

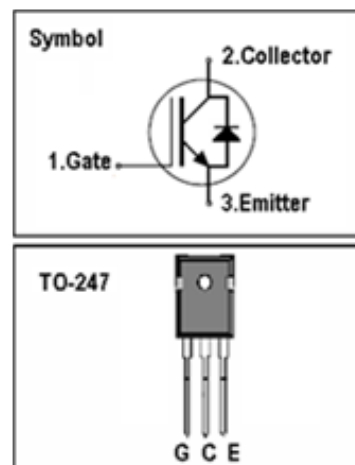
IGBT

Features

- 1200V,50A
- $V_{CE(sat)}(typ.)=1.55V@V_{GE}=15V, I_C=50A$
- Positive temperature coefficient
- Fast Switching
- Reliable and Rugged
- Halogen Free and Green Devices Available

General Description

JIAEN Trench IGBTs offer lower losses and higher energy efficiency for application such as UPS, Motor drives, PFC, Portable power station and other soft switching applications.



Absolute Maximum Ratings

Symbol	Parameter	Value	Units
V_{CES}	Collector-Emitter Voltage	1200	V
V_{GES}	Gate-Emitter Voltage	± 30	V
I_C	Continuous Collector Current ($T_C=25^\circ C$)	100	A
	Continuous Collector Current ($T_C=100^\circ C$)	50	A
I_{CM}	Pulsed Collector Current (Note 1)	200	A
I_F	Diode Continuous Forward Current ($T_C=100^\circ C$)	50	A
I_{FM}	Diode Maximum Forward Current (Note 1)	100	A
t_{sc}	Short Circuit Withstand Time	8	us
P_D	Maximum Power Dissipation ($T_C=25^\circ C$)	833	W
T_J	Operating Junction Temperature Range	-55 to +175	$^\circ C$

Thermal Characteristics

Symbol	Parameter	Max.	Units
$R_{th\ j-c}$	Thermal Resistance, Junction to case for IGBT	0.18	$^\circ C/W$
$R_{th\ j-c}$	Thermal Resistance, Junction to case for Diode	0.37	$^\circ C/W$
$R_{th\ j-a}$	Thermal Resistance, Junction to Ambient	40	$^\circ C/W$

Electrical Characteristics ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{CES}	Collector-Emitter Breakdown Voltage	$V_{GE}=0V, I_C=1mA$	1200	-	-	V
I_{CES}	Collector-Emitter Leakage Current	$V_{CE}=1200V, V_{GE}=0V$	-	-	10	μA
I_{GES}	Gate Leakage Current, Forward	$V_{GE}=\pm 20V, V_{CE}=0V$	-	-	± 200	nA
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE}=V_{CE}, I_C=250\mu A$	4.93	-	6.93	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$V_{GE}=15V, I_C=50A$	-	1.55	-	V
Q_g	Total Gate Charge	$V_{CC}=960V$ $V_{GE}=15V$ $I_C=50A$	-	291	-	nC
Q_{ge}	Gate-Emitter Charge		-	81	-	nC
Q_{gc}	Gate-Collector Charge		-	110	-	nC
$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=600V$ $V_{GE}=15V$ $I_C=50A$ $R_G=5\Omega$ Inductive Load $T_C=25^{\circ}\text{C}$	-	44	-	ns
t_r	Turn-on Rise Time		-	95	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	190	-	ns
t_f	Turn-off Fall Time		-	264	-	ns
E_{on}	Turn-on Switching Loss		-	2.57	-	mJ
E_{off}	Turn-off Switching Loss		-	3.73	-	mJ
E_{ts}	Total Switching Loss		-	6.31	-	mJ
C_{ies}	Input Capacitance	$V_{CE}=25V$	-	8408	-	pF
C_{oes}	Output Capacitance	$V_{GE}=0V$	-	197	-	pF
C_{res}	Reverse Transfer Capacitance	$f=1MHz$	-	55	-	pF

