

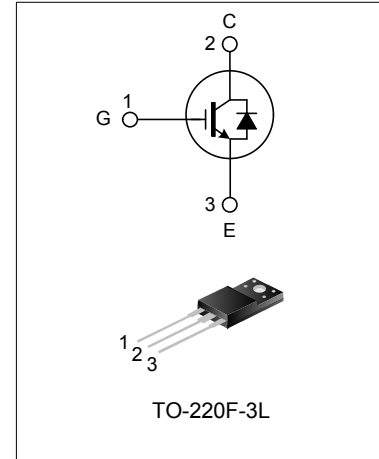
20A, 600V IGBT

DESCRIPTION

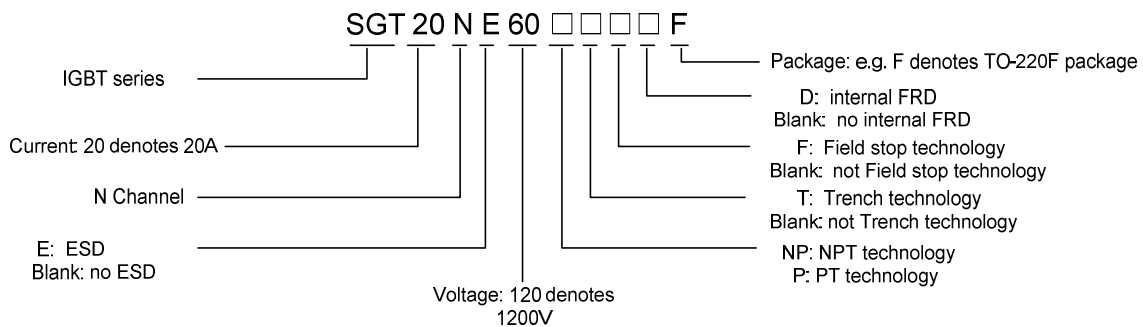
SGT20N60NPFDF using Punch Through IGBT technology, offer the optimum performance for induction Heating, UPS, SMPS and PFC application.

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	20N60NPFDF	Pb 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	$^{\circ}\text{C/W}$
Thermal Resistance, Junction to Case (FRD)	$R_{\theta JC}$	5.5	$^{\circ}\text{C/W}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	42.5	$^{\circ}\text{C/W}$

ELECTRICAL CHARACTERISTICS OF IGBT ($T_C = 25^{\circ}\text{C}$ 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	μA
G-E Leakage Current	I_{GES}	$V_{GE}=20V, V_{CE}=0V$	--	--	± 400	nA
GateThreshold Voltage	$V_{GE(th)}$	$I_C=250\mu A, V_{CE}=V_{GE}$	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
		$I_C=20A, V_{GE}=15V$ $T_C=125^{\circ}\text{C}$	--	2.1	--	V
Input Capacitance	C_{ies}	$V_{CE}=30V$	--	812	--	pF
Output Capacitance	C_{oes}	$V_{GE}=0V$	--	120	--	
Reverse Transfer Capacitance	C_{res}	$f=1MHz$	--	40	--	
Turn-On Delay Time	$T_{d(on)}$	$V_{CE}=300V$ $I_C=20A$ $R_g=24\Omega$ $V_{GE}=15V$ 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}	Inductive Load,	--	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 ($T_C = 25^{\circ}\text{C}$ unless otherwise noted)

