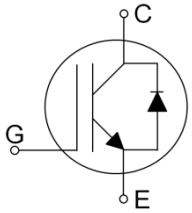
TGAN40S135FD

Reverse Conducting Field Stop Trench IGBT

Features

1350V Reverse Conducting Field Stop Trench IGBT Technology
High Speed Switching
Low Conduction Loss
Positive Temperature Coefficient
Easy Parallel Operation
175 Operating Temperature
RoHS Compliant
JEDEC Qualification



Applications

Induction Heating
Inverterized microwave ovens
Soft Switching Applications

Device	Package	Marking	Remark
TGAN40S135FD	TO-3PN	TGAN40S135FD	RoHS

Absolute Maximum Ratings

Parameter		Symbol	Value	Unit
Collector-Emitter Voltage		V_{CES}	1350	V
Gate-Emitter Voltage		V_{GES}	±25	V
Continuous Collector Current	T_C = 25	I_C	80	A
	T_C = 100		40	
Pulsed Collector Current (Note 1)		I_{CM}	160	A
Diode Continuous Forward Current	T_C = 100	I_F	40	A
Power Dissipation	T_C = 25	P_D	625	W
	T_C = 100		312	
Operating Junction Temperature		T_{vj}	-55 ~ 175	
Storage Temperature Range		T_{STG}	-55 ~ 150	
Maximum lead temperature for soldering purposes,		T_L	300	

Notes :
(1) Repetitive rating : Pulse width limited by maximum junction temperature , During production, high current switching capability is 100% verified with the inductive load single-pulse switching test. (I_C = 160A)

Thermal Characteristics

Parameter	Symbol	Value	Unit
Maximum Thermal resistance, Junction-to-Case	R_{JC} (IGBT)	0.24	/W
Maximum Thermal resistance, Junction-to-Case	R_{JC} (DIODE)	0.24	/W
Maximum Thermal resistance, Junction-to-Ambient	R_{JA}	40	/W

Electrical Characteristics T_{vj}=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	1350	--	--	V
Zero Gate Voltage Collectoe						

Electrical Characteristics T_{vj}=25℃, unless otherwise noted

Parameter	Symbol	Test condition	Min.	Typ.	Max.	Unit
SWITCHING (Note 2)						
Turn-Off Delay Time	$t_{d(off)}$	V_{CC} = 600V, I_C = 20A R_G = 5 , V_{GE} = 15V Inductive Load, T_{vj} = 25	--	226	--	ns
Fall Time	t_f		--	76	114	ns
Turn-Off Switching Loss	E_{OFF}		--	0.53	0.80	mJ
Turn-Off Delay Time	$t_{d(off)}$	V_{CC} = 600V, I_C = 20A R_G = 5 , V_{GE} = 15V Inductive Load, T_{vj} = 175	--	286	--	ns
Fall Time	t_f		--	209	--	ns
Turn-Off Switching Loss	E_{OFF}		--	1.20	1.80	mJ
Turn-Off Delay Time	$t_{d(off)}$	V_{CC} = 600V, I_C = 40A R_G = 5 , V_{GE} = 15V Inductive Load, T_{vj} = 25	--	228	--	ns
Fall Time	t_f		--	74	111	ns
Turn-Off Switching Loss	E_{OFF}		--	1.21	1.82	mJ
Turn-Off Delay Time	$t_{d(off)}$	V_{CC} = 600V, I_C = 40A R_G = 5 , V_{GE} = 15V Inductive Load, T_{vj} = 175	--	275	--	ns
Fall Time	t_f		--	238	--	ns
Turn-Off Switching Loss	E_{OFF}		--	2.64	3.96	mJ

