



**CM350DU-5F**

**HIGH POWER SWITCHING USE  
INSULATED TYPE**

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

Symbol	Parameter	Conditions	Ratings	Unit
V <sub>CE</sub> S	Collector-emitter voltage	G-E Short	250	V
V <sub>GE</sub> S	Gate-emitter voltage	C-E Short	±20	V
I <sub>C</sub>	Collector current	T <sub>C</sub> = 25°C	350	A
I <sub>CM</sub>		Pulse (Note 2)	700	A
I <sub>E</sub> (Note 1)	Emitter current	T <sub>C</sub> = 25°C	350	A
I <sub>EM</sub> (Note 1)		Pulse (Note 2)	700	A
P <sub>C</sub> (Note 3)	Maximum collector dissipation	T <sub>C</sub> = 25°C	960	W
T <sub>j</sub>	Junction temperature	—	-40 ~ +150	°C
T <sub>stg</sub>	Storage temperature	—	-40 ~ +125	°C
V <sub>iso</sub>	Isolation voltage	Charged part to base plate, f = 60Hz, AC 1 minute	2500	V <sub>rms</sub>
—	Torque strength	Main terminals M6 screw	1.96 ~ 2.94	N • m
		Mounting M6 screw	1.96 ~ 2.94	N • m
—	Weight	Typical value	520	g

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

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
I <sub>CES</sub>	Collector cutoff current	V <sub>CE</sub> = V <sub>CE</sub> S, V <sub>GE</sub> = 0V	—	—	1	mA
V <sub>GE(th)</sub>	Gate-emitter threshold voltage	I <sub>C</sub> = 35mA, V <sub>CE</sub> = 10V	3.0	4.0	5.0	V
I <sub>GES</sub>	Gate-leakage current	±V <sub>GE</sub> = V <sub>GES</sub> , V <sub>CE</sub> = 0V	—	—	0.5	μA
V <sub>CE(sat)</sub>	Collector-emitter saturation voltage	I <sub>C</sub> = 350A, V <sub>GE</sub> = 10V (Note 4)	—	1.2	1.7	V
		T <sub>j</sub> = 25°C T <sub>j</sub> = 125°C	—	1.10	—	
C <sub>ies</sub>	Input capacitance	V <sub>CE</sub> = 10V	—	—	99	nF
C <sub>oes</sub>	Output capacitance	V <sub>GE</sub> = 0V	—	—	4.5	nF
C <sub>res</sub>	Reverse transfer capacitance		—	—	3.4	nF
Q <sub>G</sub>	Total gate charge	V <sub>CC</sub> = 100V, I <sub>C</sub> = 350A, V <sub>GE</sub> = 10V	—	1320	—	nC
t <sub>d(on)</sub>	Turn-on delay time	V <sub>CC</sub> = 100V, I <sub>C</sub> = 350A	—	—	1100	ns
t <sub>r</sub>	Turn-on rise time	V <sub>GE</sub> = ±10V	—	—	2400	ns
t <sub>d(off)</sub>	Turn-off delay time	R <sub>G</sub> = 7.1Ω	—	—	900	ns
t <sub>f</sub>	Turn-off fall time	Resistive load	—	—	500	ns
V <sub>EC</sub> (Note 1)	Emitter-collector voltage	I <sub>E</sub> = 350A, V <sub>GE</sub> = 0V	—	—	2.0	V
t <sub>rr</sub> (Note 1)	Reverse recovery time	I <sub>E</sub> = 350A,	—	—	300	ns
Q <sub>rr</sub> (Note 1)	Reverse recovery charge	die / dt = -700A / μs	—	5.7	—	μC
R <sub>th(j-c)Q</sub>	Thermal resistance (Note 5)	Junction to case, IGBT part (Per 1/2 module)	—	—	0.13	K/W
R <sub>th(j-c)R</sub>		Junction to case, FWDi part (Per 1/2 module)	—	—	0.19	K/W
R <sub>th(c-f)</sub>	Contact thermal resistance	Case to heat sink, conductive grease applied (Per 1/2 module) (Note 6)	—	0.02	—	K/W