Electrical Characteristics of Diode ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_F	Diode Forward Voltage	$I_F=50A$	-	2.0	3.5	V
t_{rr}	Diode Reverse Recovery Time	$V_{CE}=600V$ $I_F=50A$ $di_F/dt=200A/\mu s$	-	94	-	ns
I_{rr}	Diode peak Reverse Recovery Current		-	9.7	-	A
Q_{rr}	Diode Reverse Recovery Charge		-	225	-	nC

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature

Typical Performance Characteristics

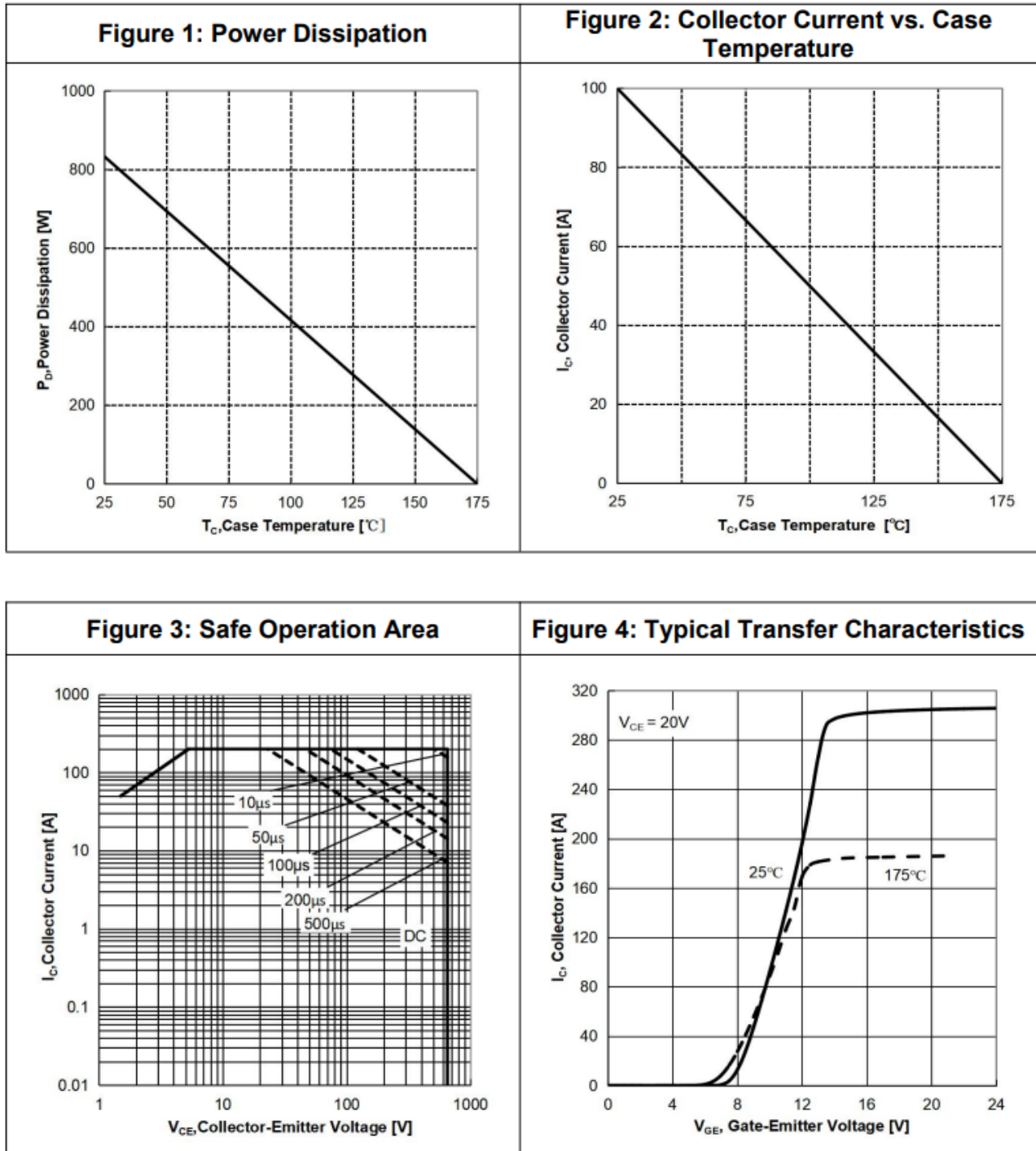


