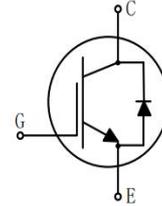


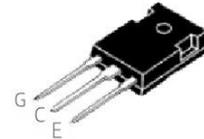
### MAIN CHARACTERISTICS

$I_C$ @TC=100°C	20A
$V_{CE}$	650V
$V_{CE(sat)}$ -typ	1.75V



### FEATURES

- Positive temperature coefficient
- Fast Switching
- Low  $V_{CE(sat)}$
- Reliable and Rugged



TO-247

### APPLICATIONS

- Motor drives
- Air Condition
- Inverters

### MECHANICAL DATA

- Case: Molded plastic
- Mounting Position: Any
- Molded Plastic: UL Flammability Classification Rating 94V-0
- Lead free in compliance with EU RoHS 2011/65/EU directive
- Solder bath temperature 275°C maximum, 10s per JESD 22-B106

### Product specification classification

Part Number	Package	Mode Name	Pack
LGT20N65HB	TO-247	LGT20N65HB	Tube

### Maximum Ratings

Characteristics	Symbol	Value	Unit
		247	
Collector-emitter voltage	$V_{CES}$	650	V
Gate-emitter voltage	$V_{GES}$	$\pm 30$	V
Continuous collector current (TC=25°C)	$I_C$	40	A
Continuous collector current (TC=100°C)		20	A
Pulsed collector current, tp limited by Tvjmax	$I_{CM}$	60	A
Diode continuous forward current (TC=25°C)	$I_F$	40	A
Diode continuous forward current (TC=100°C)		20	A
Diode maximum current, tp limited by Tvjmax	$I_{FM}$	60	A
Short circuit withstand time	tsc	10	$\mu s$
Power dissipation (TC=25°C)	$P_{tot}$	176	W
Operating junction temperature range	$T_{vj}$	-55 to +175	°C
Storage temperature range	$T_{stg}$	-55 to +175	°C

### Thermal characteristics

Characteristics	Symbol	Values		Unit
		Typ	Max.	
Thermal resistance, junction to case for IGBT	$R_{th(j-c)}$	-	0.85	°C/W
Thermal resistance, junction to case for Diode	$R_{th(j-c)}$	-	0.98	°C/W
Thermal resistance, junction to ambient	$R_{th(j-a)}$	-	40	°C/W

Note1:Pulse test: 300  $\mu s$  pulse width, 2 % duty cycle

### Electrical characteristics of IGBT at $T_{vj}=25^\circ C$ unless otherwise specified

#### Static characteristics

Characteristics	Test Condition	Symbol	Min	Typ	Max	Unit
Collector-emitter breakdown voltage	$V_{GE}=0V, I_C=250\mu A$	$BV_{CES}$	650	-	-	V
Collector-emitter leakage current	$V_{CE}=650V, V_{GE}=0V$	$I_{CES}$	-	-	10	$\mu A$
Gate leakage current, forward	$V_{GE}=\pm 20V, V_{CE}=0V$	$I_{GES}$	-	-	$\pm 200$	nA
Gate-emitter threshold voltage	$V_{GE}=V_{CE}, I_C=1mA$	$V_{GE(th)}$	4.3	5.3	6.3	V
Collector-emitter saturation voltage	$V_{GE}=15V, I_C=20A$	$V_{CE(sat)}$	-	1.75	2.05	V
	$V_{GE}=15V, I_C=20A, T_{vj}=175^\circ C$		-	1.98	-	V

#### Dynamic characteristics

Characteristics	Test Condition	Symbol	Min	Typ	Max	Unit
Input capacitance	$V_{CE}=25V$ $V_{GE}=0V$ $f=1MHz$	$C_{ies}$	-	780	-	pF
Output capacitance		$C_{oes}$	-	46	-	pF
Reverse transfer capacitance		$C_{res}$	-	22	-	pF
Total gate charge	$V_{CC}=520V, V_{GE}=15V, I_C=20A$	$Q_g$	-	45	-	nC
Gate-emitter charge		$Q_{ge}$	-	9	-	nC
Gate-collector charge		$Q_{gc}$	-	22	-	nC

