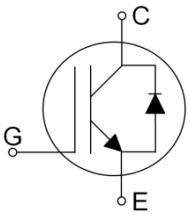
TGH25N120FDR
Field Stop Trench IGBT

Features

1200V Field Stop Trench IGBT Technology
High Speed Switching
Low Conduction Loss
Positive Temperature Coefficient
Easy Parallel Operation
Short Circuit Withstanding Time 5 s
RoHS Compliant
JEDEC Qualification



Applications

UPS, Welder, Inverter, Solar

Device	Package	Marking	Remark
TGH25N120FDR	TO-247	TGH25N120FDR	RoHS

Absolute Maximum Ratings

Parameter		Symbol	Value	Unit
Collector-Emitter Voltage		V_{CES}	1200	V
Gate-Emitter Voltage		V_{GES}	25	V
Continuous Collector Current	T_C = 25 ℃	I_C	50	A
	T_C = 100 ℃		25	A
Pulsed Collector Current (Note 1)		I_{CM}	75	A
Diode Continuous Forward Current	T_C = 100 ℃	I_F	25	A
Power Dissipation	T_C = 25 ℃	P_D	338	W
	T_C = 100 ℃		135	W
Operating Junction Temperature		T_{vj}	-55 ~ 150	℃
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. (Ic=75A)

Thermal Characteristics

Parameter	Symbol	Value	Unit
Maximum Thermal resistance, Junction-to-Case	R_{JC} (IGBT)	0.37	℃/W
Maximum Thermal resistance, Junction-to-Case	R_{JC} (DIODE)	2.1	℃/W
Maximum Thermal resistance, Junction-to-Ambient	R_{JA}	40	℃/W

Electrical Characteristics of the IGBT 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	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} =				

Current

Electrical Characteristics of the IGBT T_{vj}=25 , unless otherwise noted

Parameter	Symbol	Test condition	Min.	Typ.	Max.	Unit
SWITCHING (Note 2)						
Turn-On Delay Time	$t_{d(on)}$	V_{CC} = 600V, I_C = 12.5A R_G = 5 , V_{GE} = 15V Inductive Load, T_{vj} = 150 ℃	--	20	--	ns
Rise Time	t_r		--	24	--	ns
Turn-Off Delay Time	$t_{d(off)}$		--	150	--	ns
Fall Time	t_f		--	86	--	ns
Turn-On Switching Loss	E_{ON}		--	1.36	--	mJ
Turn-Off Switching Loss	E_{OFF}		--	0.34	--	mJ
Total Switching Loss	E_{TS}		--	1.70	--	mJ
Turn-On Delay Time	$t_{d(on)}$	V_{CC} = 600V, I_C = 25A R_G = 5 , V_{GE} = 15V Inductive Load, T_{vj} = 150 ℃	--	24	--	ns
Rise Time	t_r		--	42	--	ns
Turn-Off Delay Time	$t_{d(off)}$		--	137	--	ns
Fall Time	t_f		--	115	--	ns
Turn-On Switching Loss	E_{ON}		--	2.97	4.46	mJ
Turn-Off Switching Loss	E_{OFF}		--	0.91	1.37	mJ
Total Switching Loss	E_{TS}		--	3.88	5.83	mJ
Short Circuit Withstanding Time	t_{SC}	V_{CC} = 600V, V_{GE} = 15V, T_{vj} = 125	5	10	--	s

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

Electrical Characteristics of the DIODE T_{vj}=25 , unless otherwise noted

Parameter	Symbol	Test condition	Min.	Typ.	Max.	Unit
Diode Forward Voltage	V_{FM}	I_F =12.5A, T_{vj} = 25 ℃	--	1.56	--	V
		I_F = 12.5A, T_{vj} = 150 ℃	--	1.64	--	V
		I_F = 25A, T_{vj} = 25 ℃	--	2.00	--	V
		I_F = 25A, T_{vj} = 150 ℃	--	2.13	--	V
Reverse Recovery Time	t_{rr}	I_F = 12.5A, di/dt = 200A/μs, T_{vj} = 25 ℃	--	275	--	ns
Reverse Recovery Current	I_{rr}		--	10.9	--	A
Reverse Recovery Charge	Q_{rr}		--	1855	--	nC
Reverse Recovery Time	t_{rr}	I				

