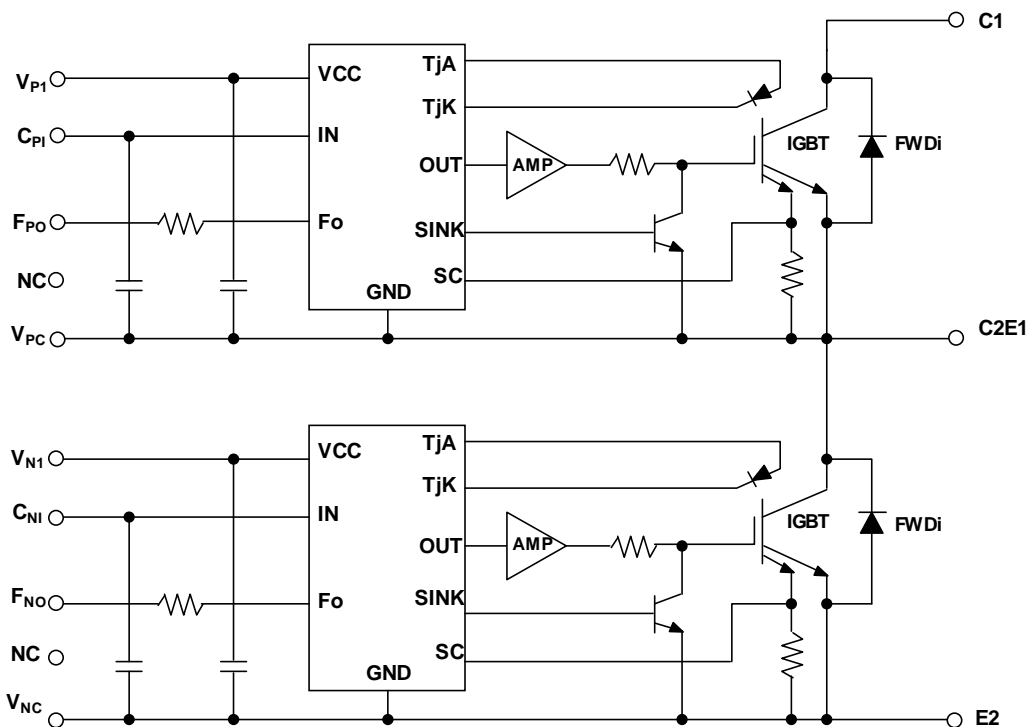


INTERNAL FUNCTIONS BLOCK DIAGRAM



MAXIMUM RATINGS ($T_j = 25^\circ\text{C}$, unless otherwise noted)

INVERTER PART

Symbol	Parameter	Conditions	Ratings	Unit
V_{CES}	Collector-Emitter Voltage	$V_D=15V, V_{CIN}=15V$	600	V
I_C	Collector Current	$T_C=25^\circ\text{C}$	800	A
I_{CRM}		Pulse	1600	
P_{tot}	Total Power Dissipation	$T_C=25^\circ\text{C}$	2500	W
I_E	Emitter Current (Free wheeling Diode Forward current)	$T_C=25^\circ\text{C}$	800	A
I_{ERM}		Pulse	1600	
T_j	Junction Temperature		-20 ~ +150	$^\circ\text{C}$

*: T_c measurement point is just under the chip.

CONTROL PART

Symbol	Parameter	Conditions	Ratings	Unit
V_D	Supply Voltage	Applied between : $V_{P1}-V_{PC}, V_{N1}-V_{NC}$	20	V
V_{CIN}	Input Voltage	Applied between : $C_{P1}-V_{PC}, C_{N1}-V_{NC}$	20	V
V_{FO}	Fault Output Supply Voltage	Applied between : $F_{P0}-V_{PC}, F_{N0}-V_{NC}$	20	V
I_{FO}	Fault Output Current	Sink current at F_{P0}, F_{N0} terminals	20	mA