### Electrical characteristics of IGBT at $T_{vj}=25^{\circ}\text{C}$ unless otherwise specified

#### Switching characteristics

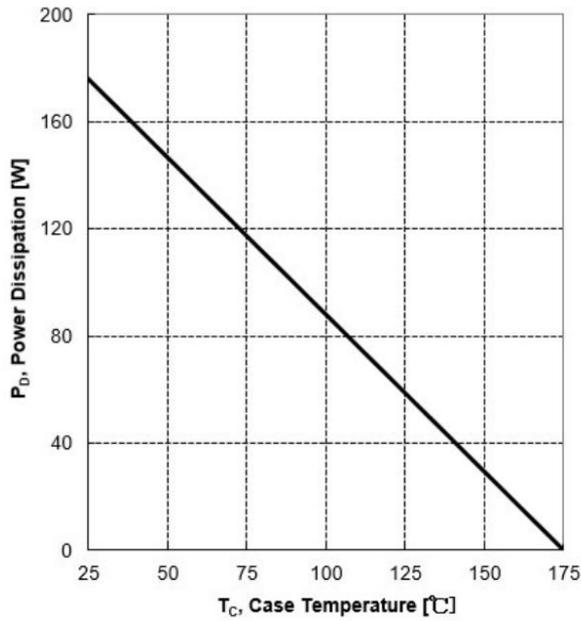
Characteristics	Test Condition	Symbol	Min	Typ	Max	Unit
Turn-on delay time	$V_{CC}=400\text{V}$ $V_{GE}=15\text{V}$ $I_C=20\text{A}$ $R_G=5\Omega$ Inductive load	td(on)	-	12	-	ns
Rise time		tr	-	24	-	ns
Turn-off delay time		td(off)	-	40	-	ns
Fall time		tf	-	68	-	ns
Turn-on energy		Eon	-	0.26	-	mJ
Turn-off energy		Eoff	-	0.39	-	mJ
Total switching energy		Ets	-	0.65	-	mJ
Turn-on delay time	$V_{CC}=400\text{V}$ $V_{GE}=15\text{V}$ $I_C=20\text{A}$ $R_G=5\Omega$ Inductive load $T_{vj}=175^{\circ}\text{C}$	td(on)	-	14	-	ns
Rise time		tr	-	32	-	ns
Turn-off delay time		td(off)	-	81	-	ns
Fall time		tf	-	60	-	ns
Turn-on energy		Eon	-	0.4	-	mJ
Turn-off energy		Eoff	-	0.57	-	mJ
Total switching energy		Ets	-	0.97	-	mJ

### Electrical characteristics of Diode at $T_{vj}=25^{\circ}\text{C}$ unless otherwise specified

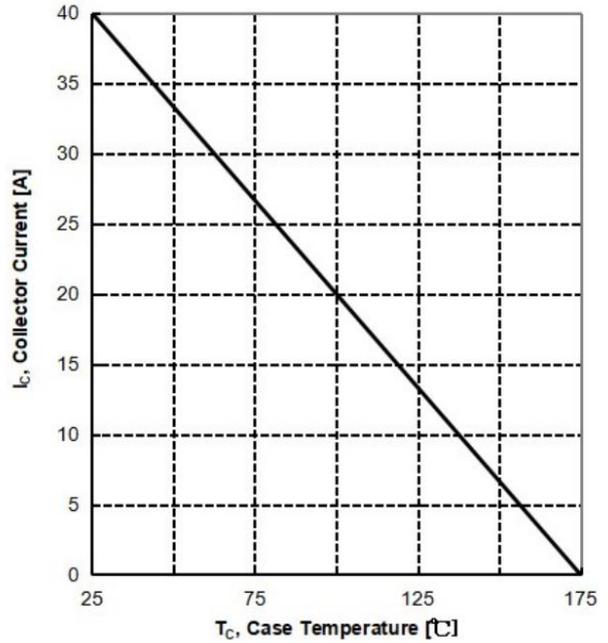
Characteristics	Test Condition	Symbol	Min	Typ	Max	Unit
Diode forward voltage	$I_F=20\text{A}$	VF	-	1.46	1.76	V
	$I_F=20\text{A}, T_{vj}=175^{\circ}\text{C}$		-	1.3	-	V
Diode reverse recovery time	$V_R=400\text{V}$	trr	-	47	-	ns
Diode peak reverse recovery current	$I_F=20\text{A}$	Irrm	-	4.8	-	A
Diode reverse recovery charge	$diF/dt=-200\text{A}/\mu\text{s}$	Qrr	-	67	-	nC
Diode reverse recovery time	$V_R=400\text{V}$	trr	-	62	-	ns
Diode peak reverse recovery current	$I_F=20\text{A}$	Irrm	-	6.3	-	A
Diode reverse recovery charge	$diF/dt=-200\text{A}/\mu\text{s}$ $T_{vj}=175^{\circ}\text{C}$	Qrr	-	102	-	nC

