



**QM40DY-3H**

**HIGH POWER SWITCHING USE  
INSULATED TYPE**

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

Symbol	Parameter	Conditions	Ratings	Unit
V <sub>CEX</sub> (SUS)	Collector-emitter voltage	I <sub>c</sub> =1A, V <sub>EB</sub> =3V	1400	V
V <sub>CEX</sub>	Collector-emitter voltage	V <sub>EB</sub> =3V	1400	V
V <sub>CB0</sub>	Collector-base voltage	Emitter open	1400	V
V <sub>EB0</sub>	Emitter-base voltage	Collector open	7	V
I <sub>c</sub>	Collector current	DC	40	A
-I <sub>c</sub>	Collector reverse current	DC (forward diode current)	40	A
P <sub>c</sub>	Collector dissipation	T <sub>c</sub> =25°C	400	W
I <sub>b</sub>	Base current	DC	4	A
-I <sub>CSM</sub>	Surge collector reverse current (forward diode current)	Peak value of one cycle of 60Hz (half wave)	400	A
T <sub>j</sub>	Junction temperature		-40~+150	°C
T <sub>stg</sub>	Storage temperature		-40~+125	°C
V <sub>iso</sub>	Isolation voltage	Main terminal to case, AC for 1 minute	3000	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	250	g

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

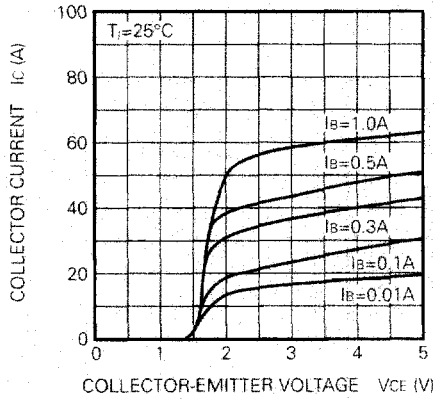
Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
I <sub>CEX</sub>	Collector cutoff current	V <sub>CE</sub> =1400V, V <sub>EB</sub> =3V	—	—	5.0	mA
I <sub>CB0</sub>	Collector cutoff current	V <sub>CB</sub> =1400V, Emitter open	—	—	5.0	mA
I <sub>EB0</sub>	Emitter cutoff current	V <sub>EB</sub> =7V	—	—	100	mA
V <sub>CE(sat)</sub>	Collector-emitter saturation voltage	I <sub>c</sub> =40A, I <sub>b</sub> =0.8A	—	—	3.0	V
V <sub>BE(sat)</sub>	Base-emitter saturation voltage		—	—	3.5	V
-V <sub>CEO</sub>	Collector-emitter reverse voltage	-I <sub>c</sub> =40A (diode forward voltage)	—	—	1.8	V
h <sub>FE</sub>	DC current gain	I <sub>c</sub> =40A, V <sub>CE</sub> =5V	100	—	—	—
t <sub>on</sub>	Switching time	V <sub>CC</sub> =800V, I <sub>c</sub> =40A, I <sub>B1</sub> =-I <sub>B2</sub> =0.8A	—	—	3.0	μs
t <sub>s</sub>			—	—	20	μs
t <sub>f</sub>			—	—	3.0	μs
R <sub>th(j-c)C</sub>	Thermal resistance (junction to case)	Transistor part (per 1/2 module)	—	—	0.31	°C/W
R <sub>th(j-c)R</sub>		Diode part (per 1/2 module)	—	—	1.2	°C/W
R <sub>th(c-f)</sub>	Contact thermal resistance (case to fin)	Conductive grease applied (per 1/2 module)	—	—	0.13	°C/W

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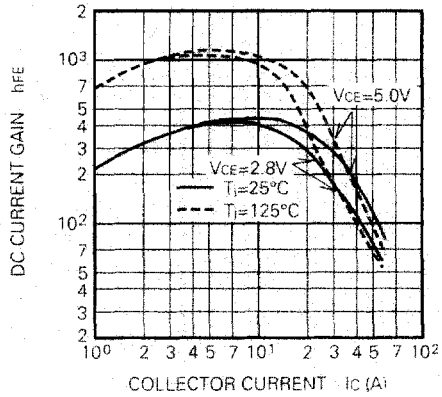
HIGH POWER SWITCHING USE  
INSULATED TYPE

