

< IGBT MODULES >

CM75MXA-34SA

HIGH POWER SWITCHING USE
INSULATED TYPE



CIB (Converter+Inverter+Chopper Brake)

Collector current I_C **75 A**
 Collector-emitter voltage V_{CES} **1700 V**
 Maximum junction temperature T_{jmax} **175 °C***

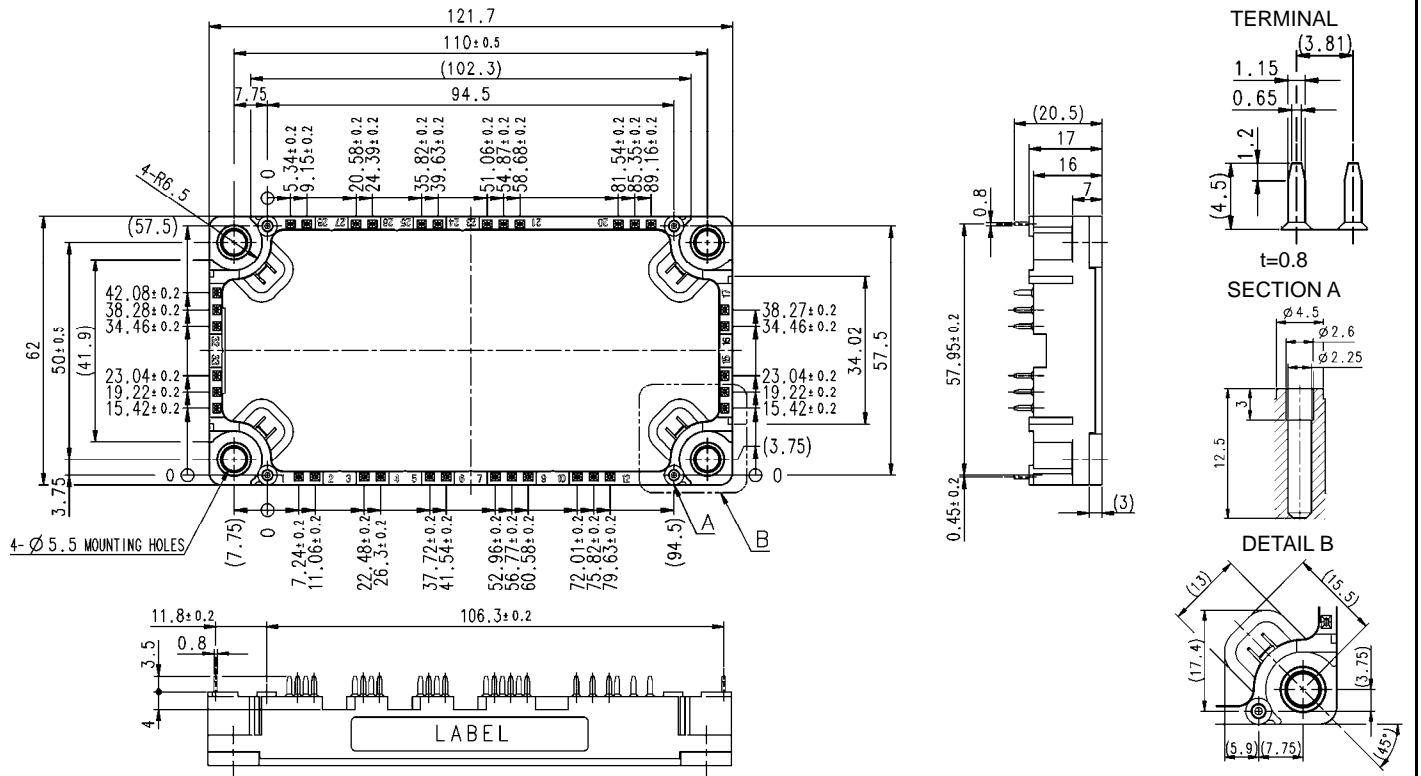
*: Converter part is permitted up to 150 °C.

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

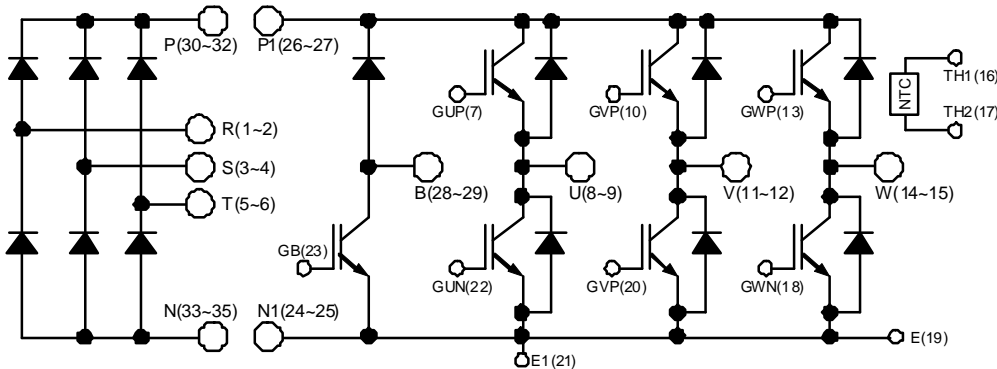
APPLICATION

AC Motor Control, Motion/Servo Control, etc.

OUTLINE DRAWING & INTERNAL CONNECTION



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

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MAXIMUM RATINGS (T_j=25 °C, unless otherwise specified)

INVERTER PART IGBT/DIODE

Symbol	Item	Conditions	Rating	Unit
V _{CES}	Collector-emitter voltage	G-E short-circuited	1700	V
V _{GES}	Gate-emitter voltage	C-E short-circuited	± 20	V
I _C	Collector current	DC, T _C =125 °C (Note2, 4)	75	A
I _{CRM}		Pulse, Repetitive (Note3)	150	
P _{tot}	Total power dissipation	T _C =25 °C (Note2, 4)	830	W
I _E (Note1)	Emitter current	DC (Note2)	75	A
I _{ERM} (Note1)		Pulse, Repetitive (Note3)	150	
T _{jm ax}	Maximum junction temperature	Instantaneous event (overload)	175	°C

BRAKE PART IGBT/DIODE

Symbol	Item	Conditions	Rating	Unit
V _{CES}	Collector-emitter voltage	G-E short-circuited	1700	V
V _{GES}	Gate-emitter voltage	C-E short-circuited	± 20	V
I _C	Collector current	DC, T _C =125 °C (Note2, 4)	50	A
I _{CRM}		Pulse, Repetitive (Note3)	100	
P _{tot}	Total power dissipation	T _C =25 °C (Note2, 4)	600	W
V _{R RM}	Repetitive peak reverse voltage	G-E short-circuited	1700	V
I _F	Forward current	DC (Note2)	50	A
I _{FRM}		Pulse, Repetitive (Note3)	100	
T _{jm ax}	Maximum junction temperature	Instantaneous event (overload)	175	°C

CONVERTER PART DIODE

Symbol	Item	Conditions	Rating	Unit
V _{R RM}	Repetitive peak reverse voltage	-	1800	V
E _a	Recommended AC input voltage	RMS	575 / 690	V
I _o	DC output current	3-phase full wave rectifying, T _C =125 °C (Note4)	75	A
I _{FSM}	Surge forward current	The sine half wave 1 cycle peak value, f=60 Hz, non-repetitive	750	A
I ² t	Current square time	Value for one cycle of surge current	2340	A ² s
T _{jm ax}	Maximum junction temperature	Instantaneous event (overload)	150	°C

MODULE

Symbol	Item	Conditions	Rating	Unit
V _{isol}	Isolation voltage	Terminals to base plate, RMS, f=60 Hz, AC 1 min	4000	V
T _{C max}	Maximum case temperature	(Note4)	125	°C
T _{j op}	Operating junction temperature	Continuous operation (under switching)	-40 ~ +150	°C
T _{stg}	Storage temperature	-	-40 ~ +125	

ELECTRICAL CHARACTERISTICS (T_j=25 °C, unless otherwise specified)

INVERTER 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	μA	
V _{GE(th)}	Gate-emitter threshold voltage	I _C =7.5 mA, V _{CE} =10 V	5.4	6.0	6.6	V	
V _{Cesat} (Terminal)	Collector-emitter saturation voltage	I _C =75 A, V _{GE} =15 V, Refer to the figure of test circuit. (Note6)	T _j =25 °C	-	2.00	2.5	V
			T _j =125 °C	-	2.20	-	
			T _j =150 °C	-	2.25	-	
V _{Cesat} (Chip)	Collector-emitter saturation voltage	I _C =75 A, V _{GE} =15 V, (Note6)	T _j =25 °C	-	1.90	2.4	V
			T _j =125 °C	-	2.10	-	
			T _j =150 °C	-	2.15	-	

