

< IGBT MODULES >

CM100DY-34A

HIGH POWER SWITCHING USE
INSULATED TYPE



Dual (Half-Bridge)

Collector current I_C **100 A**
 Collector-emitter voltage V_{CES} **1700 V**
 Maximum junction temperature T_{jmax} **150 °C**

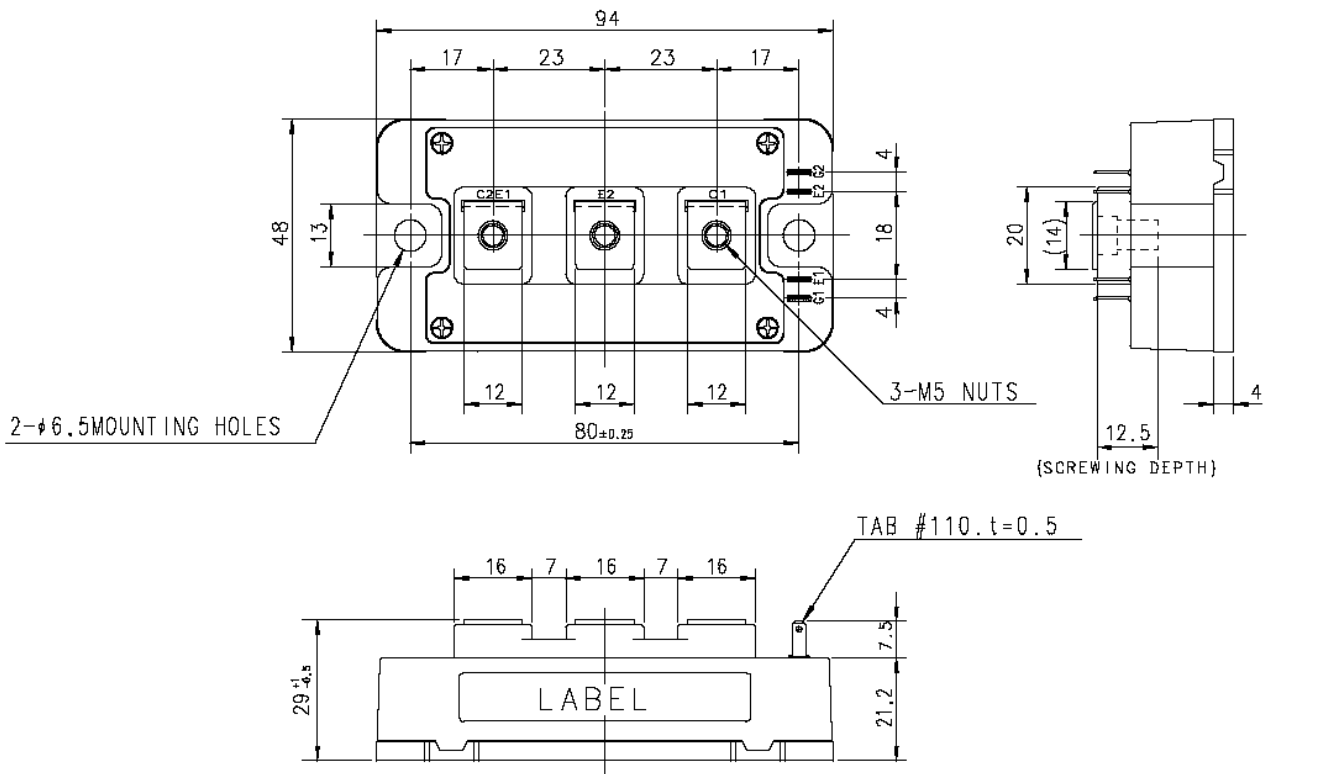
- Flat base Type
- Copper base plate
- RoHS Directive compliant
- UL Recognized under UL1557, File E323585

