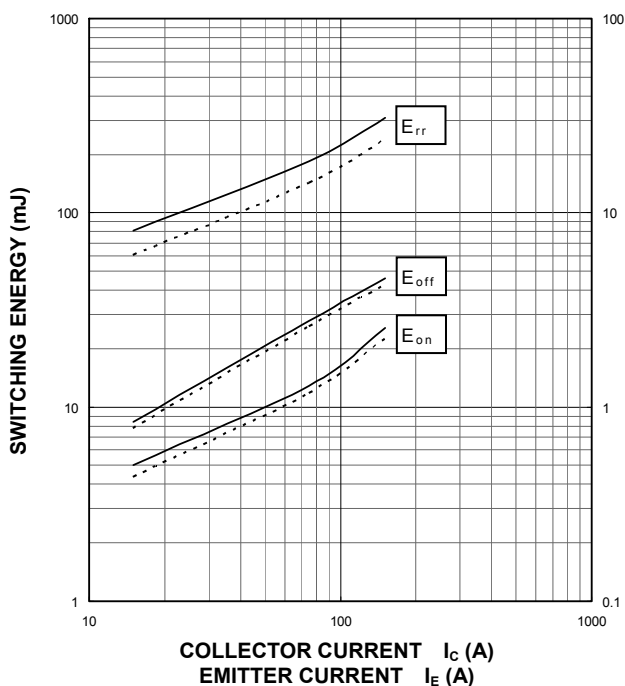
HALF-BRIDGE  
 SWITCHING CHARACTERISTICS  
 (TYPICAL)

$V_{CC}=1000\text{ V}$ ,  $V_{GE}=\pm 15\text{ V}$ ,  $I_C=150\text{ A}$ , INDUCTIVE LOAD  
 —:  $T_j=150\text{ }^\circ\text{C}$ , - - - -:  $T_j=125\text{ }^\circ\text{C}$



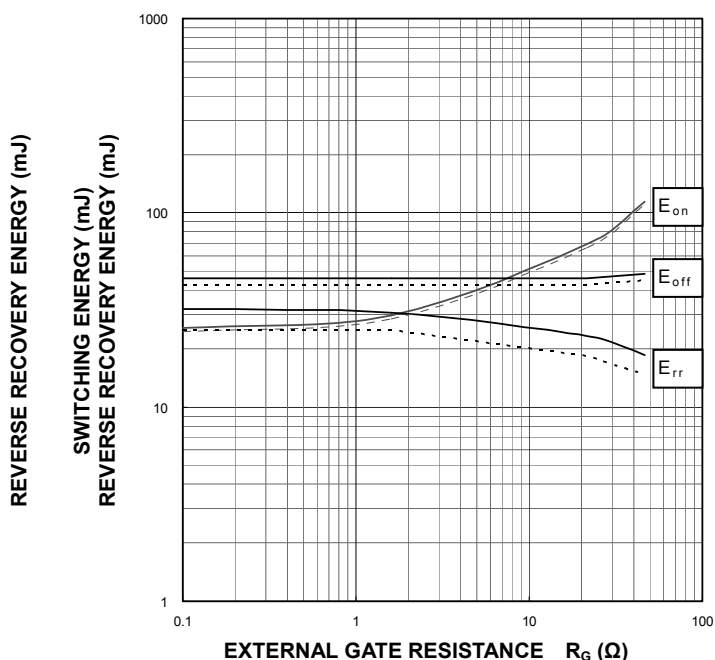
HALF-BRIDGE  
 SWITCHING CHARACTERISTICS  
 (TYPICAL)

$V_{CC}=1000\text{ V}$ ,  $V_{GE}=\pm 15\text{ V}$ ,  $R_G=0\ \Omega$ ,  
 INDUCTIVE LOAD, PER PULSE  
 —:  $T_j=150\text{ }^\circ\text{C}$ , - - - -:  $T_j=125\text{ }^\circ\text{C}$