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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.		
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		
V_{EC} (Note1) (Terminal)	Emitter-collector voltage	$I_E=75\text{ A}$, G-E short-circuited, Refer to the figure of test circuit. (Note6)	$T_j=25\text{ }^\circ\text{C}$	-	4.1	5.3	V
V_{EC} (Note1) (Chip)			$T_j=125\text{ }^\circ\text{C}$	-	2.9	-	
			$T_j=150\text{ }^\circ\text{C}$	-	2.7	-	
V_{EC} (Note1) (Chip)	G-E short-circuited, (Note6)	$T_j=25\text{ }^\circ\text{C}$	-	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	$V_{CC}=1000\text{ V}$, $I_E=75\text{ A}$, $V_{GE}=\pm 15\text{ V}$, $R_G=10\text{ }\Omega$, Inductive load	-	-	200	ns	
Q_{rr} (Note1)	Reverse recovery charge	$R_G=10\text{ }\Omega$, Inductive load	-	2.0	-	μC	
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} (Note1)	Reverse recovery energy per pulse	Inductive load	-	15.9	-	mJ	
$R_{CC'+EE'}$	Internal lead resistance	Main terminals-chip, per switch, $T_C=25\text{ }^\circ\text{C}$ (Note4)	-	-	3.7	$\text{m}\Omega$	
r_g	Internal gate resistance	Per switch	-	0	-	Ω	

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	μA	
$V_{GE(th)}$	Gate-emitter threshold voltage	$I_C=5\text{ mA}$, $V_{CE}=10\text{ V}$	5.4	6.0	6.6	V	
V_{Cesat} (Terminal)	Collector-emitter saturation voltage	$I_C=50\text{ A}$, $V_{GE}=15\text{ V}$, Refer to the figure of test circuit. (Note6)	$T_j=25\text{ }^\circ\text{C}$	-	2.00	2.5	V
V_{Cesat} (Chip)			$T_j=125\text{ }^\circ\text{C}$	-	2.20	-	
			$T_j=150\text{ }^\circ\text{C}$	-	2.25	-	
V_{Cesat} (Chip)	$I_C=50\text{ A}$, $V_{GE}=15\text{ V}$, (Note6)	$T_j=25\text{ }^\circ\text{C}$	-	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	-	-	13	nF	
C_{oes}	Output capacitance		-	-	1.1		
C_{res}	Reverse transfer capacitance		-	-	0.24		
Q_G	Gate charge	$V_{CC}=1000\text{ V}$, $I_C=50\text{ A}$, $V_{GE}=15\text{ V}$	-	276	-	nC	
$t_{d(on)}$	Turn-on delay time	$V_{CC}=1000\text{ V}$, $I_C=50\text{ A}$, $V_{GE}=\pm 15\text{ V}$, $R_G=13\text{ }\Omega$, Inductive load	-	-	200	ns	
t_r	Rise time		-	-	100		
$t_{d(off)}$	Turn-off delay time		-	-	700		
t_f	Fall time		-	-	600		

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CM75MXA-34SA

HIGH POWER SWITCHING USE
INSULATED TYPE

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

BRAKE PART IGBT/DIODE

Symbol	Item	Conditions	Limits			Unit	
			Min.	Typ.	Max.		
I_{RRM}	Reverse current	$V_R=V_{RRM}$, G-E short-circuited	-	-	1.0	mA	
V_F (Terminal)	Forward voltage	$I_F=50\text{ A}$, Refer to the figure of test circuit. (Note6)	$T_j=25\text{ }^\circ\text{C}$	-	4.1	5.3	V
			$T_j=125\text{ }^\circ\text{C}$	-	2.9	-	
			$T_j=150\text{ }^\circ\text{C}$	-	2.7	-	
V_F (Chip)	Forward voltage	$I_F=50\text{ A}$, (Note6)	$T_j=25\text{ }^\circ\text{C}$	-	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	$V_{CC}=1000\text{ V}$, $I_F=50\text{ A}$, $V_{GE}=\pm 15\text{ V}$,	-	-	200	ns	
Q_{rr}	Reverse recovery charge	$R_G=13\text{ }\Omega$, Inductive load	-	1.3	-	μC	
E_{on}	Turn-on switching energy per pulse	$V_{CC}=1000\text{ V}$, $I_C=I_F=50\text{ A}$,	-	9.7	-	mJ	
E_{off}	Turn-off switching energy per pulse	$V_{GE}=\pm 15\text{ V}$, $R_G=13\text{ }\Omega$, $T_j=150\text{ }^\circ\text{C}$,	-	11.2	-		
E_{rr}	Reverse recovery energy per pulse	Inductive load	-	9.8	-	mJ	
r_g	Internal gate resistance	-	-	0	-	Ω	

CONVERTER PART DIODE

Symbol	Item	Conditions	Limits			Unit
			Min.	Typ.	Max.	
I_{RRM}	Reverse current	$V_R=V_{RRM}$, $T_j=150\text{ }^\circ\text{C}$	-	-	20	mA
V_F (Terminal)	Forward voltage	$I_F=75\text{ A}$ (Note5)	-	1.2	1.6	V

NTC THERMISTOR PART

Symbol	Item	Conditions	Limits			Unit
			Min.	Typ.	Max.	
R_{25}	Zero-power resistance	$T_C=25\text{ }^\circ\text{C}$ (Note4)	4.85	5.00	5.15	k Ω
$\Delta R/R$	Deviation of resistance	$R_{100}=493\text{ }\Omega$, $T_C=100\text{ }^\circ\text{C}$ (Note4)	-7.3	-	+7.8	%
$B_{(25/50)}$	B-constant	Approximate by equation (Note6)	-	3375	-	K
P_{25}	Power dissipation	$T_C=25\text{ }^\circ\text{C}$ (Note4)	-	-	10	mW

THERMAL RESISTANCE CHARACTERISTICS

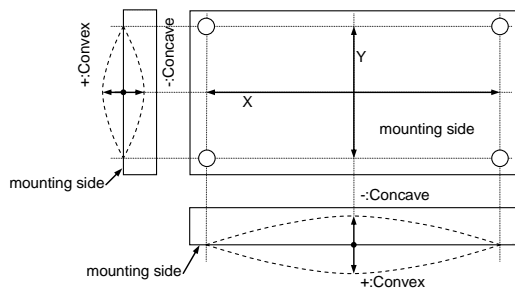
Symbol	Item	Conditions	Limits			Unit
			Min.	Typ.	Max.	
$R_{th(j-c)Q}$	Thermal resistance	Junction to case, per Inverter IGBT (Note4)	-	-	0.18	K/W
$R_{th(j-c)D}$		Junction to case, per Inverter DIODE (Note4)	-	-	0.27	
$R_{th(j-c)Q}$		Junction to case, Brake IGBT (Note4)	-	-	0.25	K/W
$R_{th(j-c)D}$		Junction to case, Brake DIODE (Note4)	-	-	0.35	
$R_{th(j-c)D}$		Junction to case, per Converter DIODE (Note4)	-	-	0.24	K/W
$R_{th(c-s)}$	Contact thermal resistance	Case to heat sink, per 1 module, Thermal grease applied (Note4, 7)	-	15	-	K/kW

MECHANICAL CHARACTERISTICS

Symbol	Item	Conditions	Limits			Unit
			Min.	Typ.	Max.	
M_s	Mounting torque	Mounting to heat sink M 5 screw	2.5	3.0	3.5	N·m
d_s	Creepage distance	Terminal to terminal	16.3	-	-	mm
		Terminal to base plate	16.8	-	-	
d_a	Clearance	Terminal to terminal	10.3	-	-	mm
		Terminal to base plate	9.53	-	-	
m	mass	-	-	330	-	g
e_c	Flatness of base plate	On the centerline X, Y (Note8)	± 0	-	+100	μm

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- Note1. Represent ratings and characteristics of the anti-parallel, emitter-collector free wheeling diode (DIODE).
 2. Junction temperature (T_j) should not increase beyond T_{jmax} rating.
 3. Pulse width and repetition rate should be such that the device junction temperature (T_j) dose not exceed T_{jmax} rating.
 4. Case temperature (T_c) and heat sink temperature (T_s) 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.
 5. Pulse width and repetition rate should be such as to cause negligible temperature rise.
 6. $B_{(25/50)} = \ln\left(\frac{R_{25}}{R_{50}}\right) / \left(\frac{1}{T_{25}} - \frac{1}{T_{50}}\right)$,
 R_{25} : resistance at absolute temperature T_{25} [K]; $T_{25}=25\text{ [}^\circ\text{C]}+273.15=298.15$ [K]
 R_{50} : resistance at absolute temperature T_{50} [K]; $T_{50}=50\text{ [}^\circ\text{C]}+273.15=323.15$ [K]
 7. Typical value is measured by using thermally conductive grease of $\lambda=0.9$ W/(m·K).
 8. The base plate (mounting side) flatness measurement points (X, Y) are as follows of the following figure.



