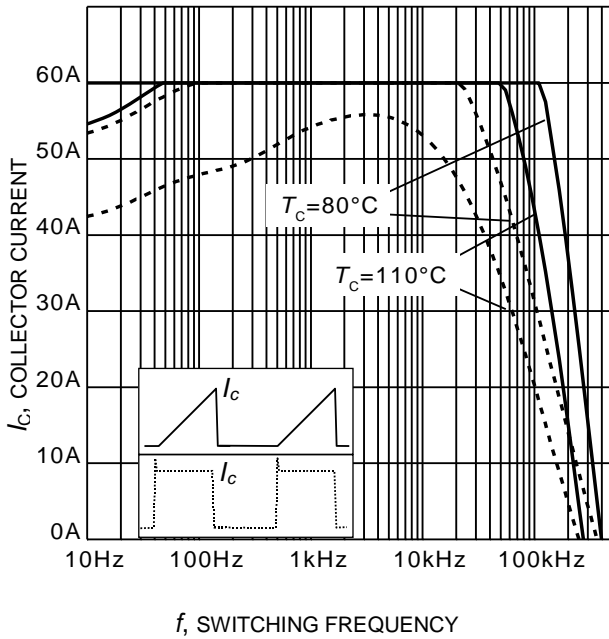


### Switching Characteristic, Inductive Load, at $T_j=25^\circ\text{C}$

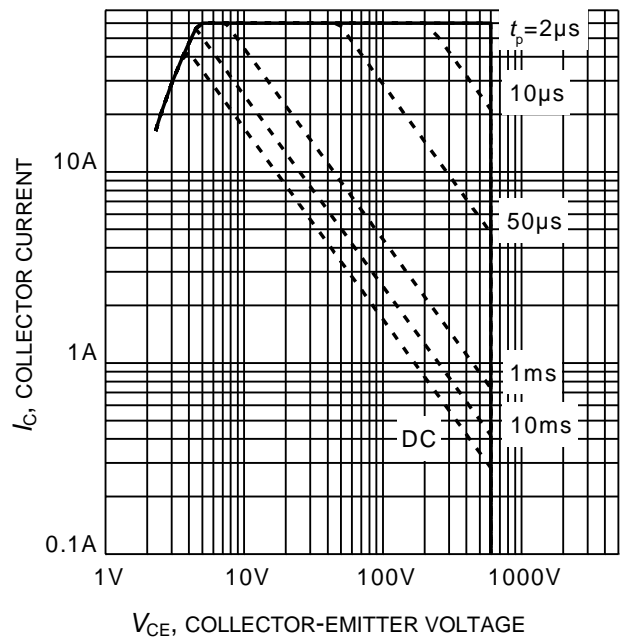
Parameter	Symbol	Conditions	Value			Unit
			min.	Typ.	max.	
<b>IGBT Characteristic</b>						
Turn-on delay time	$t_{d(on)}$	$T_j=25^\circ\text{C}$ , $V_{CC}=400\text{V}$ , $I_C=20\text{A}$ , $V_{GE}=0/15\text{V}$ , $r_G=12\Omega$ , $L_\sigma=131\text{nH}$ , $C_\sigma=31\text{pF}$	-	18	-	ns
Rise time	$t_r$		-	14	-	
Turn-off delay time	$t_{d(off)}$		-	199	-	
Fall time	$t_f$		-	42	-	
Turn-on energy	$E_{on}$	$L_\sigma$ , $C_\sigma$ from Fig. E Energy losses include "tail" and diode reverse recovery.	-	0.31	-	mJ
Turn-off energy	$E_{off}$		-	0.46	-	
Total switching energy	$E_{ts}$		-	0.77	-	
<b>Anti-Parallel Diode Characteristic</b>						
Diode reverse recovery time	$t_{rr}$	$T_j=25^\circ\text{C}$ , $V_R=400\text{V}$ , $I_F=20\text{A}$ , $di_F/dt=880\text{A}/\mu\text{s}$	-	41	-	ns
Diode reverse recovery charge	$Q_{rr}$		-	0.31	-	$\mu\text{C}$
Diode peak reverse recovery current	$I_{rrm}$		-	13.3	-	A
Diode peak rate of fall of reverse recovery current during $t_b$	$di_{rr}/dt$		-	711	-	$\text{A}/\mu\text{s}$

