

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	$t_{d(on)}$	$T_j=25^\circ\text{C}$, $V_{CC}=400\text{V}$, $I_C=4\text{A}$, $V_{GE}=0/15\text{V}$, $R_G=47\ \Omega$, $L_{\sigma}^{(1)}=150\text{nH}$, $C_{\sigma}^{(1)}=47\text{pF}$ Energy losses include "tail" and diode reverse recovery.	-	14	-	ns
Rise time	t_r		-	7	-	
Turn-off delay time	$t_{d(off)}$		-	164	-	
Fall time	t_f		-	43	-	μJ
Turn-on energy	E_{on}		-	61	-	
Turn-off energy	E_{off}		-	84	-	
Total switching energy	E_{ts}		-	145	-	
Anti-Parallel Diode Characteristic						
Diode reverse recovery time	t_{rr}	$T_j=25^\circ\text{C}$, $V_R=400\text{V}$, $I_F=4\text{A}$, $di_F/dt=610\text{A}/\mu\text{s}$	-	28	-	ns
Diode reverse recovery charge	Q_{rr}		-	79	-	nC
Diode peak reverse recovery current	I_{rrm}		-	5.3	-	A
Diode peak rate of fall of reverse recovery current during t_b	di_{rr}/dt		-	346	-	$\text{A}/\mu\text{s}$

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	$t_{d(on)}$	$T_j=175^\circ\text{C}$, $V_{CC}=400\text{V}$, $I_C=4\text{A}$, $V_{GE}=0/15\text{V}$, $R_G=47\ \Omega$, $L_{\sigma}^{(1)}=150\text{nH}$, $C_{\sigma}^{(1)}=47\text{pF}$ Energy losses include "tail" and diode reverse recovery.	-	14	-	ns
Rise time	t_r		-	10	-	
Turn-off delay time	$t_{d(off)}$		-	185	-	
Fall time	t_f		-	83	-	μJ
Turn-on energy	E_{on}		-	99	-	
Turn-off energy	E_{off}		-	97	-	
Total switching energy	E_{ts}		-	196	-	
Anti-Parallel Diode Characteristic						
Diode reverse recovery time	t_{rr}	$T_j=175^\circ\text{C}$ $V_R=400\text{V}$, $I_F=4\text{A}$, $di_F/dt=610\text{A}/\mu\text{s}$	-	95	-	ns
Diode reverse recovery charge	Q_{rr}		-	291	-	nC
Diode peak reverse recovery current	I_{rrm}		-	6.6	-	A
Diode peak rate of fall of reverse recovery current during t_b	di_{rr}/dt		-	253	-	$\text{A}/\mu\text{s}$

¹⁾ Leakage inductance L_{σ} and Stray capacity C_{σ} due to dynamic test circuit in Figure E.

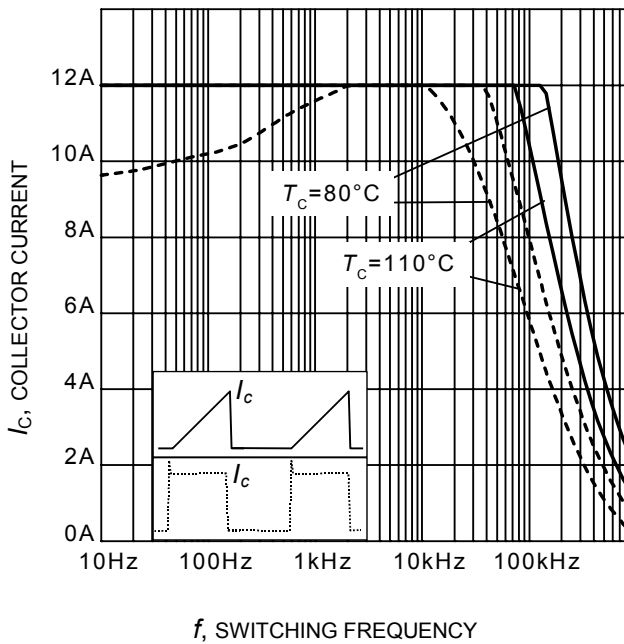


Figure 1. Collector current as a function of switching frequency
 ($T_j \leq 175^\circ\text{C}$, $D = 0.5$, $V_{CE} = 400\text{V}$, $V_{GE} = 0/+15\text{V}$, $R_G = 47\Omega$)