9. Use the following screws when mounting the printed circuit board (PCB) on the stand offs.
 $\phi 2.6 \times 10$ or $\phi 2.6 \times 12$ self tapping screw.
 The length of the screw depends on the thickness (t1.6~t2.0) of the PCB.

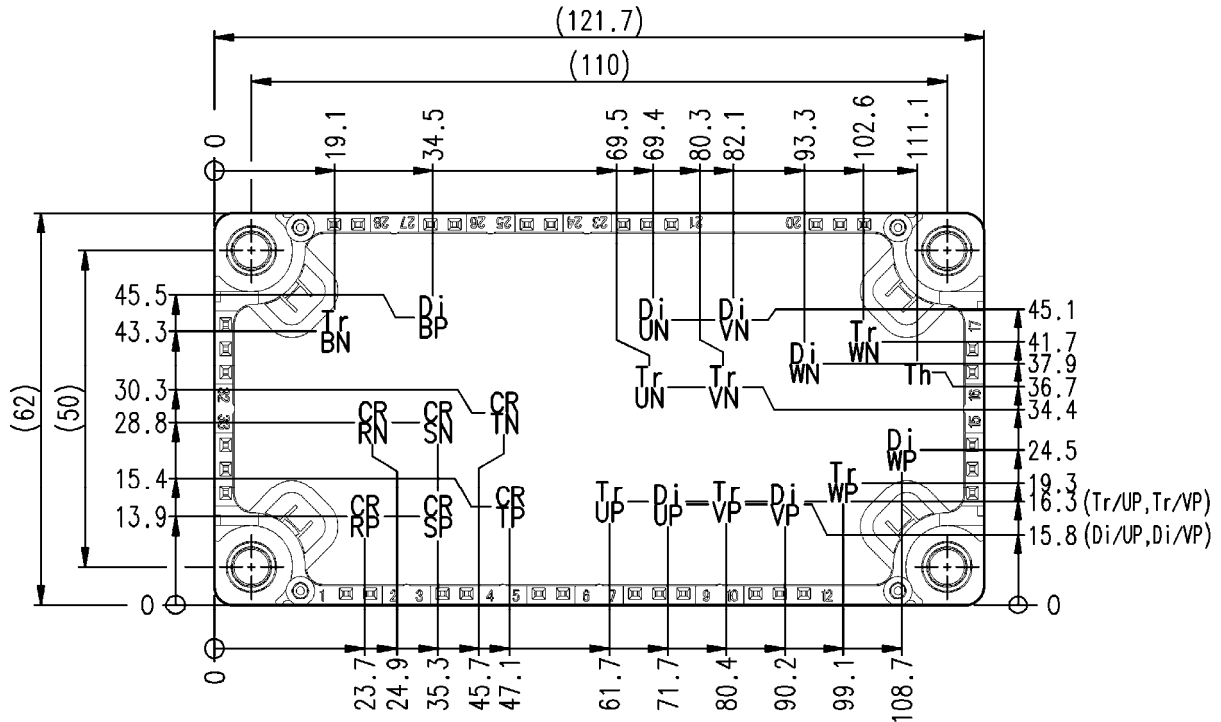
RECOMMENDED OPERATING CONDITIONS

Symbol	Item	Conditions	Limits			Unit
			Min.	Typ.	Max.	
V_{CC}	(DC) Supply voltage	Applied across P1-N1/P-N terminals	-	1000	1200	V
V_{GEon}	Gate (-emitter drive) voltage	Applied across GB-Es/ G*P*/G*N-Es(*=U, V, W) terminals	13.5	15.0	16.5	V
R_G	External gate resistance	Per switch				Ω
		Inverter IGBT	10	-	100	
		Brake IGBT	13	-	130	

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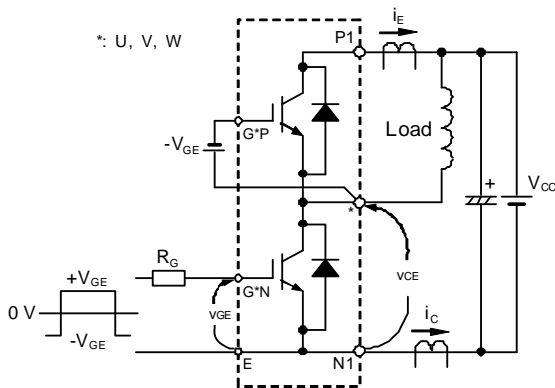
CHIP LOCATION (Top view)

Dimension in mm, tolerance: ±1 mm

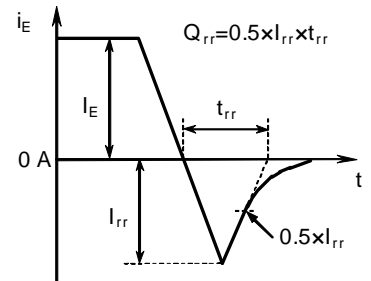
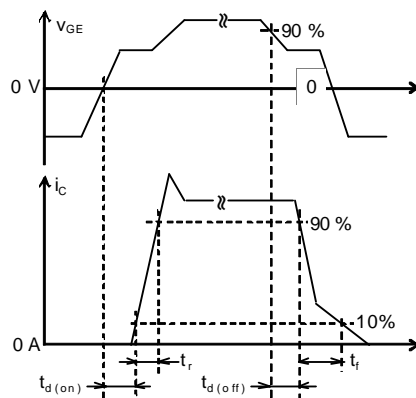


Tr*P/Tr*N/TrBN: IGBT, Di*P/Di*N: DIODE (*=U/V/W), DiBP: BRAKE DIODE, CR*P/CR*N: CONVETER DIODE (*=R/S/T), Th: NTC thermistor

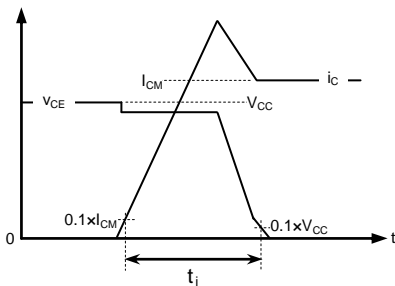
TEST CIRCUIT AND WAVEFORMS



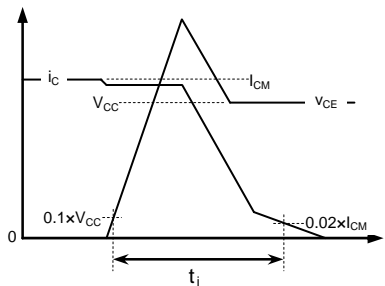
Switching characteristics test circuit and waveforms



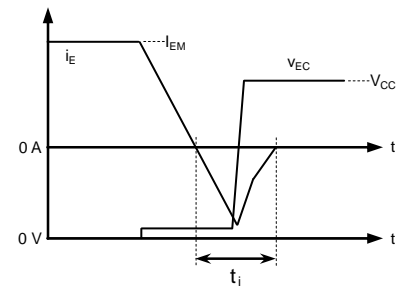
t_{rr} , Q_{rr} characteristics test waveform



