

# QM50DY-HB

MEDIUM POWER SWITCHING USE  
INSULATED TYPE

QM50DY-HB



- **IC** Collector current ..... **50A**
- **VCEX** Collector-emitter voltage ..... **600V**
- **hFE** DC current gain ..... **750**
- **Insulated Type**
- **UL Recognized**

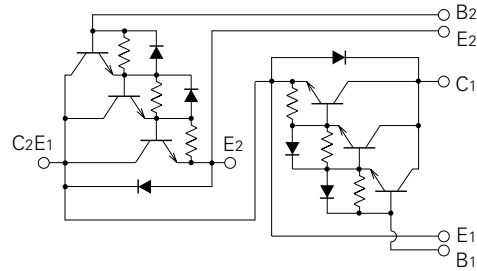
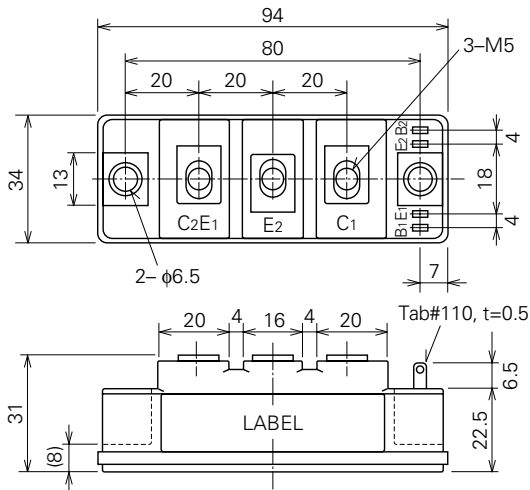
Yellow Card No. E80276 (N)  
File No. E80271

## APPLICATION

Inverters, Servo drives, UPS, DC motor controllers, NC equipment, Welders

## OUTLINE DRAWING & CIRCUIT DIAGRAM

Dimensions in mm



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**ABSOLUTE MAXIMUM RATINGS** (Tj=25°C, unless otherwise noted)

Symbol	Parameter	Conditions	Ratings	Unit
VCEX (SUS)	Collector-emitter voltage	IC=1A, VEB=2V	600	V
VCEX	Collector-emitter voltage	VEB=2V	600	V
VCBO	Collector-base voltage	Emitter open	600	V
VEBO	Emitter-base voltage	Collector open	7	V
IC	Collector current	DC	50	A
-IC	Collector reverse current	DC (forward diode current)	50	A
PC	Collector dissipation	Tc=25°C	310	W
IB	Base current	DC	3	A
-ICSM	Surge collector reverse current (forward diode current)	Peak value of one cycle of 60Hz (half wave)	500	A
Tj	Junction temperature		-40~+150	°C
Tstg	Storage temperature		-40~+125	°C
Viso	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** (Tj=25°C, unless otherwise noted)

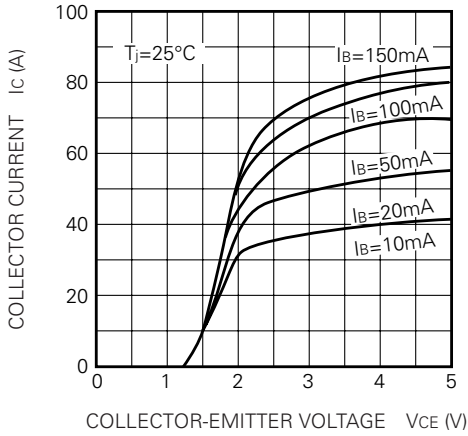
Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
ICEX	Collector cutoff current	VCE=600V, VEB=2V	—	—	1.0	mA
ICBO	Collector cutoff current	VCB=600V, Emitter open	—	—	1.0	mA
IEBO	Emitter cutoff current	VEB=7V	—	—	80	mA
VCE (sat)	Collector-emitter saturation voltage	IC=50A, IB=67mA	—	—	2.5	V
VBE (sat)	Base-emitter saturation voltage		—	—	3.0	V
-VCEO	Collector-emitter reverse voltage	-IC=50A (diode forward voltage)	—	—	1.8	V
hFE	DC current gain	IC=50A, VCE=2.5V	750	—	—	—
ton	Switching time	VCC=300V, IC=50A, IB1=100mA, IB2=-1.0A	—	—	2.0	μs
ts			—	—	8.0	μs
tf			—	—	3.0	μs
Rth (j-c) Q	Thermal resistance (junction to case)	Transistor part (per 1/2 module)	—	—	0.4	°C/W
Rth (j-c) R		Diode part (per 1/2 module)	—	—	1.3	°C/W
Rth (c-f)	Contact thermal resistance (case to fin)	Conductive grease applied (per 1/2 module)	—	—	0.15	°C/W

