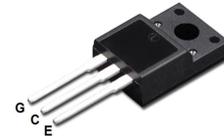
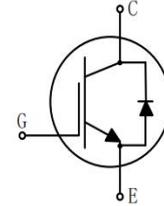


MAIN CHARACTERISTICS

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



TO-220F

FEATURES

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

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
LGT20N65HF	TO-220F	LGT20N65HF	Tube

Maximum Ratings

Characteristics	Symbol	Value	Unit
		220F	
Collector-emitter voltage	V_{CES}	650	V
Gate-emitter voltage	V_{GES}	± 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	μs
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 μs 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	μA
Gate leakage current, forward	$V_{GE}=\pm 20V, V_{CE}=0V$	I_{GES}	-	-	± 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

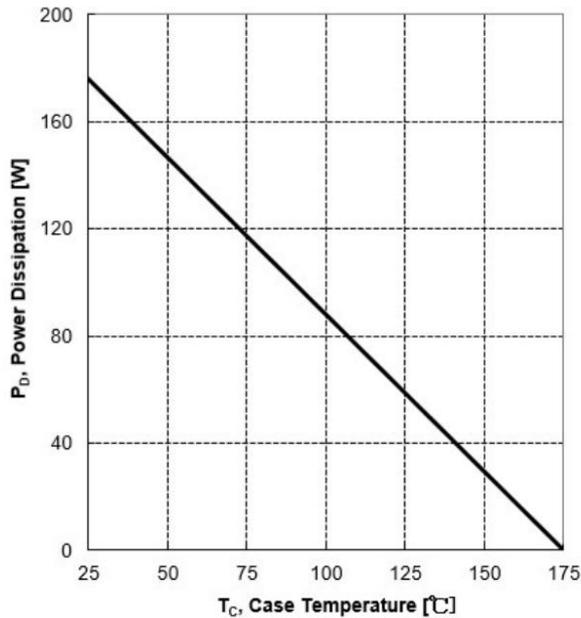


Figure 2: Collector Current vs. Case Temperature

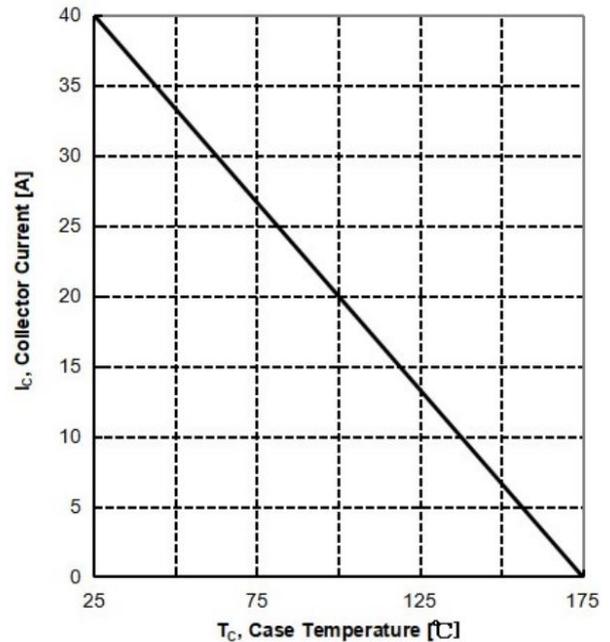


Figure 3: Safe Operation Area

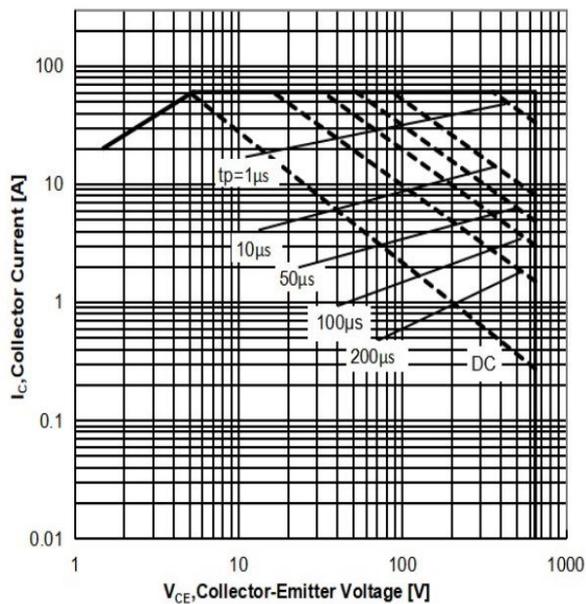
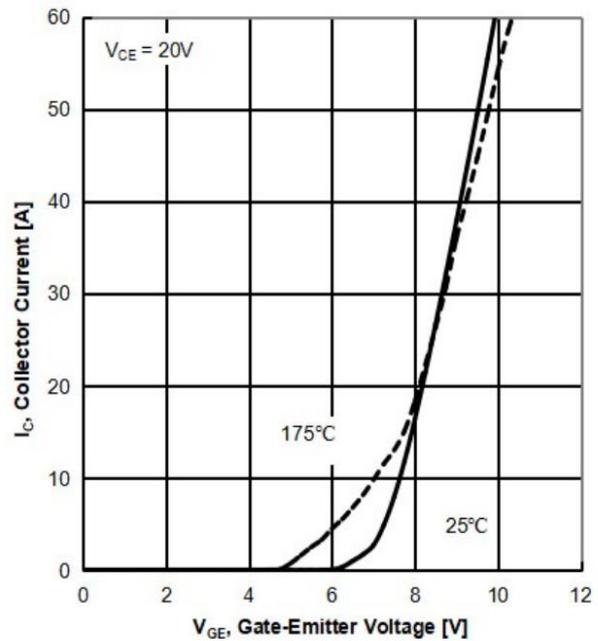