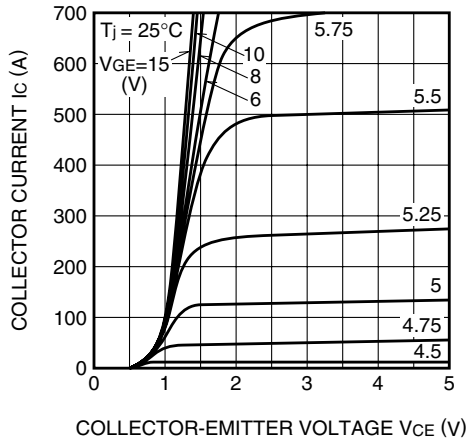
- Note 1. I<sub>E</sub>, V<sub>EC</sub>, t<sub>rr</sub>, Q<sub>rr</sub> & die/dt represent characteristics of the anti-parallel, emitter-collector free-wheel diode (FWDi).  
 2. Pulse width and repetition rate should be such that the device junction temperature (T<sub>j</sub>) does not exceed T<sub>jmax</sub> rating.  
 3. Junction temperature (T<sub>j</sub>) should not increase beyond 150°C.  
 4. Pulse width and repetition rate should be such as to cause negligible temperature rise.  
 5. Case temperature (T<sub>c</sub>) measured point is indicated in OUTLINE DRAWING.  
 6. Typical value is measured by using thermally conductive grease of λ = 0.9[W/(m • K)].

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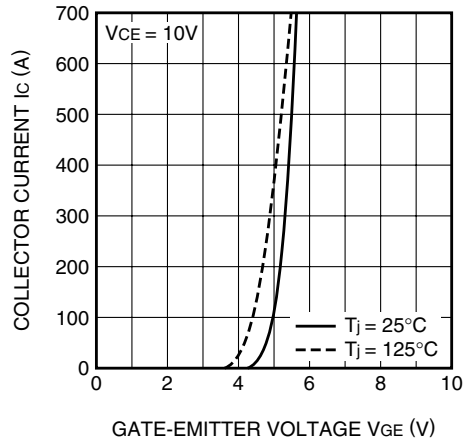
HIGH POWER SWITCHING USE  
INSULATED TYPE

## PERFORMANCE CURVES

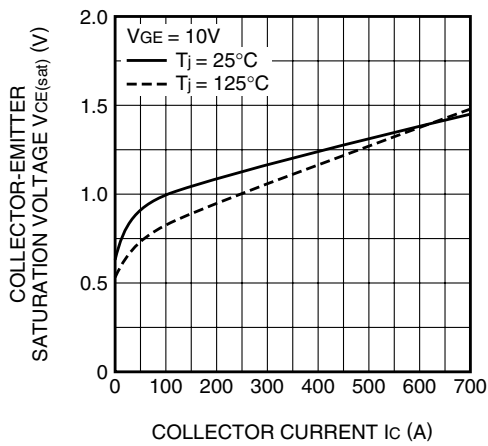
**OUTPUT CHARACTERISTICS (TYPICAL)**



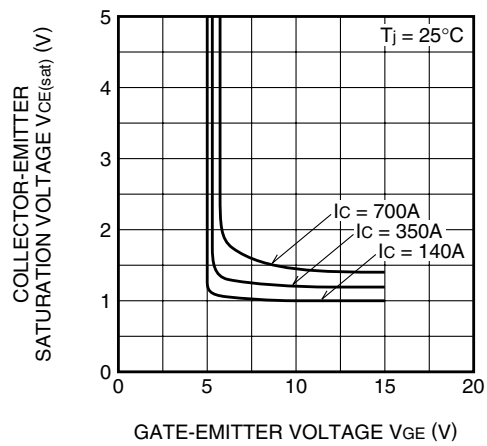
**TRANSFER CHARACTERISTICS (TYPICAL)**



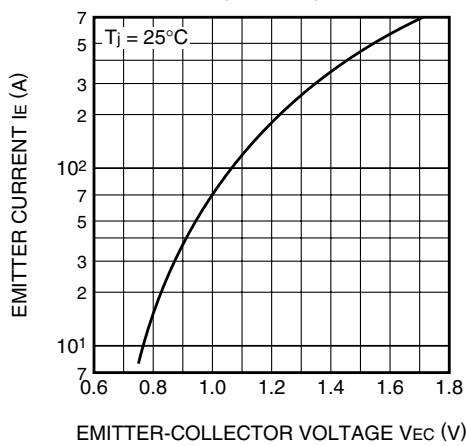
**COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)**