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

TYPICAL CHARACTERISTICS CURVE

Figure 1. Typical output characteristics

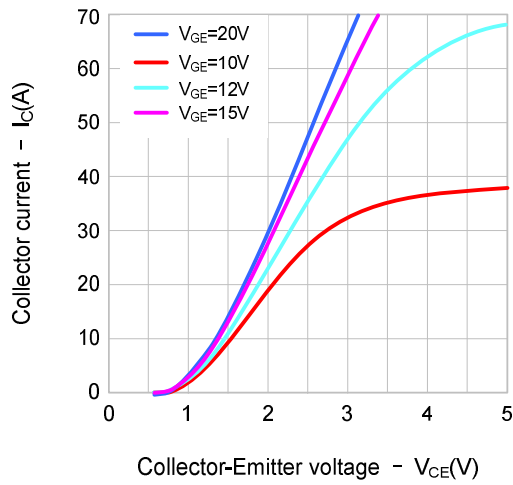


Figure 3. Transfer characteristic

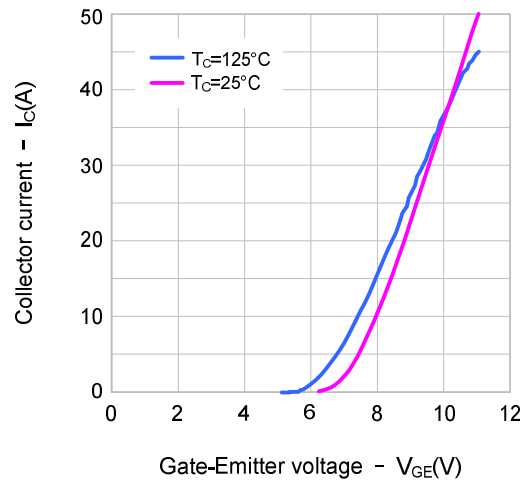


Figure 2. Typical saturation voltage characteristic

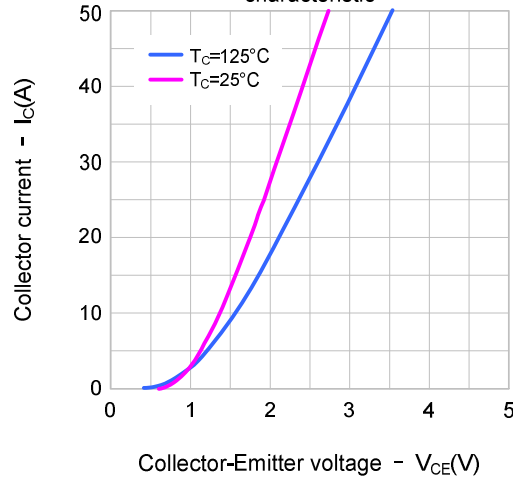


Figure 4. Saturation voltage vs. V_{ge}

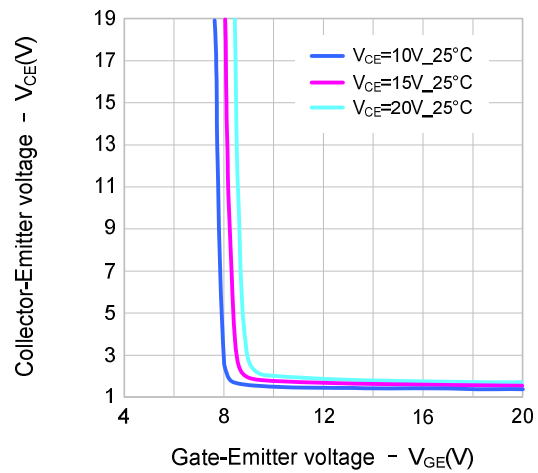


Figure 5. Saturation voltage vs. V_{ge}

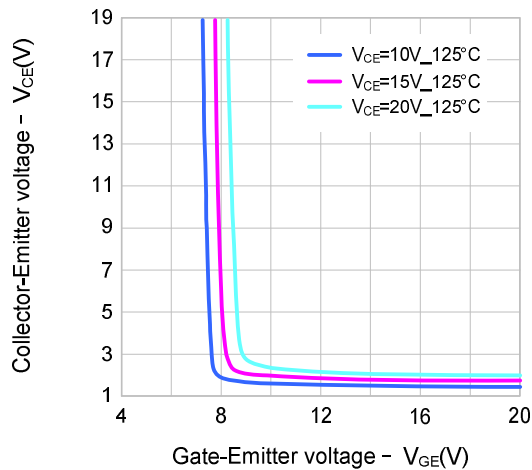
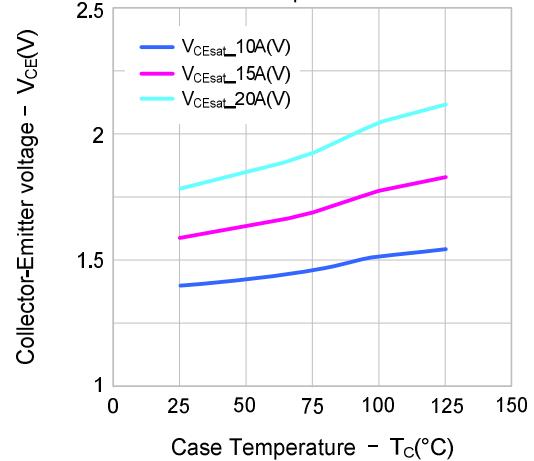


Figure 6. Saturation voltage vs. Temperature



TYPICAL CHARACTERISTICS CURVE (CONTINUED)

