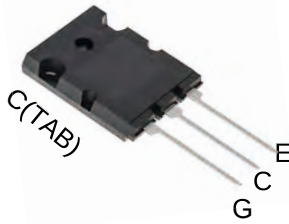


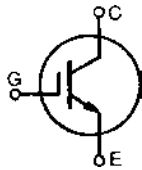
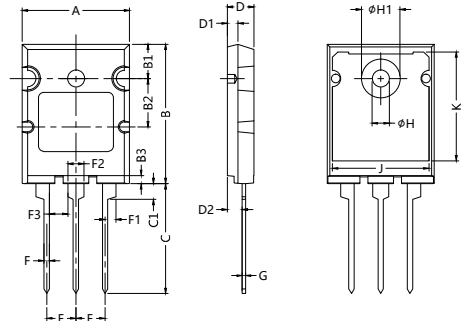
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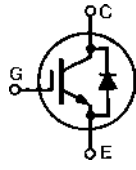


G=Gate,
C=Collector,
E=Emitter,
TAB=Collector

Dimensions TO-264



SG100T65UB3



SG100T65UDB3

MAXIMUM RATING . Ta=25°C)

SYMBOL	CHARACTERISTIC	RATING	UNIT
V_{CES}	Collector-Emitter Voltage	650	V
V_{GES}	Gate-Emitter Voltage	±20	V
I_C	Collector Current	@Tc=25°C 120 @Tc=100°C 100	A
I_{CM}^*	Pulsed Collector Current	250	A
I_F	Diode Continuous Forward	@Tc=100°C 100	A
I_{FM}	Current Diode Maximum	200	A
P_D	Forward Current Maximum Power Dissipation	@Tc=25°C 520 @Tc=100°C 260	W
T_j	Maximum Junction Temperature	175	°C
T_{stg}	Storage Temperature Range	-55 to +150	°C

*Repetitive rating : Pulse width limited by max. junction temperature

General Description

SIRECTIFIER Trench Field Stop IGBTs offer low switching losses, high energy efficiency and short circuit ruggedness. It is designed for applications such as motor control, uninterrupted power supplies(UPS), general inverters.

FEATURES

- High speed switching
- High ruggedness, temperature stable behavior
- Short Circuit Withstand Times > 10us
- Extremely enhanced avalanche capability

THERMAL CHARACTERISTIC

SYMBOL	CHARACTERISTIC	MAX.	UNIT
R_{thJC}	Thermal Resistance, Junction to Case	0.19	°C/W
R_{thJC}	(IGBT) Thermal Resistance, Junction to.....	0.62	°C/W
R_{thJA}	(DIODE) Thermal Resistance, Junction to Ambient	31	°C/W

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Discrete IGBTs

ELECTRICAL CHARACTERISTICS (Ta=25°C)

SYMBOL	CHARACTERISTIC	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Static							
BV _{CES}	Collector-Emitter Breakdown Voltage	V _{GE} =0V , I _C =250μA	650		-	V	
I _{CES}	Collector Cut-off Current	V _{GE} =0V, V _{CE} =600V	-	-	250	μA	
I _{GES}	Gate Leakage Current	V _{CE} =0V, V _{GE} =±20V	-	-	±100	nA	
V _{GE(th)}	Gate Threshold Voltage	V _{GE} =V _{CE} , I _C =7.5mA	5.0	6.0	7.5	V	
V _{CE(sat)}	Collector-Emitter Saturate	V _{GE} =15V, I _C =100A	-	1.85	2.20	V	
		V _{GE} =15V, I _C =200A	-	2.30	-	V	
		V _{GE} =15V, I _C =100A, T _C = 125°C	-	2.10	-	V	
Dynamic							
Q _g	Total Gate Charge	V _{CC} =300V, V _{GE} =15V, I _C = 100A	-	650	-	nC	
Q _{ge}	Gate-Emitter Charge		-	50	-	nC	
Q _{gc}	Gate-Collector Charge		-	140	-	nC	
t _{d(on)}	Turn-On Delay Time	V _{CC} =300V, I _C =100A, V _{GE} =15V, R _G =10Ω Inductive Load, T _C = 25°C (Note 1)	-	30	-	ns	
t _r	Rise Time		-	50	-	ns	
t _{d(off)}	Turn-Off Delay Time		-	260	-	ns	
t _f	Turn-Off Delay Time		-	35	-	ns	
E _{on}	Turn-On Switching Loss		-	3.9	-	mJ	
E _{off}	Turn-Off Switching Loss		-	2.05	-	mJ	
E _{ts}	Total Switching Loss		-	5.95	-	mJ	
t _{d(on)}	Turn-On Delay Time		V _{CC} =300V, I _C =100A, V _{GE} =15V, R _G =10Ω Inductive Load, T _C = 125°C (Note 1)	-	30	-	ns
t _r	Rise Time			-	50	-	ns
t _{d(off)}	Turn-Off Delay Time	-		340	-	ns	
t _f	Turn-Off Delay Time	-		30	-	ns	
E _{on}	Turn-On Switching Loss	-		5.0	-	mJ	
E _{off}	Turn-Off Switching Loss	-		2.35	-	mJ	
E _{ts}	Total Switching Loss	-		7.35	-	mJ	
C _{ies}	Input Capacitance	V _{CE} =30V, V _{GE} =0V, f=1MHz	-	6040	-	pF	
C _{oes}	Output Capacitance		-	200	-	pF	
C _{res}	Reverse Transfer Capacitance		-	170	-	pF	
t _{sc}	Short Circuit Withstand Time	V _{CC} =300V, V _{GE} =15V, T _C =100°C	10	-	-	μs	