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PM800DV1B060

FLAT-BASE TYPE
INSULATED PACKAGE

TOTAL SYSTEM

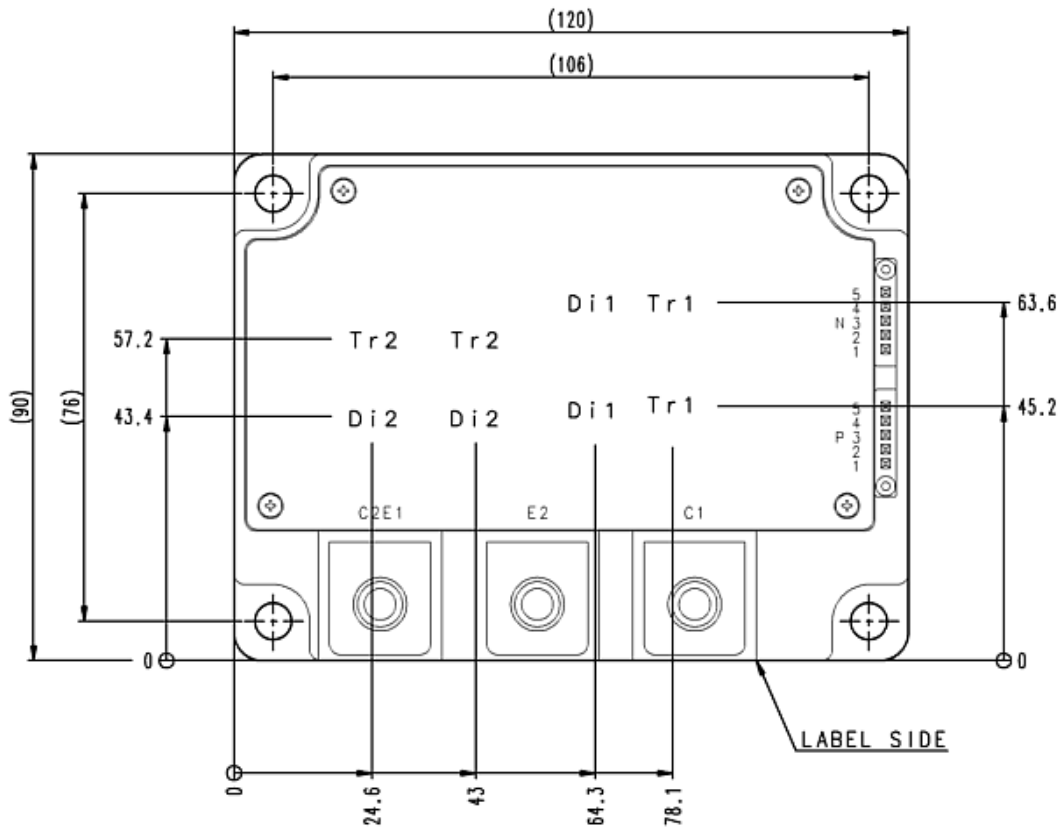
Symbol	Parameter	Conditions	Ratings	Unit
$V_{CC(Prot)}$	Supply Voltage Protected by SC	$V_D = 13.5V \sim 16.5V$ Inverter Part, $T_j = +125^\circ C$ Start	400	V
$V_{CC(surge)}$	Supply Voltage (Surge)	Applied between : C1-E2, Surge value	500	V
T_C	Module case operating temperature		-20 ~ +100	$^\circ C$
T_{stg}	Storage Temperature		-40 ~ +125	$^\circ C$
V_{isol}	Isolation Voltage	60Hz, Sinusoidal, Charged part to Base plate, AC 1min, RMS	2500	V

*: T_C measurement point is just under the chip.

THERMAL RESISTANCE

Symbol	Parameter	Conditions	Limits			Unit
			Min.	Typ.	Max.	
$R_{th(j-c)Q}$	Thermal Resistance	Junction to case, IGBT (per 1 element) (Note.1)	-	-	0.05	K/W
$R_{th(j-c)D}$		Junction to case, FWDi (per 1 element) (Note.1)	-	-	0.09	
$R_{th(c-s)}$	Contact Thermal Resistance	Case to heat sink, (per 1 module) Thermal grease applied (Note.1)	-	0.014	-	

Note1: If you use this value, $R_{th(s-a)}$ should be measured just under the chips.