### Switching Characteristic, Inductive Load, at $T_j=175^\circ\text{C}$

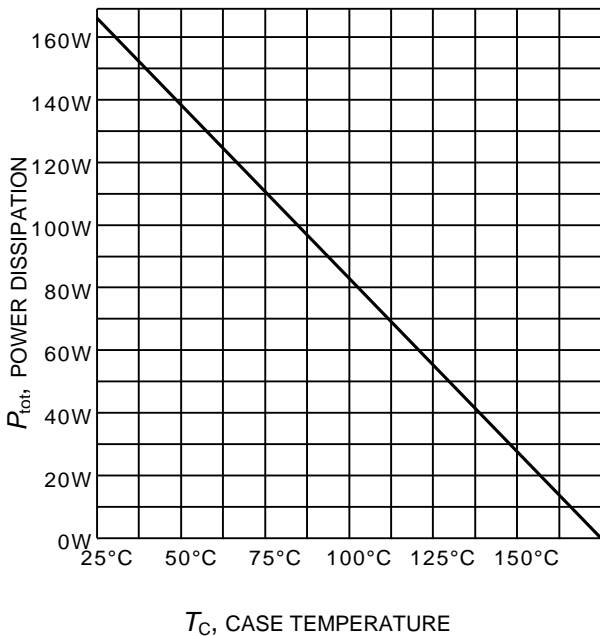
Parameter	Symbol	Conditions	Value			Unit
			min.	Typ.	max.	
<b>IGBT Characteristic</b>						
Turn-on delay time	$t_{d(on)}$	$T_j=175^\circ\text{C}$ , $V_{CC}=400\text{V}$ , $I_C=20\text{A}$ , $V_{GE}=0/15\text{V}$ , $r_G=12\Omega$ , $L_\sigma=131\text{nH}$ , $C_\sigma=31\text{pF}$	-	18	-	ns
Rise time	$t_r$		-	18	-	
Turn-off delay time	$t_{d(off)}$		-	223	-	
Fall time	$t_f$		-	76	-	
Turn-on energy	$E_{on}$	$L_\sigma$ , $C_\sigma$ from Fig. E Energy losses include "tail" and diode reverse recovery.	-	0.51	-	mJ
Turn-off energy	$E_{off}$		-	0.64	-	
Total switching energy	$E_{ts}$		-	1.15	-	
<b>Anti-Parallel Diode Characteristic</b>						
Diode reverse recovery time	$t_{rr}$	$T_j=175^\circ\text{C}$ , $V_R=400\text{V}$ , $I_F=20\text{A}$ , $di_F/dt=880\text{A}/\mu\text{s}$	-	176	-	ns
Diode reverse recovery charge	$Q_{rr}$		-	1.46	-	$\mu\text{C}$
Diode peak reverse recovery current	$I_{rrm}$		-	18.9	-	A
Diode peak rate of fall of reverse recovery current during $t_b$	$di_{rr}/dt$		-	467	-	$\text{A}/\mu\text{s}$



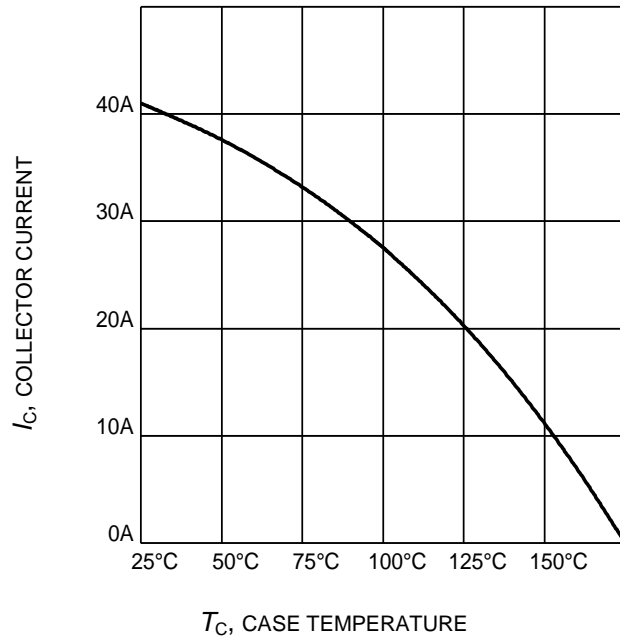
**Figure 1. Collector current as a function of switching frequency**  
 ( $T_j \leq 175^\circ\text{C}$ ,  $D = 0.5$ ,  $V_{CE} = 400\text{V}$ ,  $V_{GE} = 0/15\text{V}$ ,  $r_G = 12\Omega$ )



**Figure 2. Safe operating area**  
 ( $D = 0$ ,  $T_C = 25^\circ\text{C}$ ,  $T_j \leq 175^\circ\text{C}$ ;  $V_{GE} = 0/15\text{V}$ )



**Figure 3. Power dissipation as a function of case temperature**  
 ( $T_j \leq 175^\circ\text{C}$ )



**Figure 4. Collector current as a function of case temperature**  
 ( $V_{GE} \geq 15\text{V}$ ,  $T_j \leq 175^\circ\text{C}$ )