HALF-BRIDGE  
 SWITCHING CHARACTERISTICS  
 (TYPICAL)

$V_{CC}=1000\text{ V}$ ,  $V_{GE}=\pm 15\text{ V}$ ,  $I_C/I_E=150\text{ A}$ ,  
 INDUCTIVE LOAD, PER PULSE  
 —:  $T_j=150\text{ }^\circ\text{C}$ , - - - -:  $T_j=125\text{ }^\circ\text{C}$



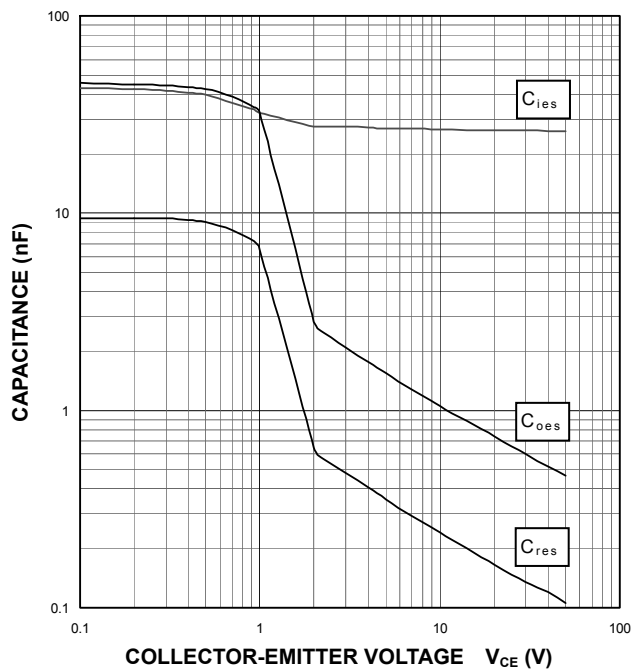
< IGBT MODULES >  
**CM150RXL-34SA**  
 HIGH POWER SWITCHING USE  
 INSULATED TYPE

PERFORMANCE CURVES

INVERTER PART

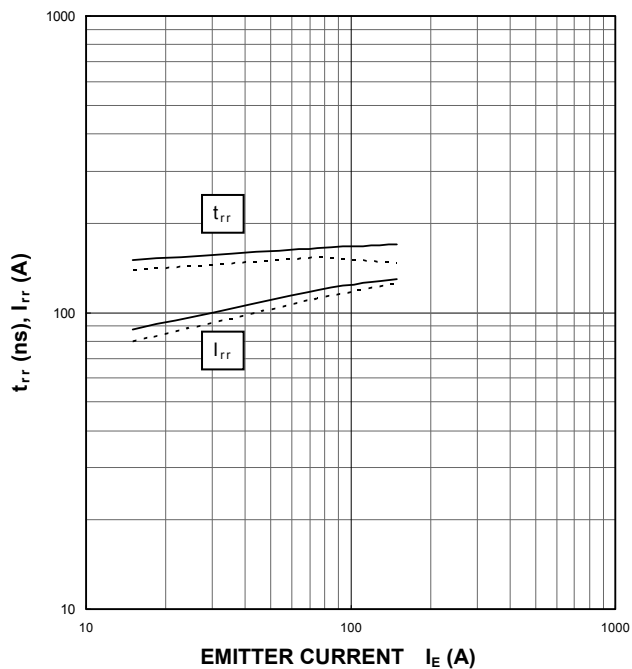
**CAPACITANCE CHARACTERISTICS**  
 (TYPICAL)