ELECTRICAL CHARACTERISTICS (T_j = 25°C, unless otherwise noted)

INVERTER PART

Symbol	Parameter	Conditions	Limits			Unit	
			Min.	Typ.	Max.		
V _{CEsat}	Collector-Emitter Saturation Voltage	V _D =15V, I _C =800A	T _j =25°C	-	1.85	2.35	V
		V _{CIN} =0V, Pulsed (Fig. 1)	T _j =125°C	-	1.85	2.35	
V _{EC}	Emitter-Collector Voltage	I _E =800A, V _D =15V, V _{CIN} =15V (Fig. 2)		-	1.7	2.8	V
t _{on}	Switching Time	V _D =15V, V _{CIN} =0V↔15V V _{CC} =300V, I _C =800A T _j =125°C Inductive Load (Fig. 3,4)		0.3	0.8	2.0	μs
t _{rr}				-	0.25	0.8	
t _{c(on)}				-	0.4	1.0	
t _{off}				-	1.4	2.3	
t _{c(off)}				-	0.3	1.0	
I _{CES}	Collector-Emitter Cut-off Current	V _{CE} =V _{CES} , V _D =15V, V _{CIN} =15V (Fig. 5)	T _j =25°C	-	-	1	mA
			T _j =125°C	-	-	10	

CONTROL PART

Symbol	Parameter	Conditions	Limits			Unit	
			Min.	Typ.	Max.		
I _D	Circuit Current	V _D =15V, V _{CIN} =15V	V _{P1} -V _{PC}	-	2	4	mA
			V _{N1} -V _{NC}	-	2	4	
V _{th(ON)}	Input ON Threshold Voltage	Applied between : C _{P1} -V _{PC} , C _{N1} -V _{NC}		1.2	1.5	1.8	V
V _{th(OFF)}	Input OFF Threshold Voltage			1.7	2.0	2.3	
SC	Short Circuit Trip Level	-20≤T _j ≤125°C, V _D =15V (Fig. 3, 6)		1200	-	-	A
t _{off(SC)}	Short Circuit Current Delay Time	V _D =15V (Fig. 3, 6)		-	0.2	-	μs
OT	Over Temperature Protection	Detect Temperature of IGBT chip	Trip level	135	-	-	°C
OT _(hys)			Hysteresis	-	20	-	
UV _i	Supply Circuit Under-Voltage Protection	-20≤T _j ≤125°C	Trip level	11.5	12.0	12.5	V
UV _r			Reset level	-	12.5	-	
I _{FO(H)}	Fault Output Current	V _D =15V, V _{FO} =15V (Note.2)		-	-	0.01	mA
I _{FO(L)}				-	10	15	
t _{FO}	Fault Output Pulse Width	V _D =15V (Note.2)		1.0	1.8	-	ms

Note.2: Fault output is given only when the internal SC, OT & UV protections schemes of either upper or lower arm device operate to protect it.

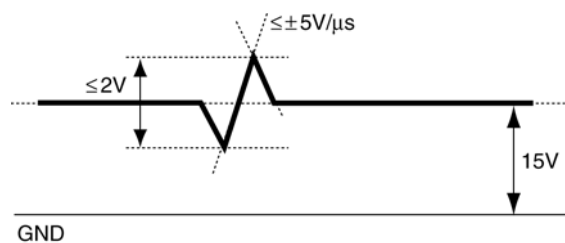
MECHANICAL RATINGS AND CHARACTERISTICS

Symbol	Parameter	Conditions	Limits			Unit
			Min.	Typ.	Max.	
M_s	Mounting Torque	Mounting part screw : M6	3.92	4.9	5.88	N·m
M_t		Main terminal part screw : M8	8.83	9.81	10.8	
m	Weight	-	-	720	-	g