### RATINGS AND CHARACTERISTIC CURVES

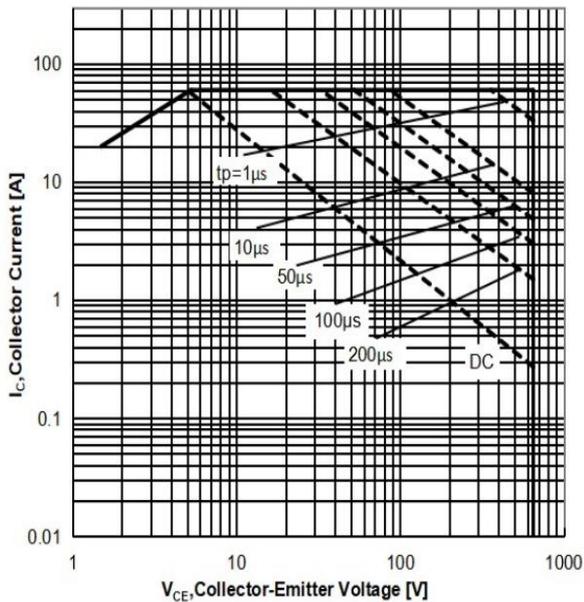
**Figure 1: Power Dissipation**



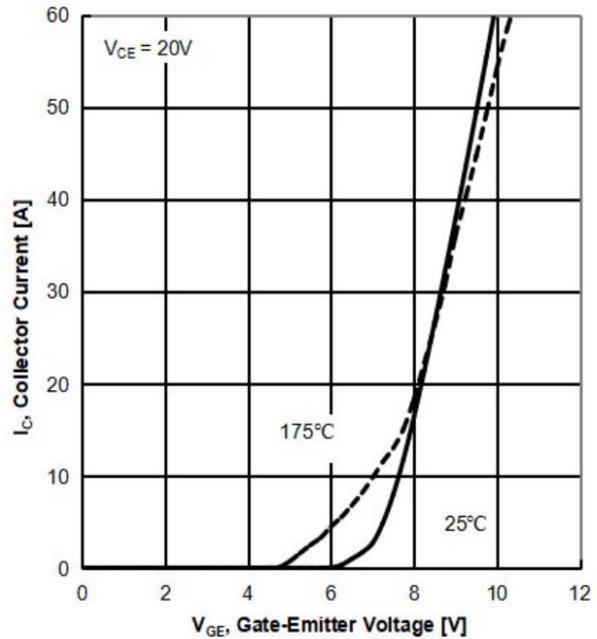
**Figure 2: Collector Current vs. Case Temperature**