Figure 4: Typical Transfer Characteristics



RATINGS AND CHARACTERISTIC CURVES

Figure 5: Typical Output Characteristics

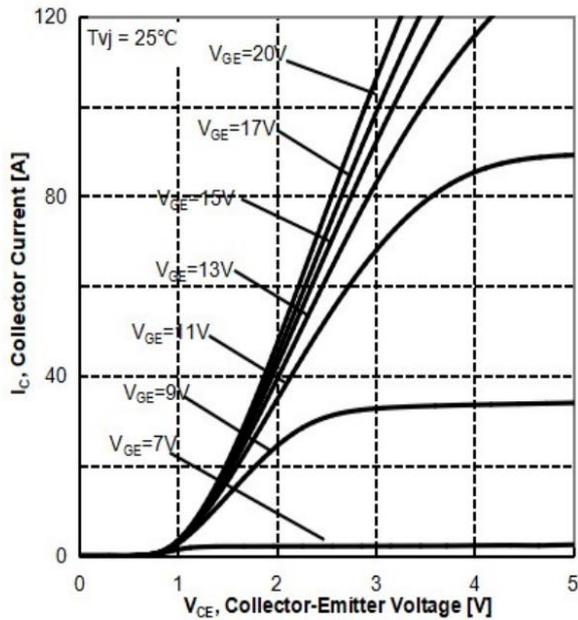


Figure 6: Typical Output Characteristics

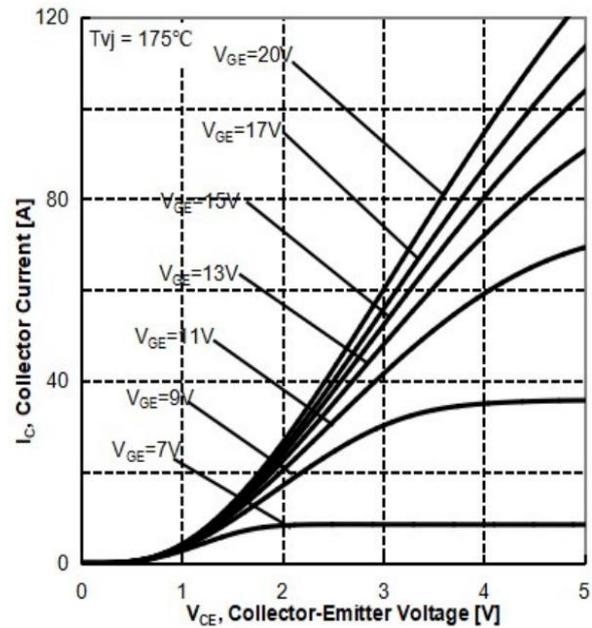


Figure 7: Typical Collector-Emitter Saturation Voltage vs. Junction Temperature

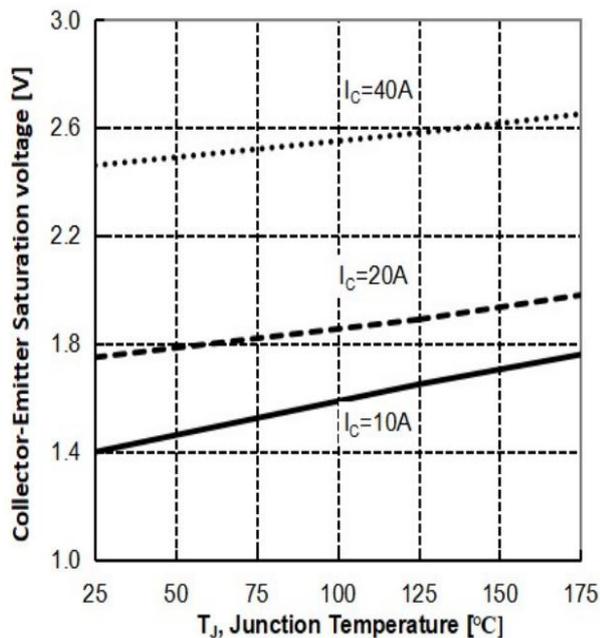