RECOMMENDED CONDITIONS FOR USE

Symbol	Parameter	Conditions	Recommended value	Unit
V_{CC}	Supply Voltage	Applied across C1-E2 terminals	≤ 400	V
V_D	Control Supply Voltage	Applied between : $V_{P1}-V_{PC}$, $V_{N1}-V_{NC}$ (Note.3)	15.0 ± 1.5	V
$V_{CIN(ON)}$	Input ON Voltage	Applied between : $C_{P1}-V_{PC}$, $C_{N1}-V_{NC}$	≤ 0.8	V
$V_{CIN(OFF)}$	Input OFF Voltage		≥ 4.0	
f_{PWM}	PWM Input Frequency	Using Application Circuit of Fig. 8	≤ 20	kHz
t_{dead}	Arm Shoot-through Blocking Time	For IPM's each input signals (Fig. 7)	≥ 3.0	μs

Note3: With ripple satisfying the following conditions: dv/dt swing $\leq \pm 5V/\mu s$, Variation $\leq 2V$ peak to peak



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 FLAT-BASE TYPE
 INSULATED PACKAGE

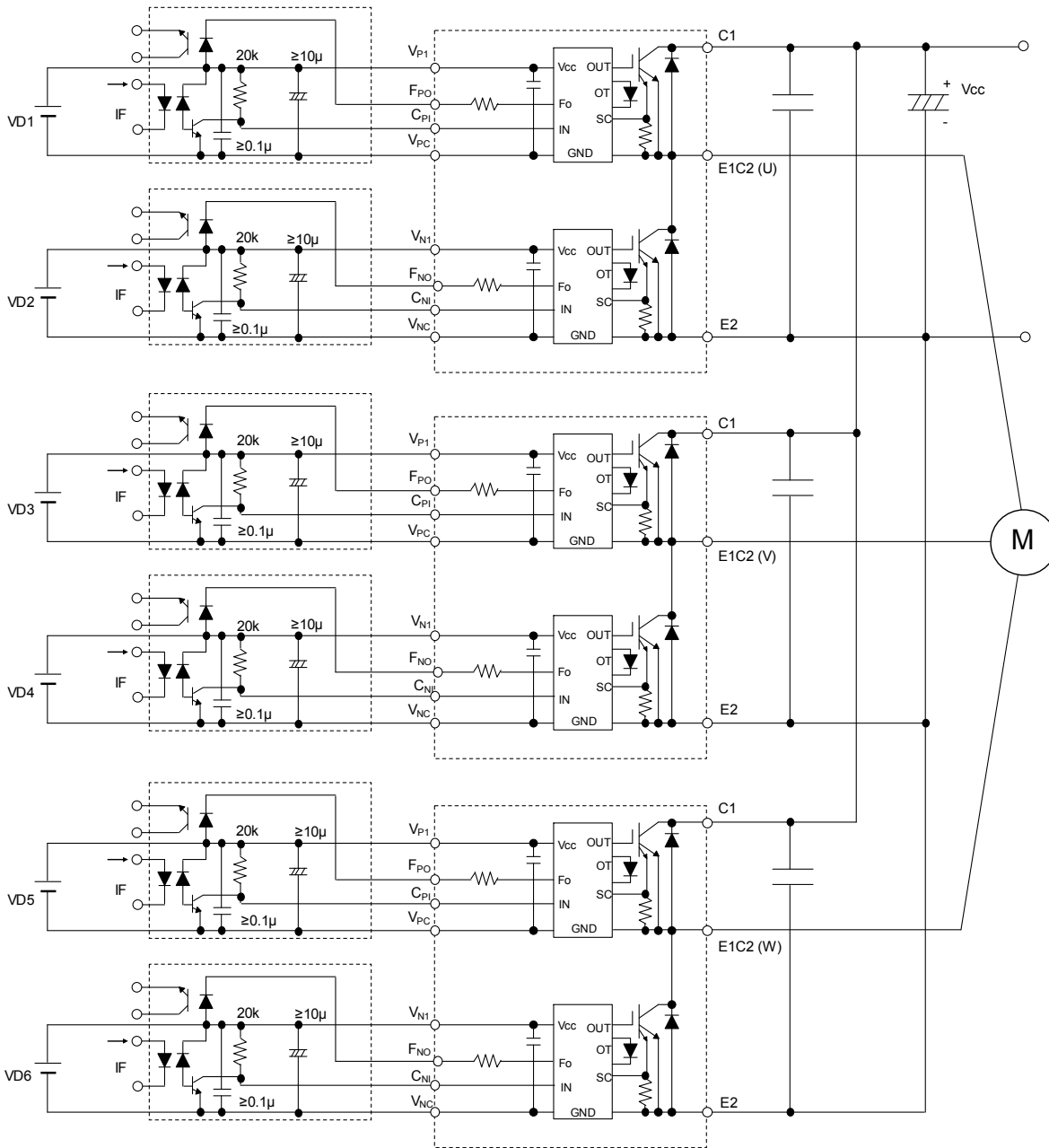


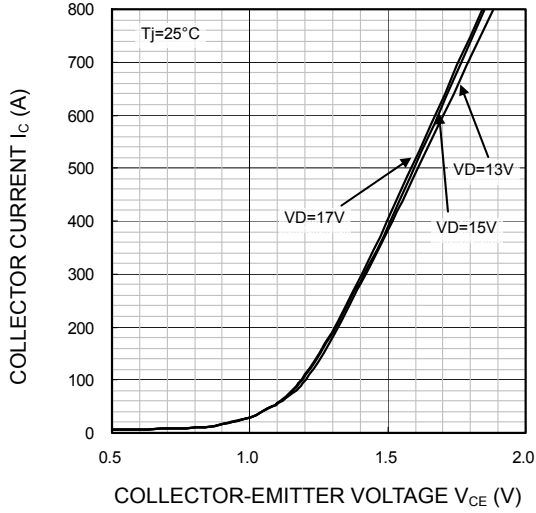