**Figure 3: Safe Operation Area**

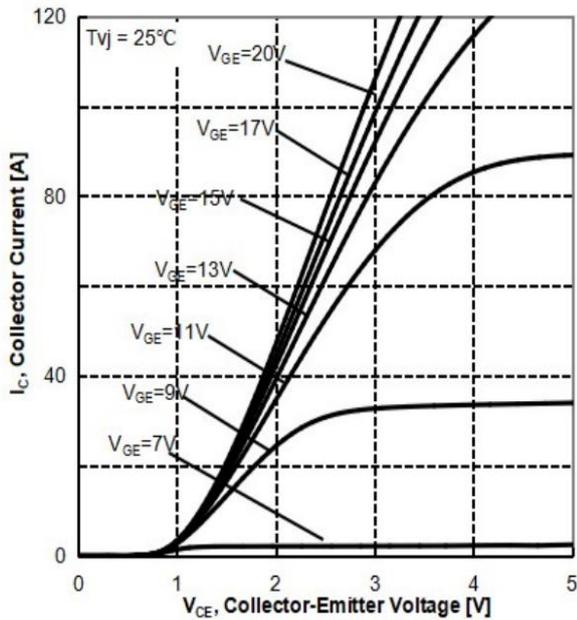


**Figure 4: Typical Transfer Characteristics**

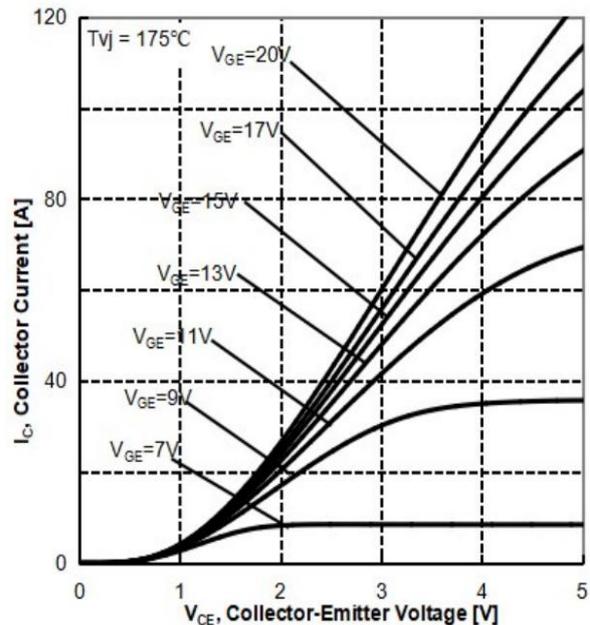


### RATINGS AND CHARACTERISTIC CURVES

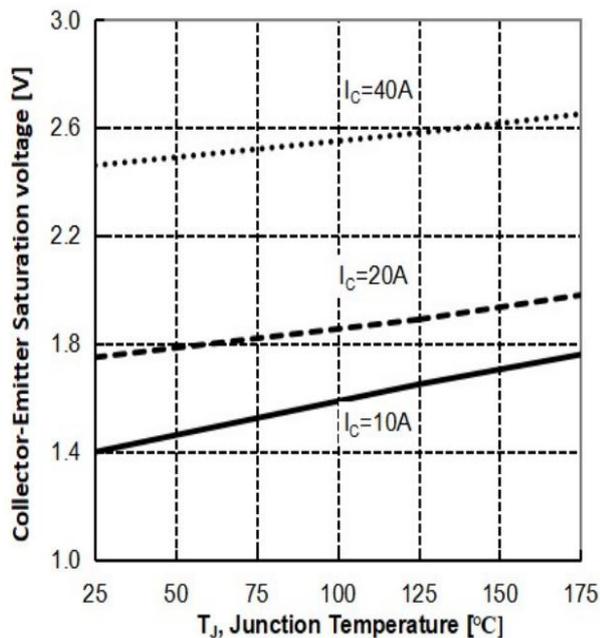
**Figure 5: Typical Output Characteristics**



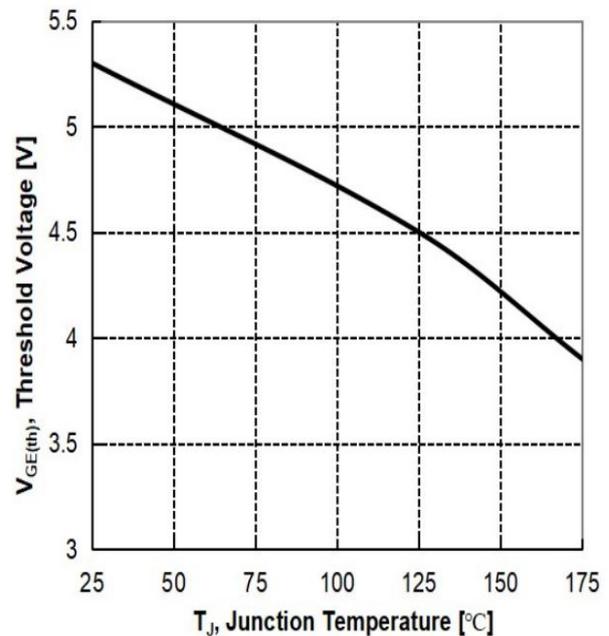
**Figure 6: Typical Output Characteristics**