APPLICATION

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

OUTLINE DRAWING & INTERNAL CONNECTION

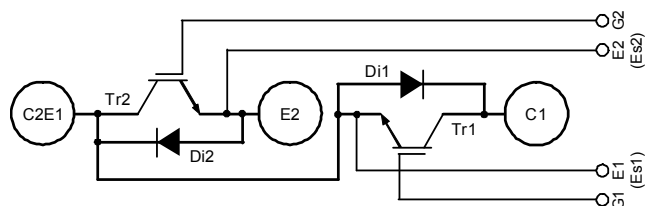
Dimension in mm



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 |

INTERNAL CONNECTION



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

| 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 =108 °C (Note.2, 4) | 100 | A |
| I _{CRM} | | Pulse, Repetitive (Note.3) | 200 | |
| P _{tot} | Total power dissipation | T _C =25 °C (Note.2, 4) | 960 | W |
| I _E (Note.1) | Emitter current | T _C =25 °C (Note.2, 4) | 100 | A |
| I _{ERM} (Note.1) | | Pulse, Repetitive (Note.3) | 200 | |
| T _J | Junction temperature | - | -40 ~ +150 | °C |
| T _{stg} | Storage temperature | - | -40 ~ +125 | |
| V _{isol} | Isolation voltage | Terminals to base plate, RMS, f=60 Hz, AC 1 min | 3500 | V |

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

| 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 | - | - | 2.0 | µA | |
| V _{GE(th)} | Gate-emitter threshold voltage | I _C =10 mA, V _{CE} =10 V | 5.5 | 7.0 | 8.5 | V | |
| V _{CEsat} | Collector-emitter saturation voltage | I _C =100 A (Note.5), V _{GE} =15 V | T _J =25 °C | - | 2.2 | 2.8 | V |
| | | | T _J =125 °C | - | 2.45 | - | |
| C _{ies} | Input capacitance | V _{CE} =10 V, G-E short-circuited | - | - | 24.7 | nF | |
| C _{oes} | Output capacitance | | - | - | 2.8 | | |
| C _{res} | Reverse transfer capacitance | | - | - | 0.53 | | |
| Q _G | Gate charge | V _{CC} =1000 V, I _C =100 A, V _{GE} =15 V | - | 670 | - | nC | |
| t _{d(on)} | Turn-on delay time | V _{CC} =1000 V, I _C =100 A, V _{GE} =±15 V, R _G =4.8 Ω, Inductive load | - | - | 200 | ns | |
| t _r | Rise time | | - | - | 150 | | |
| t _{d(off)} | Turn-off delay time | | - | - | 550 | | |
| t _f | Fall time | | - | - | 350 | | |
| V _{EC} (Note.1) | Emitter-collector voltage | I _E =100 A (Note.5), G-E short-circuited | - | 2.3 | 3.0 | V | |
| t _{rr} (Note.1) | Reverse recovery time | V _{CC} =1000 V, I _E =100 A, V _{GE} =±15 V, | - | - | 300 | ns | |
| Q _{rr} (Note.1) | Reverse recovery charge | R _G =4.8 Ω, Inductive load | - | 10 | - | µC | |
| E _{on} | Turn-on switching energy per pulse | V _{CC} =1000 V, I _C =I _E =100 A, | - | 21.3 | - | mJ | |
| E _{off} | Turn-off switching energy per pulse | V _{GE} =±15 V, R _G =4.8 Ω, T _J =125 °C, | - | 30 | - | | |
| E _{rr} (Note.1) | Reverse recovery energy per pulse | Inductive load | - | 33 | - | mJ | |
| r _g | Internal gate resistance | Per switch, T _c =25 °C | - | 0 | - | Ω | |