G-E short-circuited,  $T_j=25\text{ }^\circ\text{C}$



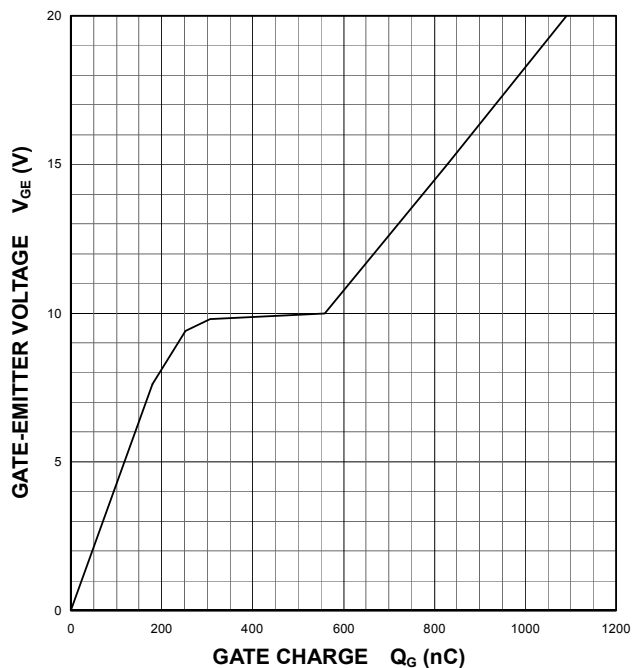
**FREE WHEELING DIODE**  
**REVERSE RECOVERY CHARACTERISTICS**  
 (TYPICAL)

$V_{CC}=1000\text{ V}$ ,  $V_{GE}=\pm 15\text{ V}$ ,  $R_G=0\ \Omega$ , INDUCTIVE LOAD  
 —:  $T_j=150\text{ }^\circ\text{C}$ , - - - - -:  $T_j=125\text{ }^\circ\text{C}$



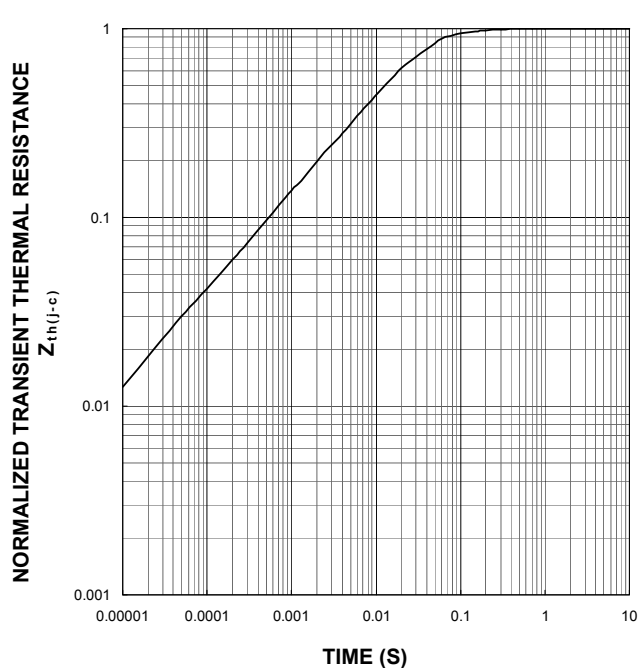
**GATE CHARGE CHARACTERISTICS**  
 (TYPICAL)

$V_{CC}=1000\text{ V}$ ,  $I_C=150\text{ A}$ ,  $T_j=25\text{ }^\circ\text{C}$



**TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS**  
 (MAXIMUM)

Single pulse,  $T_C=25\text{ }^\circ\text{C}$   
 $R_{th(j-c)Q}=0.10\text{ K/W}$ ,  $R_{th(j-c)D}=0.16\text{ K/W}$