Notes :
(2) Not subject to production test verified by design/characterization

Device Characteristics

Fig. 1 IGBT Output Characteristics

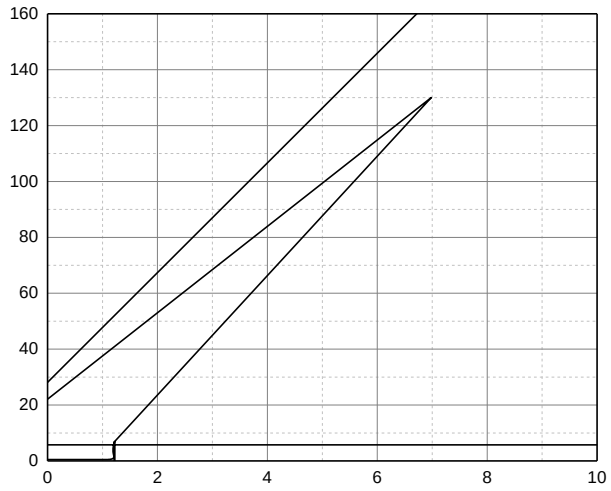
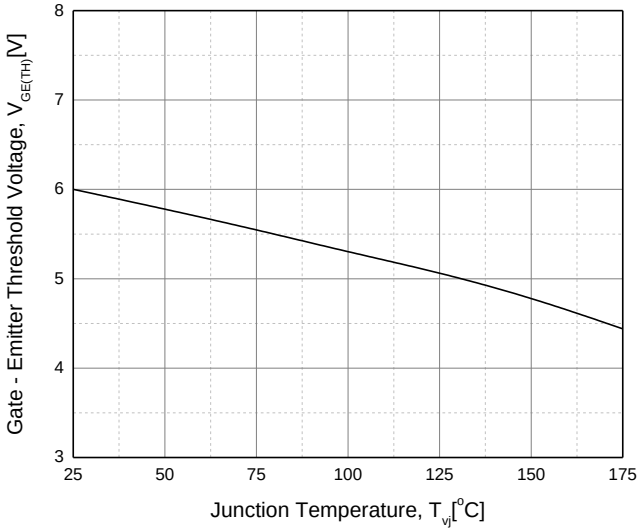