Figure 5: Typical Output Characteristics

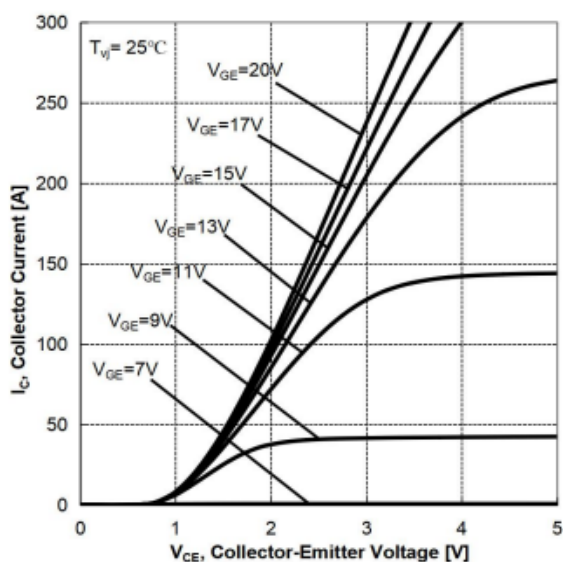


Figure 6: Typical Output Characteristics

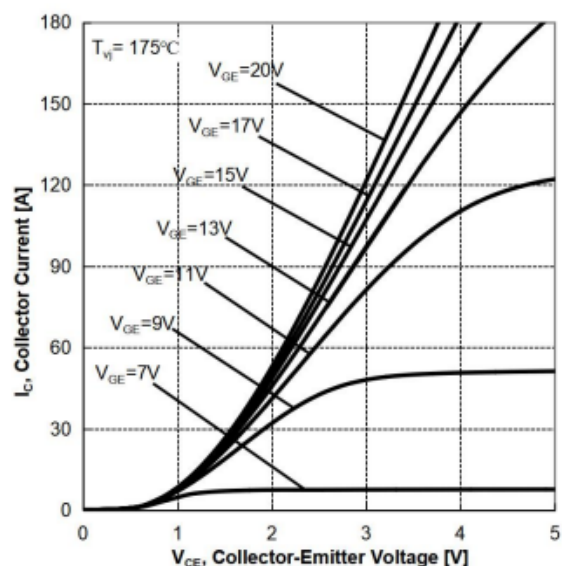


Figure 7: Typical Collector-Emitter Saturation Voltage vs. Junction Temperature

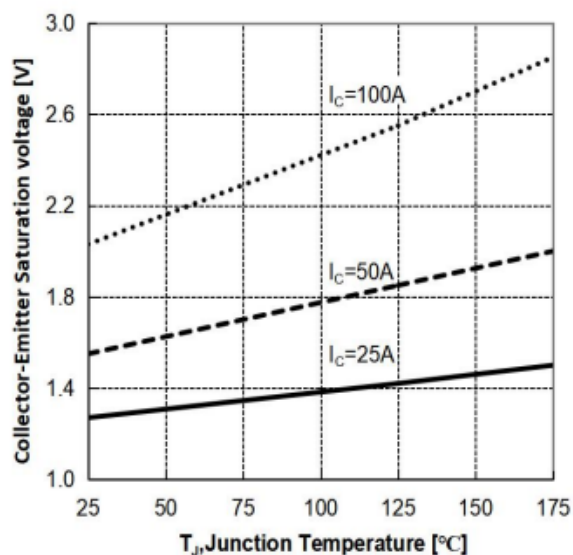


Figure 8: Typical Gate-Emitter Threshold Voltage vs. Junction Temperature

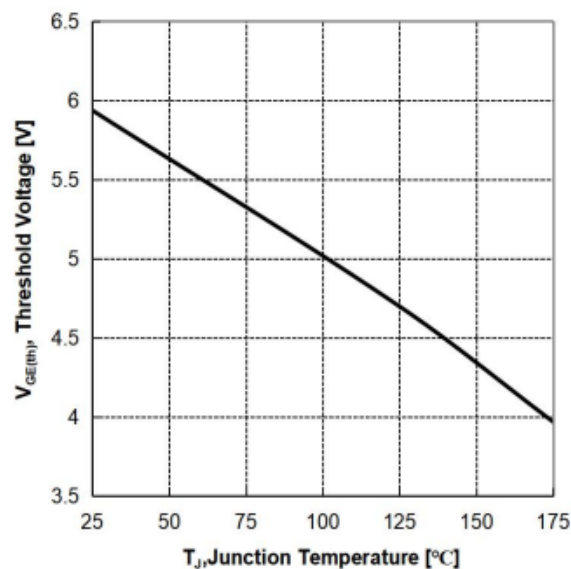