IGBT Turn-on switching energy



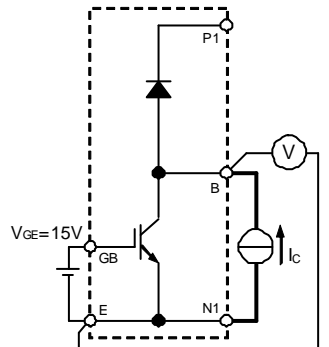
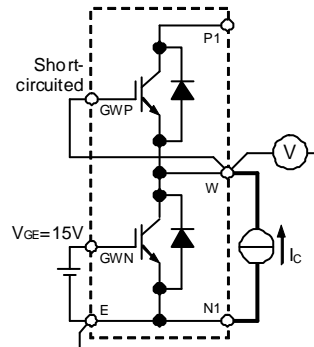
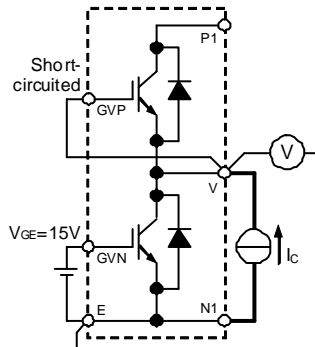
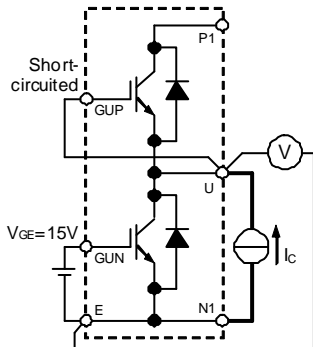
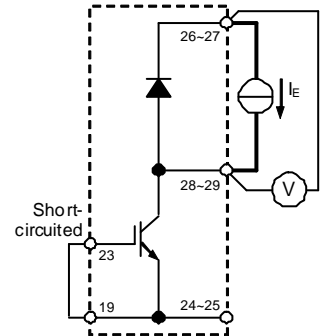
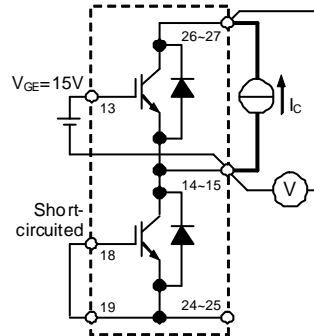
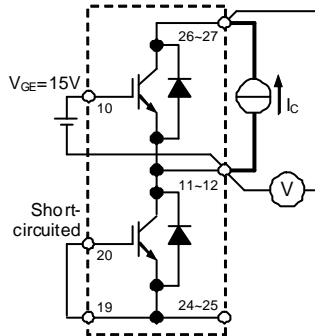
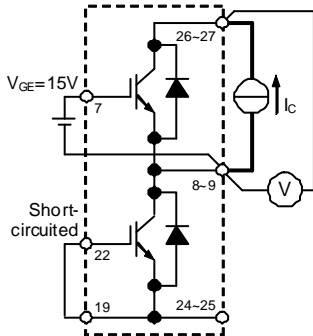
IGBT Turn-off switching energy



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-V GVN-Es,
short-circuited GWP-W, GWN-Es,
GB-Es

UP / UN IGBT

Gate-emitter GUP-U, GUN-Es,
short-circuited GWP-W, GWN-Es,
GB-Es

VP / VN IGBT

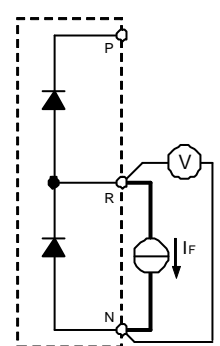
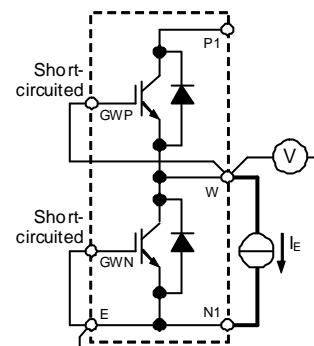
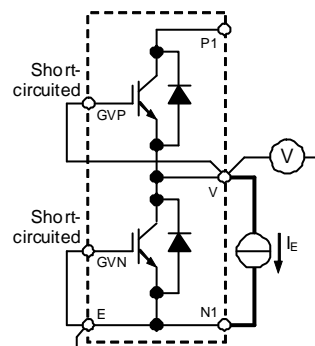
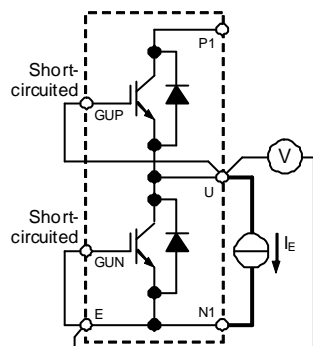
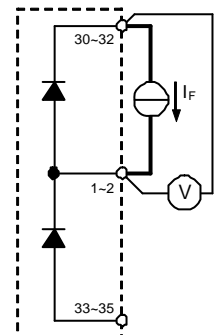
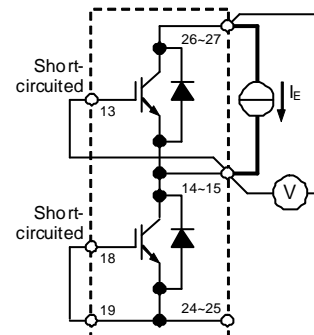
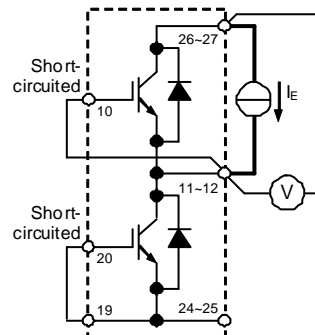
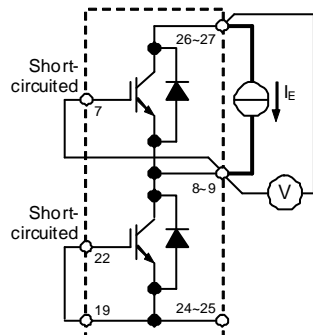
Gate-emitter GUP-U GUN-Es,
short-circuited GVP-V, GVN-Es,
GB-Es

WP / WN IGBT

Gate-emitter GUP-U, GUN-Es,
short-circuited GVP-V, GVN-Es,
GWP-W, GWN-Es

Brake IGBT/DIODE

V_{CEsat} / Brake part V_F characteristics test circuit



Gate-emitter GVP-V GVN-Es,
short-circuited GWP-W, GWN-Es,
GB-Es

UP / UN DIODE

Gate-emitter GUP-U, GUN-Es,
short-circuited GWP-W, GWN-Es,
GB-Es

VP / VN DIODE

Gate-emitter GUP-U GUN-Es,
short-circuited GVP-V, GVN-Es,
GB-Es

WP / WN DIODE

CONVERTER DIODE (ex. Phase R)

V_{EC} / Converter part V_F characteristics test circuit

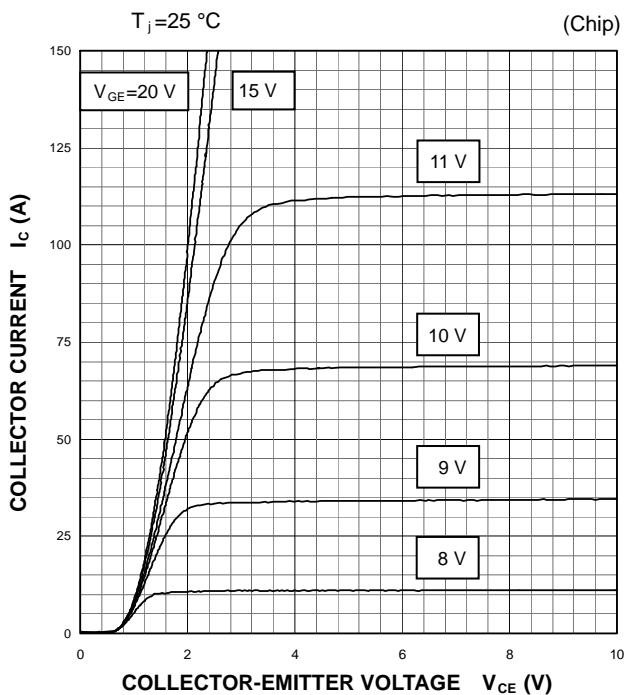
Caution: Each (two or three) pin terminal of P/N/P1/N1/U/W/B/R/S/T is connected in the module, but should use all each three pins for the external wiring.