THERMAL RESISTANCE CHARACTERISTICS

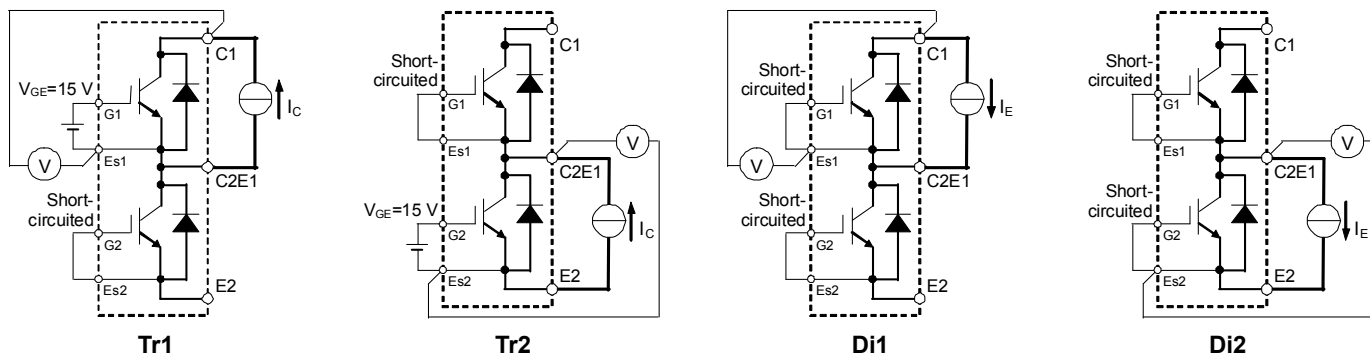
| Symbol | Item | Conditions | Limits | | | Unit |
|-----------------------|-------------------------------------|---|--------|-------|------|------|
| | | | Min. | Typ. | Max. | |
| R _{th(j-c)Q} | Thermal resistance (Note.2) | Junction to case, per IGBT | - | - | 0.13 | K/W |
| R _{th(j-c)D} | | Junction to case, per FWDi | - | - | 0.21 | K/W |
| R _{th(c-s)} | Contact thermal resistance (Note.2) | Case to heat sink, per 1/2 module, Thermal grease applied (Note.6) | - | 0.022 | - | K/kW |

MECHANICAL CHARACTERISTICS

| Symbol | Item | Conditions | Limits | | | Unit |
|----------------|------------------------|---------------------------------|--------|------|------|------|
| | | | Min. | Typ. | Max. | |
| M _t | Mounting torque | Main terminals M 5 screw | 2.5 | 3.0 | 3.5 | N·m |
| M _s | | Mounting to heat sink M 6 screw | 3.5 | 4.0 | 4.5 | N·m |
| m | Weight | - | - | 310 | - | g |
| e _c | Flatness of base plate | On the centerline X, Y (Note.7) | -100 | - | +100 | µm |

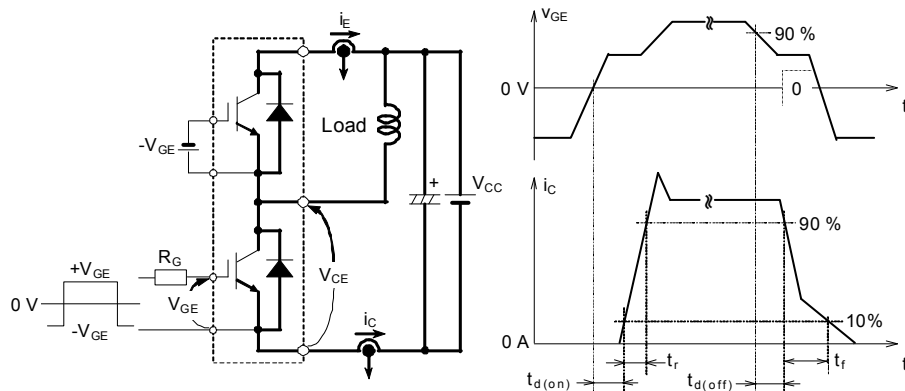
< IGBT MODULES >
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TEST CIRCUIT AND WAVEFORMS