Fig. 8 Application Example Circuit

NOTES FOR STABLE AND SAFE OPERATION ;

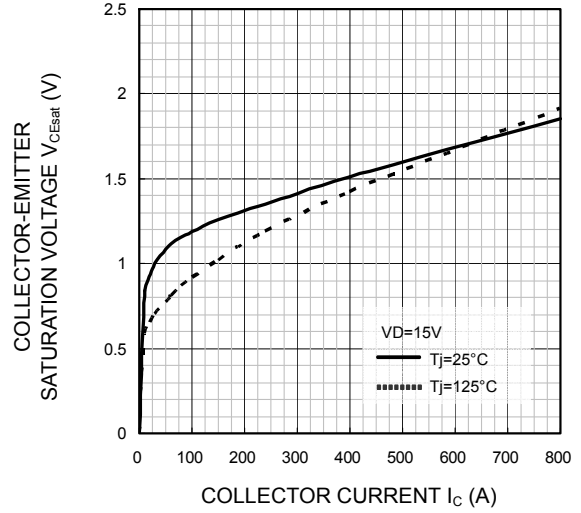
- Design the PCB pattern to minimize wiring length between opto-coupler and IPM's input terminal, and also to minimize the stray capacity between the input and output wirings of opto-coupler.
- Connect low impedance capacitor between the Vcc and GND terminal of each fast switching opto-coupler.
- Fast switching opto-couplers: $t_{PLH}, t_{PHL} \leq 0.8\mu s$, Use High CMR type.
- Slow switching opto-coupler: $CTR > 100\%$
- Use 6 isolated control power supplies (V_D). Also, care should be taken to minimize the instantaneous voltage charge of the power supply.
- Make inductance of DC bus line as small as possible, and minimize surge voltage using snubber capacitor between C1 and E2 terminal.