< IGBT MODULES >
CM75MXA-34SA
 HIGH POWER SWITCHING USE
 INSULATED TYPE

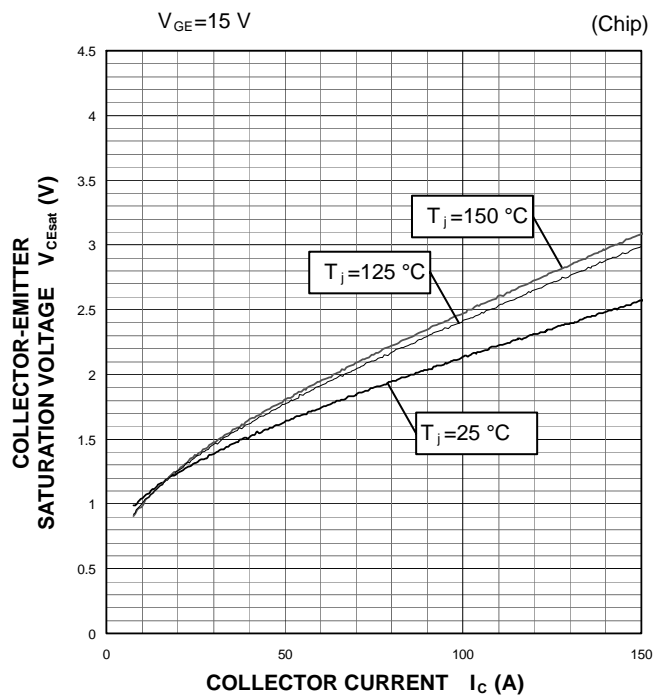
PERFORMANCE CURVES

INVERTER PART

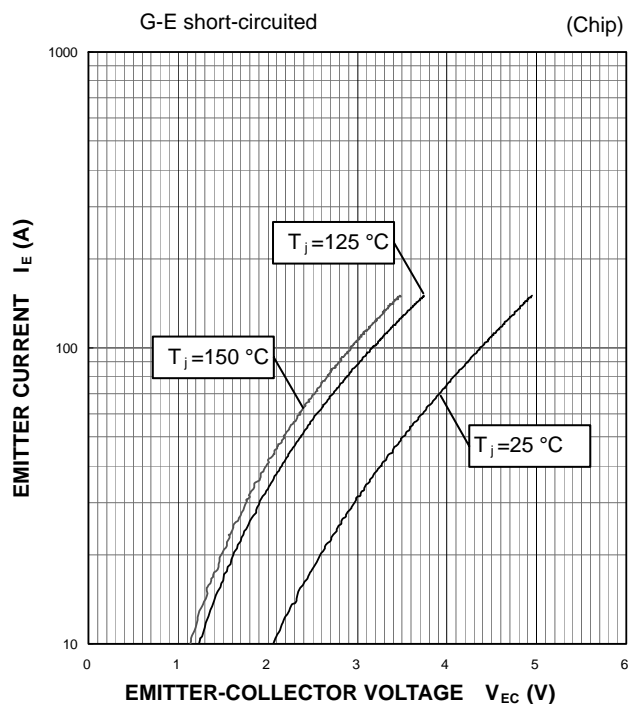
OUTPUT CHARACTERISTICS
 (TYPICAL)



COLLECTOR-EMITTER SATURATION VOLTAGE
 CHARACTERISTICS
 (TYPICAL)



FREE WHEELING DIODE
 FORWARD CHARACTERISTICS
 (TYPICAL)

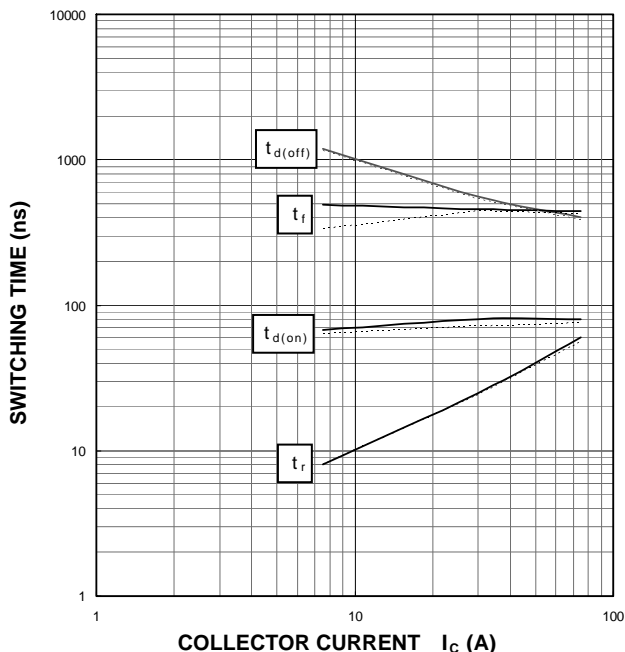


PERFORMANCE CURVES

INVERTER PART

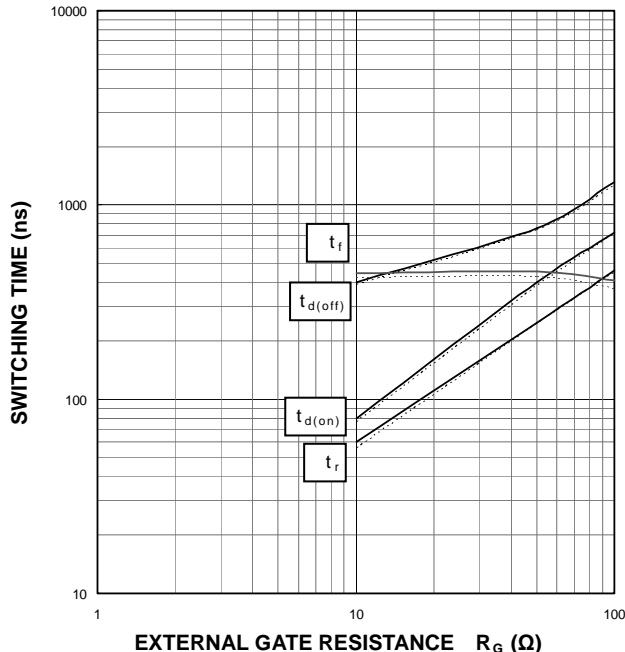
HALF-BRIDGE
SWITCHING CHARACTERISTICS
(TYPICAL)

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



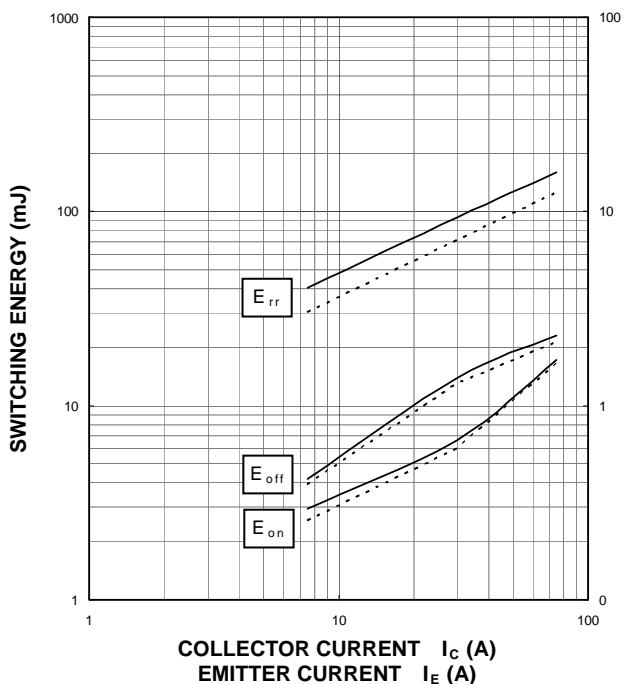
HALF-BRIDGE
SWITCHING CHARACTERISTICS
(TYPICAL)

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



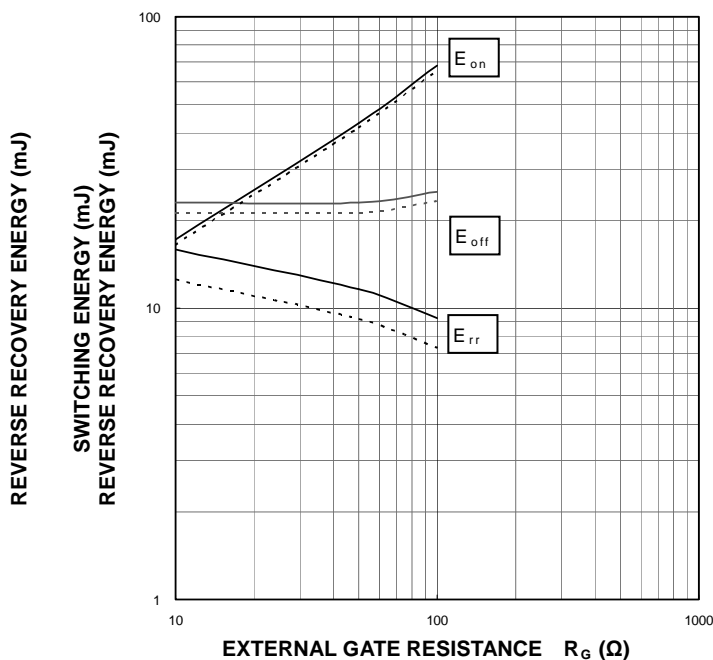
HALF-BRIDGE
SWITCHING CHARACTERISTICS
(TYPICAL)