Fig. 2 IGBT Output Characteristics

Fig. 3 IGBT Saturation Voltage vs. Junction Temperature

Fig. 4 IGBT Threshold Voltage vs. Junction Temperature



Device Characteristics

Fig. 5 IGBT Transfer Characteristic

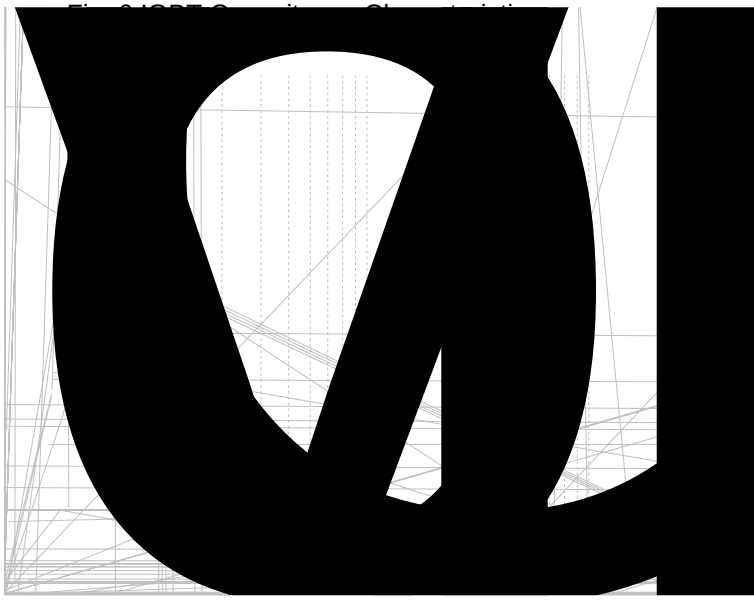


Fig. 7 Diode Conduction Characteristics

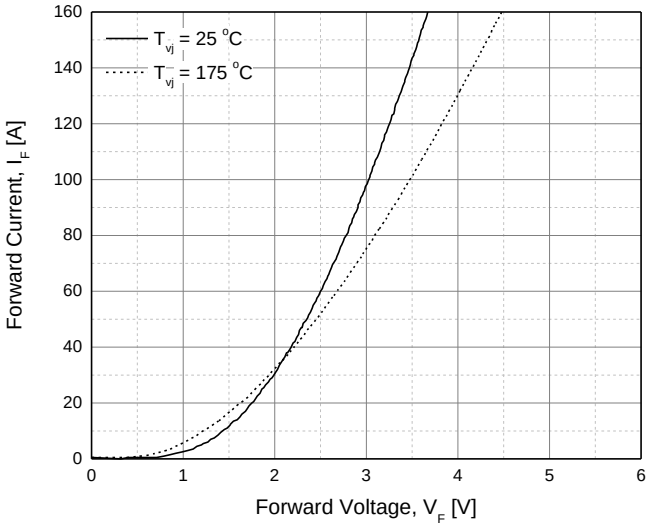


Fig. 8 Diode Forward Voltage
vs. Junction Temperature

Device Characteristics

Fig. 9 Turn-off Time vs. Gate Resistor

Fig. 10 Turn-off Time vs. Collector Current

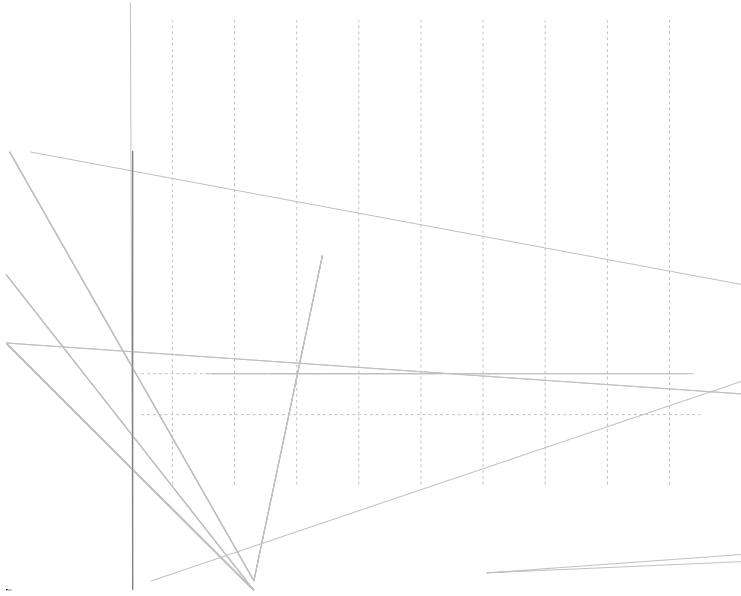


Fig. 11 Turn-off Loss vs. Gate Resistor

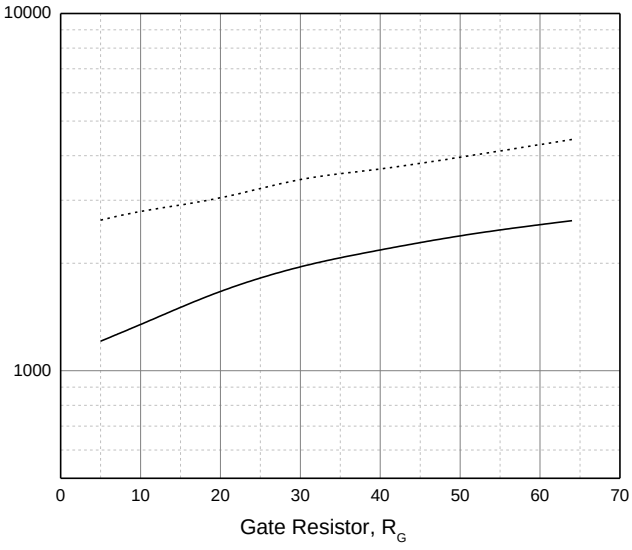
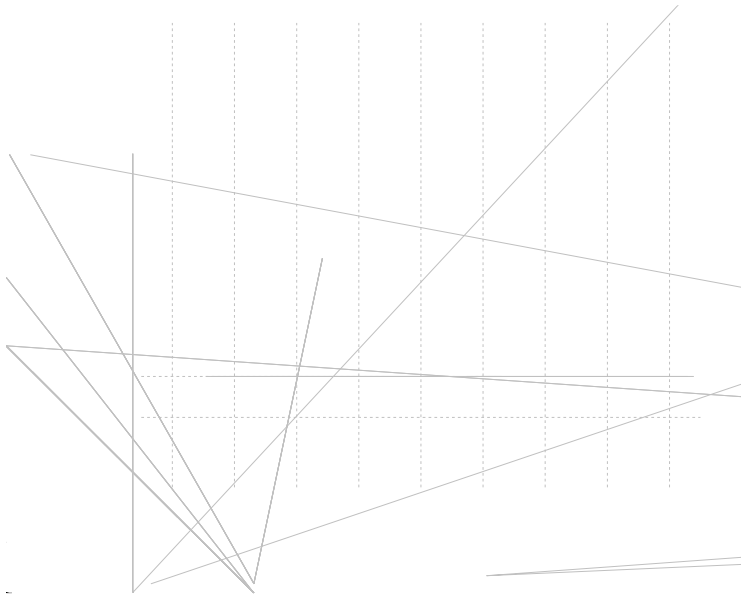


