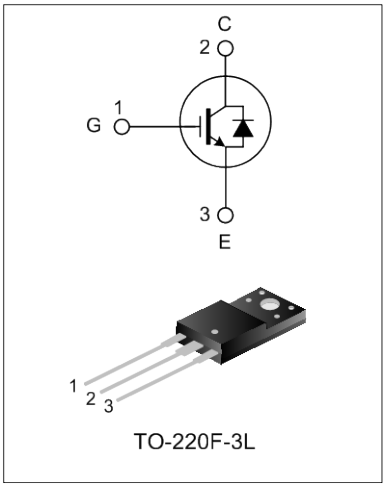
20A, 600V IGBT

DESCRIPTION

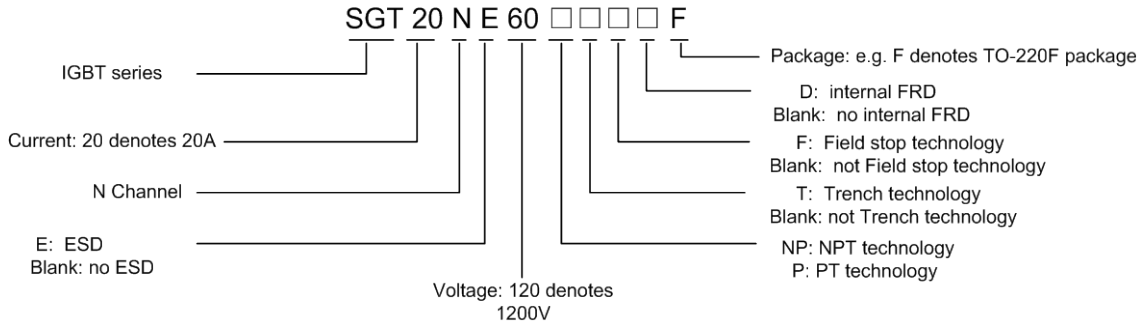
SGT20N60NPFDF using Punch Through IGBT technology, offer the optimum performance for induction Heating, UPS, SMPS and PFC application.



FEATURES

- 20A, 600V, $V_{CE(sat)(typ.)}$ =1.8V@I_C=20A
- Low conduction loss
- Fast switching
- High input impedance
- Low Cres/Cies

NOMENCLATURE



ORDERING INFORMATION

Part No.	Package	Marking	Material	Packing
SGT20N60NPFDF	TO-220F-3L	20N60NPFD	Halogen free	Tube

ABSOLUTE MAXIMUM RATINGS (TC = 25°, UNLESS OTHERWISE NOTED)

Characteristics		Symbol	Ratings	Units
Collector to Emitter Voltage		V_{CE}	600	V
Gate to Emitter Voltage		V_{GE}	±20	V
Collector Current	T_C=25°C	I_C	40	A
	T_C=100°C		20	
Pulsed Collector Current		I_{CM}	80	A
Maximum Power Dissipation (T_C=25°C)		P_D	32	W
-Derate above 25°C			0.23	W/°C
Operating Junction Temperature Range		T_J	-55～+150	°C
Storage Temperature Range		T_{stg}	-55～+150	°C

THERMAL CHARACTERISTICS

Characteristics	Symbol	Ratings	Units
Thermal Resistance, Junction to Case (IGBT)	$R_{\theta JC}$	2.9	°C/W
Thermal Resistance, Junction to Case (FRD)	$R_{\theta JC}$	5.5	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	42.5	°C/W

ELECTRICAL CHARACTERISTICS OF IGBT (T_C = 25°C unless otherwise noted)

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Units
Collector to Emitter Breakdown Voltage	BV_{CE}	V_{GE}=0V, I_C=1mA	600	--	--	V
C-E Leakage Current	I_{CES}	V_{CE}=600V, V_{GE}=0V	--	--	200	uA
G-E Leakage Current	I_{GES}	V_{GE}=20V, V_{CE}=0V	--	--	±400	nA
GateThreshold Voltage	$V_{GE(th)}$	I_C=250uA, V_{CE}=V_{GE}	4.0	5.5.	7.0	V
Collector to Emitter Saturation Voltage	$V_{CE(sat)}$	I_C=20A, V_{GE}=15V	--	1.8	2.5	V
		I_C=20A, V_{GE}=15V T_C=125°C	--	2.1	--	V
Input Capacitance	C_{ies}	V_{CE}=30V V_{GE}=0V f=1MHz	--	812	--	pF
Output Capacitance	C_{oes}		--	120	--	
Reverse Transfer Capacitance	C_{res}		--	40	--	
Turn-On Delay Time	$T_{d(on)}$	V_{CE}=300V I_C=20A R_g=24Ω V_{GE}=15V Inductive Load,	--	12	--	ns
Rise Time	T_r		--	48	--	
Turn-Off Delay Time	$T_{d(off)}$		--	109	--	
Fall Time	T_f		--	118	--	
Turn-On Switching Loss	E_{on}		--	0.61	--	mJ
Turn-Off Switching Loss	E_{off}		--	0.19	--	
Total Switching Loss	E_{st}		--	0.8	--	
Total Gate Charge	Q_g	V_{CE} = 390V, I_C=5A, V_{GE} = 15V	--	46	--	nC
Gate to Emitter Charge	Q_{ge}		--	7	--	
Gate to Collector Charge	Q_{gc}		--	27	--	