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



HALF-BRIDGE
SWITCHING CHARACTERISTICS
(TYPICAL)

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



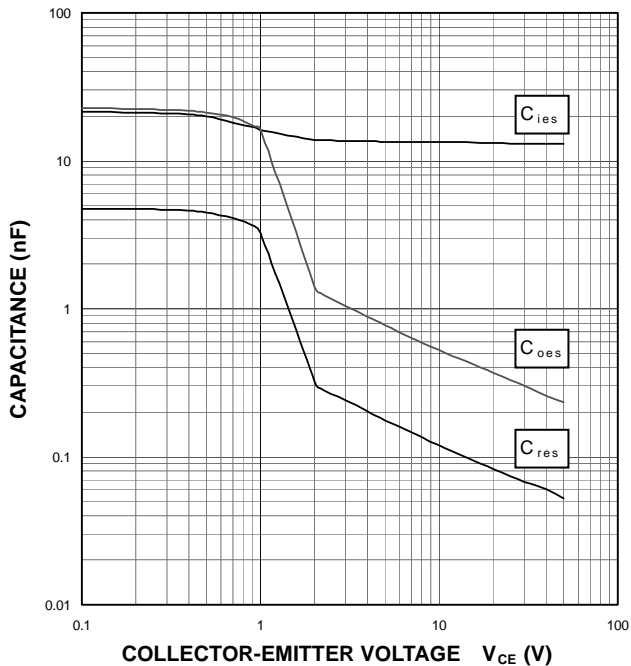
< IGBT MODULES >
CM75MXA-34SA
 HIGH POWER SWITCHING USE
 INSULATED TYPE

PERFORMANCE CURVES

INVERTER PART

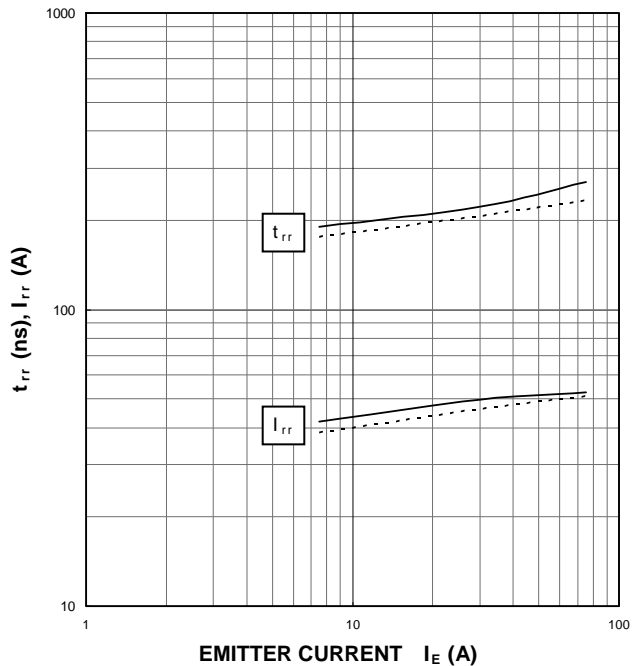
CAPACITANCE CHARACTERISTICS
 (TYPICAL)

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



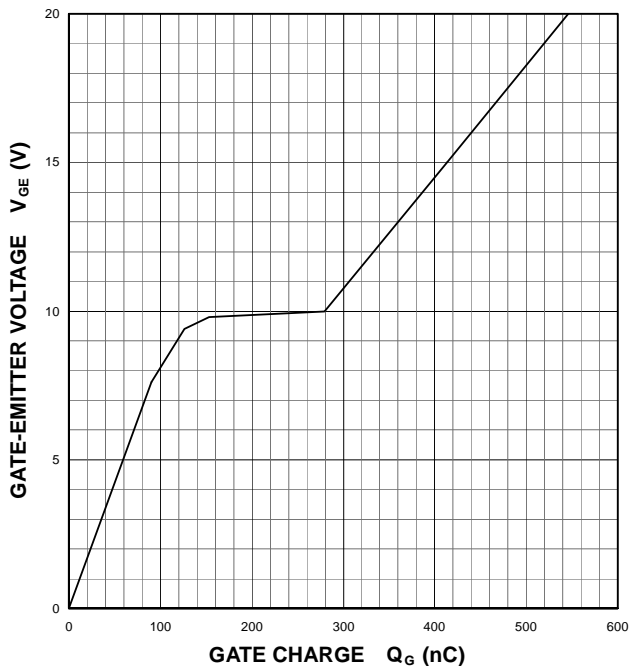
FREE WHEELING DIODE
REVERSE RECOVERY CHARACTERISTICS
 (TYPICAL)

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



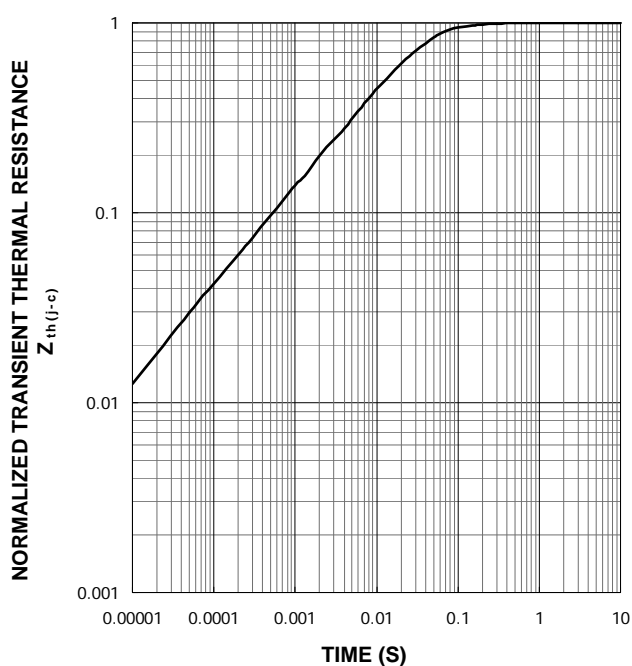
GATE CHARGE CHARACTERISTICS
 (TYPICAL)

$V_{CC}=1000\text{ V}$, $I_C=75\text{ A}$, $T_j=25\text{ }^\circ\text{C}$



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS
 (MAXIMUM)