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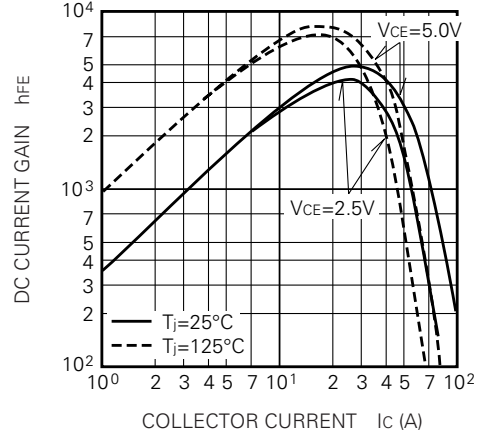
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## PERFORMANCE CURVES

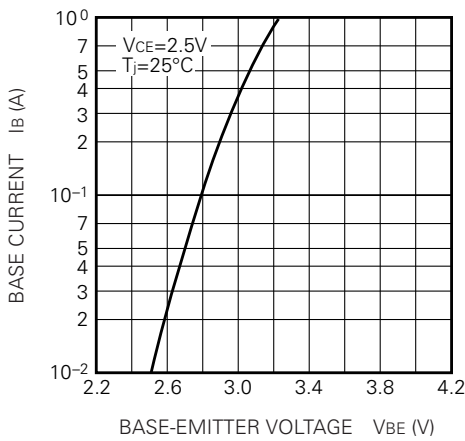
**COMMON EMITTER OUTPUT CHARACTERISTICS (TYPICAL)**



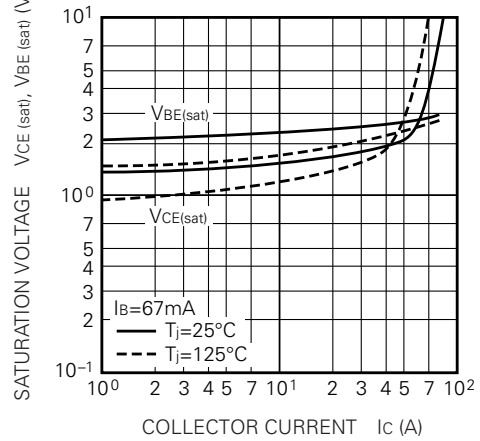
**DC CURRENT GAIN VS. COLLECTOR CURRENT (TYPICAL)**



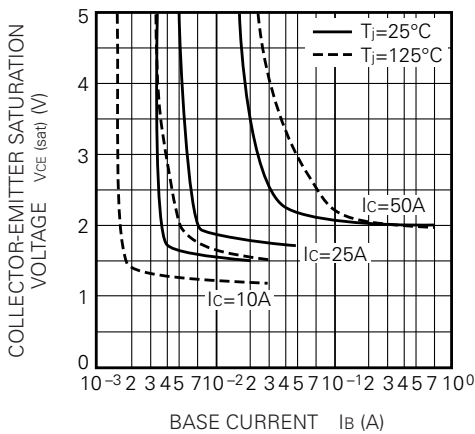
**COMMON EMITTER INPUT CHARACTERISTIC (TYPICAL)**