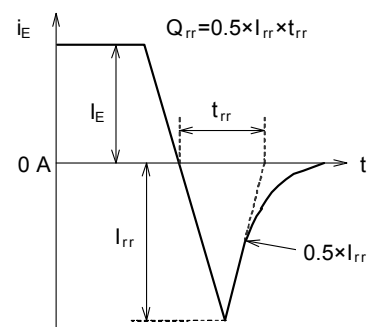


V_{CEsat} test circuit

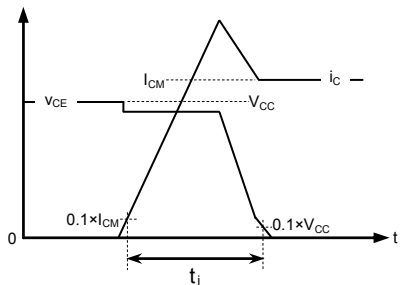
V_{EC} test circuit



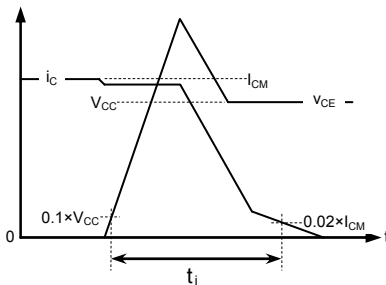
Switching characteristics test circuit and waveforms



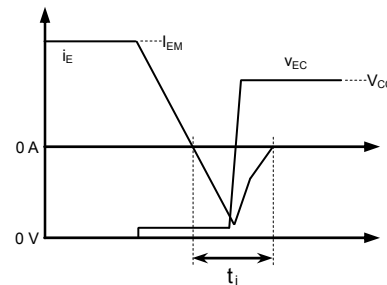
t_{rr} , Q_{rr} test waveform



IGBT Turn-on switching energy



IGBT Turn-off switching energy



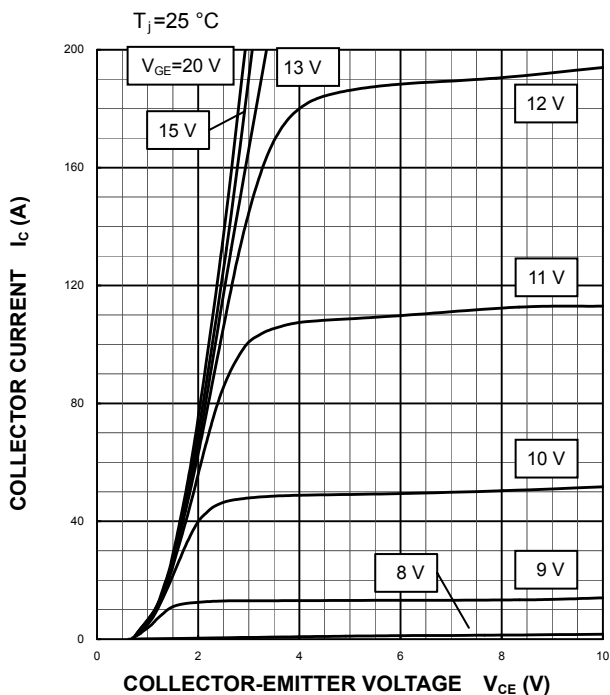
FWDi Reverse recovery energy

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

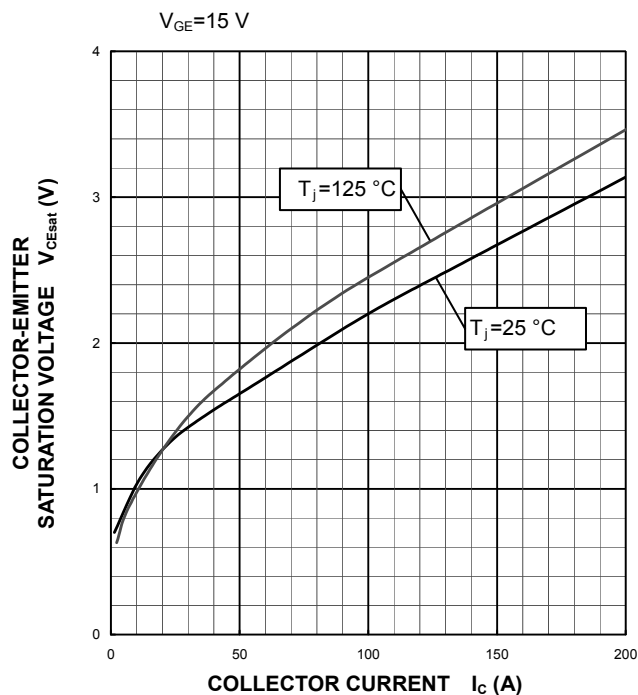
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PERFORMANCE CURVES