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

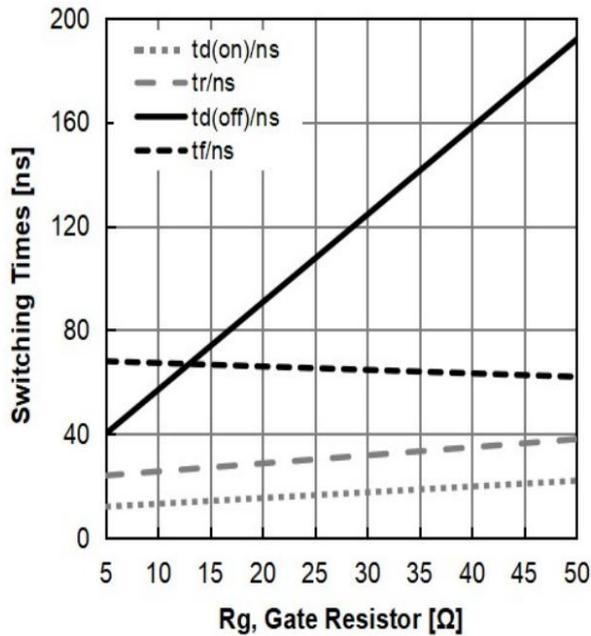


**Figure 8: Typical Gate-Emitter Threshold Voltage vs. Junction Temperature**

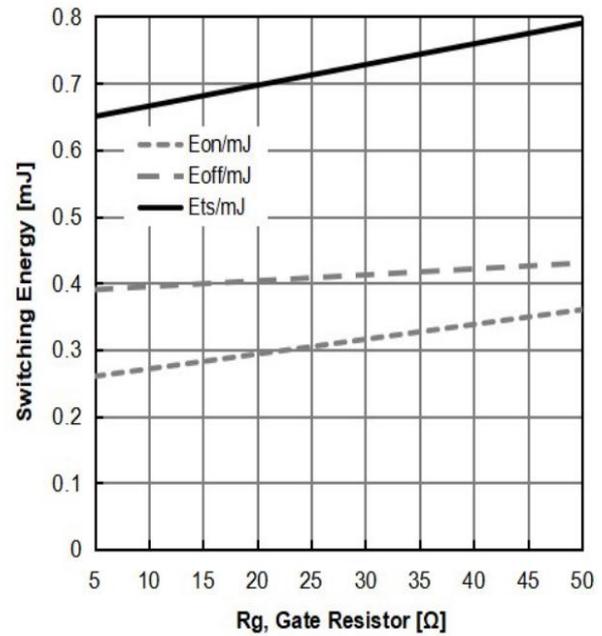


### RATINGS AND CHARACTERISTIC CURVES

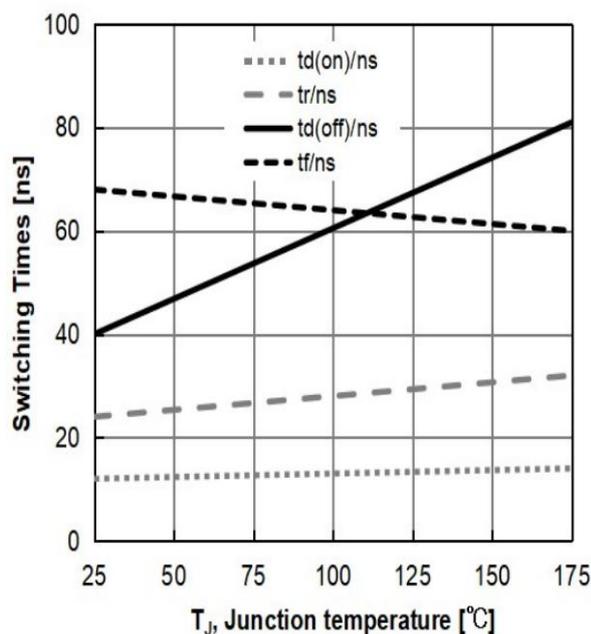
**Figure 9: Typical Switching Times vs. Gate Resistor ( $T_J=25^\circ\text{C}$ ,  $V_{CE}=400\text{V}$ ,  $V_{GE}=15\text{V}$ ,  $I_C=20\text{A}$ )**



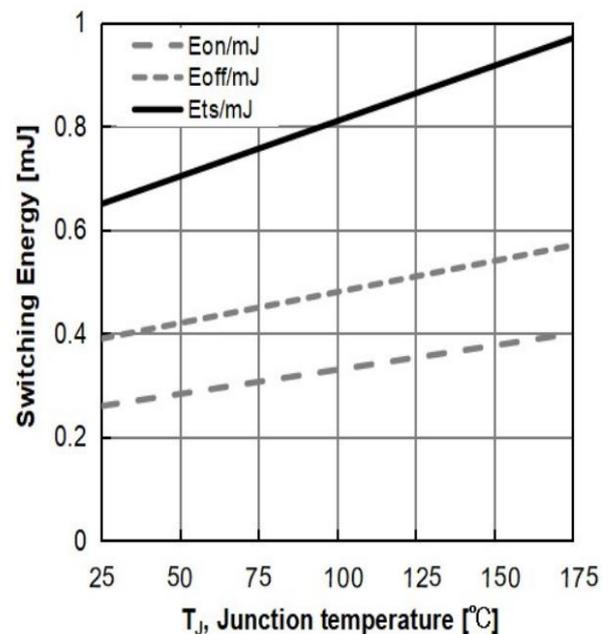
**Figure 10: Typical Switching Energy vs. Gate Resistor ( $T_J=25^\circ\text{C}$ ,  $V_{CE}=400\text{V}$ ,  $V_{GE}=15\text{V}$ ,  $I_C=20\text{A}$ )**



**Figure 11: Typical Switching Times vs. Junction Temperature ( $V_{CE}=400\text{V}$ ,  $V_{GE}=15\text{V}$ ,  $I_C=20\text{A}$ ,  $R_g=5\Omega$ )**

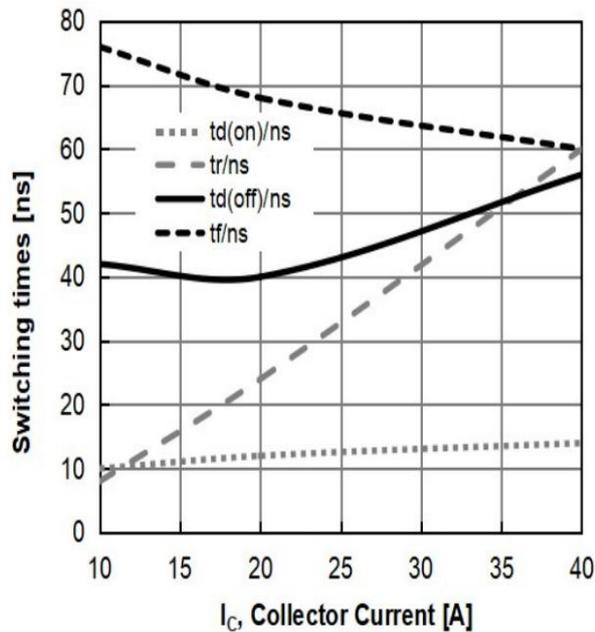


**Figure 12: Typical Switching Energy vs. Junction Temperature ( $V_{CE}=400\text{V}$ ,  $V_{GE}=15\text{V}$ ,  $I_C=20\text{A}$ ,  $R_g=5\Omega$ )**