IGBT Characteristics

Fig. 1 IGBT Output Characteristics

Fig. 2 IGBT Output Characteristics

Fig. 3 IGBT Saturation Voltage vs. Junction Temperature

Fig. 4 oltage vs. Gate Bias

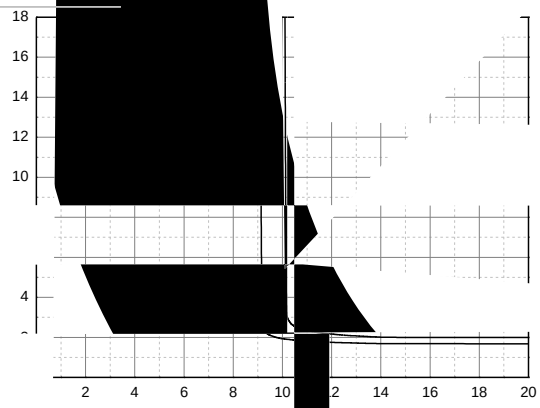
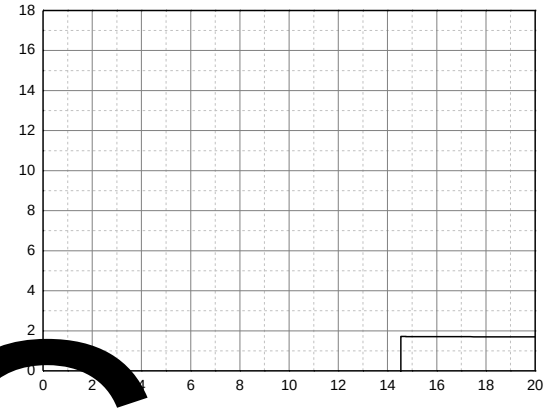