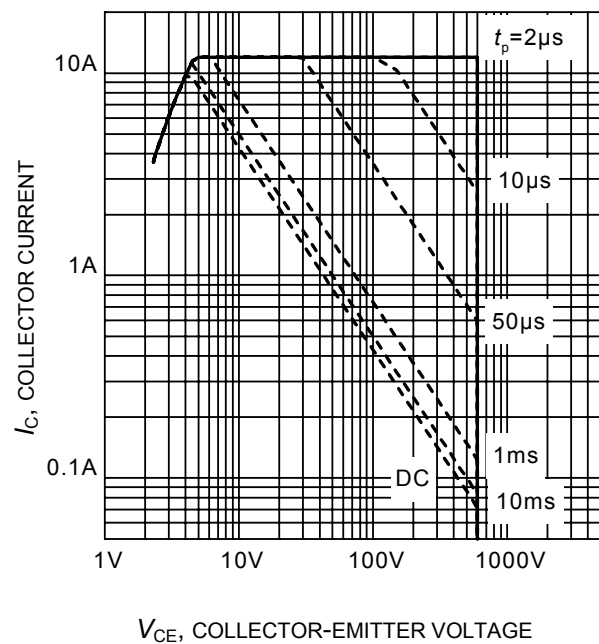


Figure 2. Safe operating area
 ($D = 0$, $T_C = 25^\circ\text{C}$, $T_j \leq 175^\circ\text{C}$; $V_{GE} = 15\text{V}$)

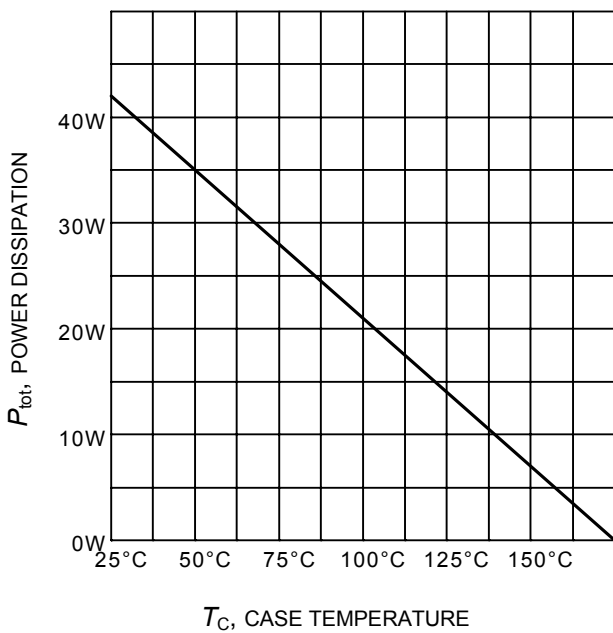


Figure 3. Power dissipation as a function of case temperature
 ($T_j \leq 175^\circ\text{C}$)

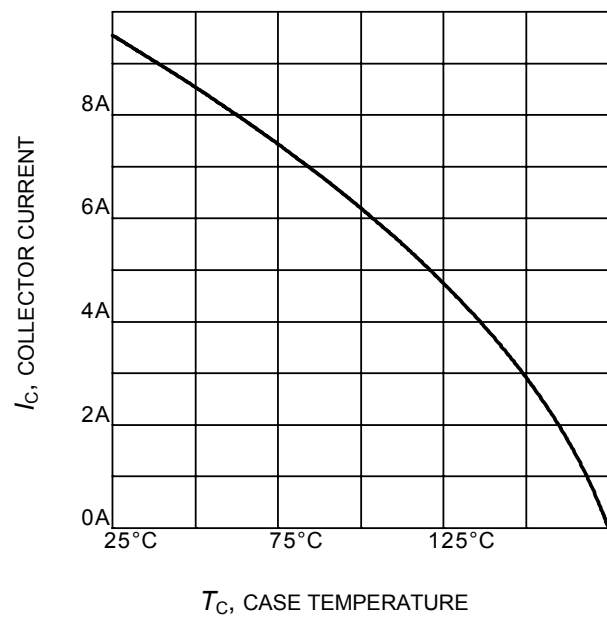


Figure 4. Collector current as a function of case temperature
 ($V_{GE} \geq 15\text{V}$, $T_j \leq 175^\circ\text{C}$)