PERFORMANCE CURVES

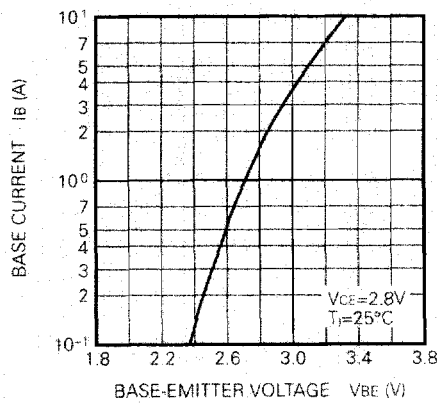
COMMON EMITTER OUTPUT CHARACTERISTICS (TYPICAL)



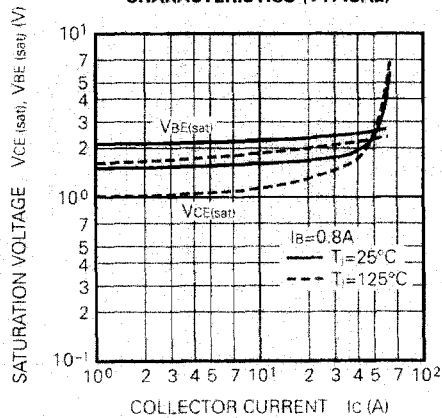
DC CURRENT GAIN VS. COLLECTOR CURRENT (TYPICAL)



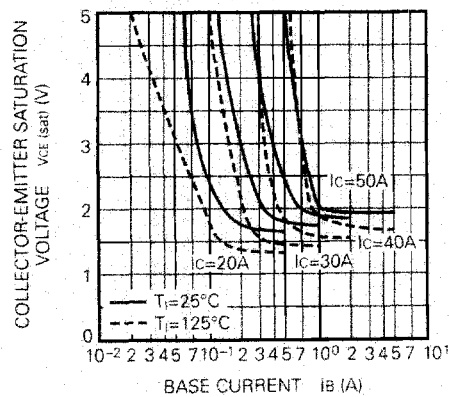
COMMON EMITTER INPUT CHARACTERISTIC (TYPICAL)



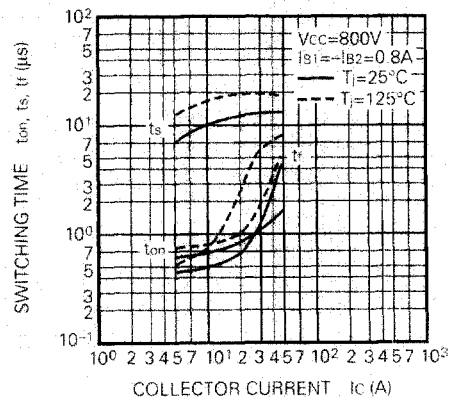
SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



COLLECTOR-EMITTER SATURATION VOLTAGE (TYPICAL)



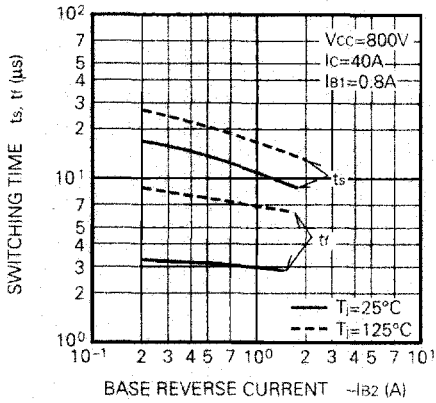
SWITCHING TIME VS. COLLECTOR CURRENT (TYPICAL)



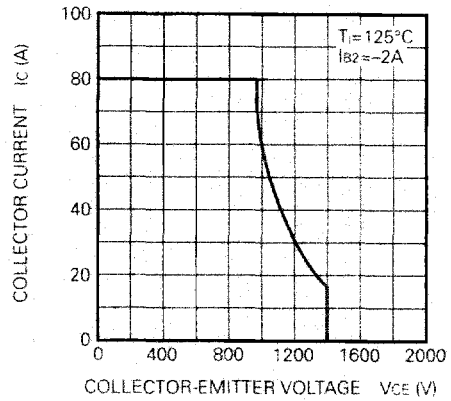
**QM40DY-3H**

**HIGH POWER SWITCHING USE  
INSULATED TYPE**

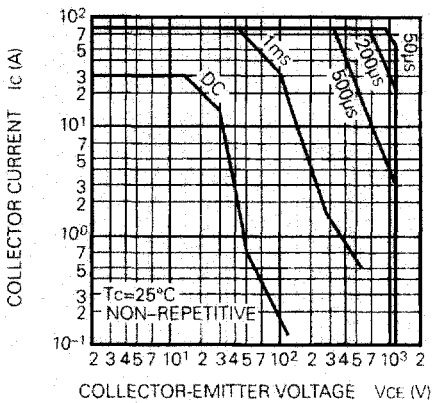
**SWITCHING TIME VS. BASE CURRENT (TYPICAL)**