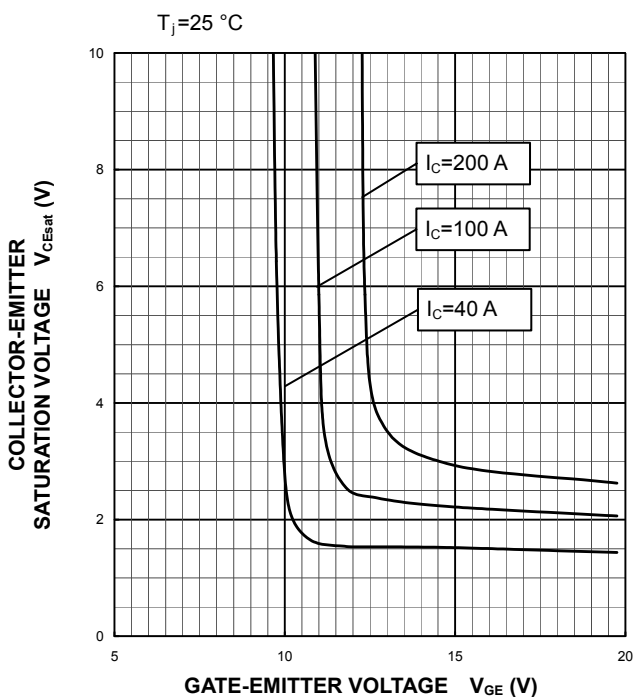
OUTPUT CHARACTERISTICS
(TYPICAL)



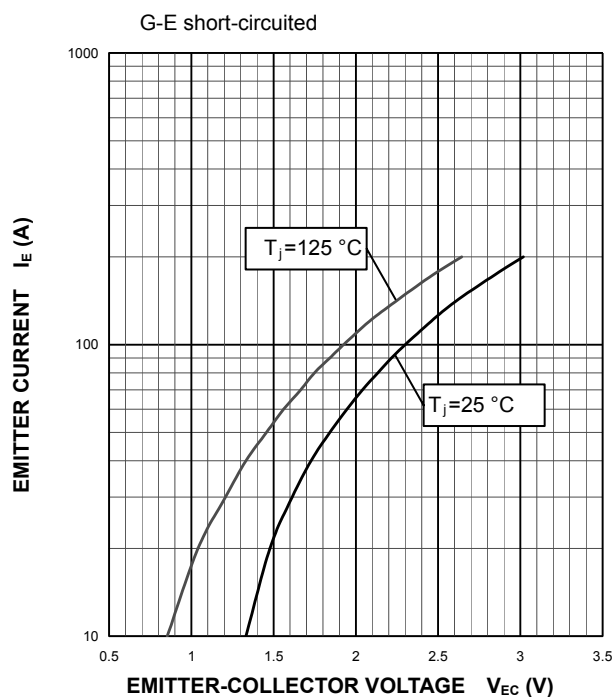
COLLECTOR-EMITTER SATURATION
VOLTAGE CHARACTERISTICS
(TYPICAL)



COLLECTOR-EMITTER SATURATION
VOLTAGE CHARACTERISTICS
(TYPICAL)



FREE WHEELING DIODE
FORWARD CHARACTERISTICS
(TYPICAL)