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



< IGBT MODULES >

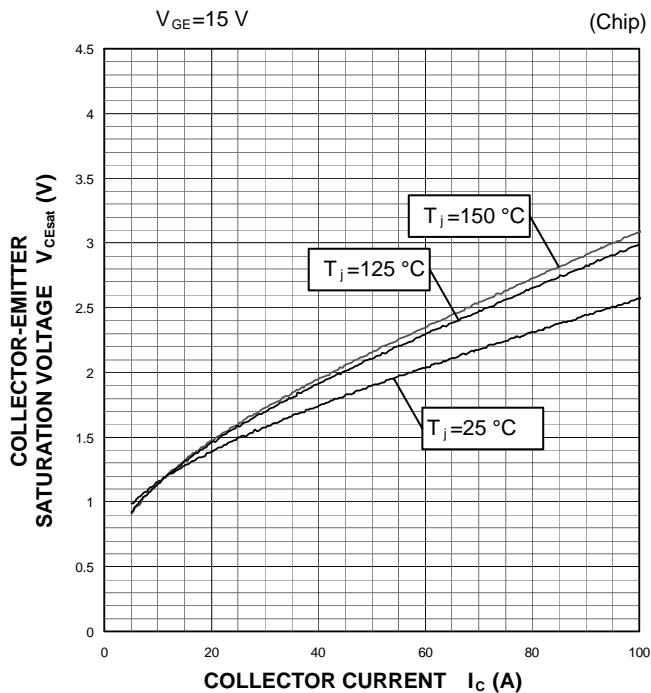
CM75MXA-34SA

HIGH POWER SWITCHING USE
INSULATED TYPE

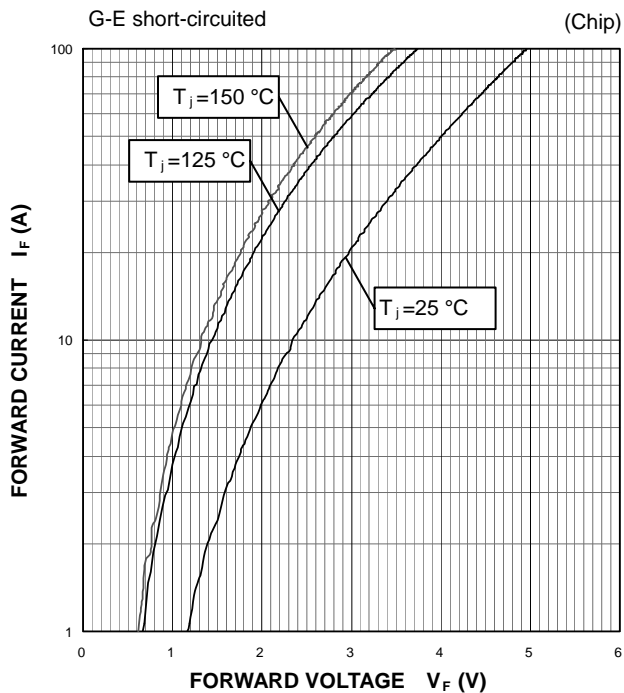
PERFORMANCE CURVES

BRAKE PART

COLLECTOR-EMITTER SATURATION
VOLTAGE CHARACTERISTICS
(TYPICAL)

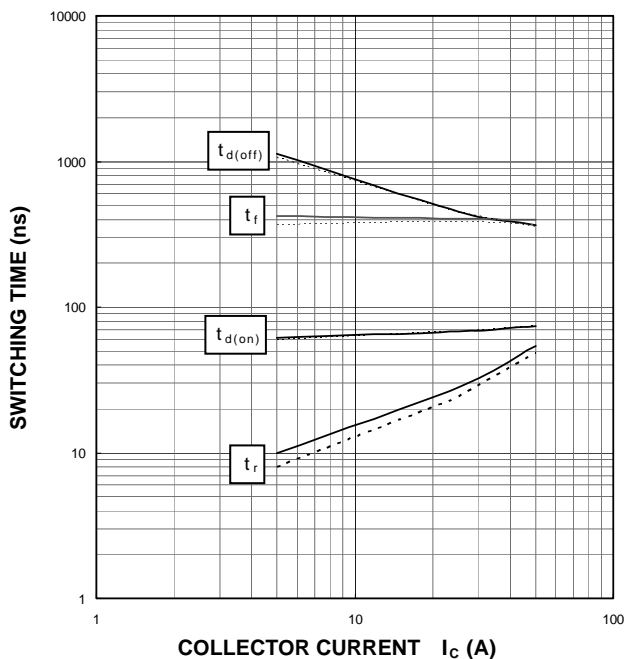


DIODE
FORWARD CHARACTERISTICS
(TYPICAL)



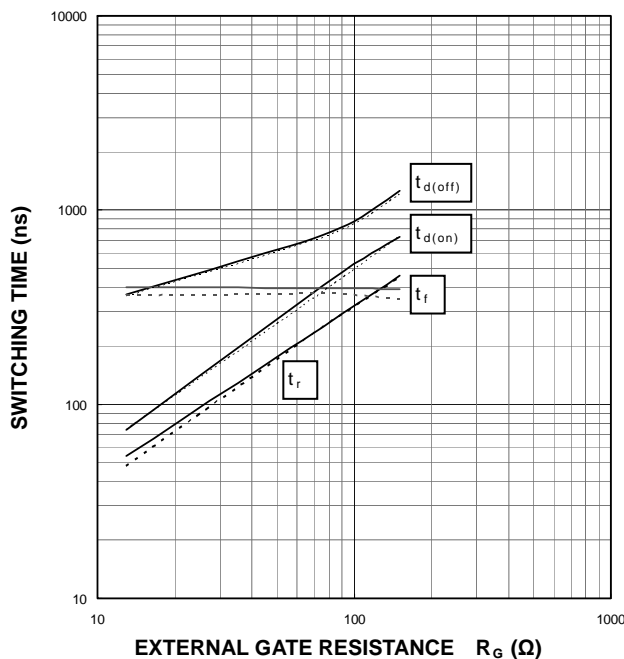
HALF-BRIDGE
SWITCHING CHARACTERISTICS
(TYPICAL)

$V_{CC} = 1000 \text{ V}$, $V_{GE} = \pm 15 \text{ V}$, $R_G = 13 \Omega$, INDUCTIVE LOAD
——: $T_j = 150 \text{ }^\circ\text{C}$, - - - -: $T_j = 125 \text{ }^\circ\text{C}$



HALF-BRIDGE
SWITCHING CHARACTERISTICS
(TYPICAL)

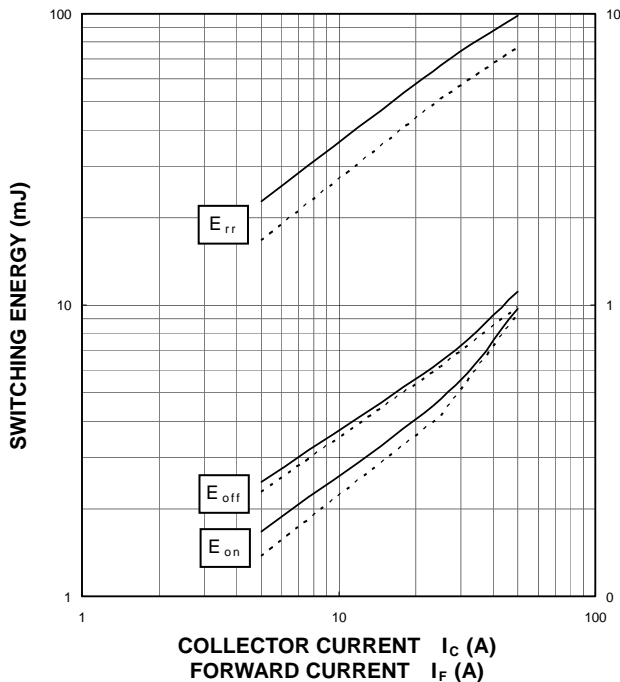
$V_{CC} = 1000 \text{ V}$, $I_C = 50 \text{ A}$, $V_{GE} = \pm 15 \text{ V}$, INDUCTIVE LOAD
——: $T_j = 150 \text{ }^\circ\text{C}$, - - - -: $T_j = 125 \text{ }^\circ\text{C}$



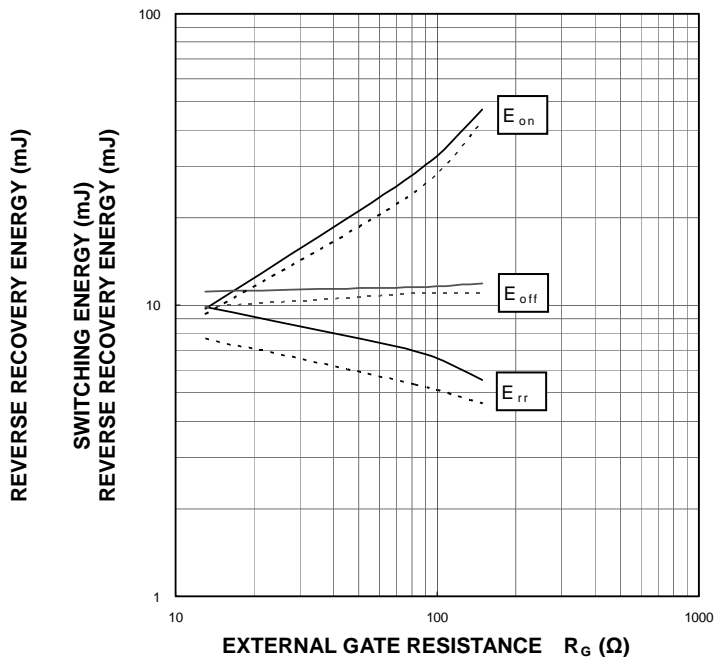
PERFORMANCE CURVES

BRAKE PART

HALF-BRIDGE SWITCHING CHARACTERISTICS (TYPICAL)
 $V_{CC}=1000\text{ V}$, $V_{GE}=\pm 15\text{ V}$, $R_G=13\ \Omega$,
 INDUCTIVE LOAD, PER PULSE
 —: $T_j=150\text{ }^\circ\text{C}$, - - - -: $T_j=125\text{ }^\circ\text{C}$