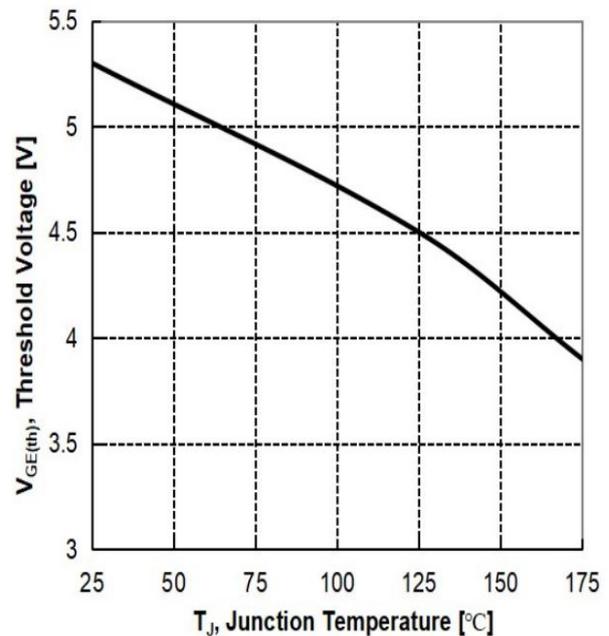


Figure 8: Typical Gate-Emitter Threshold Voltage vs. Junction Temperature



RATINGS AND CHARACTERISTIC CURVES

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

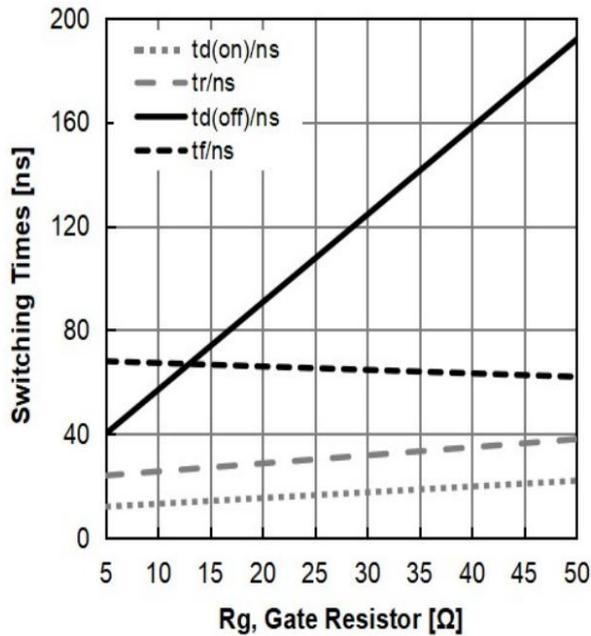


Figure 10: Typical Switching Energy vs. Gate Resistor ($T_J=25^\circ\text{C}$, $V_{CE}=400\text{V}$, $V_{GE}=15\text{V}$, $I_C=20\text{A}$)