Figure 9: Typical Switching Times vs. Gate Resistor ($T_J=25^{\circ}\text{C}$, $V_{CE}=600\text{V}$, $V_{GE}=15\text{V}$, $I_C=50\text{A}$)

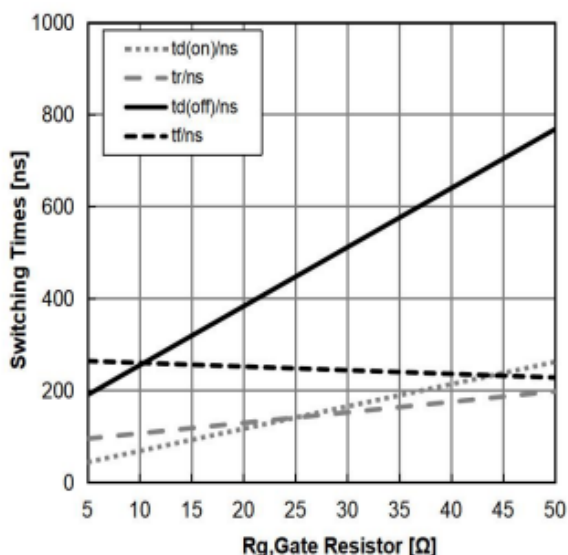


Figure 10: Typical Switching Energy vs. Gate Resistor ($T_J=25^{\circ}\text{C}$, $V_{CE}=600\text{V}$, $V_{GE}=15\text{V}$, $I_C=50\text{A}$)

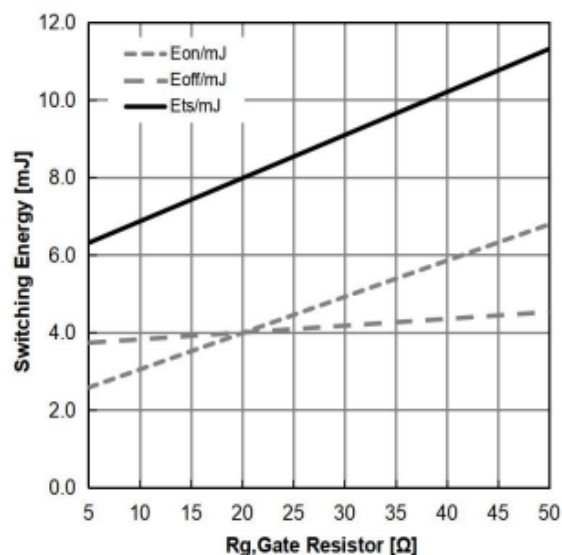


Figure 11: Typical Switching Times vs. Junction Temperature ($V_{CE}=600\text{V}$, $V_{GE}=15\text{V}$, $I_C=50\text{A}$, $R_g=5\Omega$)