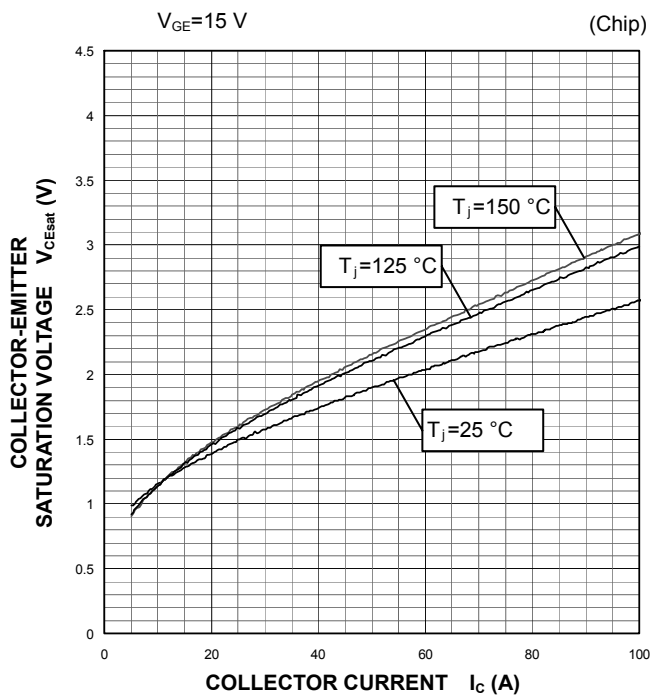


< IGBT MODULES >  
**CM150RXL-34SA**  
 HIGH POWER SWITCHING USE  
 INSULATED TYPE

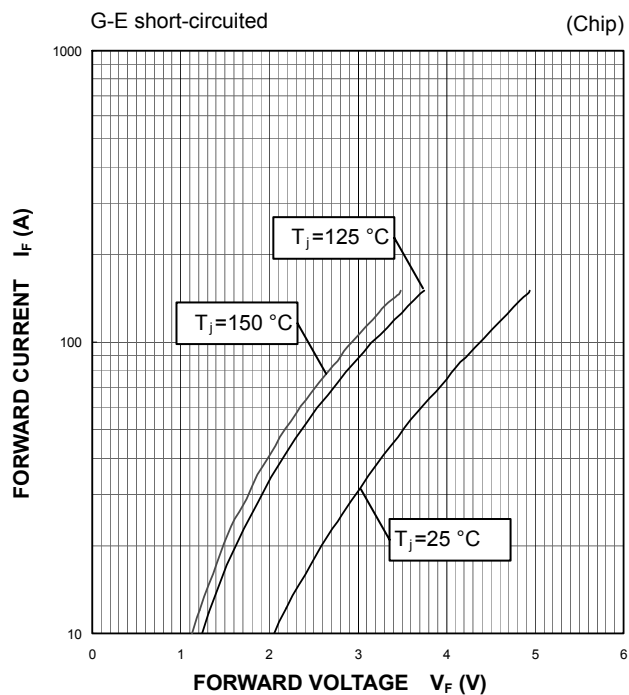
PERFORMANCE CURVES

BRAKE PART

COLLECTOR-EMITTER SATURATION  
 VOLTAGE CHARACTERISTICS  
 (TYPICAL)

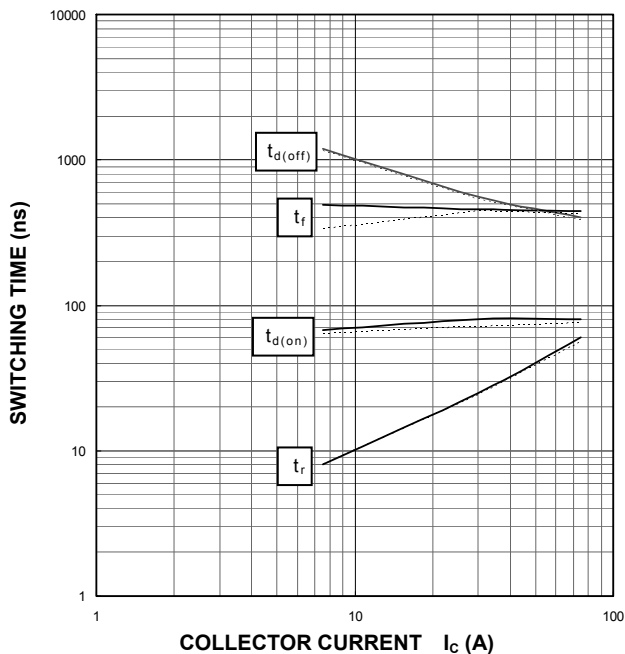


CLAMP DIODE  
 FORWARD CHARACTERISTICS  
 (TYPICAL)