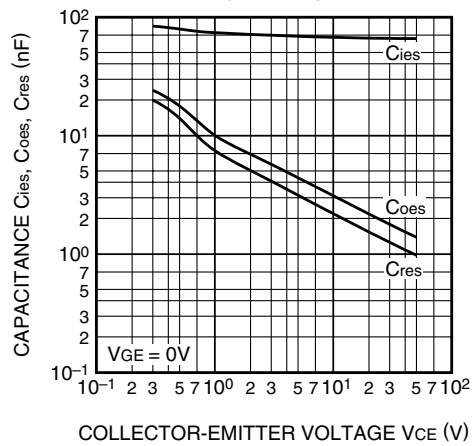
**COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)**



**FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL)**



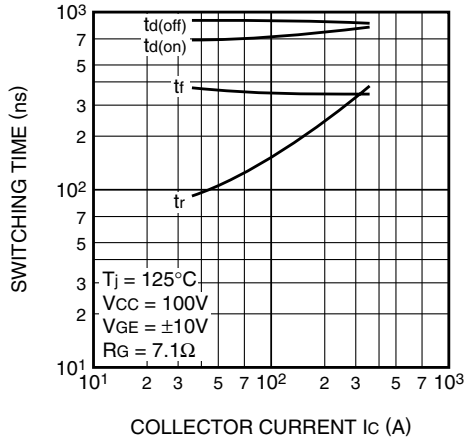
**CAPACITANCE CHARACTERISTICS (TYPICAL)**



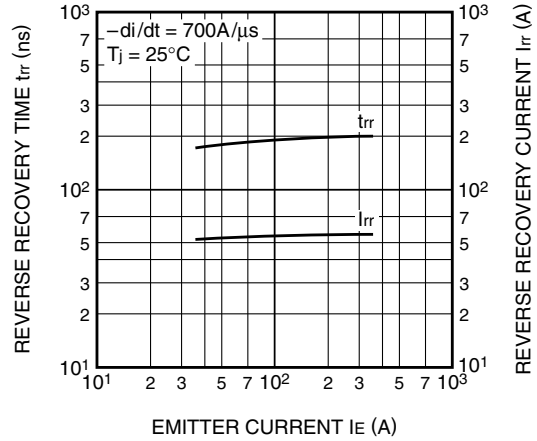
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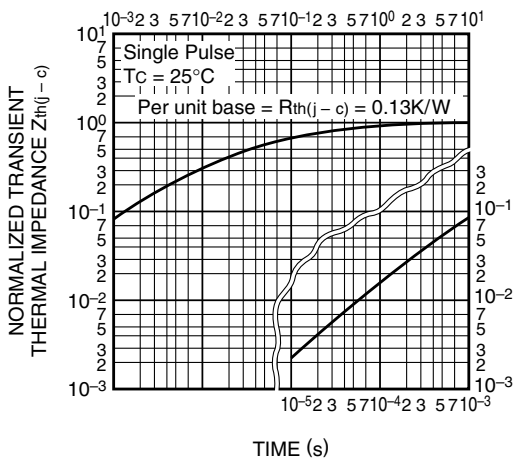
**HALF-BRIDGE  
SWITCHING TIME CHARACTERISTICS  
(TYPICAL)**



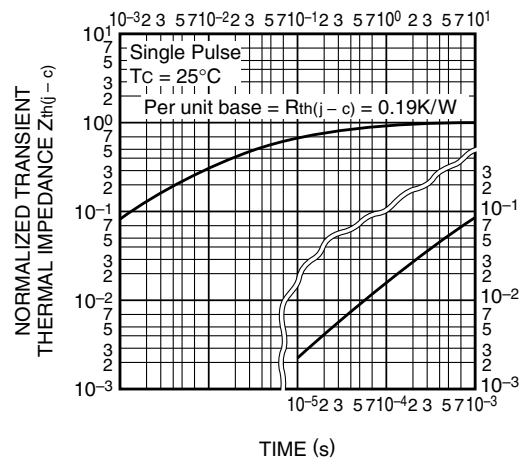
**REVERSE RECOVERY CHARACTERISTICS  
OF FREE-WHEEL DIODE  
(TYPICAL)**



**TRANSIENT THERMAL  
IMPEDANCE CHARACTERISTICS  
(IGBT part)**



**TRANSIENT THERMAL  
IMPEDANCE CHARACTERISTICS  
(FWDi part)**



**GATE CHARGE CHARACTERISTICS  
(TYPICAL)**