Note 1 : Energy loss include tail current and diode reverse recovery.

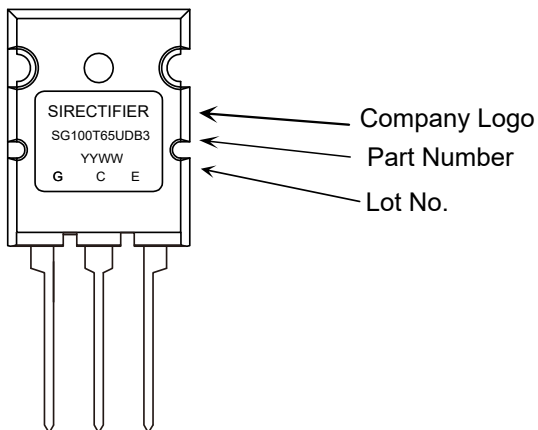
SG100T65UDB3

Discrete IGBTs

ELECTRICAL CHARACTERISTIC OF DIODE

SYMBOL	CHARACTERISTIC	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
V _F	Diode Forward Voltage	I _F = 100A	T _C =25°C	-	1.75	2.1	V
			T _C =125°C	-	1.65	-	
t _{rr}	Diode Reverse Recovery Time	V _{CC} =300V, I _F =100A di/dt = 600A/μs	T _C =25°C	-	170	-	ns
			T _C =125°C	-	230	-	
I _{rr}	Diode Peak Reverse Recovery Current		T _C =25°C	-	25	-	A
			T _C =125°C	-	23	-	
Q _{rr}	Diode Reverse Recovery Charge		T _C =25°C	-	2.2	-	μC
			T _C =125°C	-	3.2	-	

MARKING



ORDERING INFORMATION

Part Number	Package	Shipping	Marking Code
SG100T65UDB3	TO-264	20pcs / Tube	SG100T65UDB3

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Discrete IGBTs

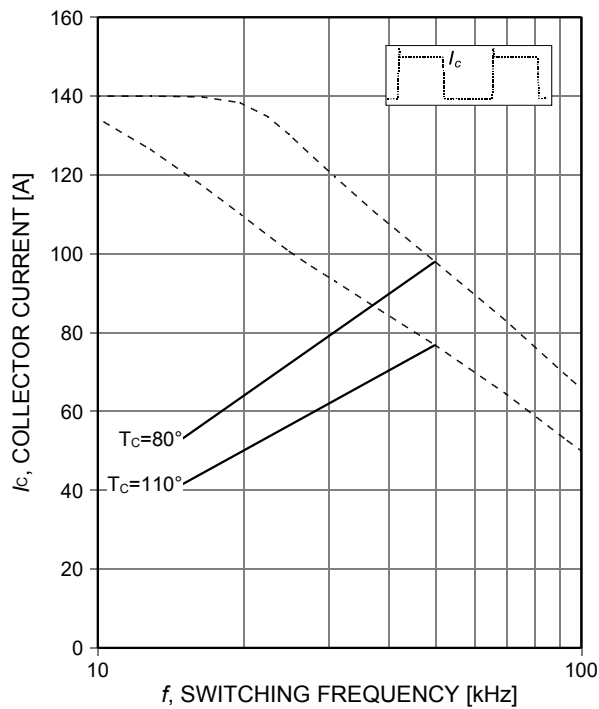


Figure 1. **Collector current as a function of switching frequency**
($T_{vj} \leq 175^\circ\text{C}$, $D=0.5$, $V_{CE}=400\text{V}$, $V_{GE}=15/0\text{V}$, $r_g=3.5\Omega$, $R_{th(j-c)}=0.21\text{K/W}$)