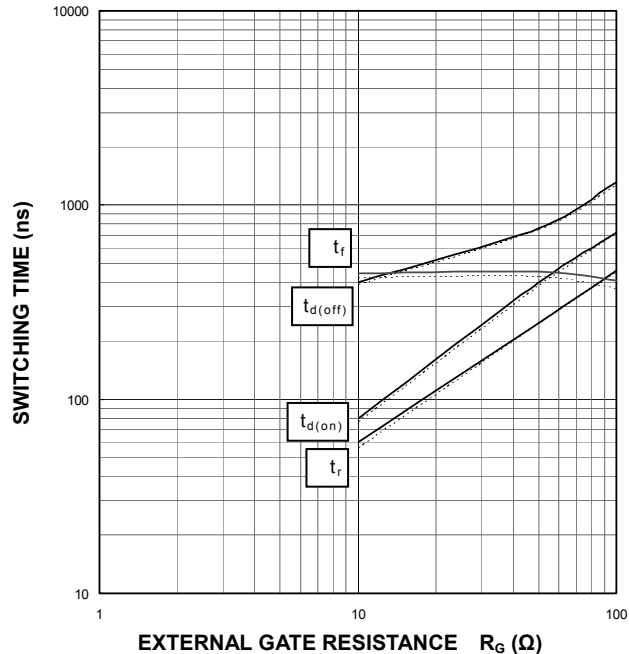
HALF-BRIDGE  
 SWITCHING CHARACTERISTICS  
 (TYPICAL)

$V_{CC}=1000\text{ V}$ ,  $V_{GE}=\pm 15\text{ V}$ ,  $R_G=10\text{ }\Omega$ , INDUCTIVE LOAD  
 —:  $T_j=150\text{ }^\circ\text{C}$ , - - - -:  $T_j=125\text{ }^\circ\text{C}$



HALF-BRIDGE  
 SWITCHING CHARACTERISTICS  
 (TYPICAL)

$V_{CC}=1000\text{ V}$ ,  $I_c=75\text{ A}$ ,  $V_{GE}=\pm 15\text{ V}$ , INDUCTIVE LOAD  
 —:  $T_j=150\text{ }^\circ\text{C}$ , - - - -:  $T_j=125\text{ }^\circ\text{C}$