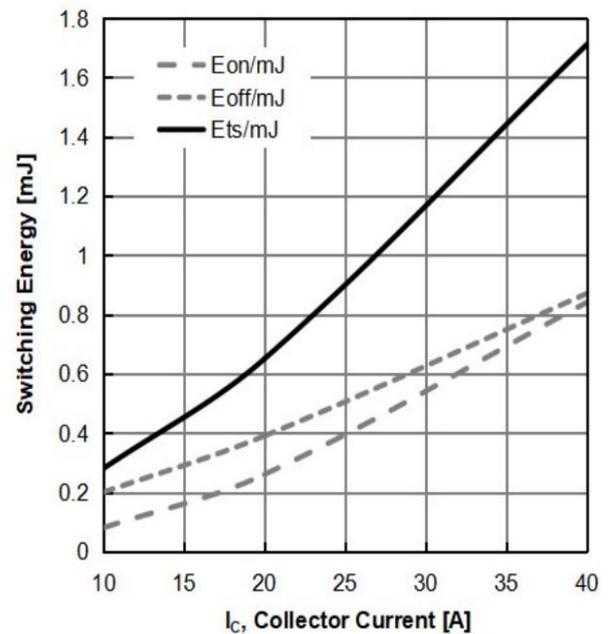


### RATINGS AND CHARACTERISTIC CURVES

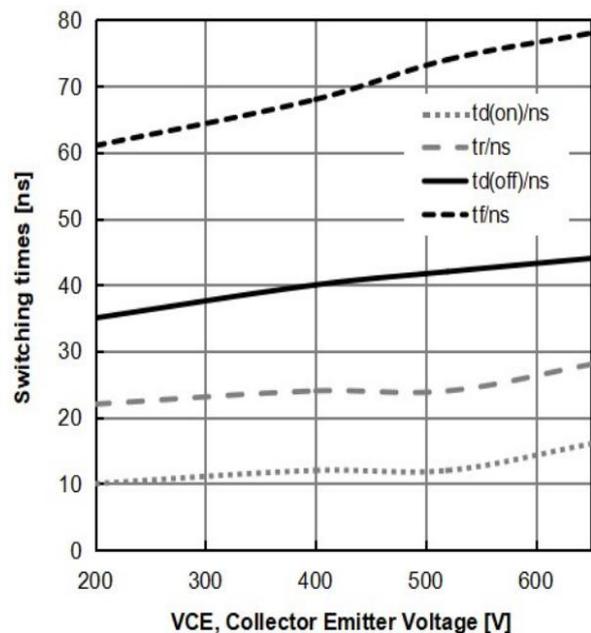
**Figure 13: Typical Switching Times vs. Collector Current ( $T_J=25^\circ\text{C}$ ,  $V_{CE}=400\text{V}$ ,  $V_{GE}=15\text{V}$ ,  $R_g=5\Omega$ )**



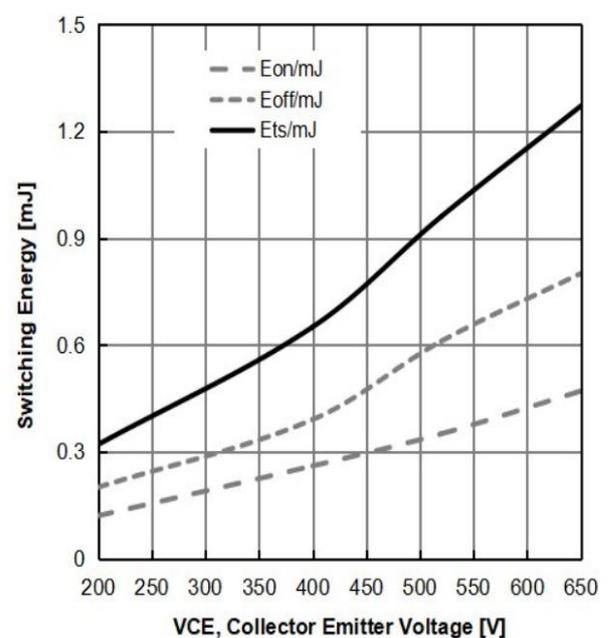
**Figure 14: Typical Switching Energy vs. Collector Current ( $T_J=25^\circ\text{C}$ ,  $V_{CE}=400\text{V}$ ,  $V_{GE}=15\text{V}$ ,  $R_g=5\Omega$ )**



**Figure 15: Typical Switching Times vs. VCE ( $T_J=25^\circ\text{C}$ ,  $V_{GE}=15\text{V}$ ,  $I_C=20\text{A}$ ,  $R_g=5\Omega$ )**

