

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

Parameter	Symbol	Conditions	Value			Unit	
			min.	Typ.	max.		
IGBT Characteristic							
Turn-on delay time	$t_{d(on)}$	$T_j=25^\circ\text{C}$, $V_{CC}=400\text{V}$, $I_C=15\text{A}$, $V_{GE}=0/15\text{V}$, $r_G=15\Omega$, $L_\sigma=154\text{nH}$, $C_\sigma=39\text{pF}$	-	17	-	ns	
Rise time	t_r		-	11	-		
Turn-off delay time	$t_{d(off)}$		-	188	-		
Fall time	t_f		-	50	-		
Turn-on energy	E_{on}	L_σ , C_σ from Fig. E Energy losses include "tail" and diode reverse recovery.	-	0.22	-	mJ	
Turn-off energy	E_{off}		-	0.35	-		
Total switching energy	E_{ts}		-	0.57	-		
Anti-Parallel Diode Characteristic							
Diode reverse recovery time	t_{rr}	$T_j=25^\circ\text{C}$, $V_R=400\text{V}$, $I_F=15\text{A}$, $di_F/dt=825\text{A}/\mu\text{s}$	-	34	-	ns	
Diode reverse recovery charge	Q_{rr}		-	0.24	-		μC
Diode peak reverse recovery current	I_{rrm}		-	10.4	-		
Diode peak rate of fall of reverse recovery current during t_b	di_{rr}/dt		-	718	-		$\text{A}/\mu\text{s}$

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

Parameter	Symbol	Conditions	Value			Unit	
			min.	Typ.	max.		
IGBT Characteristic							
Turn-on delay time	$t_{d(on)}$	$T_j=175^\circ\text{C}$, $V_{CC}=400\text{V}$, $I_C=15\text{A}$, $V_{GE}=0/15\text{V}$, $r_G=15\Omega$, $L_\sigma=154\text{nH}$, $C_\sigma=39\text{pF}$	-	17	-	ns	
Rise time	t_r		-	15	-		
Turn-off delay time	$t_{d(off)}$		-	212	-		
Fall time	t_f		-	79	-		
Turn-on energy	E_{on}	L_σ , C_σ from Fig. E Energy losses include "tail" and diode reverse recovery.	-	0.34	-	mJ	
Turn-off energy	E_{off}		-	0.47	-		
Total switching energy	E_{ts}		-	0.81	-		
Anti-Parallel Diode Characteristic							
Diode reverse recovery time	t_{rr}	$T_j=175^\circ\text{C}$, $V_R=400\text{V}$, $I_F=15\text{A}$, $di_F/dt=825\text{A}/\mu\text{s}$	-	140	-	ns	
Diode reverse recovery charge	Q_{rr}		-	1.0	-		μC
Diode peak reverse recovery current	I_{rrm}		-	14.7	-		
Diode peak rate of fall of reverse recovery current during t_b	di_{rr}/dt		-	495	-		$\text{A}/\mu\text{s}$

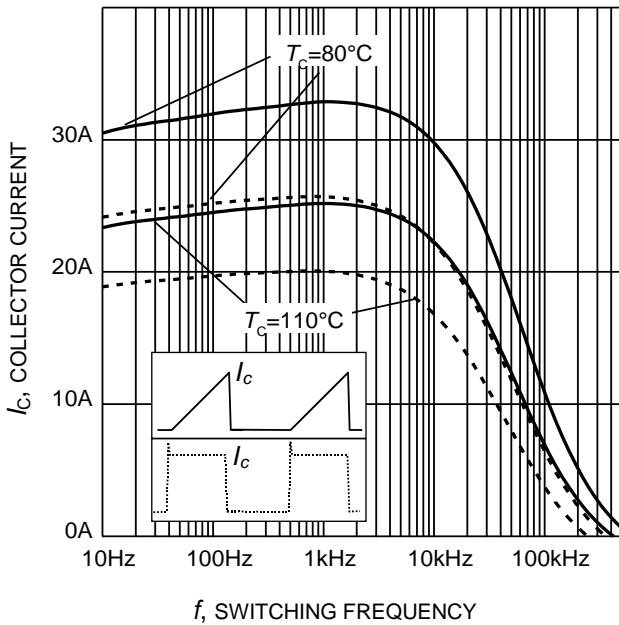


Figure 1. Collector current as a function of switching frequency
 ($T_j \leq 175^\circ\text{C}$, $D = 0.5$, $V_{CE} = 400\text{V}$,
 $V_{GE} = 0/15\text{V}$, $r_G = 15\Omega$)