PERFORMANCE CURVES

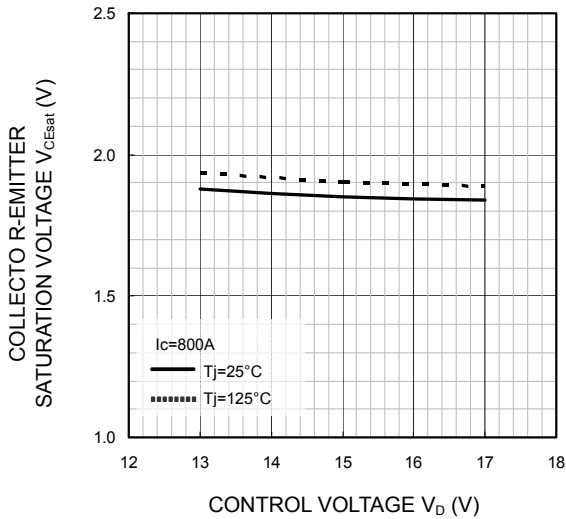
OUTPUT CHARACTERISTICS (TYPICAL)



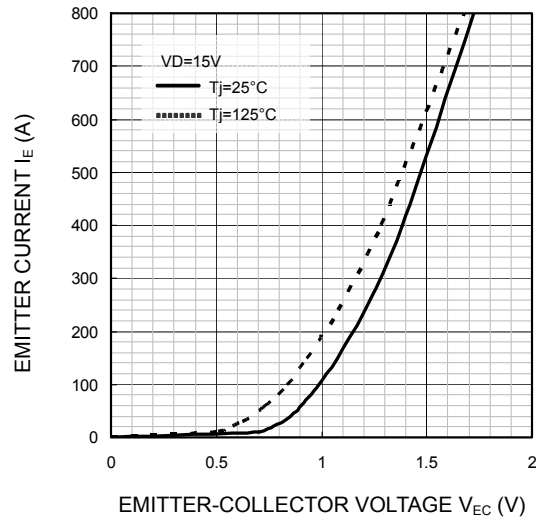
COLLECTOR-EMITTER SATURATION VOLTAGE (VS. I_c) CHARACTERISTICS (TYPICAL)



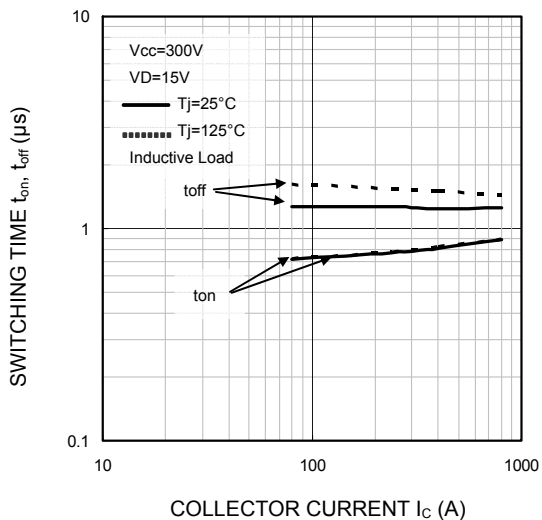
COLLECTOR-EMITTER SATURATION VOLTAGE (VS. V_D) CHARACTERISTICS (TYPICAL)



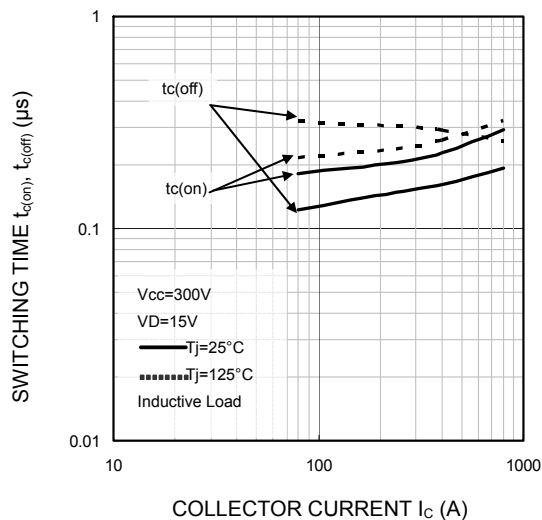
FREE WHEELING DIODE FORWARD CHARACTERISTICS (TYPICAL)



