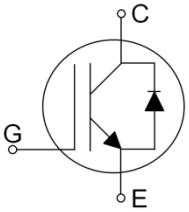
Features

1200V Field Stop Trench Technology
Low Switching Loss for a Wide Temperature Range
Positive Temperature Coefficient
Easy Parallel Operation
RoHS Compliant
JEDEC Qualification



Applications

UPS, Welder, Inverter, Solar

Device	Package	Marking	Remark
TGAN40N120F2D	TO-3PN	TGAN40N120F2D	RoHS

Absolute Maximum Ratings

Parameter		Symbol	Value	Unit
Collector-Emitter Voltage		V_{CES}	1200	V
Gate-Emitter Voltage		V_{GES}	20	V
Continuous Collector Current	T_C = 25	I_C	80	A
	T_C = 100		40	A
Pulsed Collector Current (Note 1)		I_{CM}	200	A
Diode Continuous Forward Current	T_C = 100	I_F	40	A
Power Dissipation	T_C = 25	P_D	500	W
	T_C = 100		200	W
Operating Junction Temperature		T_J	-55 ~ 150	
Storage Temperature Range		T_{STG}	-55 ~ 150	
Maximum lead temperature for soldering purposes,		T_L	300	

Thermal Characteristics

Parameter	Symbol	Value	Unit
Maximum Thermal resistance, Junction-to-Case	R_{JC} (IGBT)	0.25	/W
Maximum Thermal resistance, Junction-to-Case	R_{JC} (DIODE)	0.95	/W
Maximum Thermal resistance, Junction-to-Ambient	R_{JA}	40	/W

Electrical Characteristics of the IGBT T_C=25 , unless otherwise noted

Parameter	Symbol	Test condition	Min.	Typ.	Max.	Unit
OFF						
Collector Emitter Breakdown Voltage	BV_{CES}	V_{GE} = 0V, I_C = 1mA	1200	--	--	V
Zero Gate Voltage Collector Current	I_{CES}	V_{CE} = 1200V, V_{GE} = 0V	--	--	1	mA
Gate Emitter Leakage Current	I_{GES}	V_{CE} = 0V, V_{GE} = 20V	--	--	250	nA
ON						
Gate Emitter Threshold Voltage	$V_{GE(TH)}$	V_{GE} = V_{CE}, I_C = 40mA	5.0	6.5	8.0	V
Collector Emitter Saturation Voltage	$V_{CE(SAT)}$	V_{GE} = 15V, I_C = 40A, T_C = 25	--	1.82	2.32	V
		V_{GE} = 15V, I_C = 40A, T_C = 150	--	2.10	--	V
DYNAMIC						
Input Capacitance	C_{IES}	V_{CE} = 30V, V_{GE} = 0V f = 1MHz	--	7135	--	pF
Output Capacitance	C_{OES}		--	150	--	pF
Reverse Transfer Capacitance	C_{RES}		--	113		

Electrical Characteristics of the DIODE T_C=25 , unless otherwise noted

Parameter	Symbol	Test condition		Min.	Typ.	Max.	Unit
Diode Forward Voltage	V_{FM}	I_F = 40A	T_C = 25	--	2.65	--	V
			T_C = 150	--	2.76	--	
Reverse Recovery Time	t_{rr}	I_F = 40A, di/dt = 200A/μs	T_C = 25	--	240	--	ns
			T_C = 150	--	335	--	
Reverse Recovery Current	I_{rr}		T_C = 25	--	12	--	A
			T_C = 150	--	17	--	
Reverse Recovery Charge	Q_{rr}		T_C = 25	--	1700	--	nC
			T_C = 150	--	3600	--	