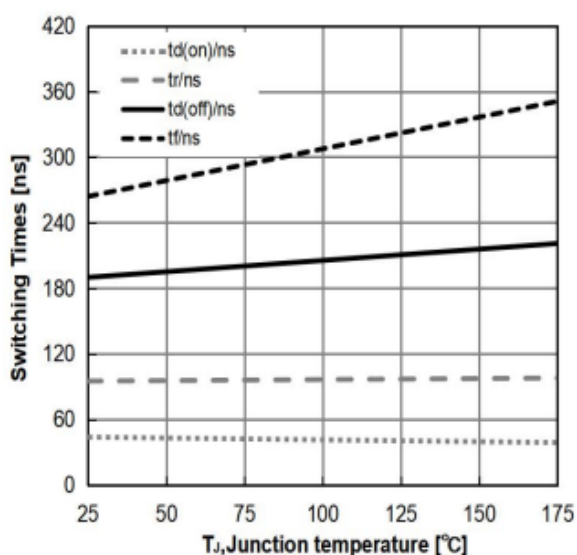


Figure 12: Typical Switching Energy vs. Junction Temperature ($V_{CE}=600\text{V}$, $V_{GE}=15\text{V}$, $I_C=50\text{A}$, $R_g=5\Omega$)

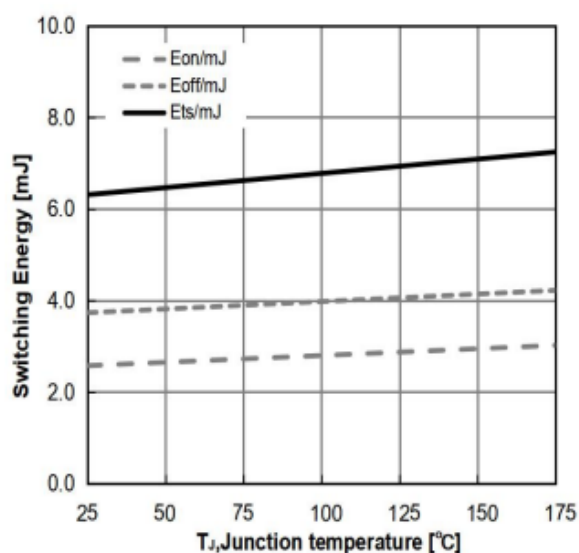


Figure 13: Typical Switching Times vs. Collector Current ($T_J=25^\circ\text{C}$, $V_{CE}=600\text{V}$, $V_{GE}=15\text{V}$, $R_g=5\Omega$)

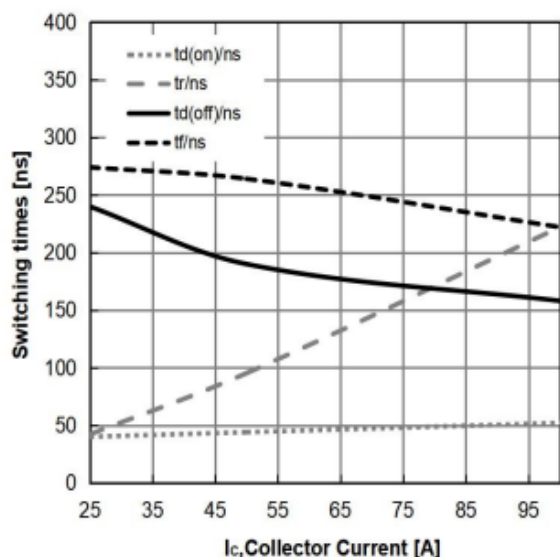


Figure 14: Typical Switching Energy vs. Collector Current ($T_J=25^\circ\text{C}$, $V_{CE}=600\text{V}$, $V_{GE}=15\text{V}$, $R_g=5\Omega$)