ELECTRICAL CHARACTERISTICS OF FRD (T_C = 25°C unless otherwise noted)

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Units
Diode Forward Voltage	V_{FM}	I_F = 12A T_C=25°C	--	1.9	2.6	V
		I_F = 12A T_C=125°C	--	1.5	--	
Diode Reverse Recovery Time	T_{rr}	I_{ES} =12A, dI_{ES}/dt=100A/μs	--	32	--	ns
Diode Reverse Recovery Charge	Q_{rr}	I_{ES} =12A, dI_{ES}/dt=100A/μs	--	31	--	nC

TYPICAL CHARACTERISTICS CURVE

Figure 1. Typical output characteristics

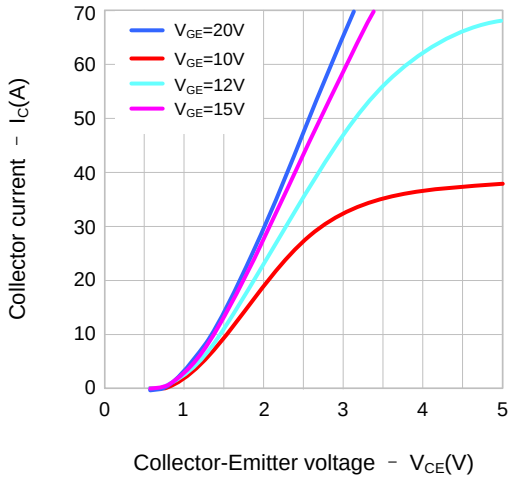