Figure 7. Capacitance characteristic

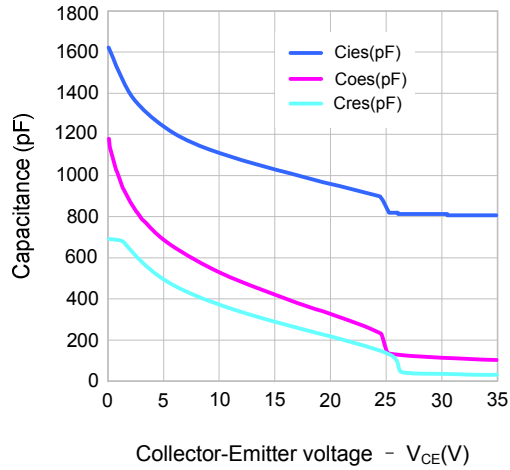


Figure 8. Gate charge characteristic

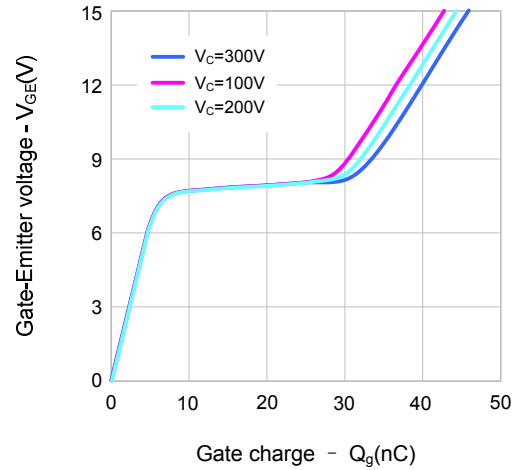


Figure 9. Turn-on characteristic vs. Gate resistance

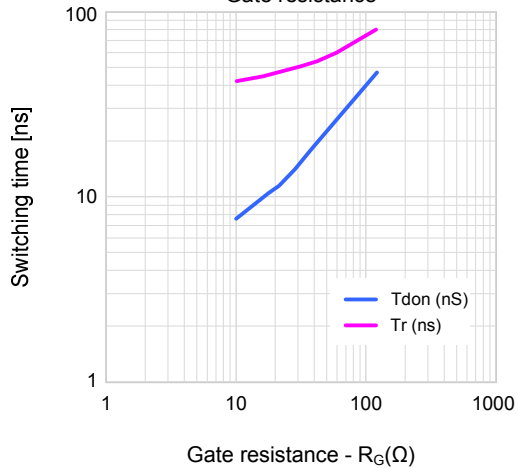


Figure 10. Turn-off characteristic vs. Gate resistance

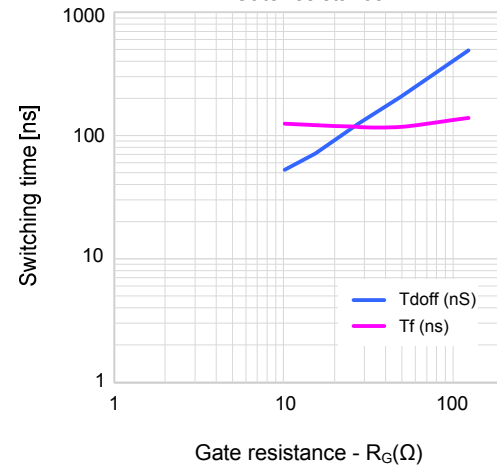


Figure 11. Switching loss vs. Gate resistance

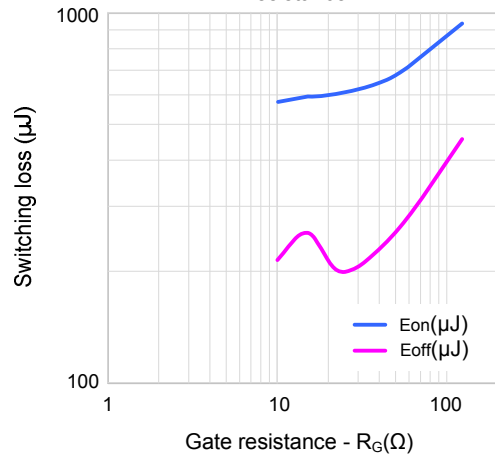
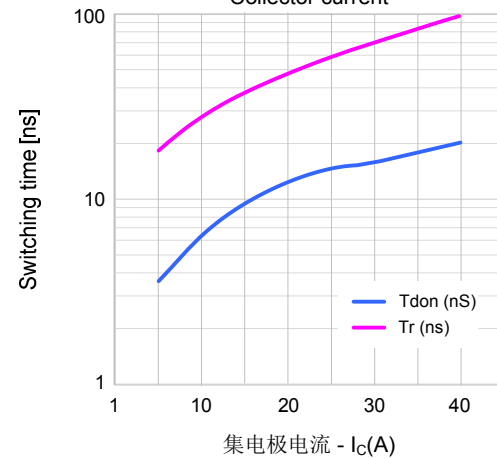


Figure 12. Turn-on characteristic vs. Collector current



TYPICAL CHARACTERISTICS CURVE (CONTINUED)