IGBT Characteristics

Fig. 1 Output characteristics

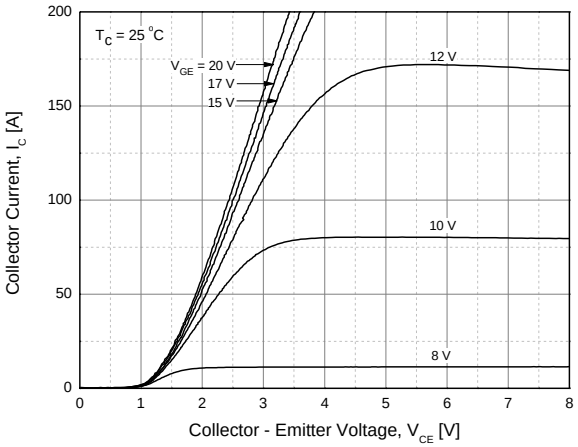


Fig. 2 Saturation voltage characteristics

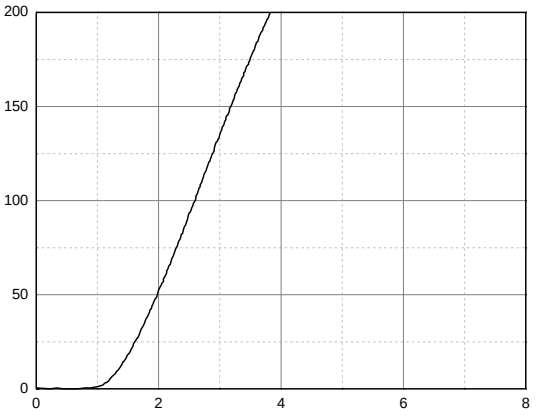


Fig. 3 Saturation voltage vs. collector current

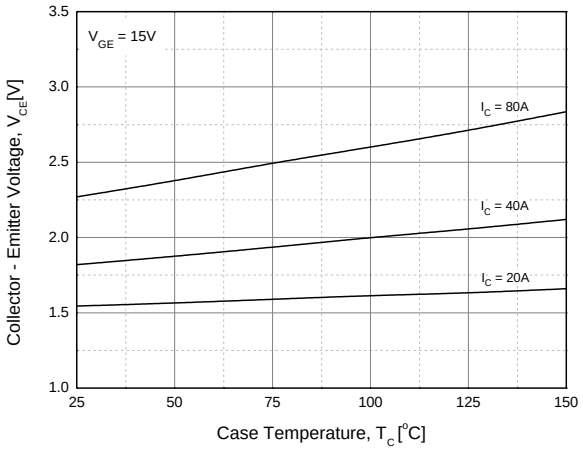


Fig. 4 Saturation voltage vs. gate bias

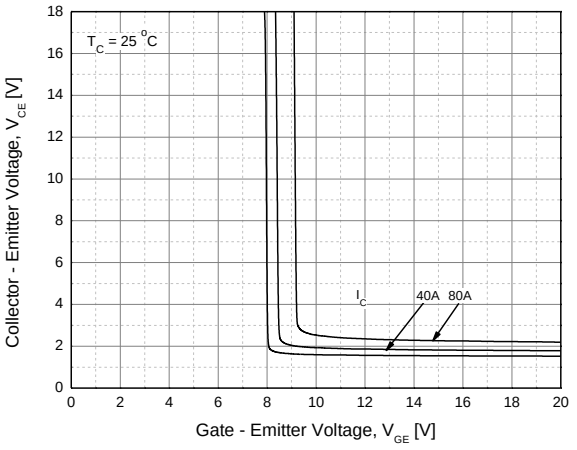
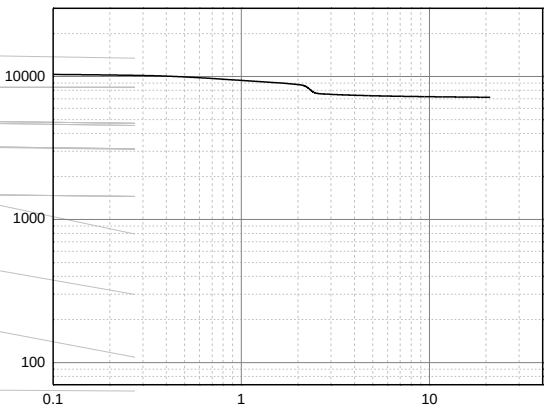