Figure 3. Transfer characteristic

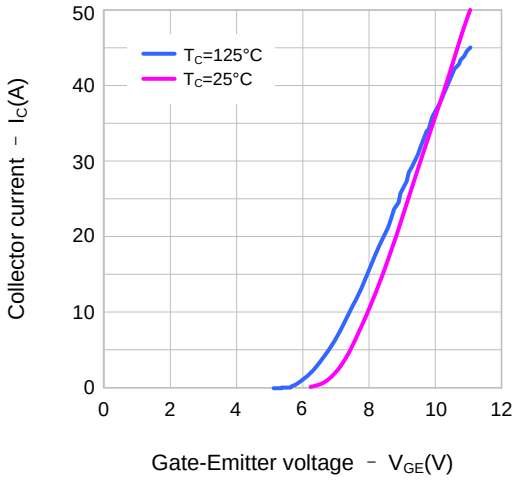


Figure 2. Typical saturation voltage characteristic

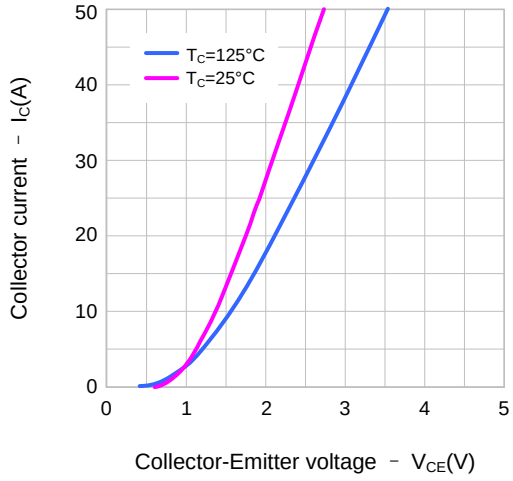


Figure 4. Saturation voltage vs. V_{GE}

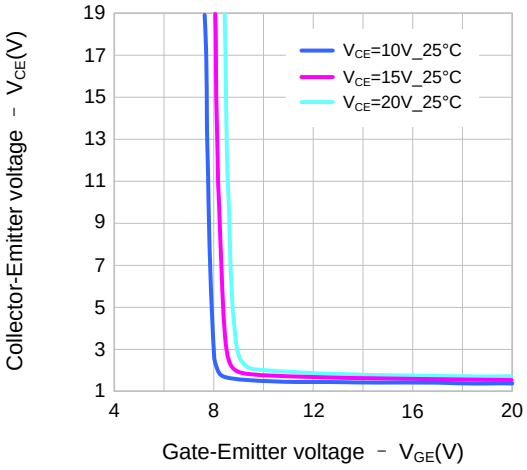


Figure 5. Saturation voltage vs. V_{GE}

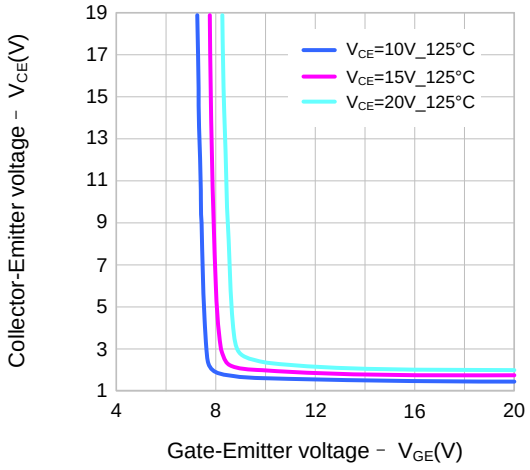
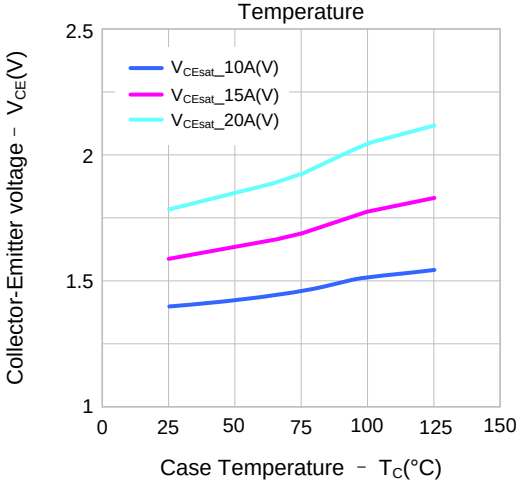


Figure 6. Saturation voltage vs. Temperature



TYPICAL CHARACTERISTICS CURVE (CONTINUED)