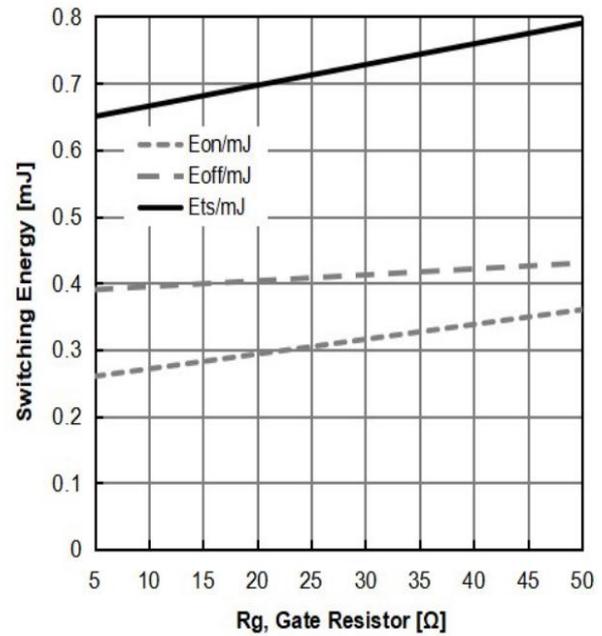


Figure 11: Typical Switching Times vs. Junction Temperature ($V_{CE}=400\text{V}$, $V_{GE}=15\text{V}$, $I_C=20\text{A}$, $R_g=5\Omega$)

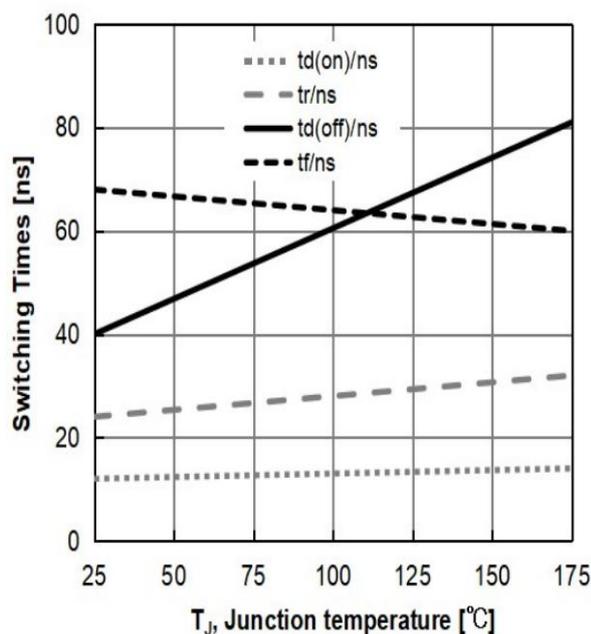
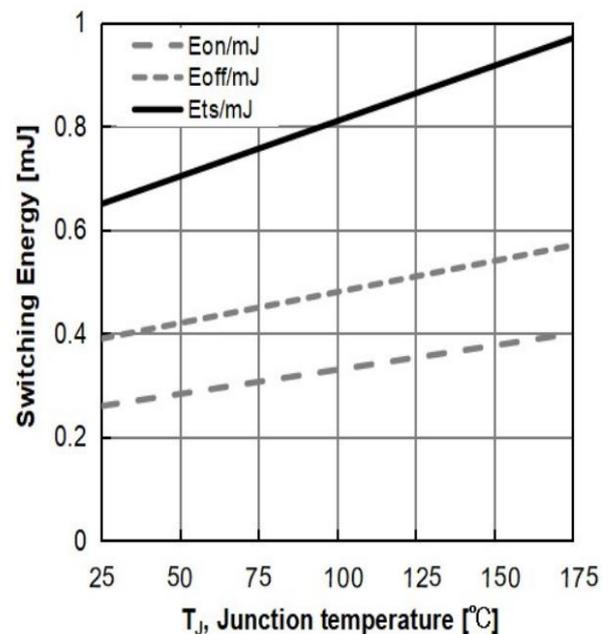