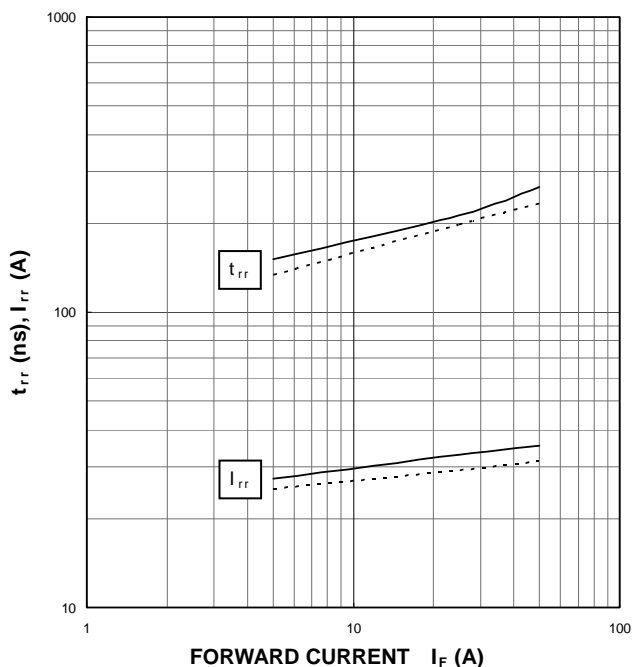


HALF-BRIDGE SWITCHING CHARACTERISTICS (TYPICAL)
 $V_{CC}=1000\text{ V}$, $I_C/I_F=50\text{ A}$, $V_{GE}=\pm 15\text{ V}$,
 INDUCTIVE LOAD, PER PULSE
 —: $T_j=150\text{ }^\circ\text{C}$, - - - -: $T_j=125\text{ }^\circ\text{C}$



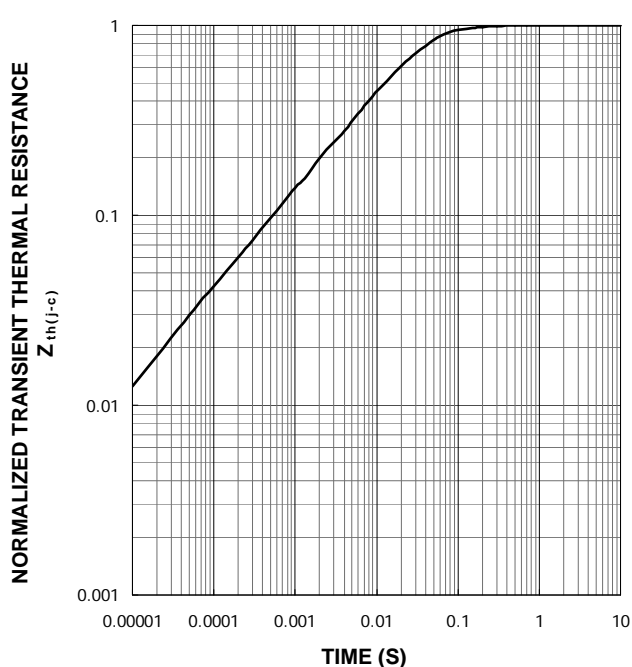
CLAMP DIODE REVERSE RECOVERY CHARACTERISTICS (TYPICAL)

$V_{CC}=1000\text{ V}$, $V_{GE}=\pm 15\text{ V}$, $R_G=13\ \Omega$, INDUCTIVE LOAD
 —: $T_j=150\text{ }^\circ\text{C}$, - - - -: $T_j=125\text{ }^\circ\text{C}$



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (MAXIMUM)

Single pulse, $T_C=25\text{ }^\circ\text{C}$
 $R_{th(j-c)Q}=0.25\text{ K/W}$, $R_{th(j-c)D}=0.35\text{ K/W}$

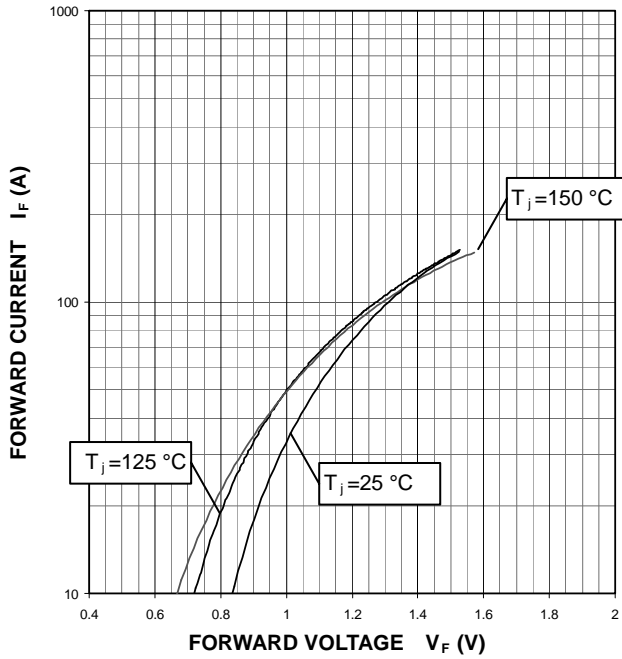


< IGBT MODULES >
CM75MXA-34SA
 HIGH POWER SWITCHING USE
 INSULATED TYPE

PERFORMANCE CURVES

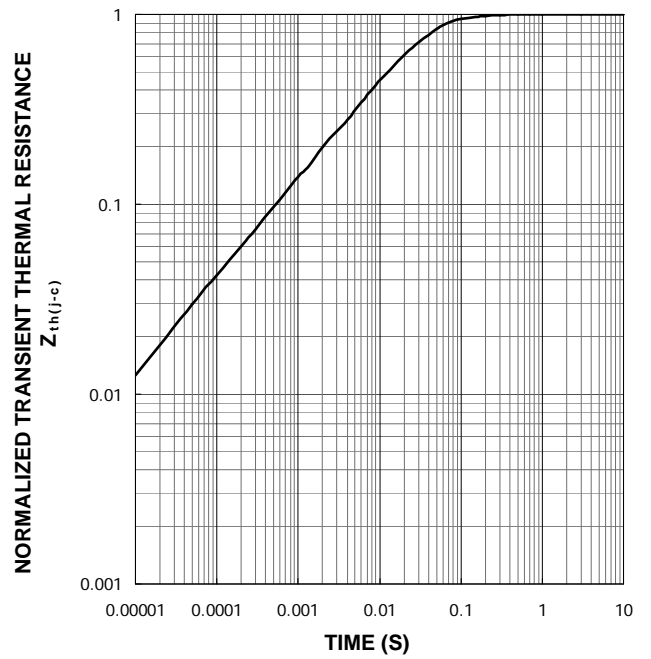
CONVERTER PART

**DIODE
 FORWARD CHARACTERISTICS
 (TYPICAL)**



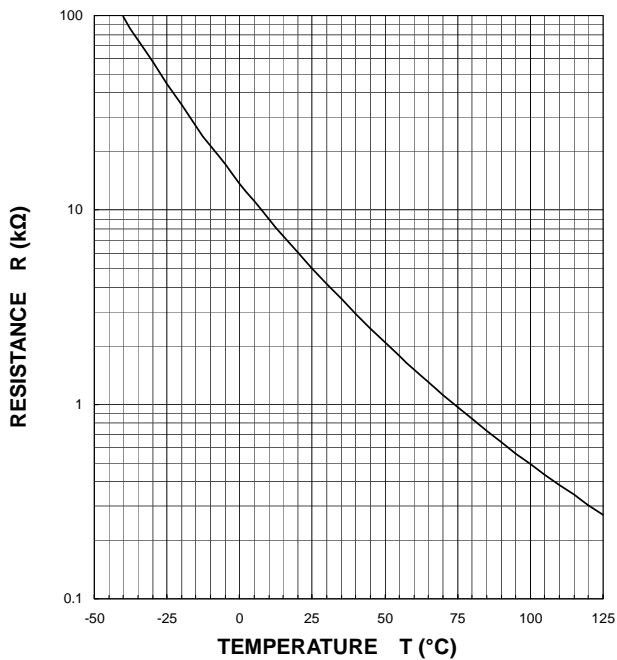
**TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS
 (MAXIMUM)**

Single pulse, $T_C = 25\text{ °C}$
 $R_{th(j-c)D} = 0.24\text{ K/W}$



NTC THERMISTOR PART

**TEMPERATURE CHARACTERISTICS
 (TYPICAL)**



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