Fig. 5 IGBT Saturation Voltage vs. Gate Bias



IGBT Characteristics

Fig. 7 Turn-on Time vs. Gate Resistor

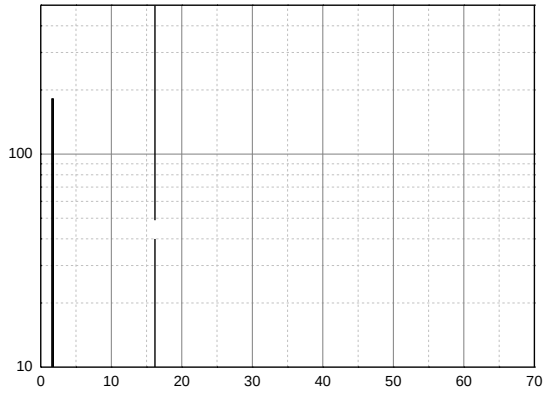


Fig. 8 Turn-off Time vs. Gate Resistor

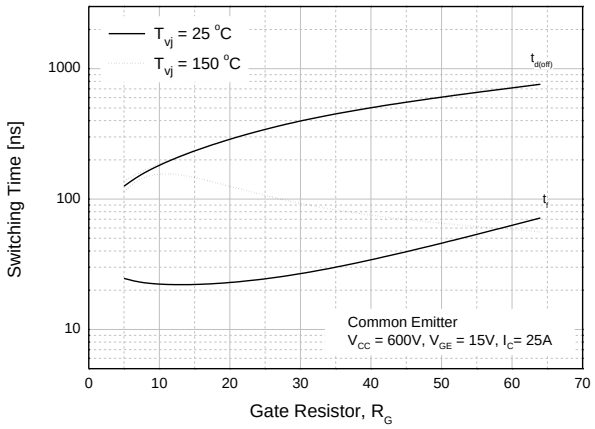


Fig. 9 Switching Loss vs. Gate Resistor

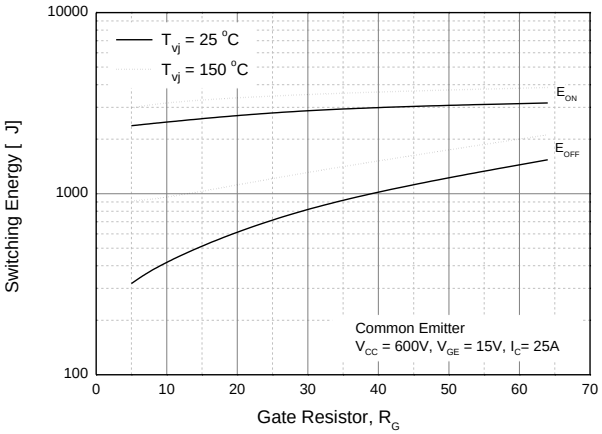


Fig. 10 Turn-on Time vs. Collector Current

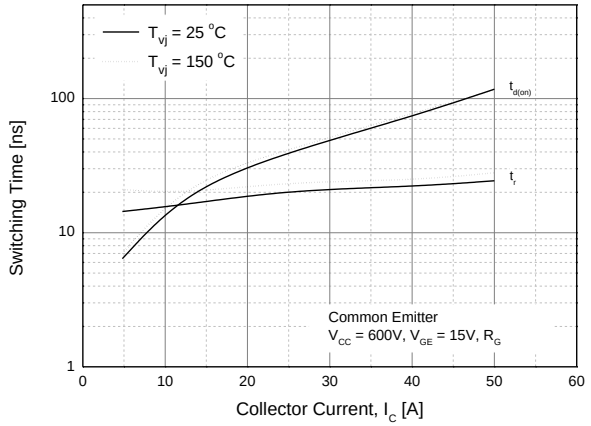
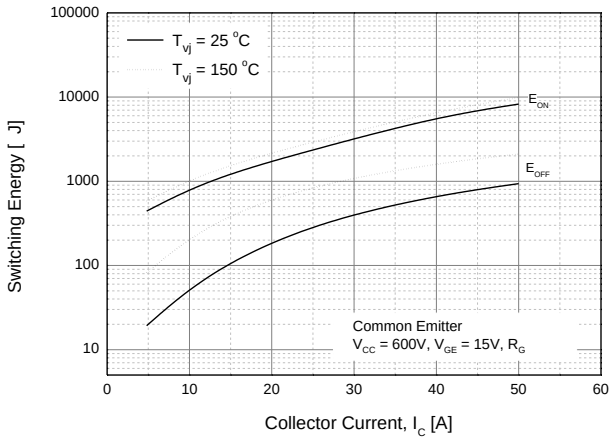


Fig. 11 Turn-off Time vs. Collector Current

Fig. 12 Switching Loss vs. Collector Current



IGBT Characteristics

Fig. 13 Gate Charge characteristics

Fig. 14 SOA

Fig. 15 RBSOA

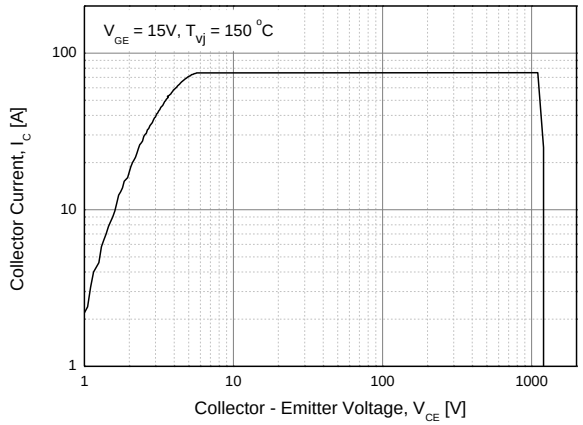
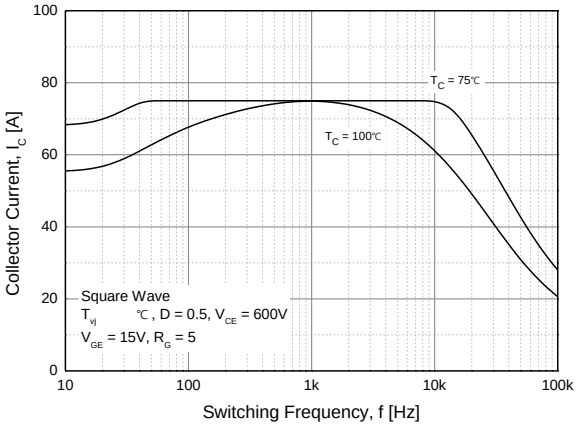