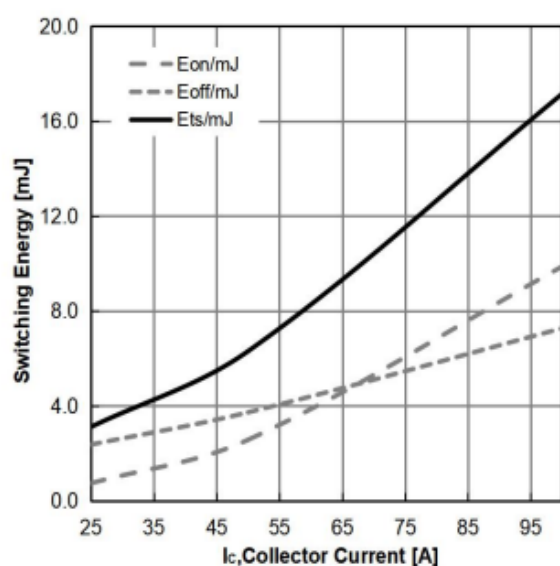


Figure 15: Typical Switching Energy vs. VCE ($T_J=25^\circ\text{C}$, $V_{GE}=15\text{V}$, $I_c=50\text{A}$, $R_g=5\Omega$)

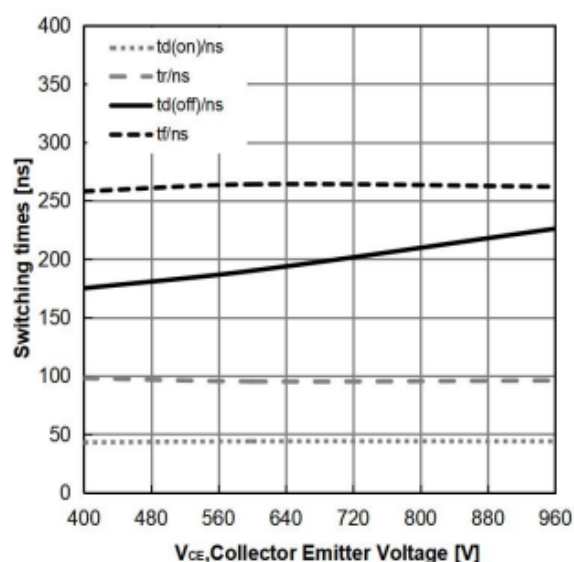


Figure 16: Typical Switching Energy vs. VCE ($T_J=25^\circ\text{C}$, $V_{GE}=15\text{V}$, $I_c=50\text{A}$, $R_g=5\Omega$)