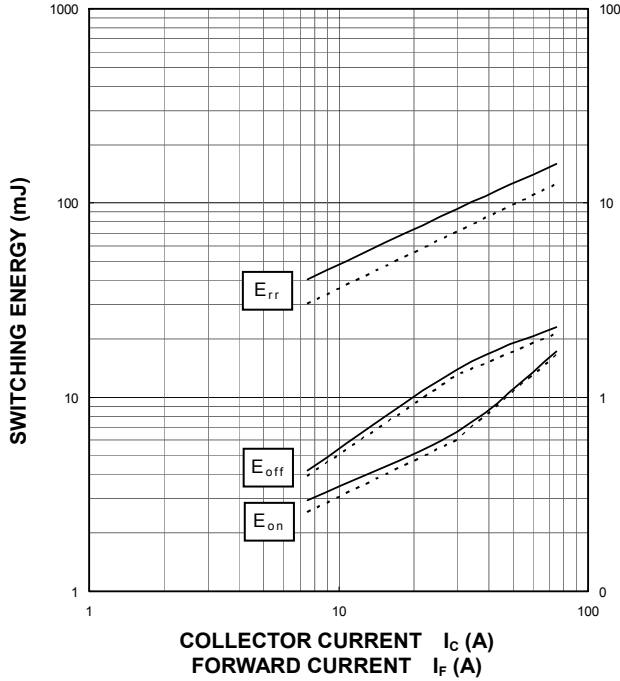


PERFORMANCE CURVES

BRAKE PART

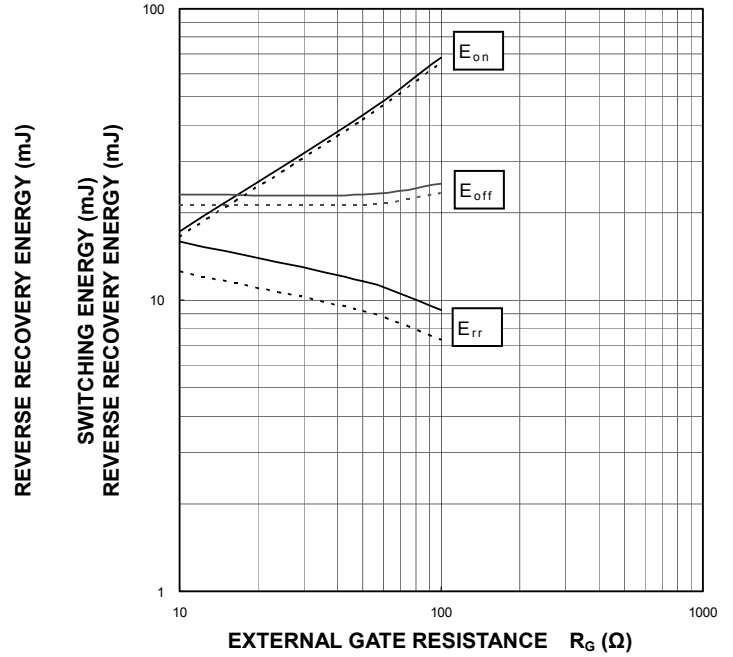
HALF-BRIDGE  
SWITCHING CHARACTERISTICS  
(TYPICAL)

$V_{CC}=1000\text{ V}$ ,  $V_{GE}=\pm 15\text{ V}$ ,  $R_G=10\ \Omega$ ,  
INDUCTIVE LOAD, PER PULSE  
————:  $T_j=150\text{ }^\circ\text{C}$ , - - - - -:  $T_j=125\text{ }^\circ\text{C}$



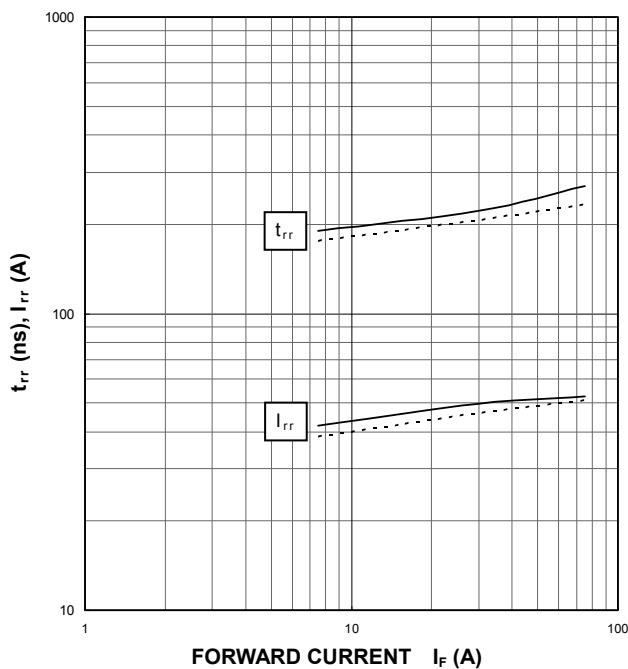
HALF-BRIDGE  
SWITCHING CHARACTERISTICS  
(TYPICAL)

$V_{CC}=1000\text{ V}$ ,  $I_C/I_F=75\text{ A}$ ,  $V_{GE}=\pm 15\text{ V}$ ,  
INDUCTIVE LOAD, PER PULSE  
————:  $T_j=150\text{ }^\circ\text{C}$ , - - - - -:  $T_j=125\text{ }^\circ\text{C}$