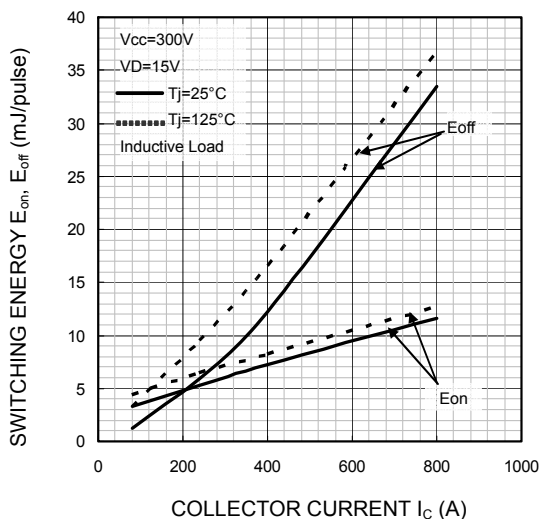
SWITCHING TIME (t_{on} , t_{off}) CHARACTERISTICS (TYPICAL)



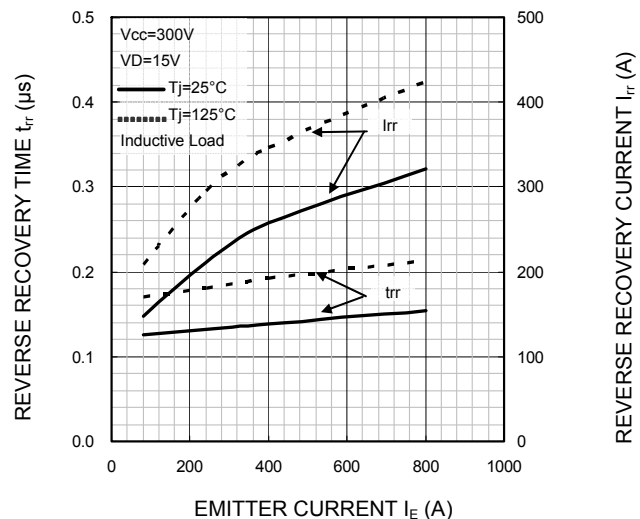
SWITCHING TIME ($t_{c(on)}$, $t_{c(off)}$) CHARACTERISTICS (TYPICAL)



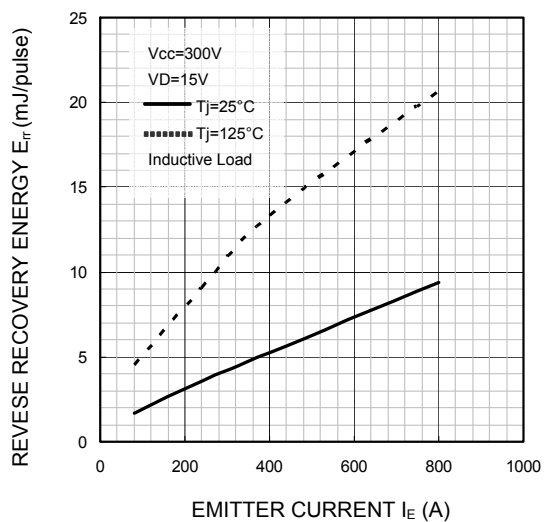
SWITCHING ENERGY CHARACTERISTICS (TYPICAL)



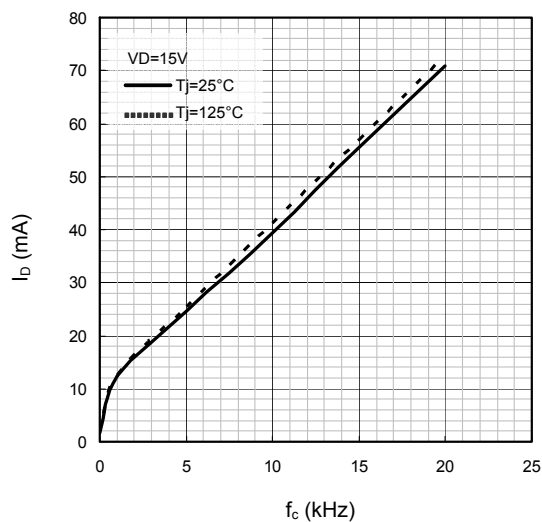
FREE WHEELING DIODE REVERSE RECOVERY CHARACTERISTICS (TYPICAL)