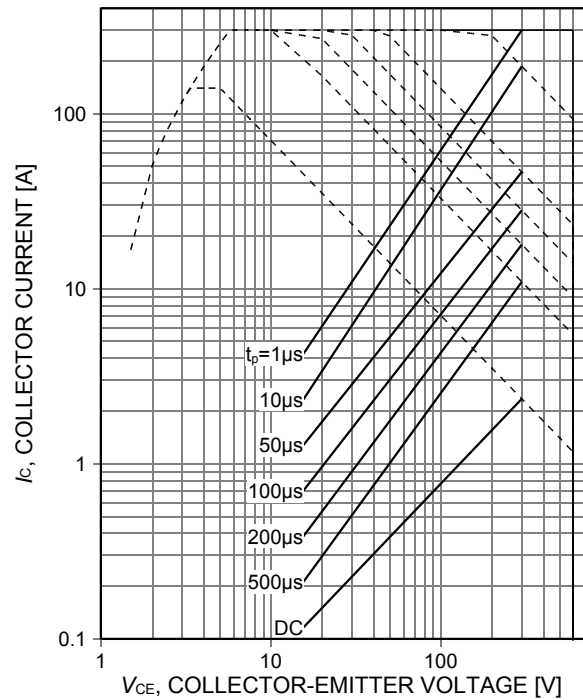


Figure 2. **Forward bias safe operating area**
($D=0$, $T_c=25^\circ\text{C}$, $T_{vj} \leq 175^\circ\text{C}$, $V_{GE}=15\text{V}$, $R_{th(j-c)}=0.21\text{K/W}$)

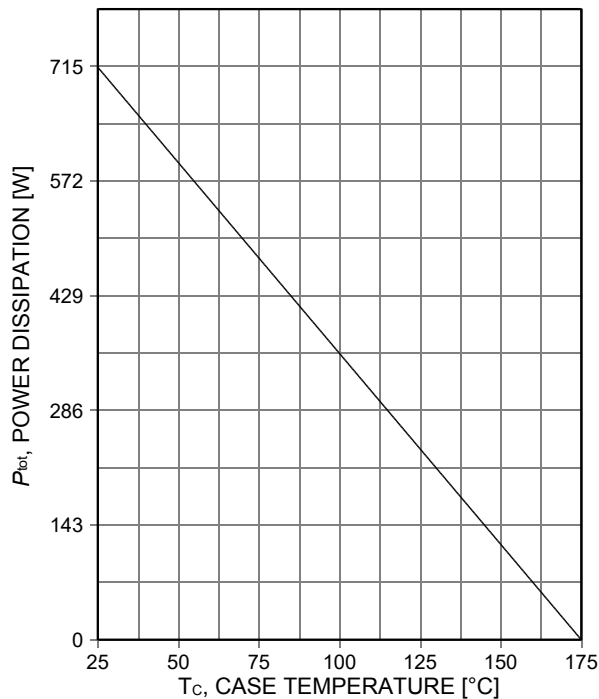


Figure 3. **Power dissipation as a function of case temperature**
($T_{vj} \leq 175^\circ\text{C}$, $R_{th(j-c)}=0.21\text{K/W}$)

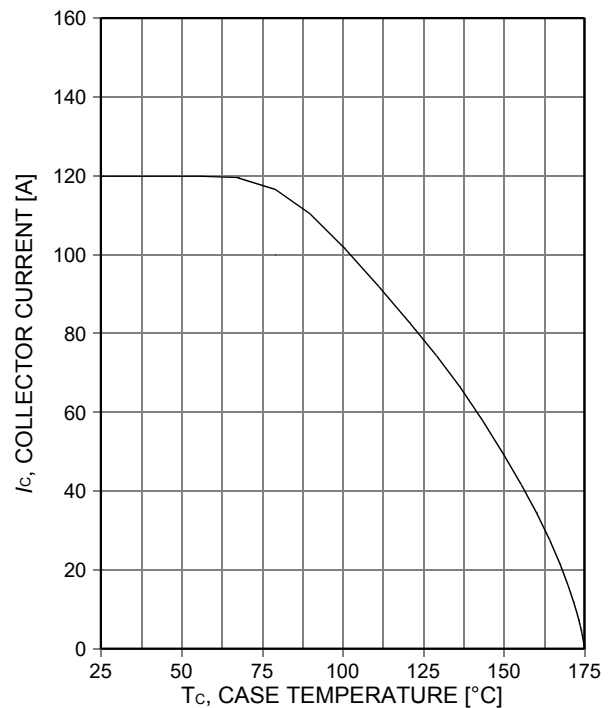


Figure 4. **Collector current as a function of case temperature**
($V_{GE} \geq 15\text{V}$, $T_{vj} \leq 175^\circ\text{C}$, $R_{th(j-c)}=0.21\text{K/W}$)