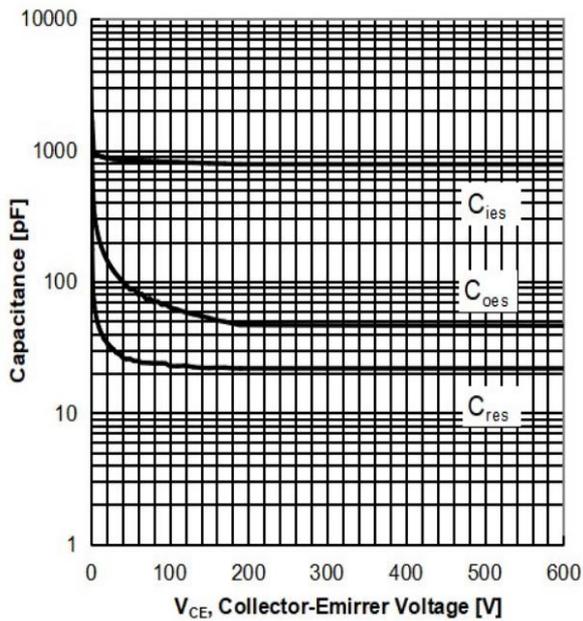


**Figure 16: Typical Switching Energy vs. VCE ( $T_J=25^\circ\text{C}$ ,  $V_{GE}=15\text{V}$ ,  $I_C=20\text{A}$ ,  $R_g=5\Omega$ )**

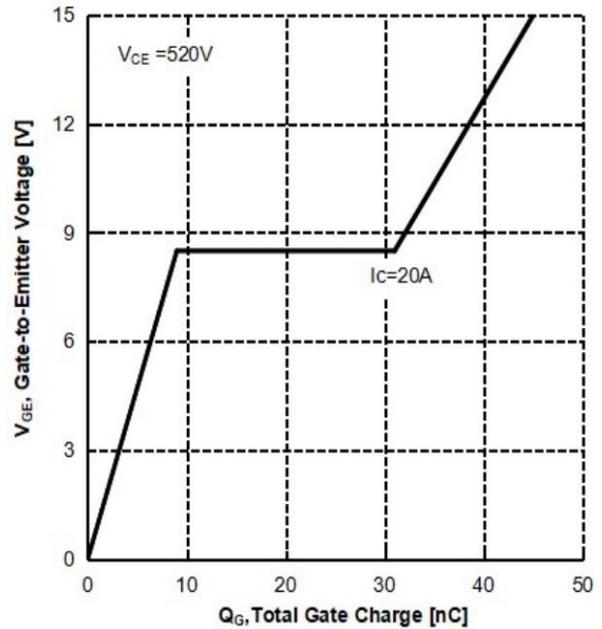


### RATINGS AND CHARACTERISTIC CURVES

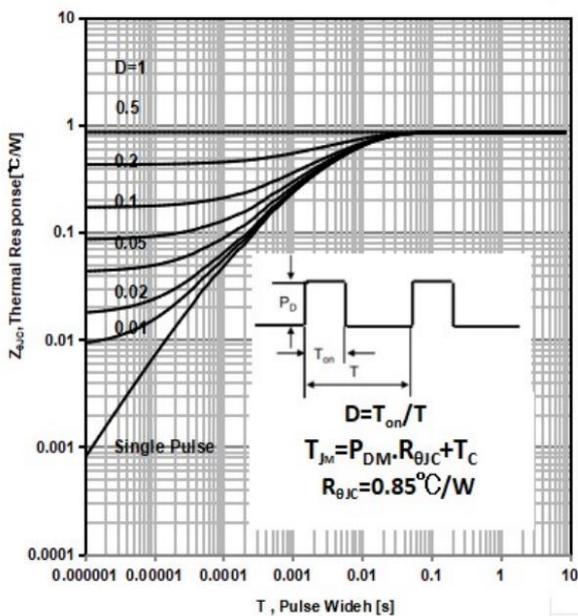
**Figure 17: Typical Capacitance vs. Collector- Emitter Voltage**