Figure 12: Typical Switching Energy vs. Junction Temperature ($V_{CE}=400\text{V}$, $V_{GE}=15\text{V}$, $I_C=20\text{A}$, $R_g=5\Omega$)



RATINGS AND CHARACTERISTIC CURVES

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

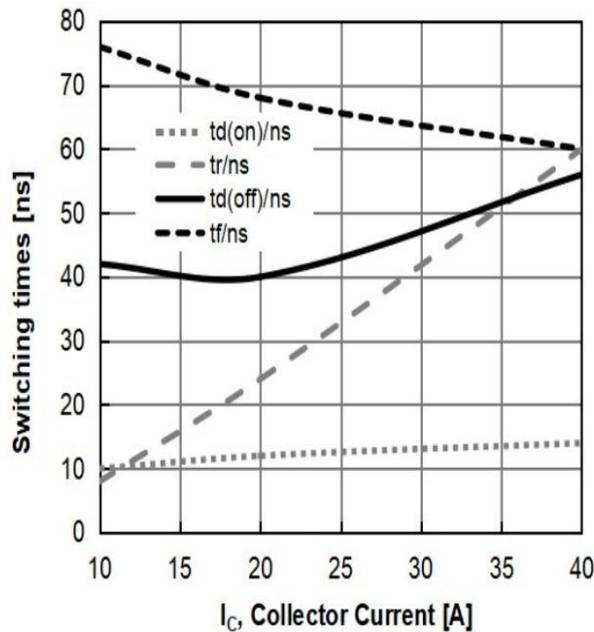


Figure 14: Typical Switching Energy vs. Collector Current ($T_J=25^\circ\text{C}$, $V_{CE}=400\text{V}$, $V_{GE}=15\text{V}$, $R_g=5\Omega$)

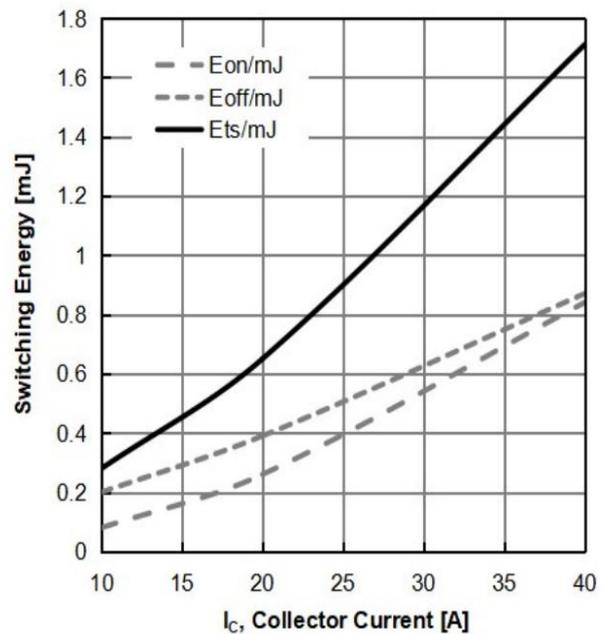


Figure 15: Typical Switching Times vs. VCE ($T_J=25^\circ\text{C}$, $V_{GE}=15\text{V}$, $I_C=20\text{A}$, $R_g=5\Omega$)