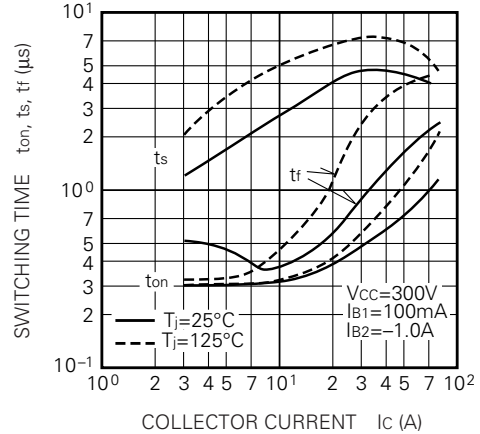
**SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)**



**COLLECTOR-EMITTER SATURATION VOLTAGE (TYPICAL)**



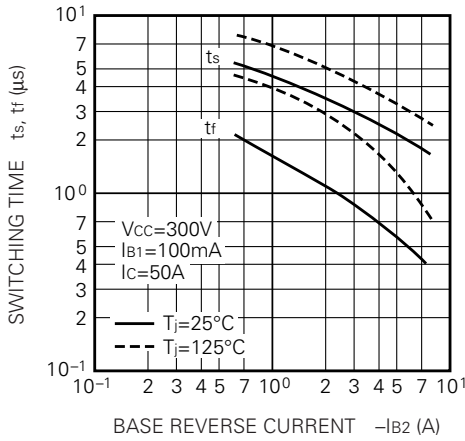
**SWITCHING TIME VS. COLLECTOR CURRENT (TYPICAL)**



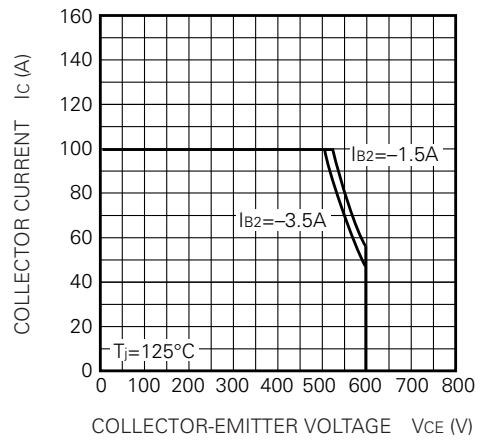
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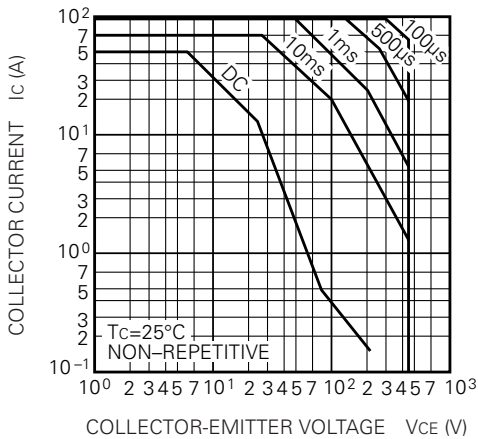
**SWITCHING TIME VS. BASE CURRENT (TYPICAL)**