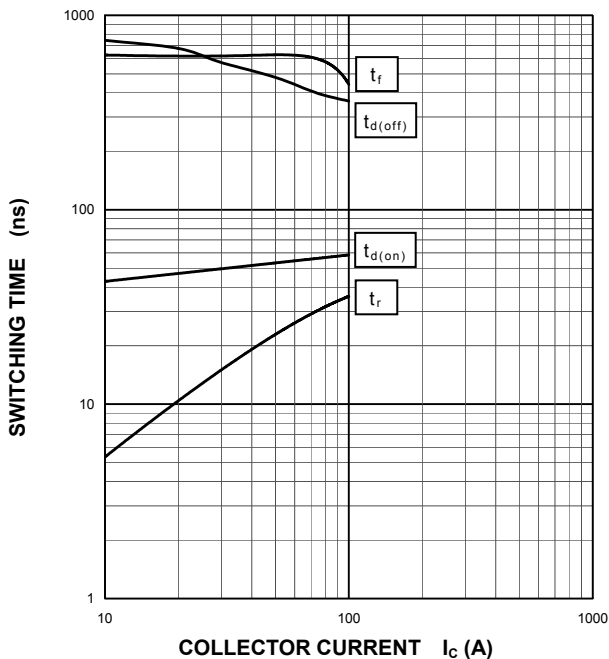


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PERFORMANCE CURVES

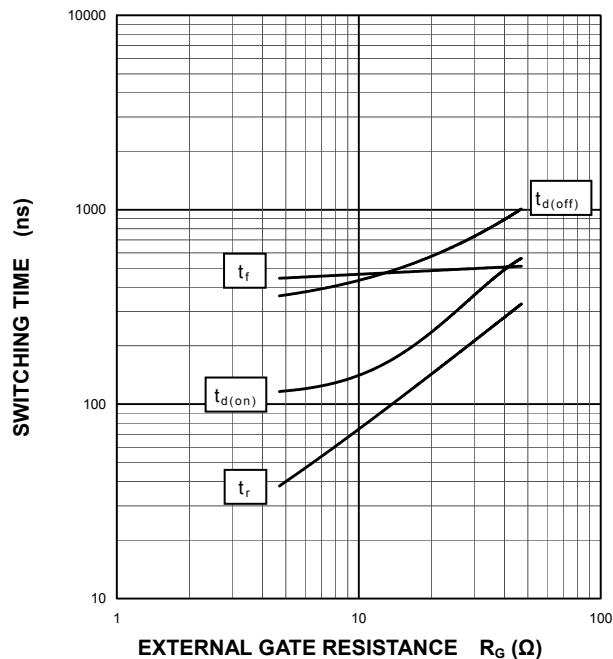
**HALF-BRIDGE
 SWITCHING CHARACTERISTICS
 (TYPICAL)**

$V_{CC}=1000\text{ V}$, $V_{GE}=\pm 15\text{ V}$, $R_G=4.8\ \Omega$,
 $T_J=125\text{ }^\circ\text{C}$, INDUCTIVE LOAD



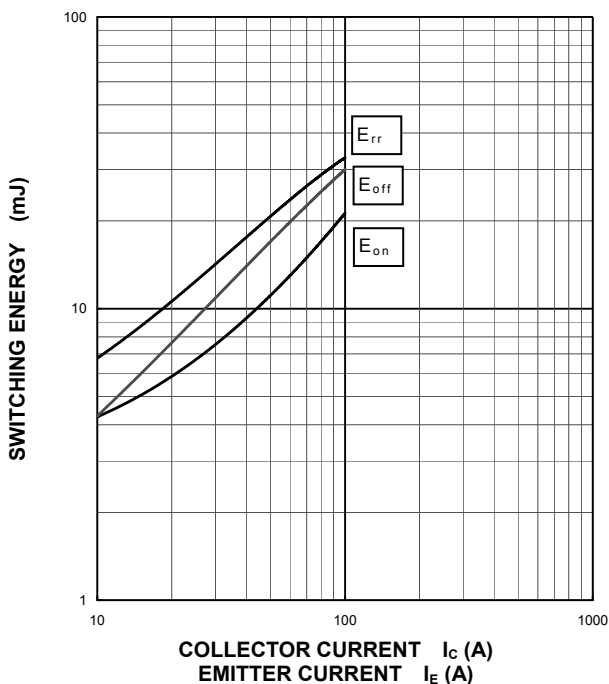
**HALF-BRIDGE
 SWITCHING CHARACTERISTICS
 (TYPICAL)**

$V_{CC}=1000\text{ V}$, $I_C=100\text{ A}$, $V_{GE}=\pm 15\text{ V}$,
 $T_J=125\text{ }^\circ\text{C}$, INDUCTIVE LOAD