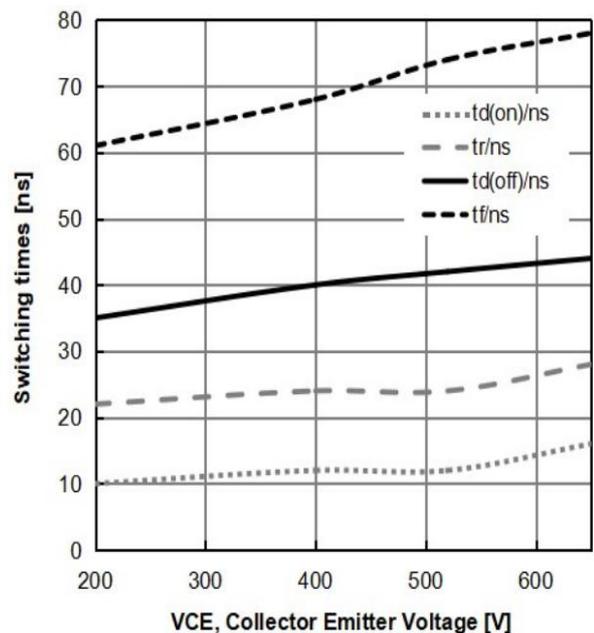
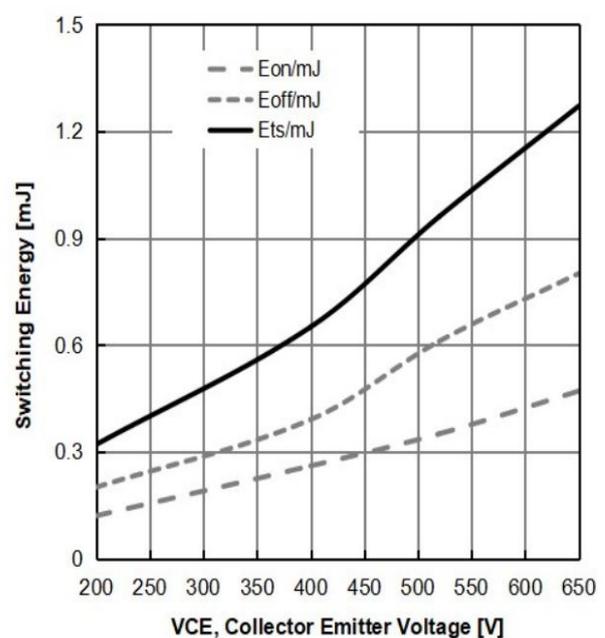


Figure 16: Typical Switching Energy vs. VCE ($T_J=25^\circ\text{C}$, $V_{GE}=15\text{V}$, $I_C=20\text{A}$, $R_g=5\Omega$)



