

MITSUBISHI TRANSISTOR MODULES
QM50E2Y/E3Y-2H

MEDIUM POWER SWITCHING USE
 INSULATED TYPE

QM50E2Y/E3Y-2H



- **I_C** Collector current **50A**
- **V_{CEX}** Collector-emitter voltage **1000V**
- **h_{FE}** DC current gain **75**
- **Insulated Type**
- **UL Recognized**

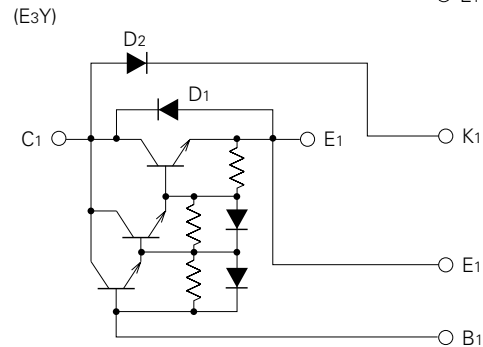
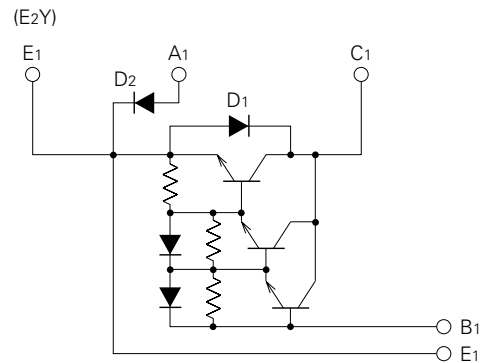
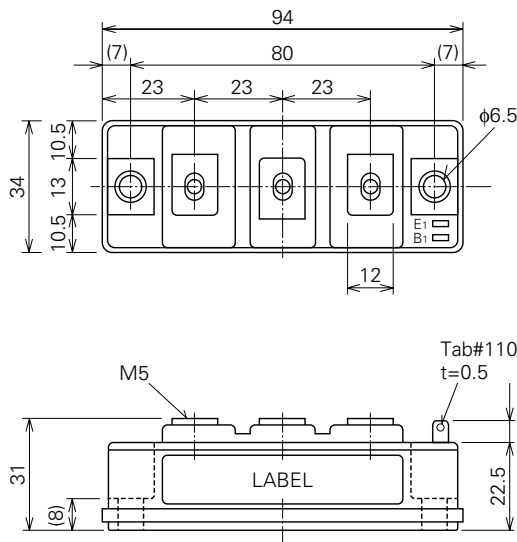
Yellow Card No. E80276 (N)
 File No. E80271

APPLICATION

DC chopper, DC motor controllers, Inverters

OUTLINE DRAWING & CIRCUIT DIAGRAM

Dimensions in mm



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ABSOLUTE MAXIMUM RATINGS (Transistor part including D1, $T_j=25^\circ\text{C}$)

Symbol	Parameter	Conditions	Ratings	Unit
VCEX (SUS)	Collector-emitter voltage	$I_C=1\text{A}$, $V_{EB}=2\text{V}$	1000	V
VCEX	Collector-emitter voltage	$V_{EB}=2\text{V}$	1000	V
VCBO	Collector-base voltage	Emitter open	1000	V
VEBO	Emitter-base voltage	Collector open	7	V
I_C	Collector current	DC	50	A
$-I_C$	Collector reverse current	DC (forward diode current)	50	A
PC	Collector dissipation	$T_C=25^\circ\text{C}$	400	W
I_B	Base current	DC	3	A
$-I_{CSM}$	Surge collector reverse current (forward diode current)	Peak value of one cycle of 60Hz (half wave)	500	A

ABSOLUTE MAXIMUM RATINGS (Diode part (D2), $T_j=25^\circ\text{C}$)

Symbol	Parameter	Conditions	Ratings	Unit
VRRM	Repetitive peak reverse voltage		1000	V
VRSM	Non-repetitive peak reverse voltage		1100	V
VR (DC)	DC reverse voltage		800	V
I_{DC}	DC current	DC circuit, resistive, inductive load	50	A
I_{FSM}	Surge (non-repetitive) forward current	Peak value of one cycle of 60Hz (half wave)	1000	A
I^2t	I^2t for fusing	Value for one cycle of surge current	4.2×10^3	A^2s

ABSOLUTE MAXIMUM RATINGS (Common)

Symbol	Parameter	Conditions	Ratings	Unit
T_j	Junction temperature		$-40 \sim 150$	$^\circ\text{C}$
T_{stg}	Storage temperature		$-40 \sim 125$	$^\circ\text{C}$
V_{iso}	Isolation voltage	Charged part to case, AC for 1 minute	2500	V
—	Mounting torque	Main terminal screw M5	1.47~1.96	N·m
			15~20	kg·cm
		Mounting screw M6	1.96~2.94	N·m
			20~30	kg·cm
—	Weight	Typical value	210	g

ELECTRICAL CHARACTERISTICS (Transistor part including D1, $T_j=25^\circ\text{C}$)

Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
I_{CEX}	Collector cutoff current	$V_{CE}=1000\text{V}$, $V_{EB}=2\text{V}$	—	—	1.0	mA
I_{CBO}	Collector cutoff current	$V_{CB}=1000\text{V}$, Emitter open	—	—	1.0	mA
I_{EBO}	Emitter cutoff current	$V_{EB}=7\text{V}$	—	—	200	mA
$V_{CE(sat)}$	Collector-emitter saturation voltage	$I_C=50\text{A}$, $I_B=1\text{A}$	—	—	25	V
$V_{BE(sat)}$	Base-emitter saturation voltage		—	—	3.5	V
$-V_{CEO}$	Collector-emitter reverse voltage	$-I_C=50\text{A}$ (diode forward voltage)	—	—	1.8	V
hFE	DC current gain	$I_C=50\text{A}$, $V_{CE}=2.8\text{V}/5\text{V}$	75/100	—	—	—
t_{on}	Switching time	$V_{CC}=600\text{V}$, $I_C=50\text{A}$, $I_{B1}=-I_{B2}=1\text{A}$	—	—	2.5	μs
t_s			—	—	15	μs
t_f			—	—	3.0	μs
$R_{th(j-c)Q}$	Thermal resistance (junction to case)	Transistor part	—	—	0.31	$^\circ\text{C}/\text{W}$
$R_{th(j-c)R}$		Diode part	—	—	1.2	$^\circ\text{C}/\text{W}$
$R_{th(c-f)}$	Contact thermal resistance (case to fin)	Conductive grease applied	—	—	0.15	$^\circ\text{C}/\text{W}$

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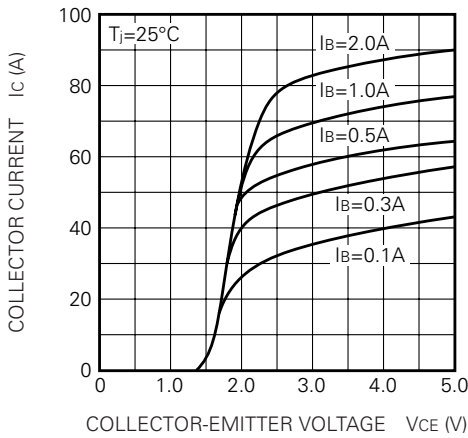
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ELECTRICAL CHARACTERISTICS (Diode part (D2), $T_j=25^\circ\text{C}$)

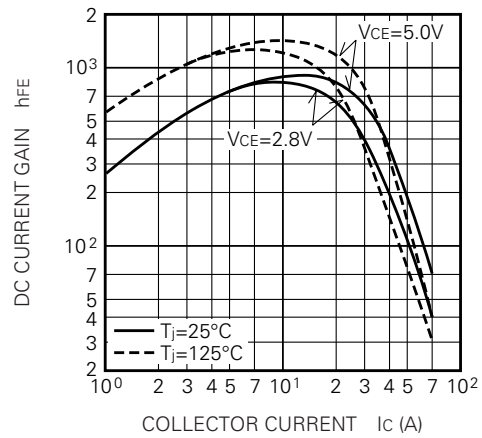
Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
I_{RRM}	Repetitive peak reverse current	$V_R=V_{RRM}, T_j=150^\circ\text{C}$	—	—	10	mA
V_{FM}	Forward voltage	$I_F=50\text{A}$	—	—	1.5	V
t_{rr}	Reverse recovery time	$I_F=50\text{A}, di/dt=-100\text{A}/\mu\text{s}, V_R=600\text{V}, T_j=150^\circ\text{C}$	—	—	1.0	μs
Q_{rr}	Reverse recovery charge		—	—	25	μC
$R_{th(j-c)}$	Thermal resistance	Junction to case	—	—	0.65	$^\circ\text{C}/\text{W}$
$R_{th(c-f)}$	Contact thermal resistance	Conductive grease applied (case to fin)	—	—	0.15	$^\circ\text{C}/\text{W}$

PERFORMANCE CURVES

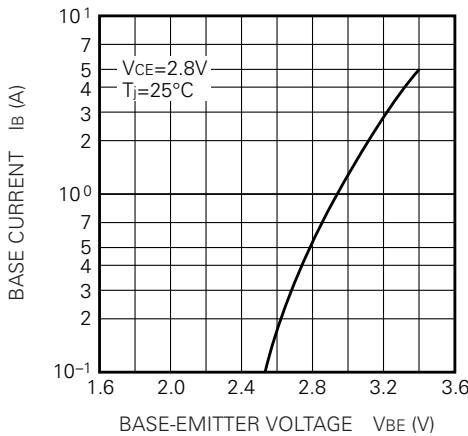
COMMON EMITTER OUTPUT CHARACTERISTICS (TYPICAL)



DC CURRENT GAIN VS. COLLECTOR CURRENT (TYPICAL)



COMMON EMITTER INPUT CHARACTERISTIC (TYPICAL)



SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)