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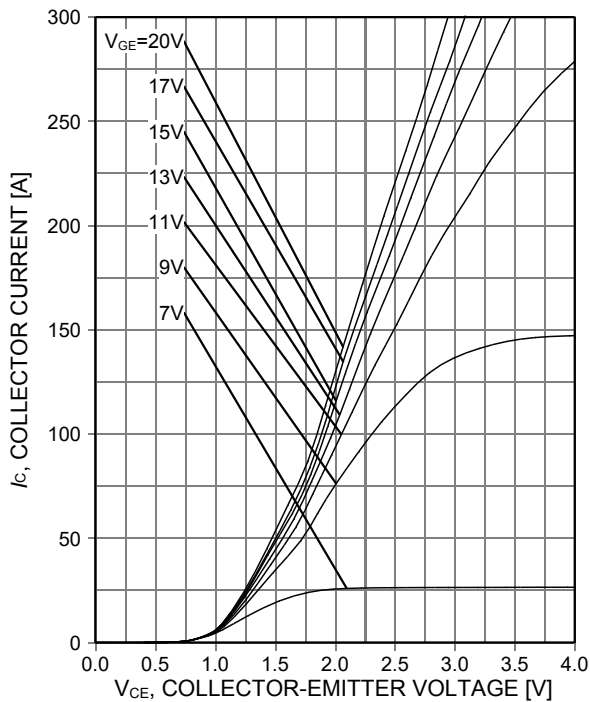


Figure 5. Typical output characteristic
($T_{vj}=25^{\circ}\text{C}$)

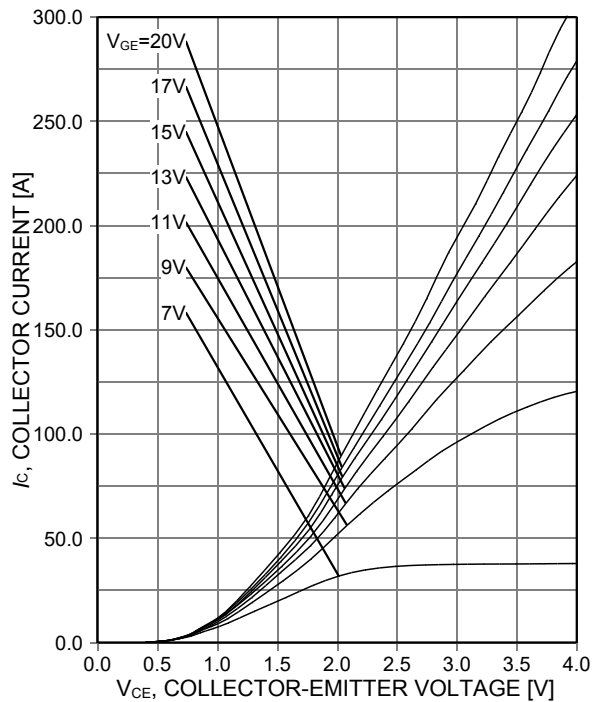


Figure 6. Typical output characteristic
($T_{vj}=175^{\circ}\text{C}$)

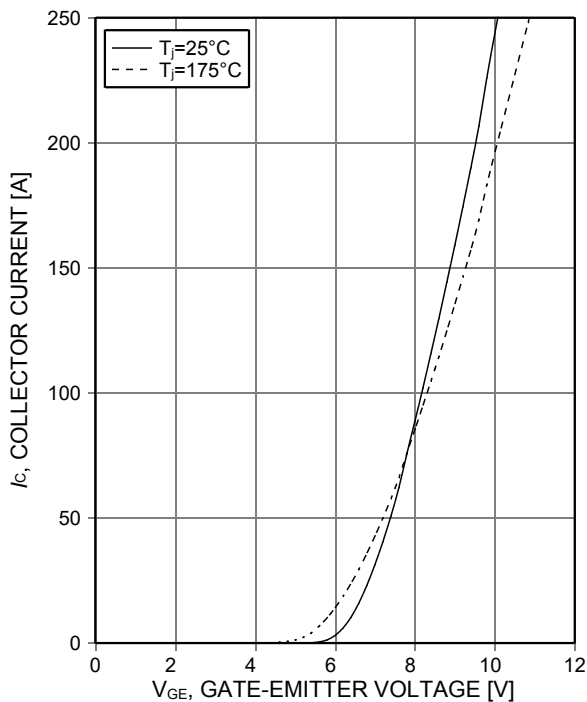


Figure 7. Typical transfer characteristic
($V_{CE}=20\text{V}$)