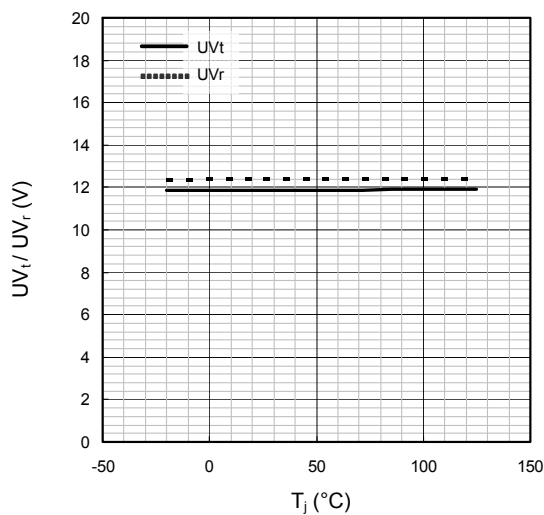
**FREE WHEELING DIODE
REVERSE RECOVERY ENERGY CHARACTERISTICS
(TYPICAL)**



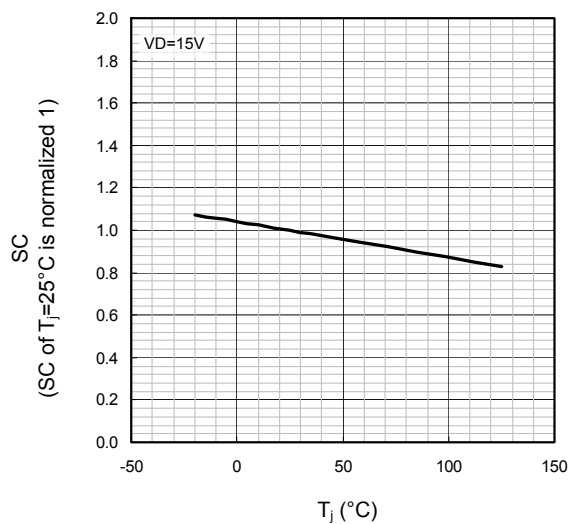
**I_b VS. f_c CHARACTERISTICS
(TYPICAL)**

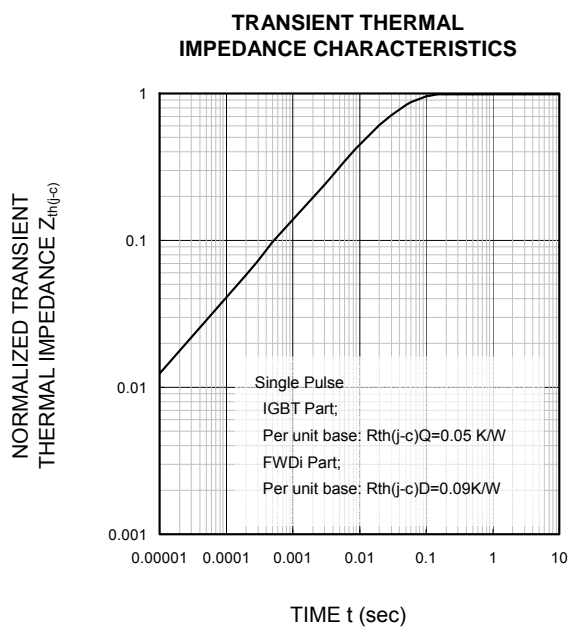


**UV TRIP LEVEL VS. T_j CHARACTERISTICS
(TYPICAL)**



**SC TRIP LEVEL VS. T_j CHARACTERISTICS
(TYPICAL)**





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FLAT-BASE TYPE
INSULATED PACKAGE

Main Revision for this Edition

No.	Date	Revision	
		Pages	Points
1	November 2011	8	Output characteristics , "VD=13V" and "VD=17V" were reversed.

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