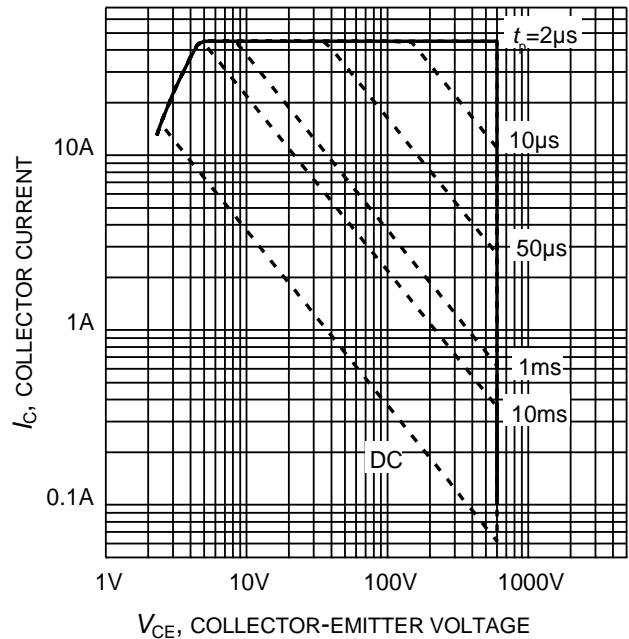


Figure 2. Safe operating area
 ($D = 0$, $T_C = 25^\circ\text{C}$, $T_j \leq 175^\circ\text{C}$;
 $V_{GE} = 0/15\text{V}$)

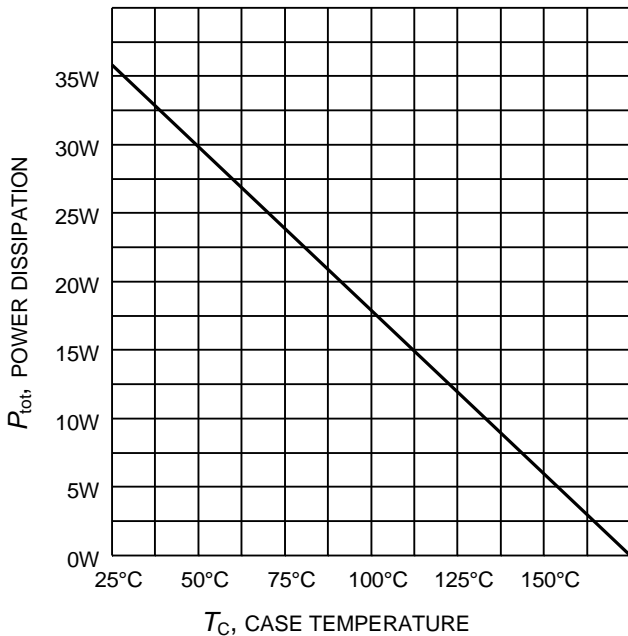


Figure 3. Power dissipation as a function of case temperature
 ($T_j \leq 175^\circ\text{C}$)

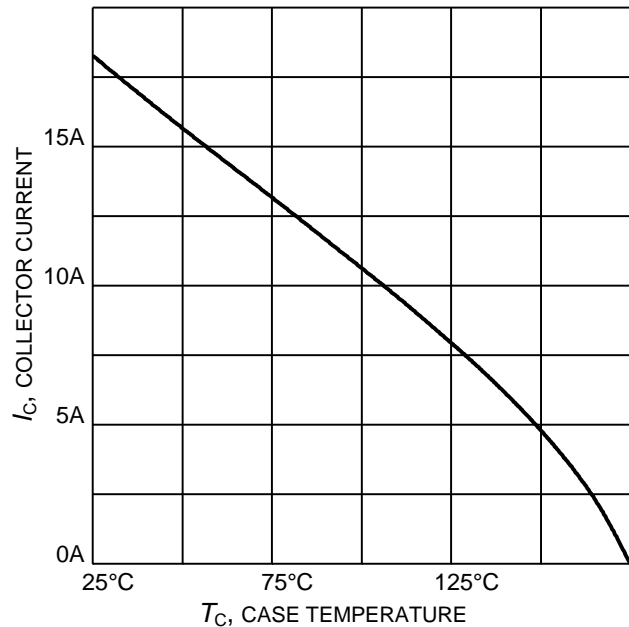


Figure 4. Collector current as a function of case temperature
 ($V_{GE} \geq 15\text{V}$, $T_j \leq 175^\circ\text{C}$)