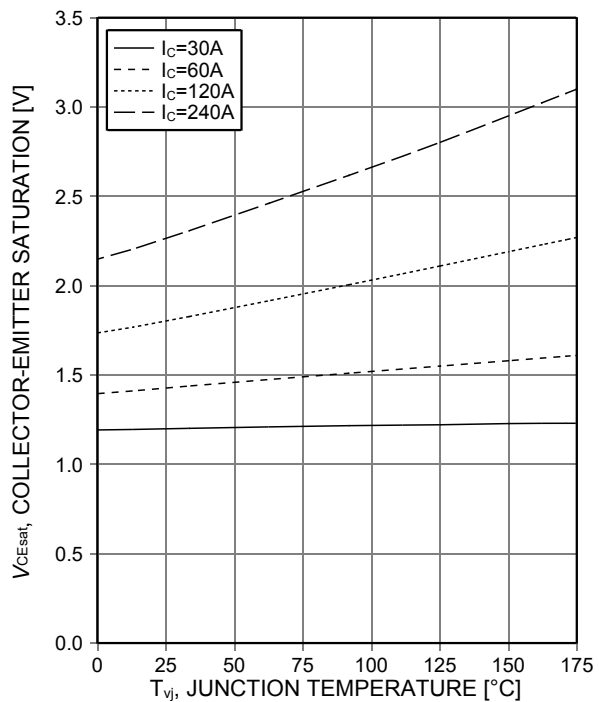


Figure 8. Typical collector-emitter saturation voltage as
a function of junction temperature
($V_{GE}=15\text{V}$)

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Discrete IGBTs

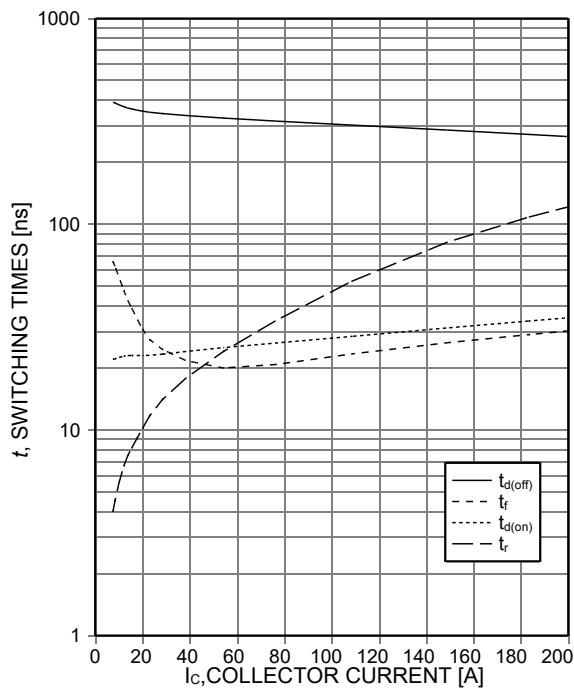


Figure 9. **Typical switching times as a function of collector current**
(inductive load, $T_{vj}=175^{\circ}\text{C}$, $V_{CE}=400\text{V}$, $V_{GE}=15/0\text{V}$, $r_G=3.5\Omega$, Dynamic test circuit in Figure E)

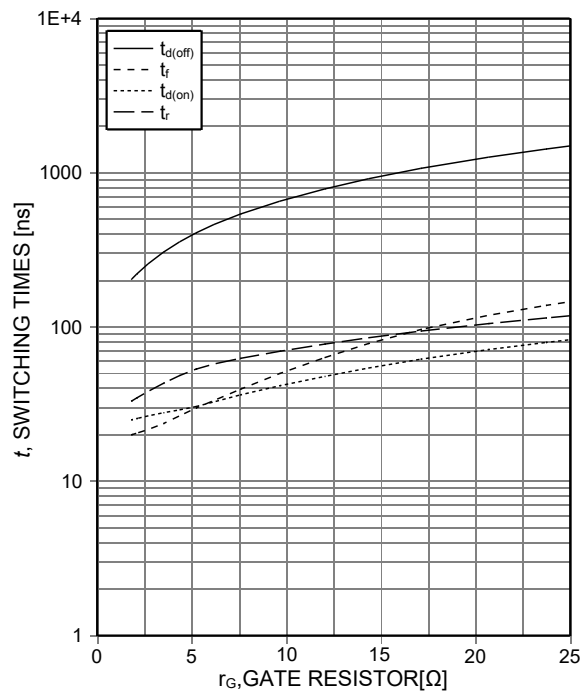


Figure 10. **Typical switching times as a function of gate resistor**
(inductive load, $T_{vj}=175^{\circ}\text{C}$, $V_{CE}=400\text{V}$, $V_{GE}=15/0\text{V}$, $I_C=100\text{A}$, Dynamic test circuit in Figure E)