RATINGS AND CHARACTERISTIC CURVES

Figure 17: Typical Capacitance vs. Collector- Emitter Voltage

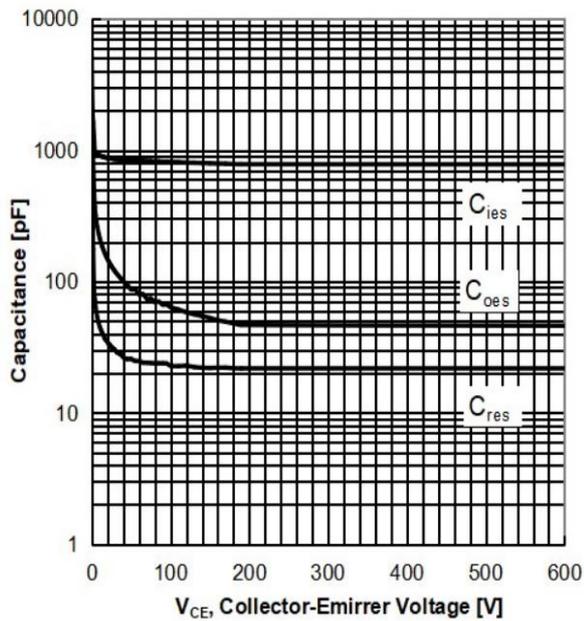


Figure 18: Typical Gate Charge

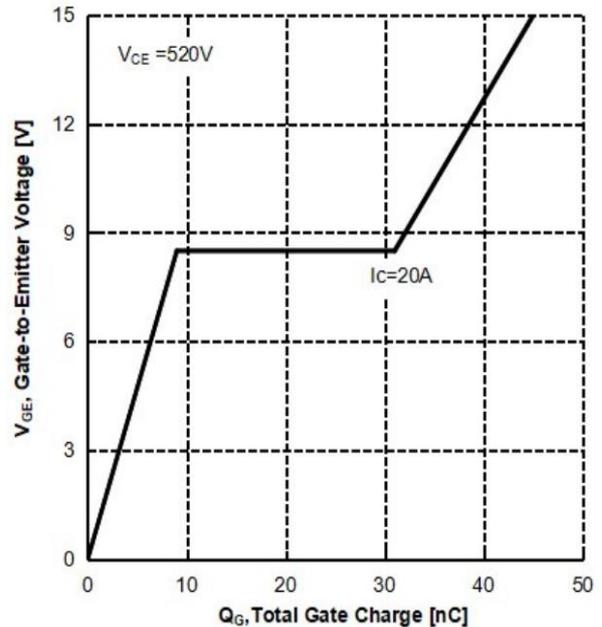


Figure 19: IGBT Transient Thermal Impedance vs. Pulse Width

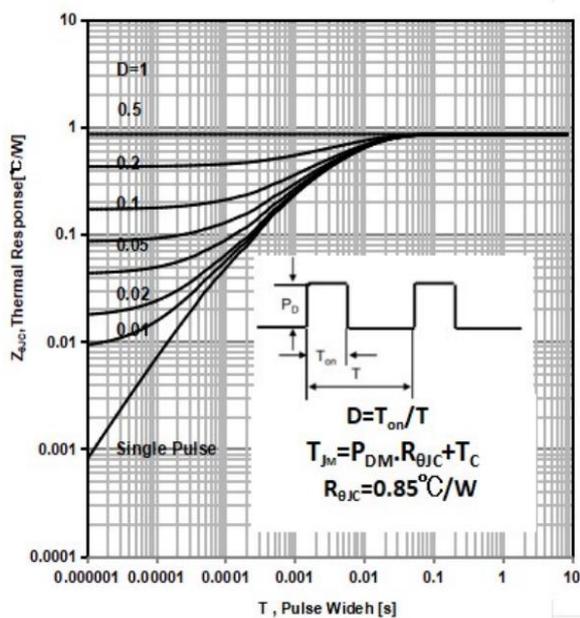
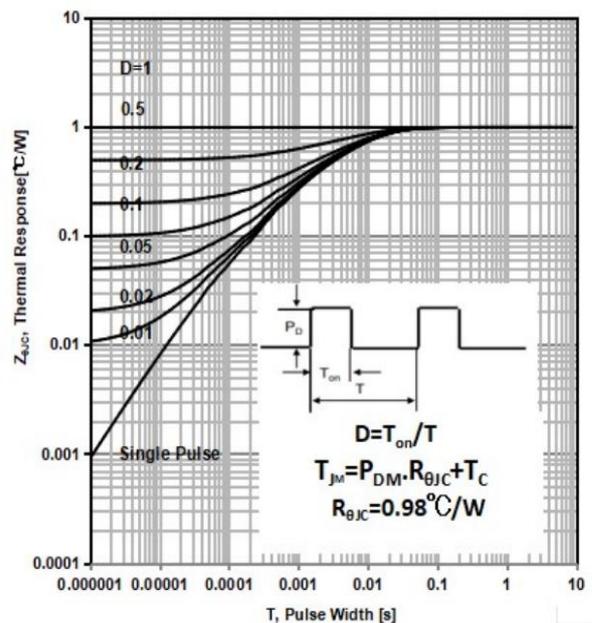
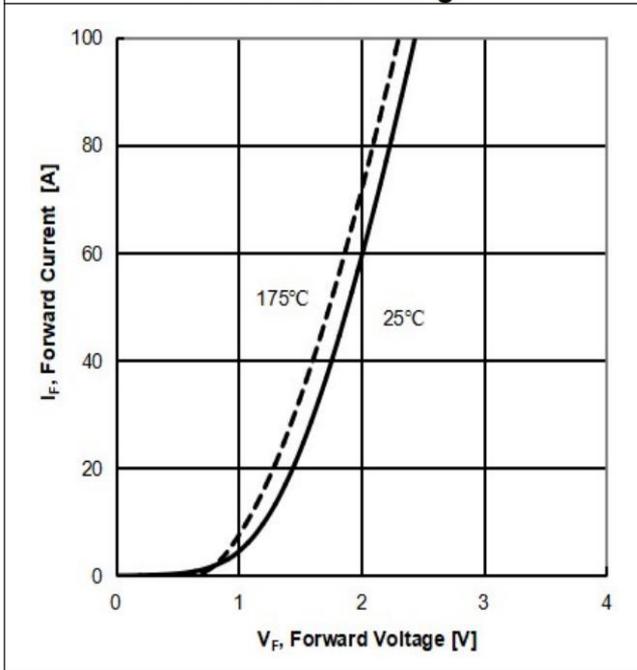