Fig. 12 Turn-off Loss vs. Collector Current



Device Characteristics

Fig. 13 Gate Charge Characteristics

Fig. 14 Transient Thermal Impedance

Fig. 15 Power Dissipation vs. Case Temperature

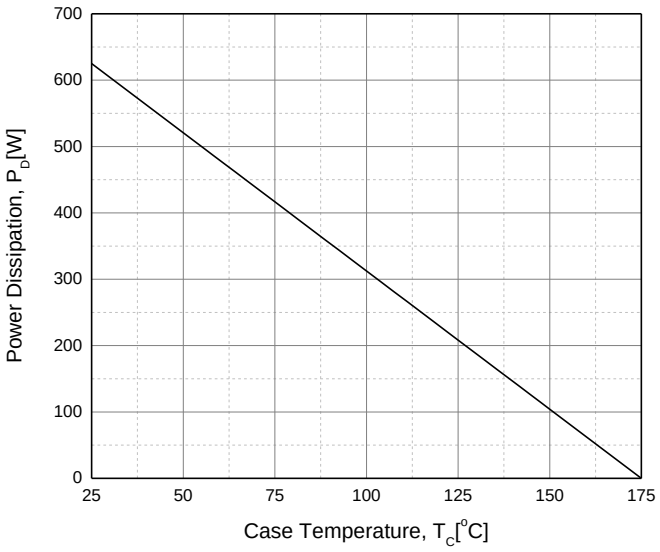
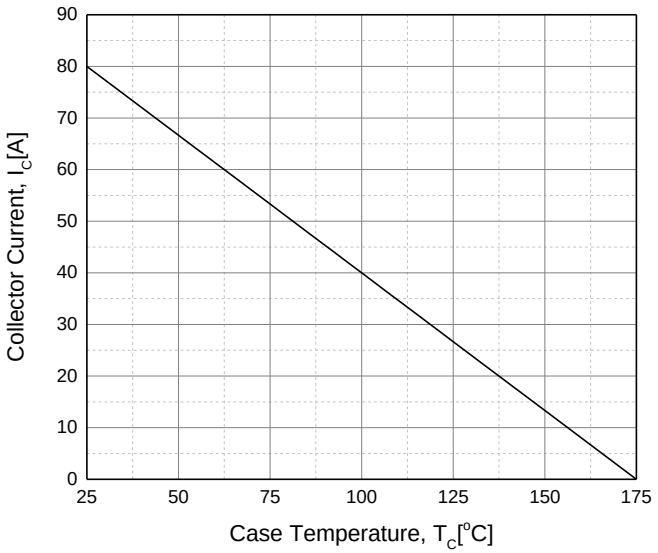