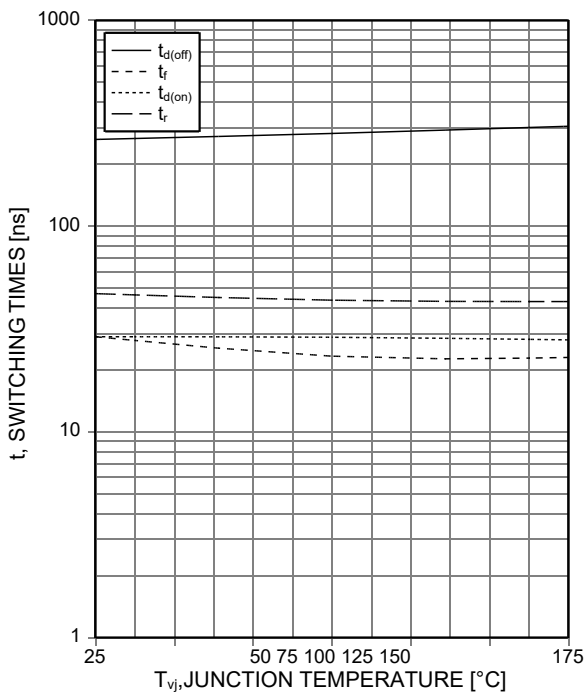


Figure 11. **Typical switching times as a function of junction temperature**
(inductive load, $V_{CE}=400\text{V}$, $V_{GE}=15/0\text{V}$, $I_C=100\text{A}$, $r_G=3.5\Omega$, Dynamic test circuit in Figure E)

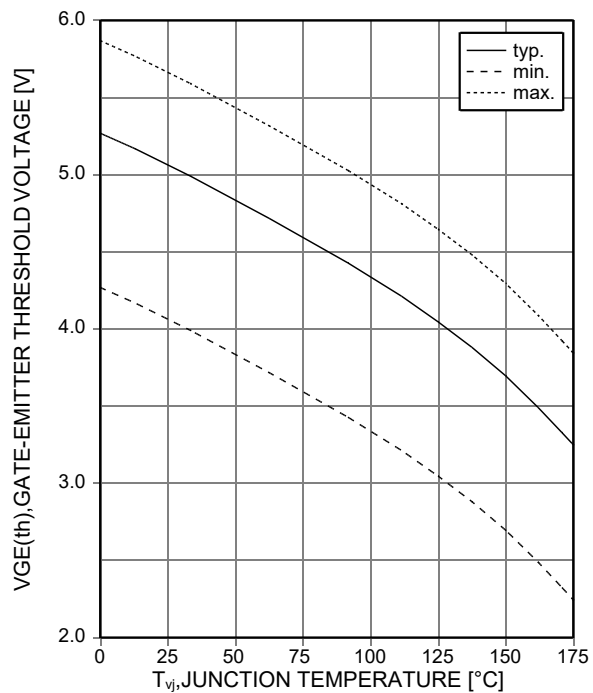


Figure 12. **Gate-emitter threshold voltage as a function of junction temperature**
($I_C=1.6\text{mA}$)

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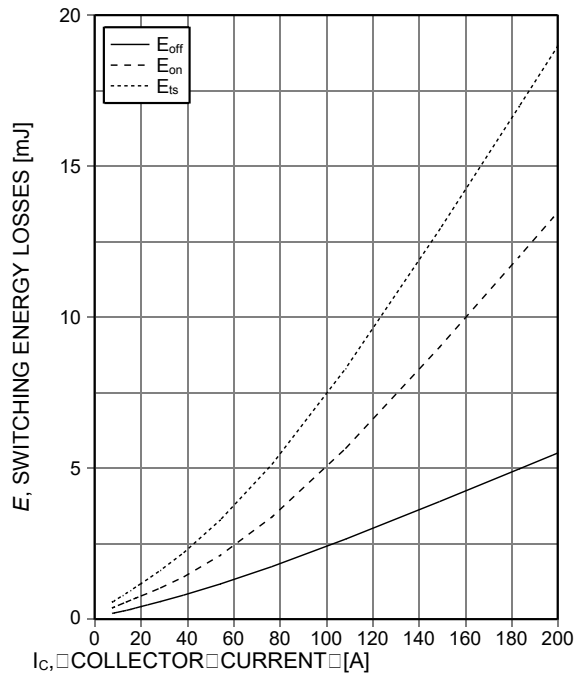


Figure 13. Typical switching energy losses as a function of collector current
(inductive load, $T_{vj}=175^{\circ}\text{C}$, $V_{CE}=400\text{V}$, $V_{GE}=15/0\text{V}$, $r_G=3.5\Omega$, Dynamic test circuit in Figure E)

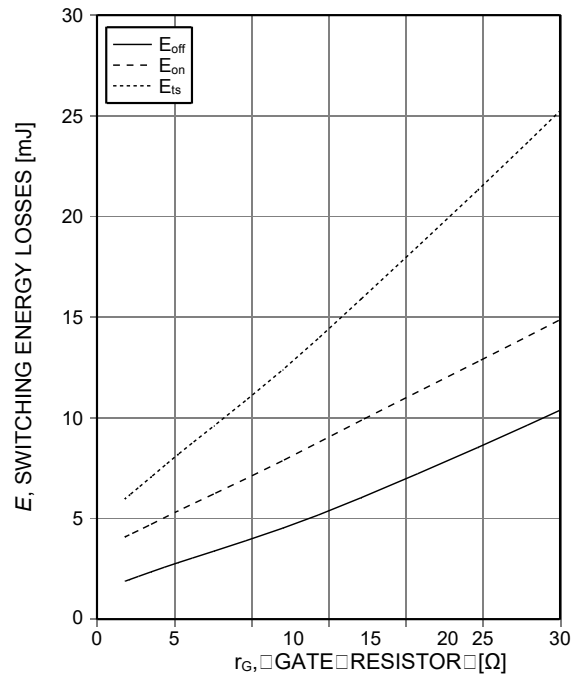


Figure 14. Typical switching energy losses as a function of gate resistor
(inductive load, $T_{vj}=175^{\circ}\text{C}$, $V_{CE}=400\text{V}$, $V_{GE}=15/0\text{V}$, $I_C=100\text{A}$, Dynamic test circuit in Figure E)