Figure 7. Capacitance characteristic

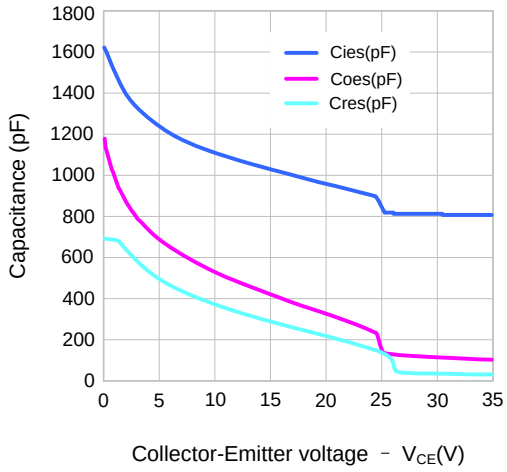


Figure 8. Gate charge characteristic

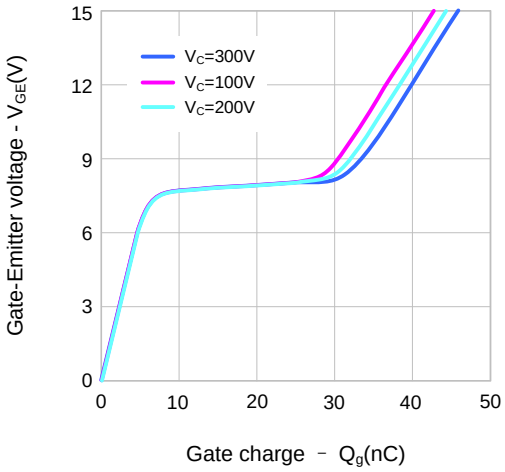


Figure 9. Turn-on characteristic vs. Gate resistance

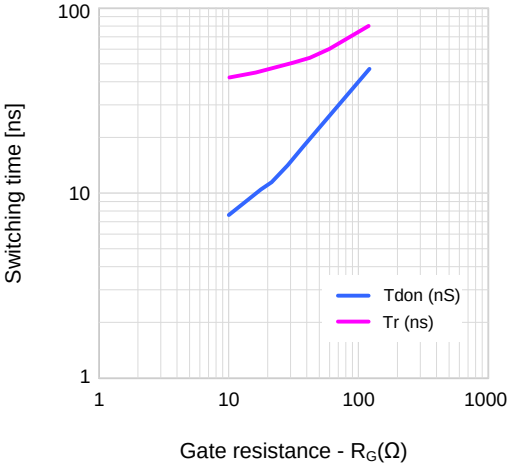


Figure 10. Turn-off characteristic vs. Gate resistance

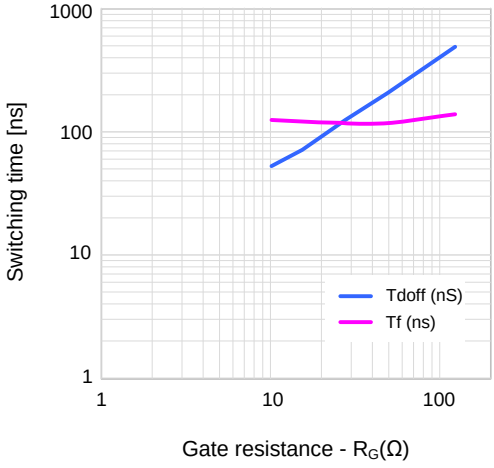


Figure 11. Switching loss vs. Gate resistance

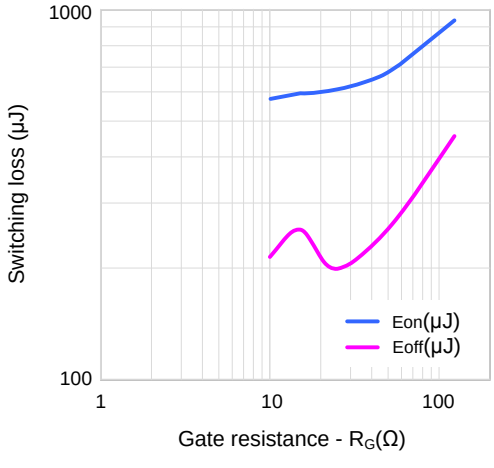
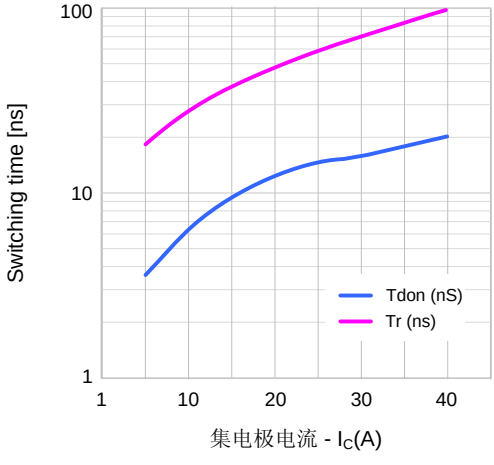


Figure 12. Turn-on characteristic vs. Collector current



TYPICAL CHARACTERISTICS CURVE (CONTINUED)