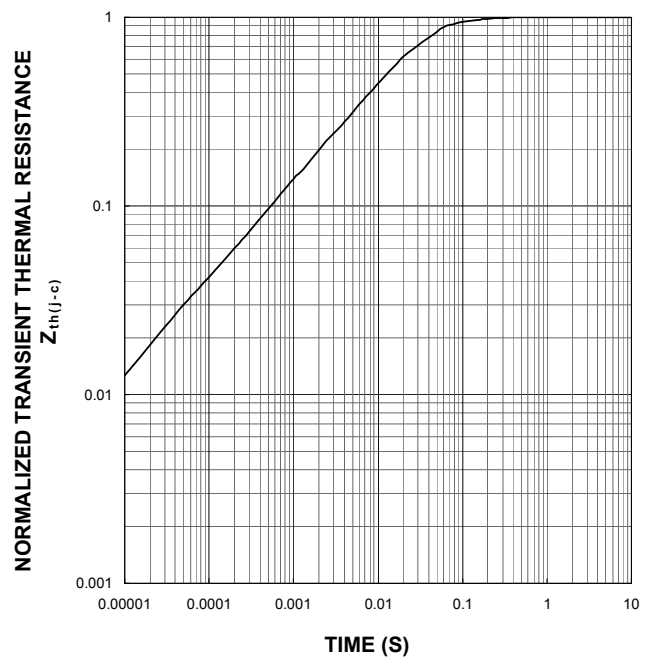
CLAMP DIODE  
REVERSE RECOVERY CHARACTERISTICS  
(TYPICAL)

$V_{CC}=1000\text{ V}$ ,  $V_{GE}=\pm 15\text{ V}$ ,  $R_G=10\ \Omega$ , INDUCTIVE LOAD  
————:  $T_j=150\text{ }^\circ\text{C}$ , - - - - -:  $T_j=125\text{ }^\circ\text{C}$



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS  
(MAXIMUM)

Single pulse,  $T_C=25\text{ }^\circ\text{C}$   
 $R_{th(j-c)Q}=0.18\text{ K/W}$ ,  $R_{th(j-c)D}=0.27\text{ K/W}$



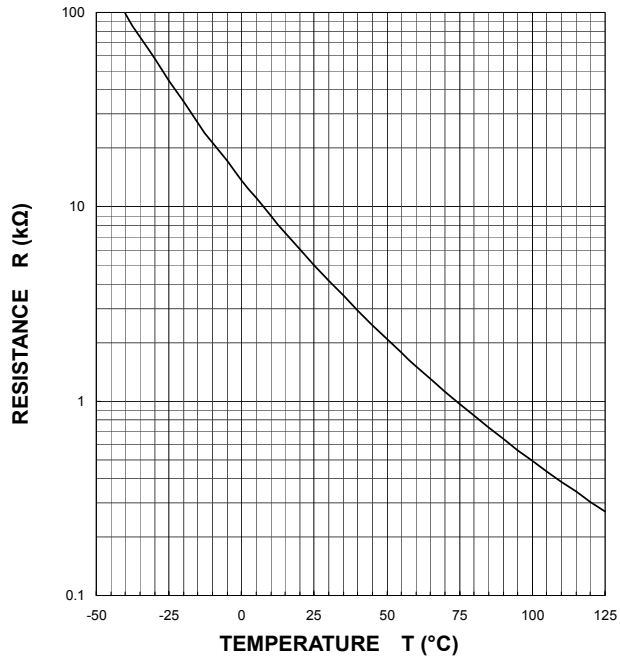
< IGBT MODULES >  
CM150RXL-34SA  
HIGH POWER SWITCHING USE  
INSULATED TYPE

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PERFORMANCE CURVES

NTC thermistor part

TEMPERATURE CHARACTERISTICS  
(TYPICAL)



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