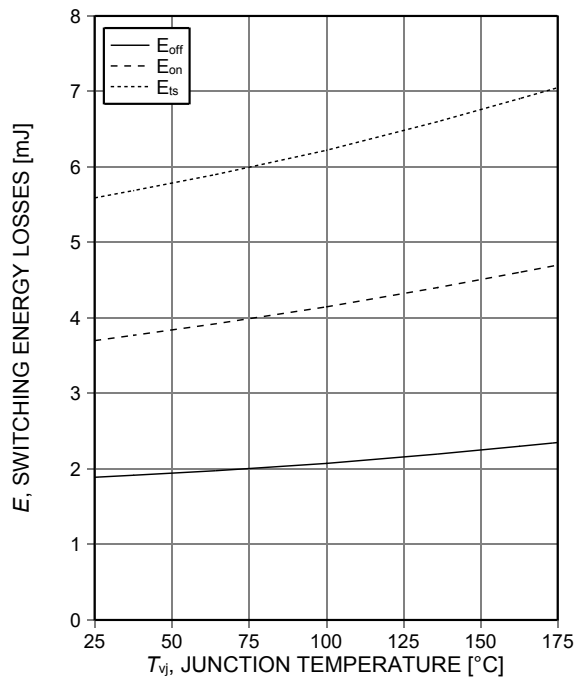


Figure 15. Typical switching energy losses as a function of junction temperature
(inductive load, $V_{CE}=400\text{V}$, $V_{GE}=15/0\text{V}$, $I_C=100\text{A}$, $r_G=3.5\Omega$, Dynamic test circuit in Figure E)

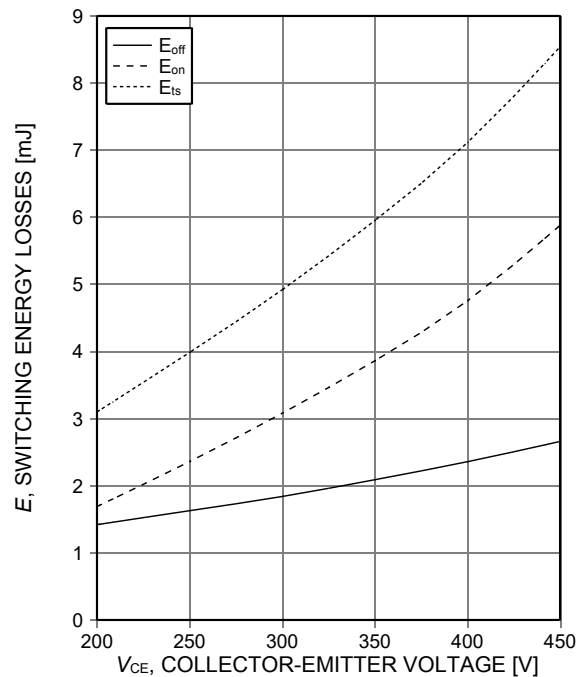


Figure 16. Typical switching energy losses as a function of collector-emitter voltage
(inductive load, $T_{vj}=175^{\circ}\text{C}$, $V_{GE}=15/0\text{V}$, $I_C=100\text{A}$, $r_G=3.5\Omega$, Dynamic test circuit in Figure E)

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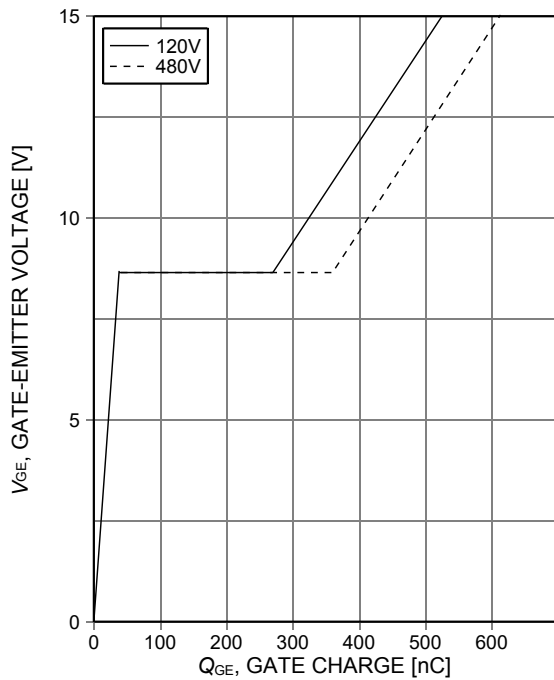