Figure 20: Diode Transient Thermal Impedance vs. Pulse Width



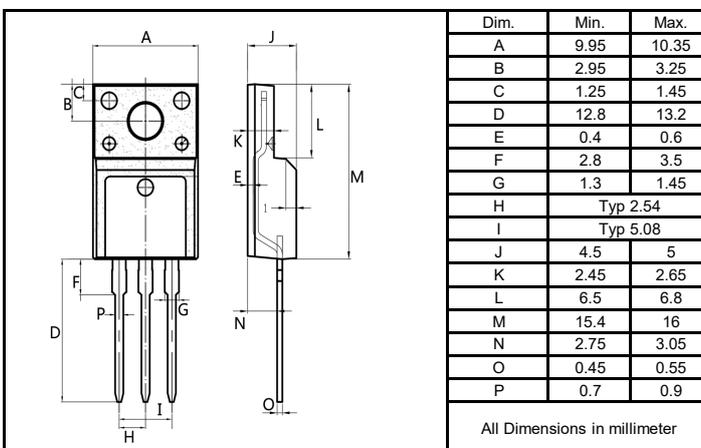
RATINGS AND CHARACTERISTIC CURVES

Figure 21: Typical Diode Forward Current vs. Forward Voltage

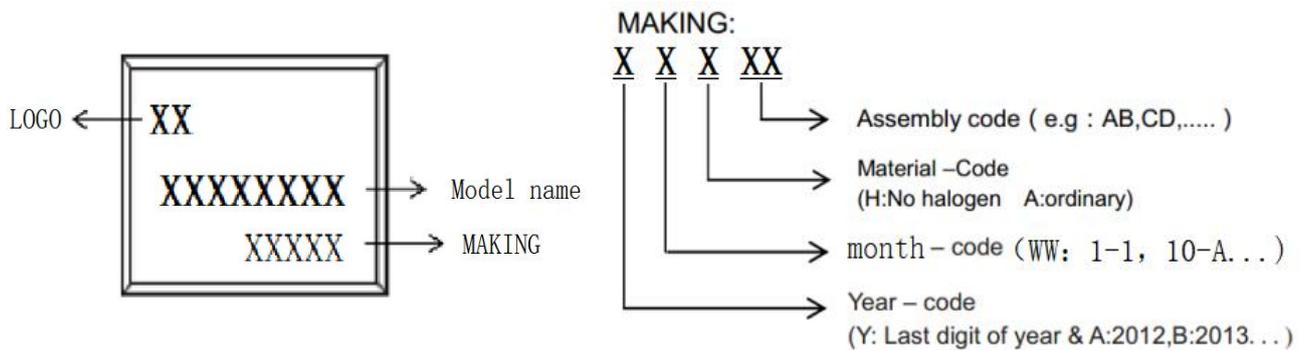


Package Outline Dimensions millimeters

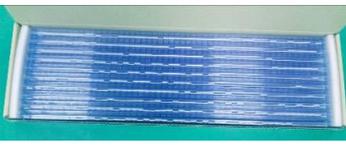
T0-220F



Marking on the body



packing instruction

PKG	最小包装	内盒	外箱
TO-220F			
	50PCS/管	1000pcs/盒	5000pcs/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.