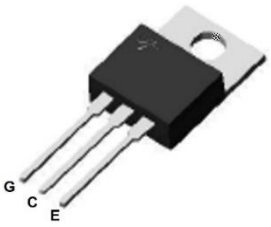
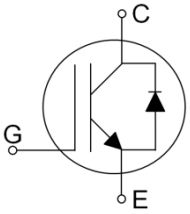
TGP15N60FDR
Field Stop Trench IGBT

Features

600V Field Stop Trench IGBT Technology
High Speed Switching
Low Conduction Loss
Positive Temperature Coefficient
Easy Parallel Operation
Short Circuit Withstanding Time 5 s
175℃ Operating Temperature
RoHS Compliant
JEDEC Qualification

TO-220





Applications

Motor Drive, Air Conditioner, Inverter, Solar

Device	Package	Marking	Remark
TGP15N60FDR	TO-220	TGP15N60FDR	RoHS

Absolute Maximum Ratings

Parameter		Symbol	Value	Unit
Collector-Emitter Voltage		V_{CES}	600	V
Gate-Emitter Voltage		V_{GES}	20	V
Continuous Collector Current	T_C = 25 ℃	I_C	30	A
	T_C = 100 ℃		15	A
Pulsed Collector Current (Note 1)		I_{CM}	45	A
Diode Continuous Forward Current	T_C = 100 ℃	I_F	15	A
Diode Pulsed Forward Current (Note 1)		I_{FM}	100	A
Power Dissipation	T_C = 25 ℃	P_D	100	W
	T_C = 100 ℃		50	W
Operating Junction Temperature		T_{vj}	-55 ~ 175	℃
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)	1.50	℃/W
Maximum Thermal resistance, Junction-to-Case	R_{JC} (DIODE)	2.35	℃/W
Maximum Thermal resistance, Junction-to-Ambient	R_{JA}	62.5	℃/W

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 = 7.5A, T_{vj} = 25 ℃	--	1.59	--	V
		I_F = 7.5A, T_{vj} = 125 ℃	--	1.35	--	V
		I_F = 7.5A, T_{vj} = 175 ℃	--	1.21	--	V
		I_F = 15A, T_{vj} = 25 ℃	--	1.91	--	V
		I_F = 15A, T_{vj} = 125 ℃	--	1.69	--	V
		I_F = 15A, T_{vj} = 175 ℃	--	1.61	--	V
Reverse Recovery Time	t_{rr}	I_F = 7.5A, di/dt = 200A/μs, T_{vj} = 25 ℃	--	46	--	ns
Reverse Recovery Current	I_{rr}		--	3.9	--	A
Reverse Recovery Charge	Q_{rr}		--	99	--	nC
Reverse Recovery Time	t_{rr}	I_F = 7.5A, di/dt = 200A/μs, T_{vj} = 175 ℃	--	109	--	ns
Reverse Recovery Current	I_{rr}		--	8.0	--	A
Reverse Recovery Charge	Q_{rr}		--	525	--	nC
Reverse Recovery Time	t_{rr}	I_F = 15A, di/dt = 200A/μs, T_{vj} = 25 ℃	--	50	--	ns
Reverse Recovery Current	I_{rr}		--	4.8	--	A
Reverse Recovery Charge	Q_{rr}		--	143	--	nC
Reverse Recovery Time	t_{rr}	I_F = 15A, di/dt = 200A/μs, T_{vj} = 175 ℃	--	121	--	ns
Reverse Recovery Current	I_{rr}		--	10.0	--	A
Reverse Recovery Charge	Q_{rr}		--	695	--	nC