Figure 17. **Typical gate charge**
($I_c=100A$)

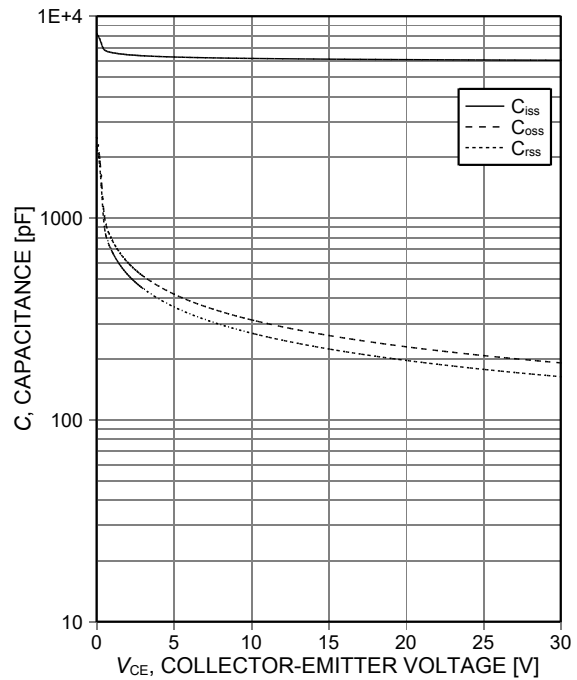


Figure 18. **Typical capacitance as a function of collector-emitter voltage**
($V_{GE}=0V$, $f=1MHz$)

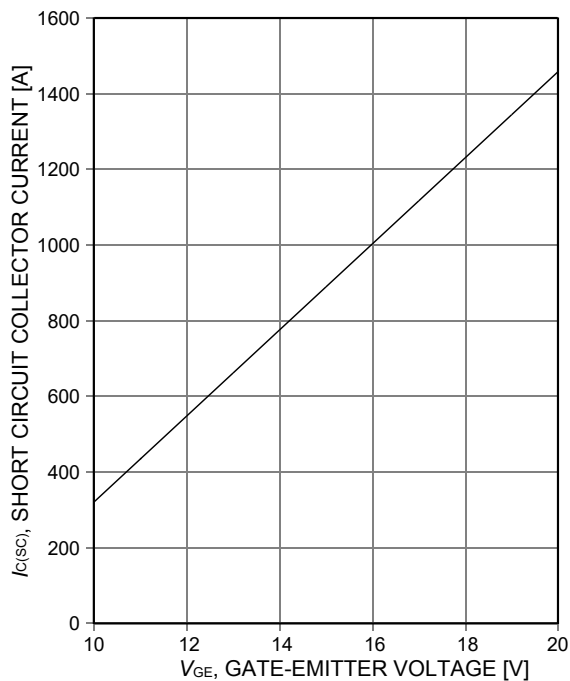


Figure 19. **Typical short circuit collector current as a function of gate-emitter voltage**
($V_{CE} \leq 400V$, $T_{vj} \leq 150^\circ C$)

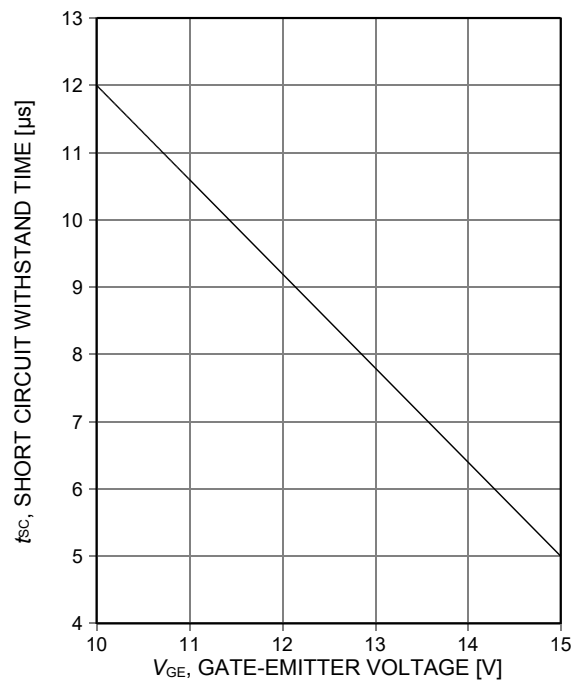


Figure 20. **Short circuit withstand time as a function of gate-emitter voltage**
($V_{CE} \leq 400V$, start at $T_{vj} \leq 150^\circ C$)