Fig. 5 Saturation voltage vs. gate bias

Fig. 6 Capacitance characteristics



IGBT Characteristics

Fig. 7 Turn-on time vs. gate resistor

Fig. 8 Turn-off time vs. gate resistor

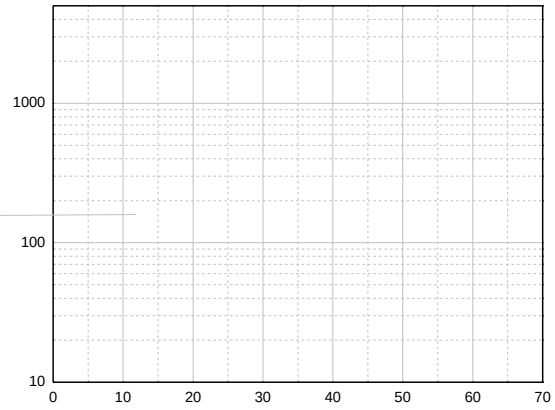


Fig. 9 Switching loss vs. gate resistor

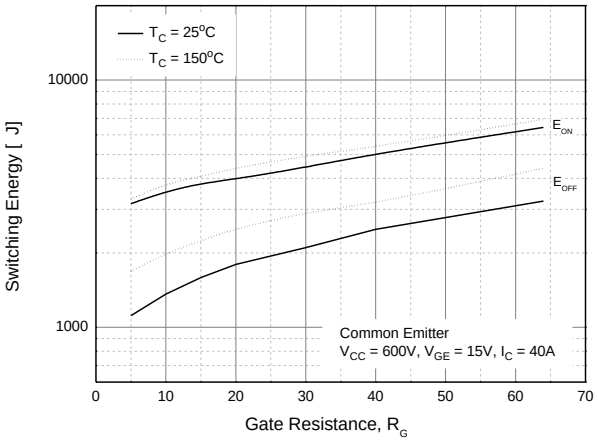


Fig. 10 Turn-on time vs. collector current

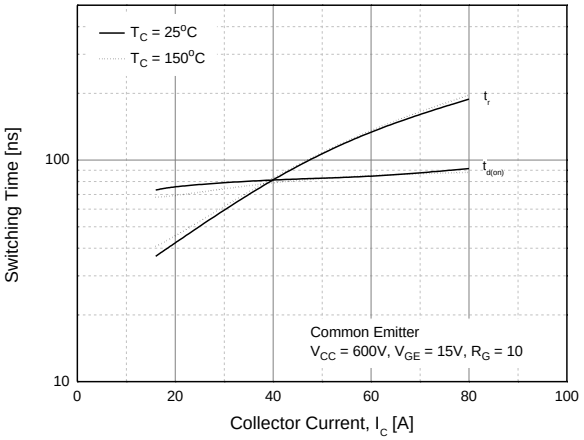


Fig. 11 Turn-off time vs. collector current

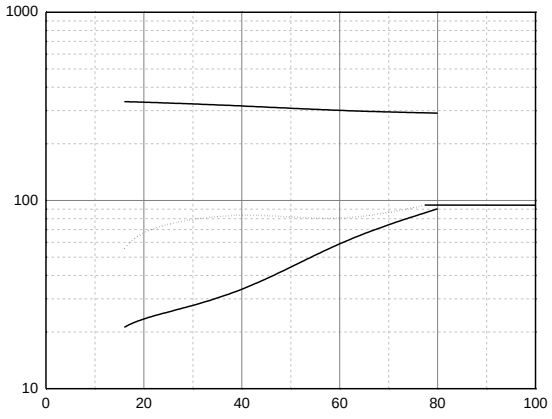
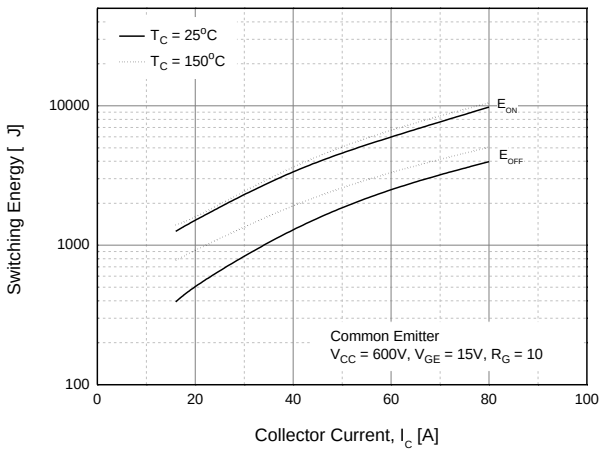
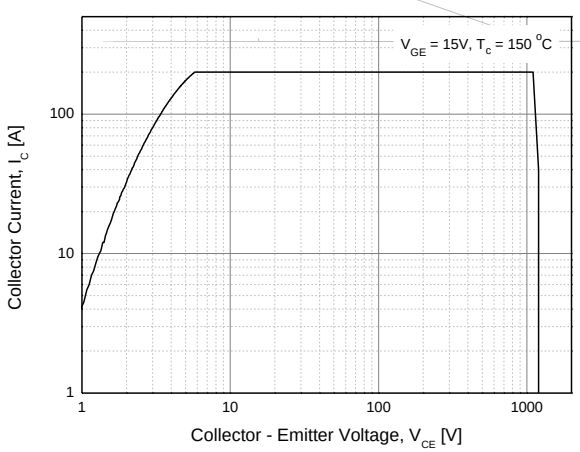


Fig. 12 Switching loss vs. collector current




V_{GE} = 15V, T_c = 150 °C
100
10
1
1
10
100
1000
Collector Current, I_C [A]
Collector - Emitter Voltage, V_{CE} [V]

Diode Characteristics

Fig. 18 Conduction characteristics

Fig. 19 Reverse recovery current vs. forward current

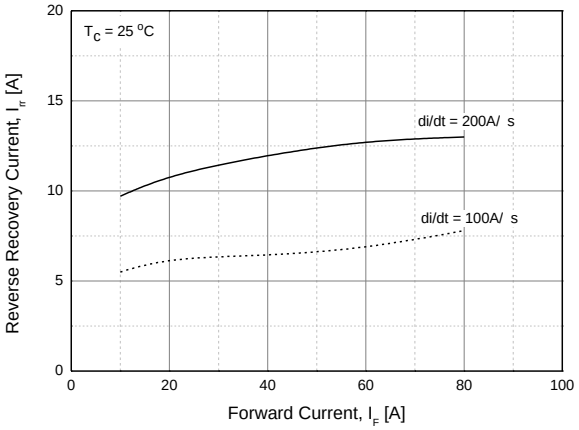


Fig. 20 Reverse recovery charge vs. forward current

Fig. 21 Reverse recovery time vs. forward current

TO-3PN MECHANICAL DATA