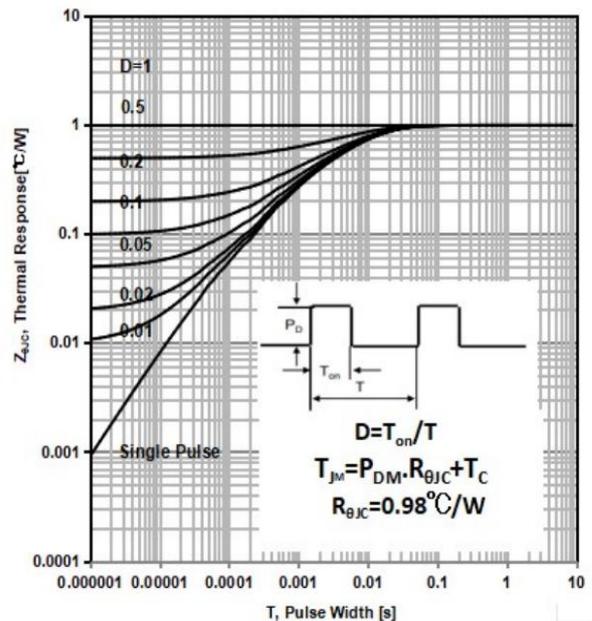
**Figure 18: Typical Gate Charge**



**Figure 19: IGBT Transient Thermal Impedance vs. Pulse Width**

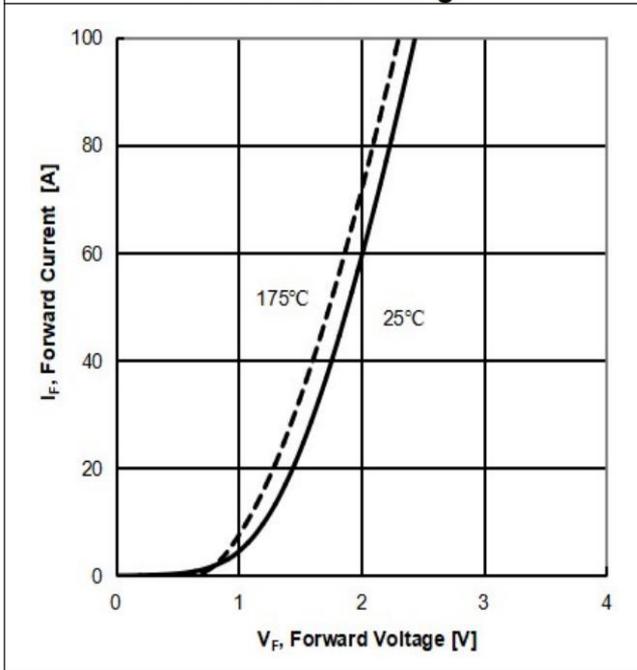


**Figure 20: Diode Transient Thermal Impedance vs. Pulse Width**



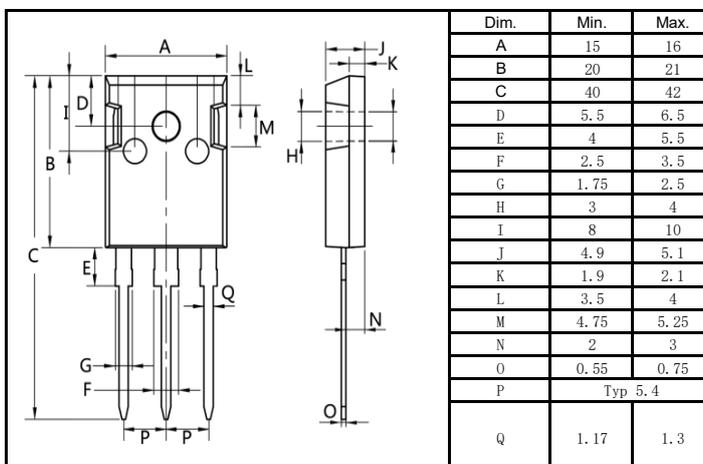
### RATINGS AND CHARACTERISTIC CURVES

**Figure 21: Typical Diode Forward Current vs. Forward Voltage**

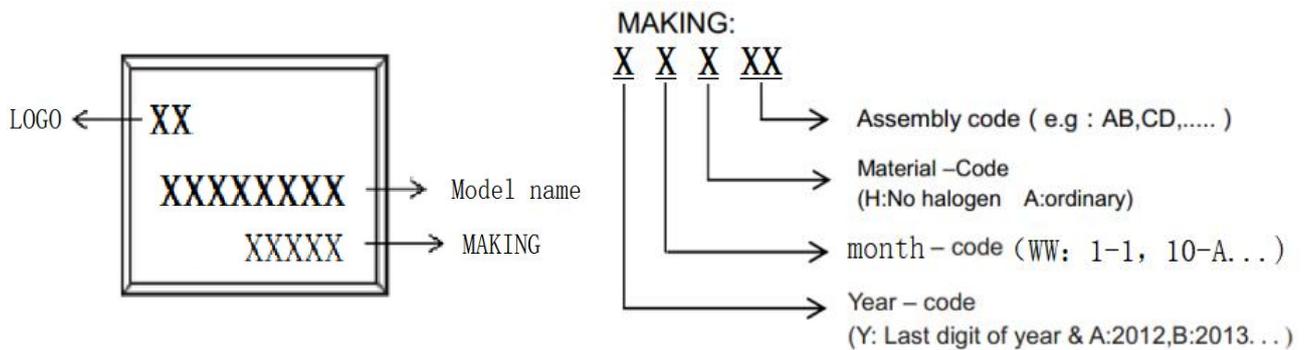


### Package Outline Dimensions millimeters

T0-247



### Marking on the body



### packing instruction

PKG	最小包装	内盒	外箱
TO-247			
	30PCS/管	600pcs/盒	3000pcs/箱

### Notice

All product, product specifications and data are subject to change without notice to improve. The right to explain is owned by LINGXUN electronics company.

Confirm that operation temperature is within the specified range described in the product specification. Avoid applying power exceeding normal rated power; exceeding the power rating under steady-state loading condition may negatively affect product performance and reliability.

LINGXUN electronics shall not be in any way responsible or liable for failure induced under deviant condition from what is defined in this document; power exceeding the power rating under steady-state loading condition may negatively affect product performance and reliability.