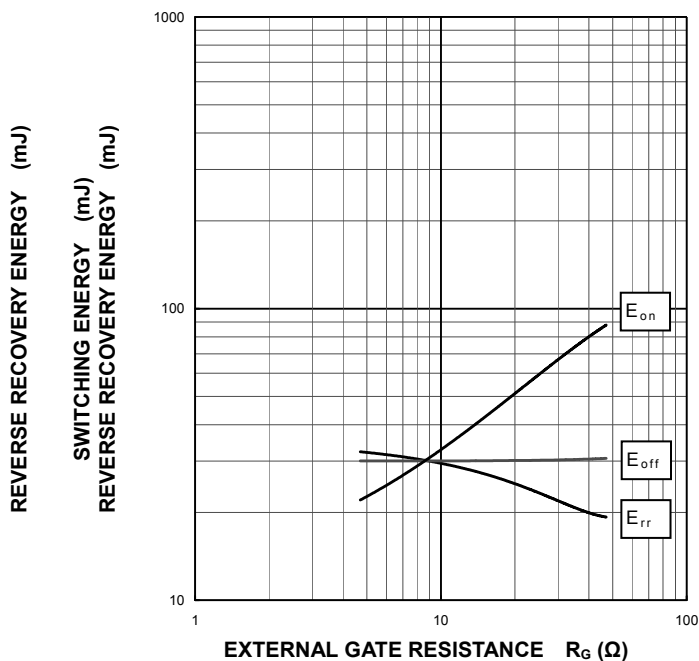
**HALF-BRIDGE
 SWITCHING CHARACTERISTICS
 (TYPICAL)**

$V_{CC}=1000\text{ V}$, $V_{GE}=\pm 15\text{ V}$, $R_G=4.8\ \Omega$, $T_J=125\text{ }^\circ\text{C}$
 INDUCTIVE LOAD, PER PULSE



**HALF-BRIDGE
 SWITCHING CHARACTERISTICS
 (TYPICAL)**

$V_{CC}=1000\text{ V}$, $I_C/I_E=100\text{ A}$, $V_{GE}=\pm 15\text{ V}$, $T_J=125\text{ }^\circ\text{C}$
 INDUCTIVE LOAD, PER PULSE