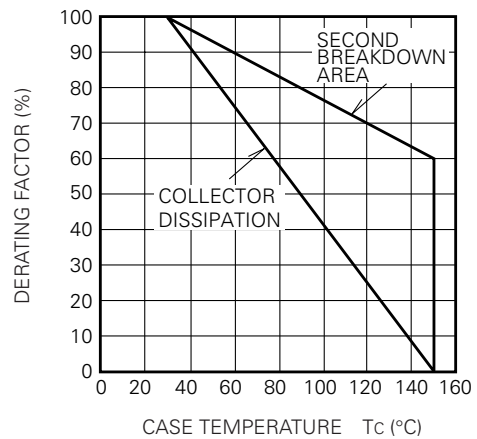
**REVERSE BIAS SAFE OPERATING AREA**



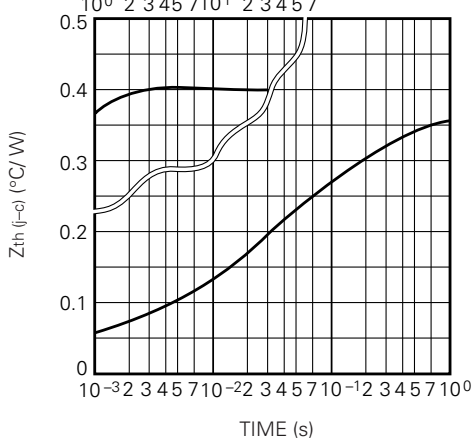
**FORWARD BIAS SAFE OPERATING AREA**



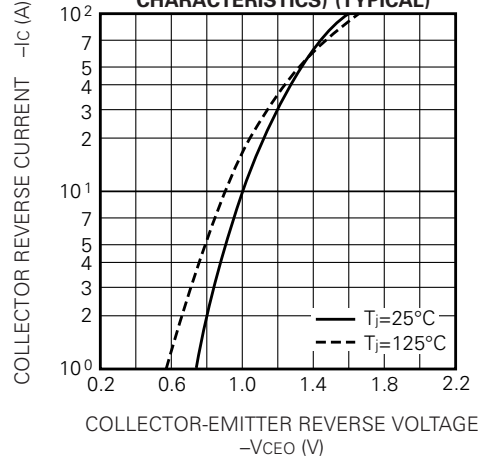
**DERATING FACTOR OF F. B. S. O. A.**



**TRANSIENT THERMAL IMPEDANCE CHARACTERISTIC (TRANSISTOR)**



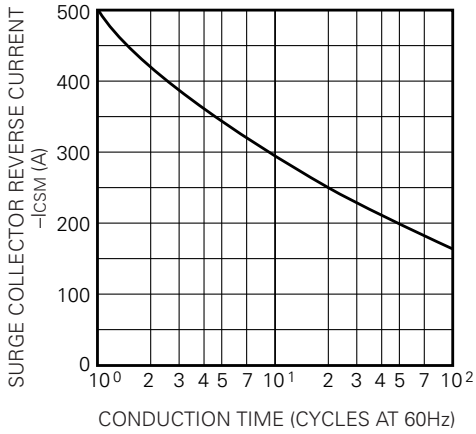
**REVERSE COLLECTOR CURRENT VS. COLLECTOR-EMITTER REVERSE VOLTAGE (DIODE FORWARD CHARACTERISTICS) (TYPICAL)**



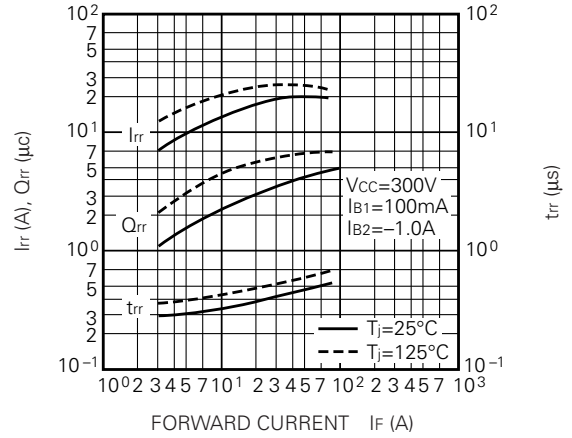
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**RATED SURGE COLLECTOR REVERSE CURRENT  
(DIODE FORWARD SURGE CURRENT)**



**REVERSE RECOVERY CHARACTERISTICS  
OF FREE-WHEEL DIODE (TYPICAL)**



**TRANSIENT THERMAL IMPEDANCE  
CHARACTERISTIC (DIODE)**