Fig. 16 Transient Thermal Impedance of IGBT

Fig. 17 Load Current vs. Frequency



Diode Characteristics

Fig. 18 Diode Conduction Characteristics

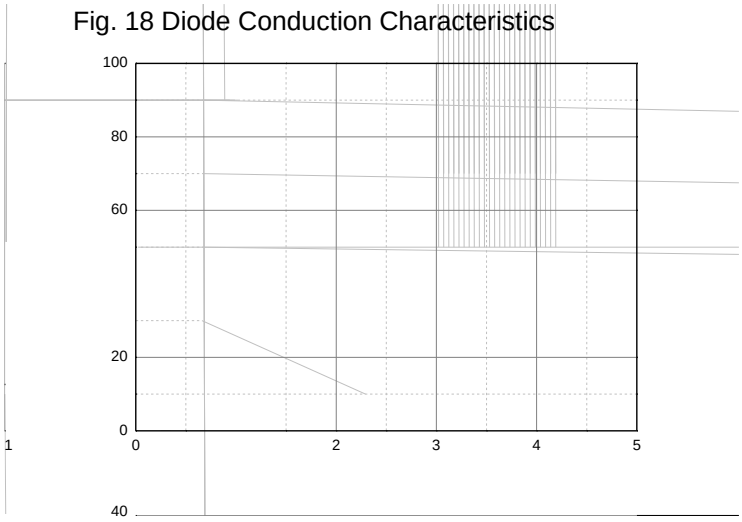


Fig. 19 Reverse Recovery Current vs. Forward Current

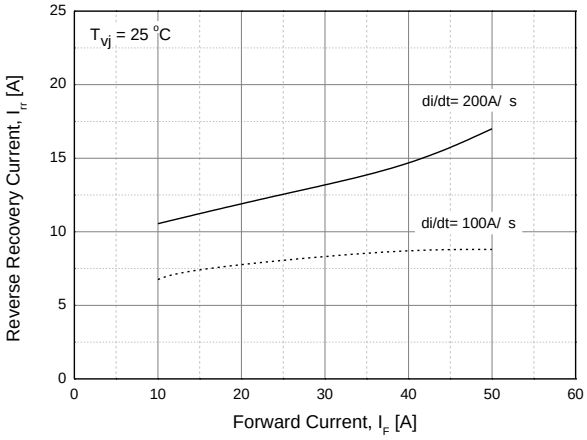


Fig. 20 Reverse Recovery Charge vs. Forward Current

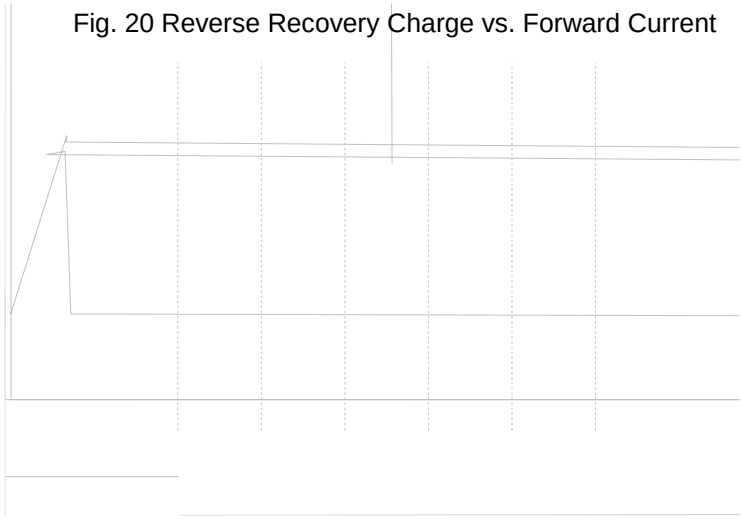
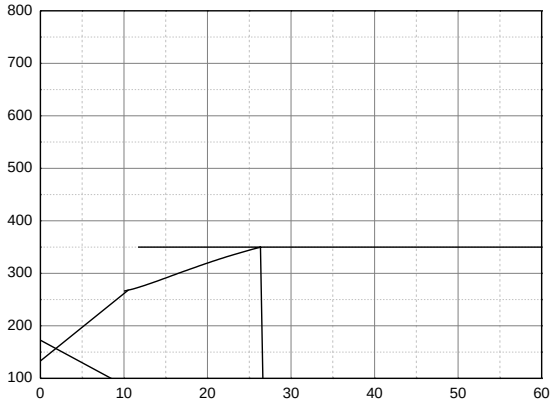
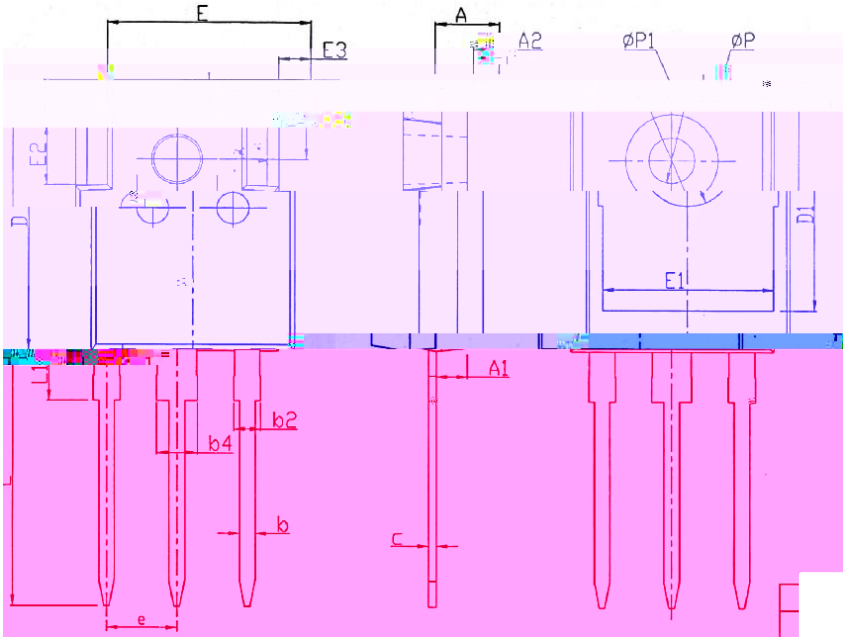


Fig. 21 Reverse Recovery Time vs. Forward Current



TO-247 MECHANICAL DATA



SYMBOL	mm		
	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.21	2.41	2.59
A2	1.85	2.00	2.15
b	1.11	1.21	1.36
b2	1.91	2.01	2.21
b4	2.91	3.01	3.21
c	0.51	0.61	0.75
D	20.80	21.00	21.30
D1	16.25	16.55	16.85
E	15.50	15.80	16.10
E1	13.00	13.30	13.60
E2	4.80	5.00	5.20
E3	2.30	2.50	2.70
e	5.44BSC		
L	19.62	19.92	20.22
L1	-	-	4.30
P	3.40	3.60	3.80
P1	-	-	7.30
S	6.15BSC		

Disclaimer

TRinno technology reserves the right to make changes without notice to products herein to improve reliability, performance, or design. The information given in this document is believed to be accurate and reliable. However, it shall in no event be regarded as a guarantee of conditions and characteristics. With respect to any information regarding the application of the device, TRinno technology hereby disclaims any and all warranties and liabilities of any kind, including without limitation, warranties of non-infringement of patent rights of any third party.