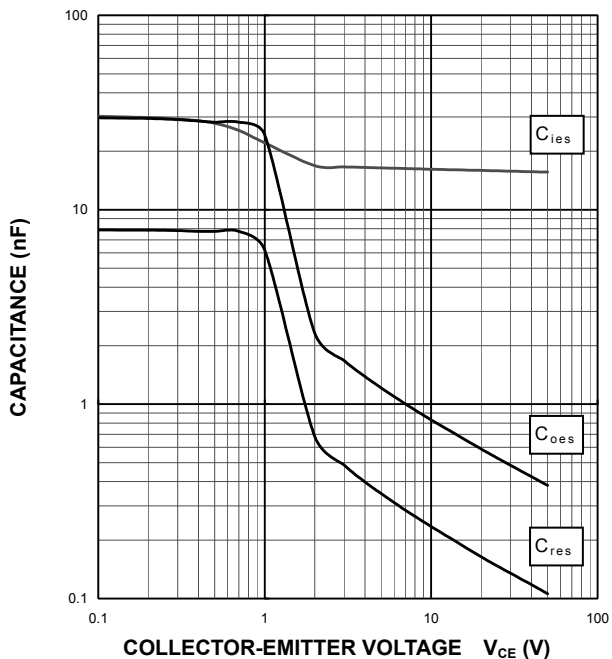


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PERFORMANCE CURVES

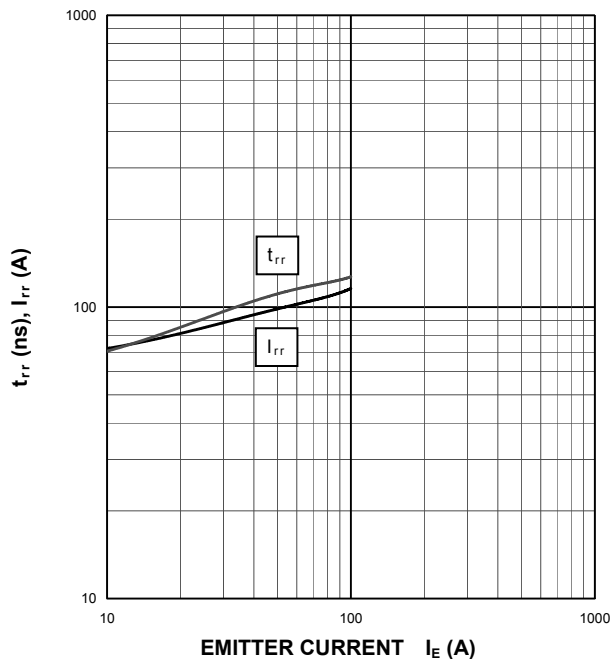
CAPACITANCE CHARACTERISTICS (TYPICAL)

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



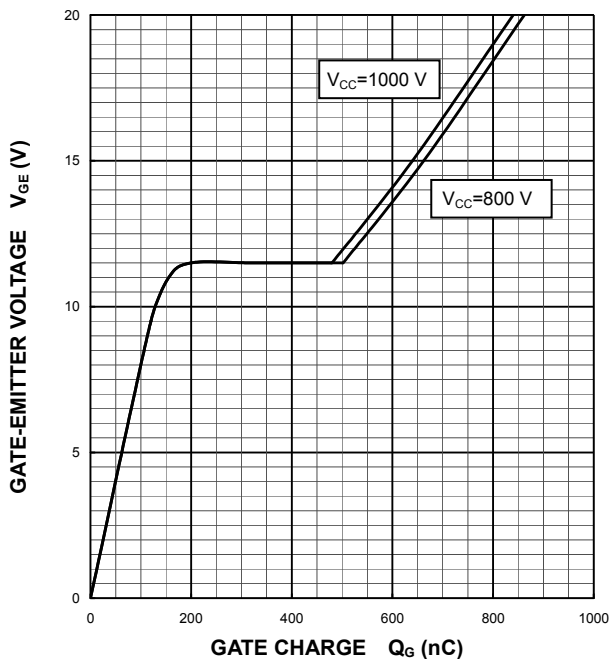
FREE WHEELING DIODE REVERSE RECOVERY CHARACTERISTICS (TYPICAL)

$V_{CC}=1000\text{ V}$, $V_{GE}=\pm 15\text{ V}$, $R_G=4.8\ \Omega$,
 $T_j=25^\circ\text{C}$, INDUCTIVE LOAD



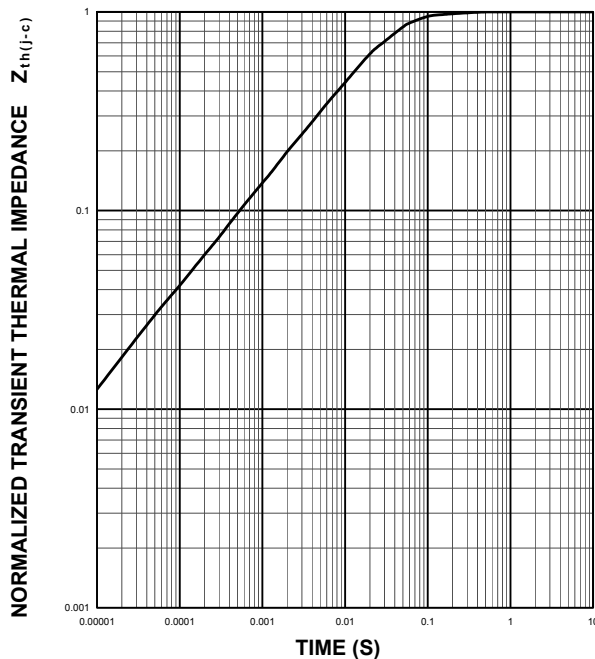
GATE CHARGE CHARACTERISTICS (TYPICAL)

$I_C=100\text{ A}$, $T_j=25^\circ\text{C}$



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (MAXIMUM)

Single pulse, $T_C=25^\circ\text{C}$
 $R_{th(j-c)Q}=0.13\text{ K/W}$, $R_{th(j-c)D}=0.21\text{ K/W}$



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