Figure 13. Turn-off characteristic vs. Collector current

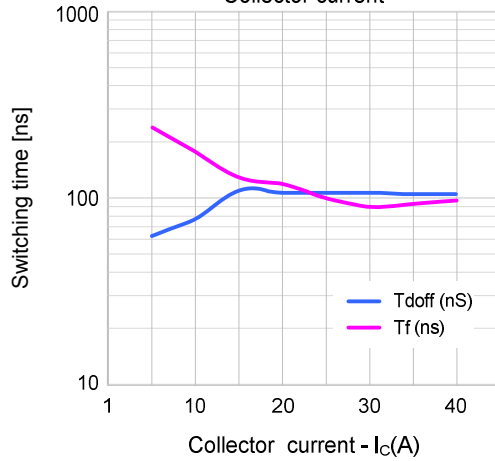


Figure 14. Switching losses vs. Collector current

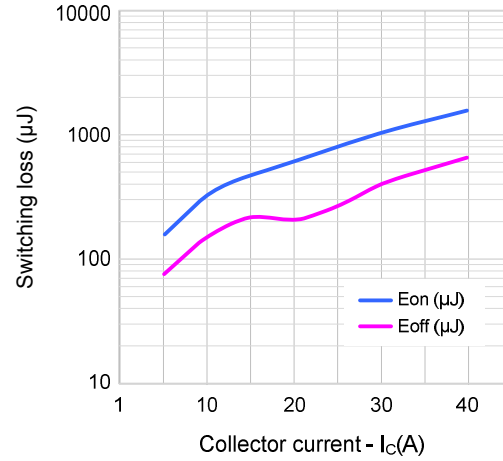


Figure 15. Forward characteristic

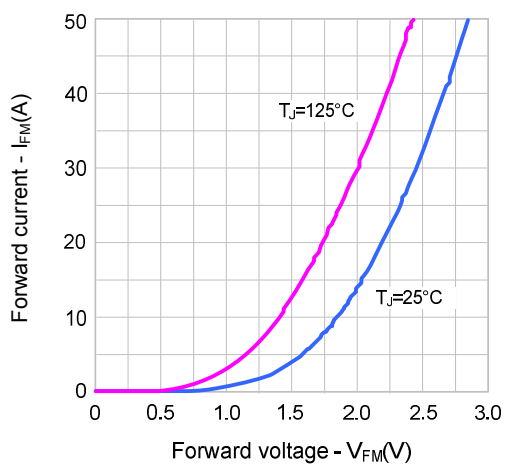
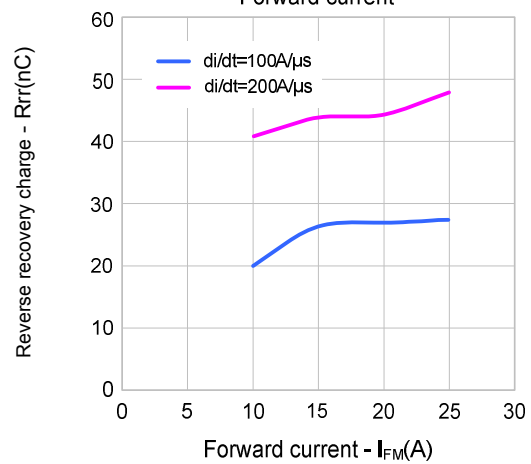


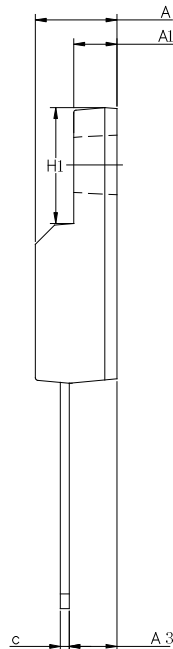
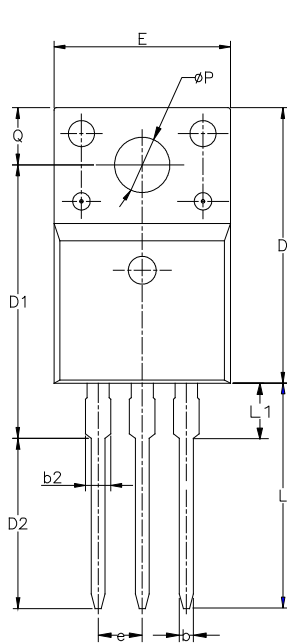
Figure 16. Reverse recovery charge vs. Forward current



PACKAGE OUTLINE

TO-220F-3L

Unit: mm



SYMBOL	MIN	NOM	MAX
A	4.42	4.70	5.02
A1	2.30	2.54	2.80
A3	2.50	2.76	3.10
b	0.70	0.80	0.90
b2	—	—	1.47
c	0.35	0.50	0.65
D	15.25	15.87	16.25
D1	15.30	15.75	16.30
D2	9.30	9.80	10.30
E	9.73	10.16	10.36
e	2.54BCS		
H1	6.40	6.68	7.00
L	12.48	12.98	13.48
L1	/	/	3.50
ØP	3.00	3.18	3.40
Q	3.05	3.30	3.55

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Rev.:	1.3	Author:	Zhang Kefeng
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Revision History:

1. Modify the package information
 2. Modify the ordering information
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Rev.:	1.2	Author:	Zhang Kefeng
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Revision History:

1. Add pin No.
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Rev.:	1.1	Author:	Zhang Kefeng
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Revision History:

1. Modify the absolute maximum ratings
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Rev.:	1.0	Author:	Zhang Kefeng
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Revision History:

1. First release
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