Fig. 16 Collector Current vs. Case Temperature



Device Characteristics

Fig. 17 SOA

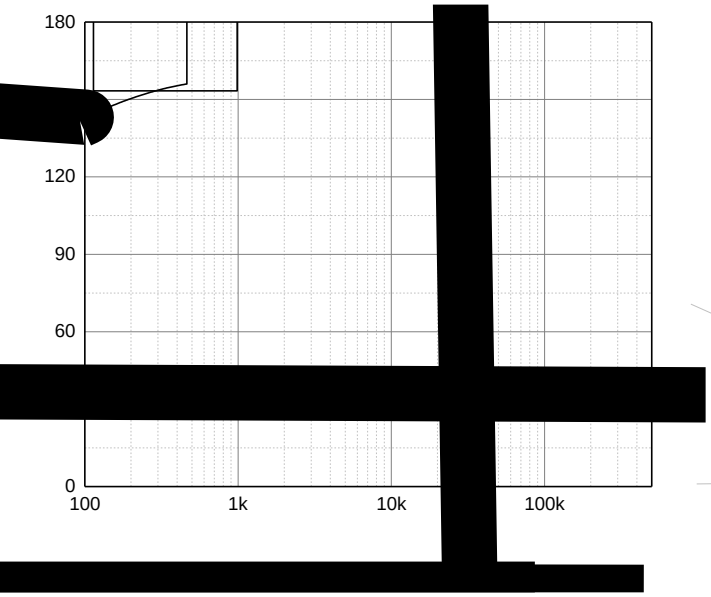


Fig. 18 RBSOA

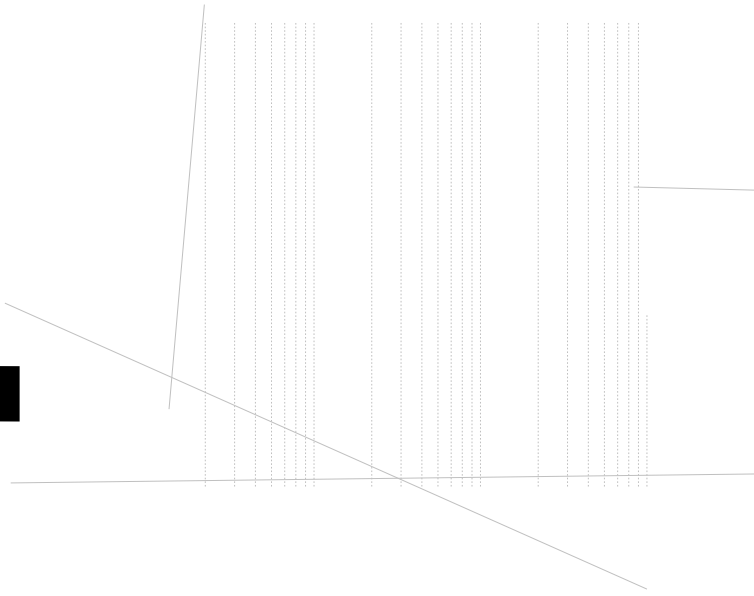


Fig. 19 Load Current vs. Frequency

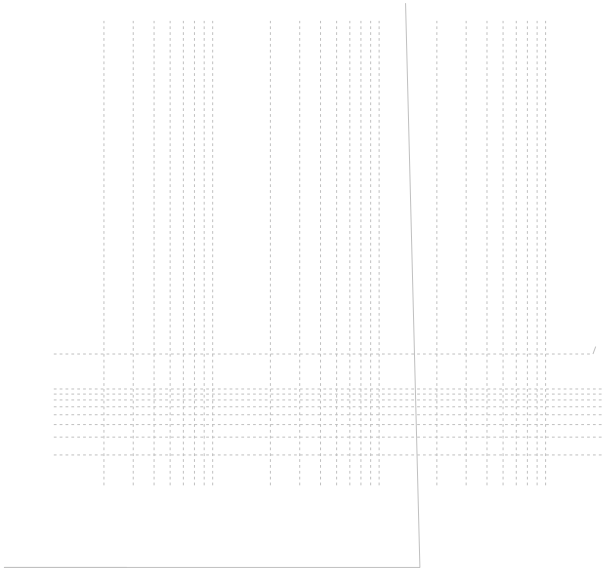


Fig. 20 Load Current vs. Frequency