Figure 13. Turn-off characteristic vs. Collector current

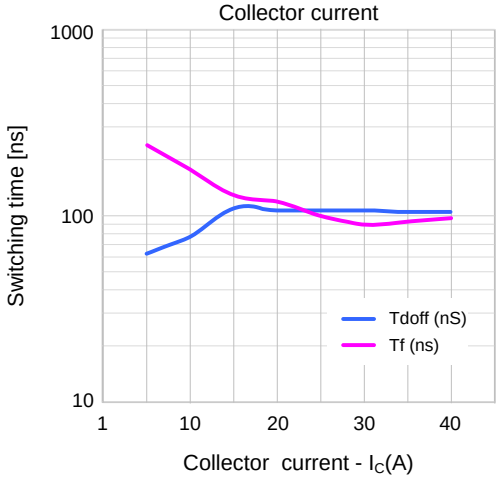


Figure 14. Switching losses vs. Collector current

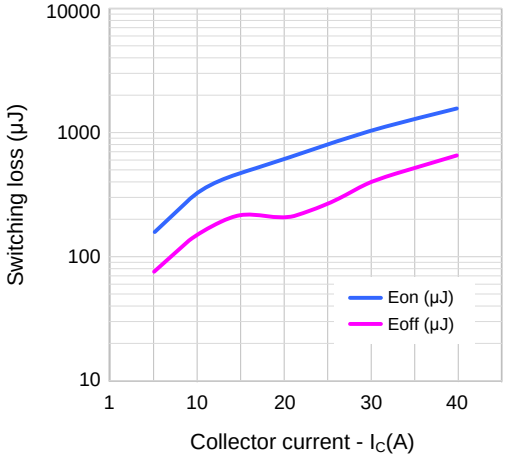


Figure 15. Forward characteristic

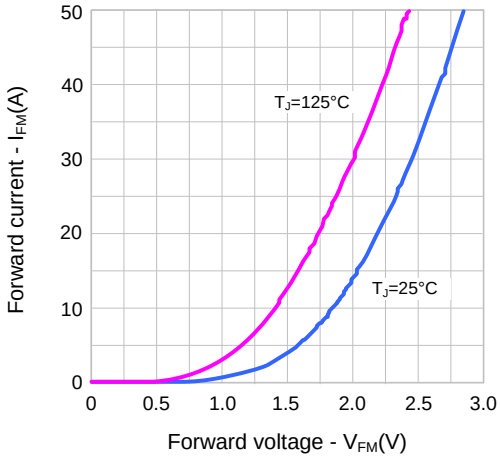
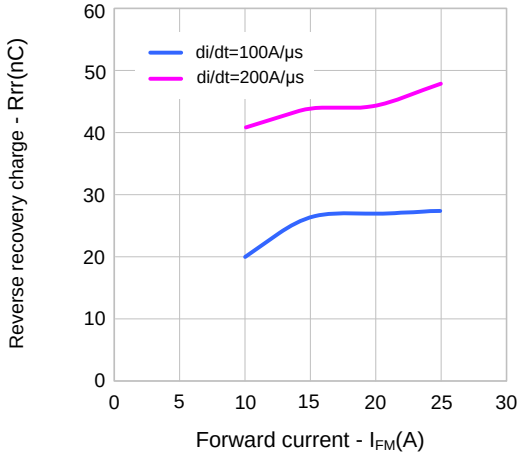
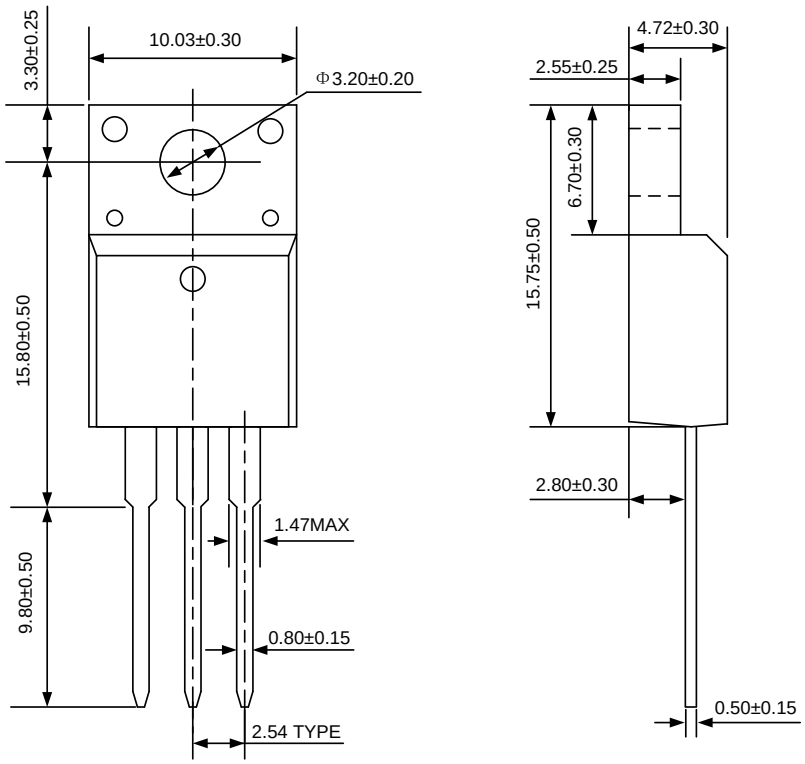


Figure 16. Reverse recovery charge vs. Forward current



PACKAGE OUTLINE

TO-220F-3L **Unit: mm**



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Revision History:

1. Add pin No.

Rev.:	1.1	Author:	Zhang Kefeng

Revision History:

1. Modify the absolute maximum ratings

Rev.:	1.0	Author:	Zhang Kefeng

Revision History:

1. First release