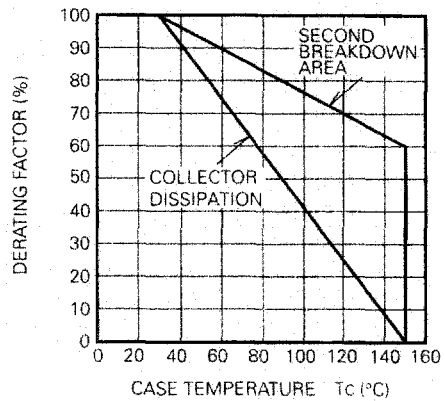
**REVERSE BIAS SAFE OPERATING AREA**



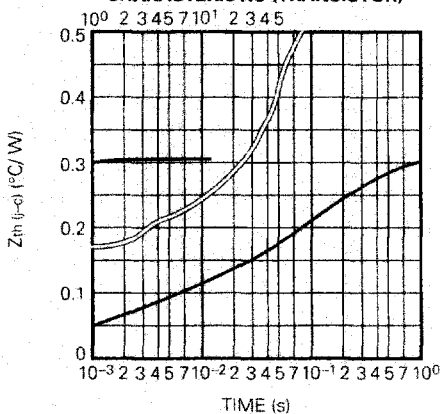
**FORWARD BIAS SAFE OPERATING AREA**



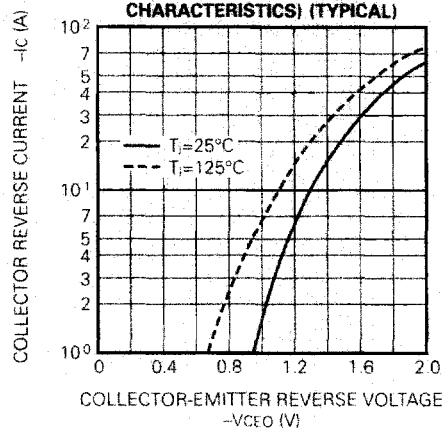
**DERATING FACTOR OF F. B. S. O. A.**



**TRANSIENT THERMAL IMPEDANCE CHARACTERISTIC (TRANSISTOR)**



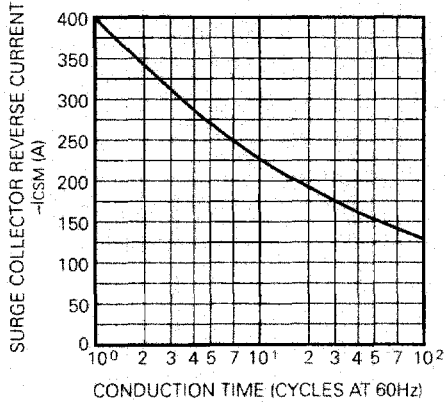
**REVERSE COLLECTOR CURRENT VS. COLLECTOR-EMITTER REVERSE VOLTAGE (DIODE FORWARD CHARACTERISTICS) (TYPICAL)**



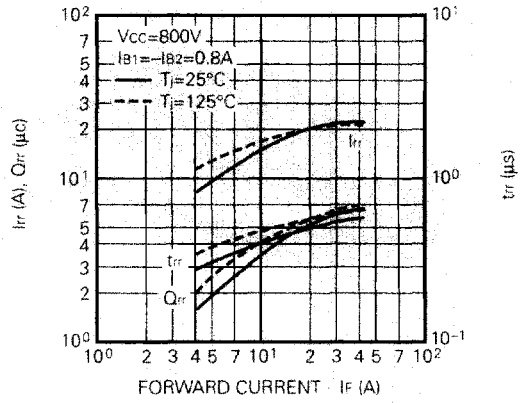
**QM40DY-3H**

**HIGH POWER SWITCHING USE  
INSULATED TYPE**

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



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



**TRANSIENT THERMAL IMPEDANCE  
CHARACTERISTIC (DIODE)**