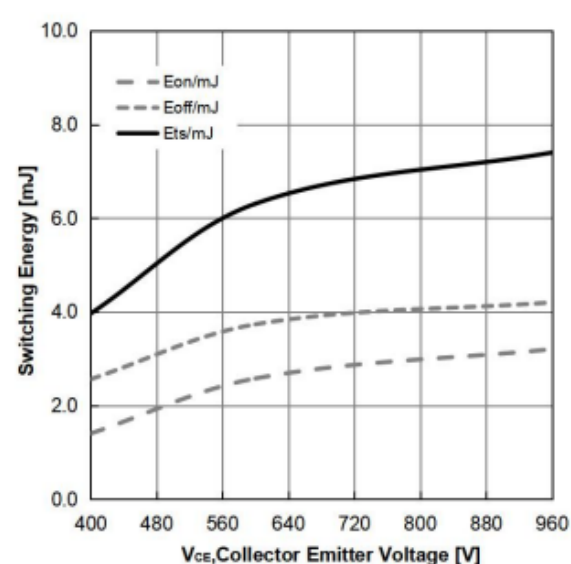


Figure 17: Typical Capacitance vs. Collector- Emitter Voltage

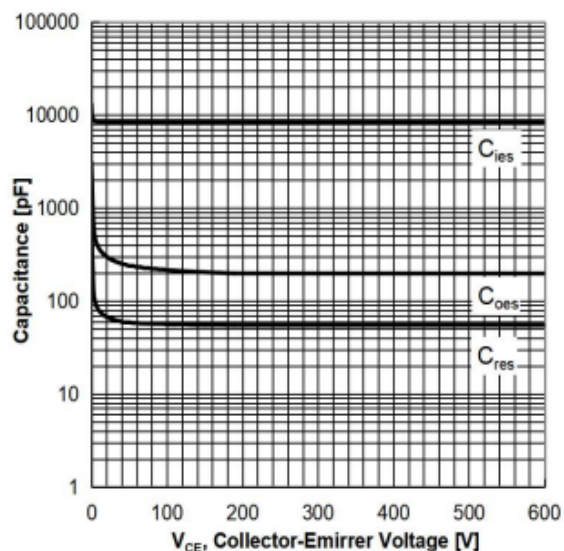


Figure 18: Typical Gate Charge

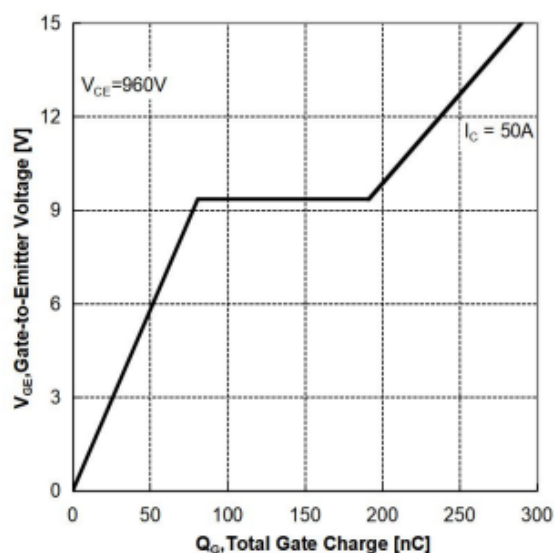


Figure 19: IGBT Transient Thermal Impedance vs. Pulse Width

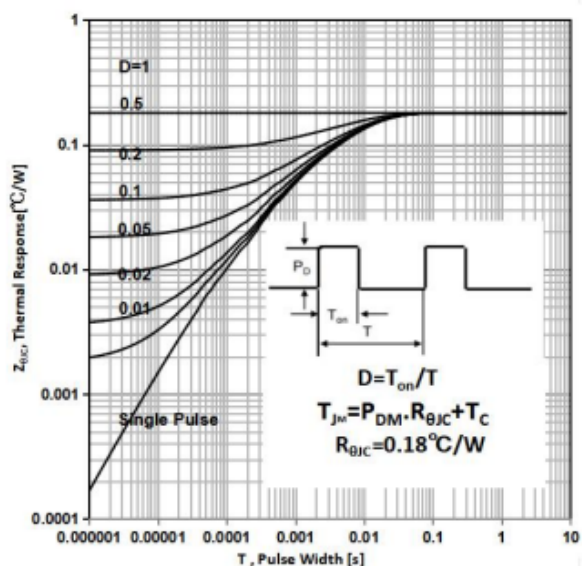


Figure 20: Diode Transient Thermal Impedance vs. Pulse Width

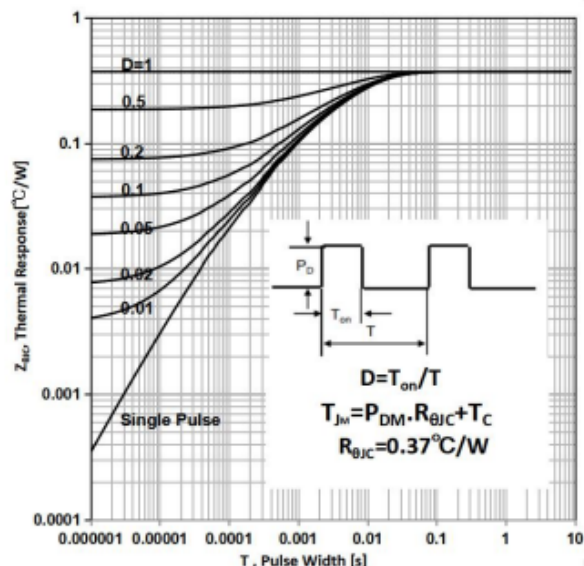
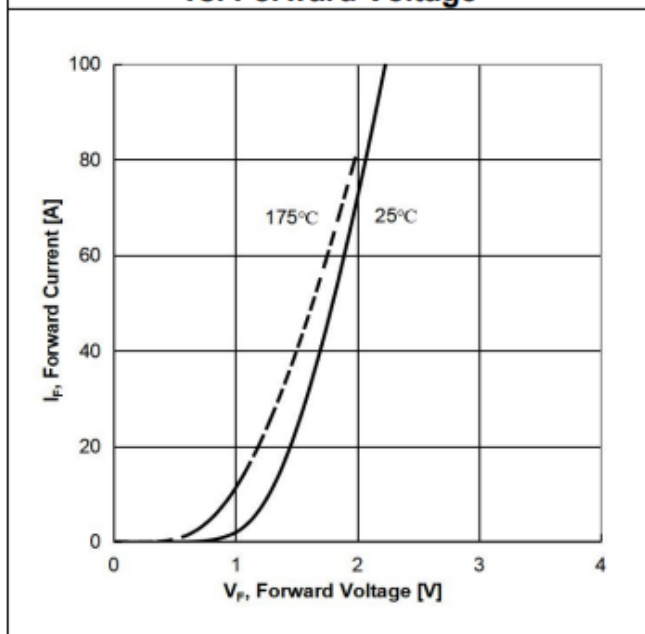
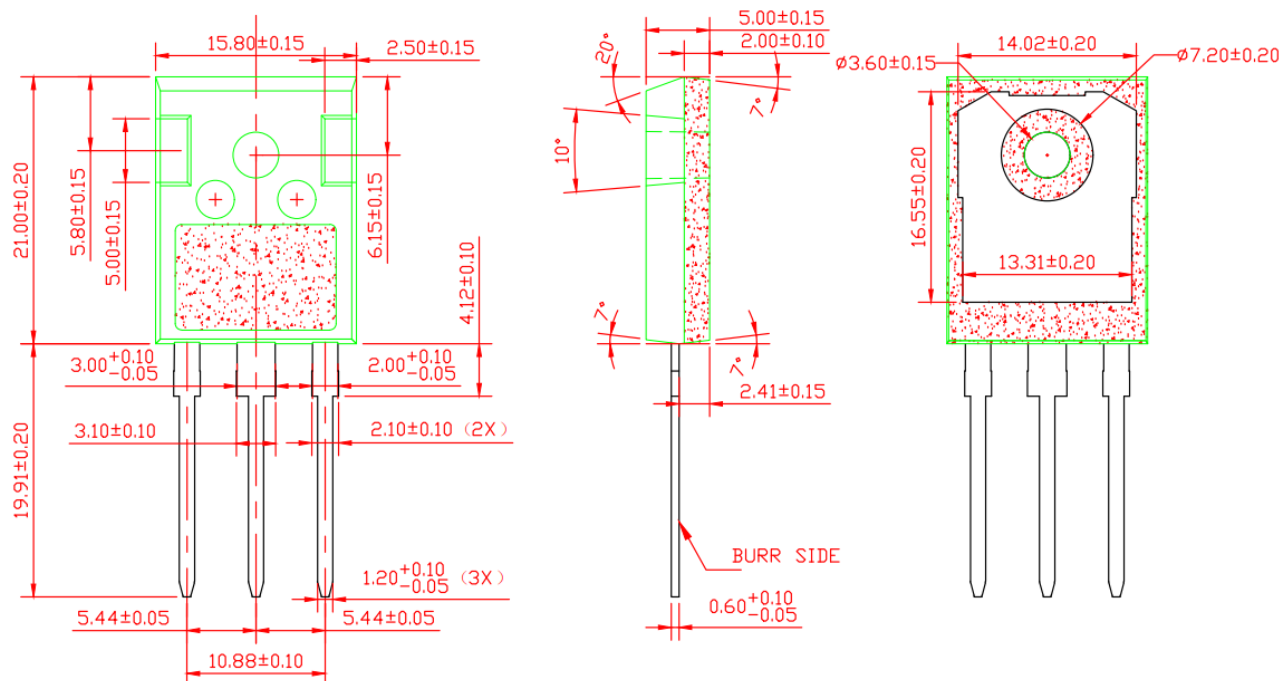


Figure 21: Typical Diode Forward Current vs. Forward Voltage



TO-247 PACKAGE OUTLINE



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