IGBT Characteristics

Fig. 1 IGBT Output Characteristics

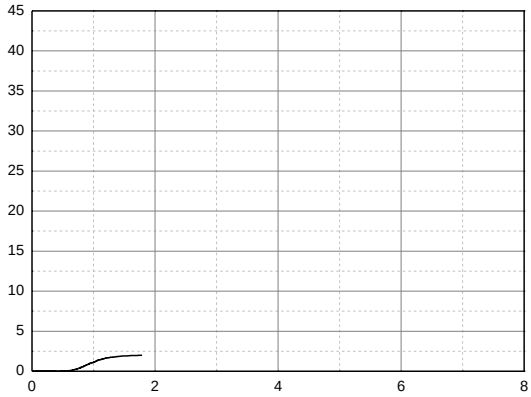


Fig. 2 IGBT Output Characteristics

Fig. 3 IGBT Saturation Voltage vs. Junction Temperature

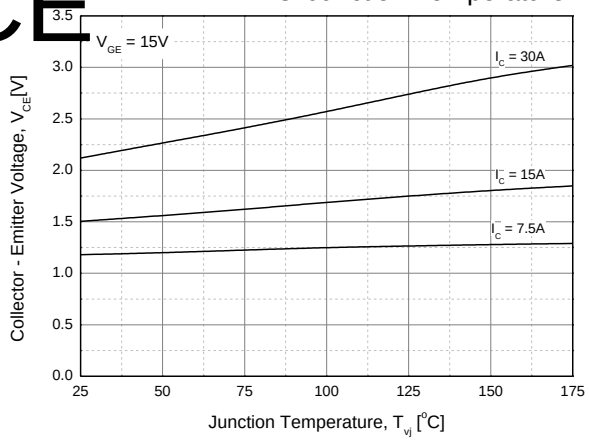


Fig. 4 IGBT Saturation Voltage vs. Gate Bias

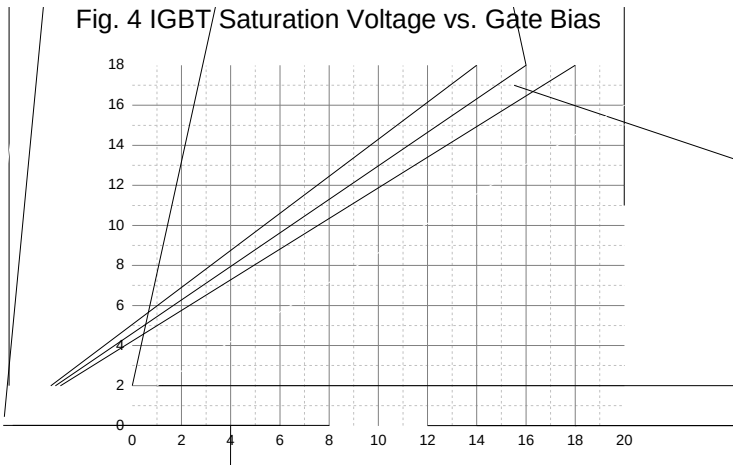
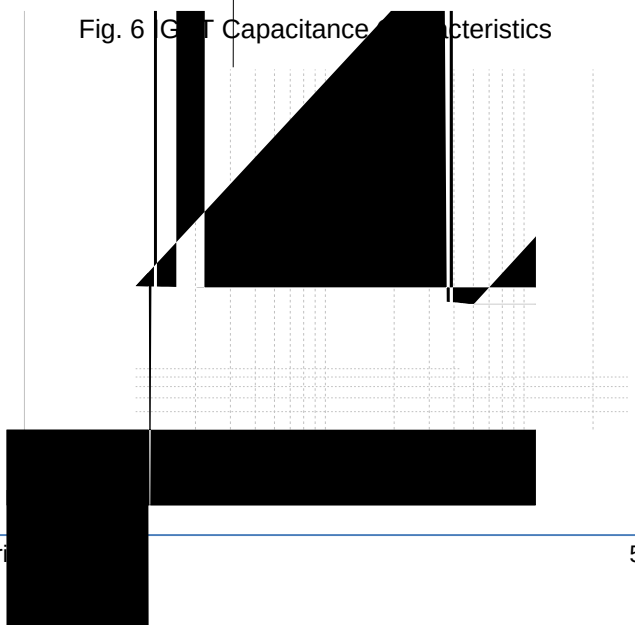


Fig. 5 IGBT Saturation Voltage vs. Gate Bias

Fig. 6 IGBT Capacitance Characteristics



IGBT Characteristics

Fig. 7 Turn-on Time vs. Gate Resistor

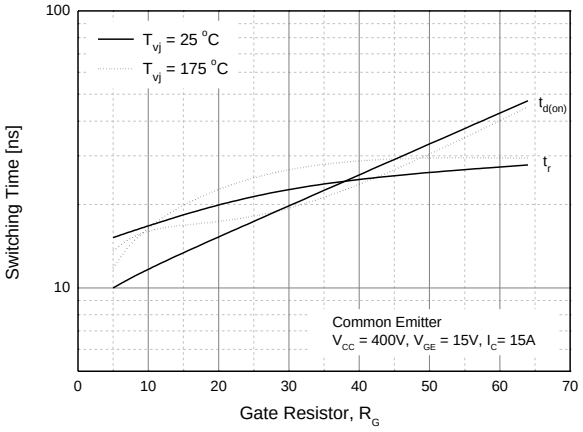


Fig. 8 Turn-off Time vs. Gate Resistor

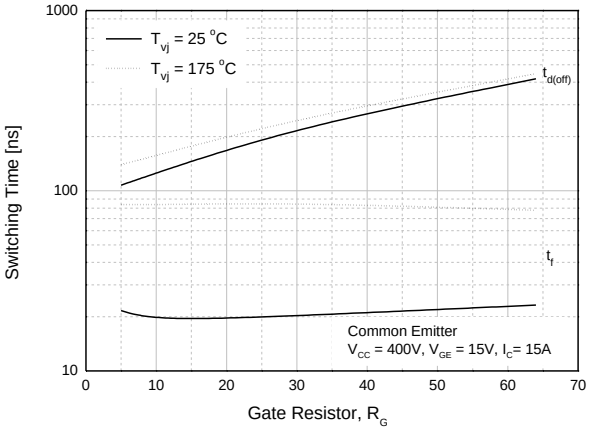


Fig. 9 Switching Loss vs. Gate Resistor

Fig. 10 Turn-on Time vs. Collector Current

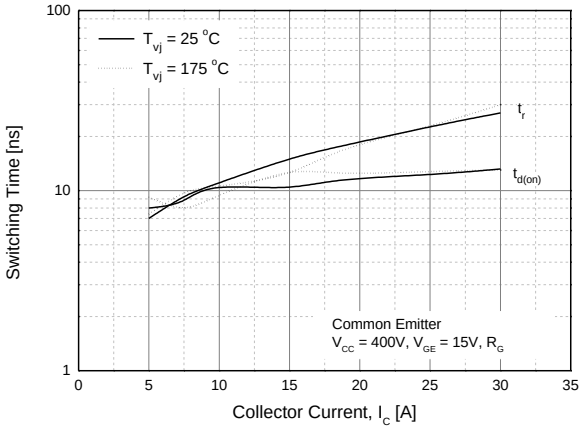
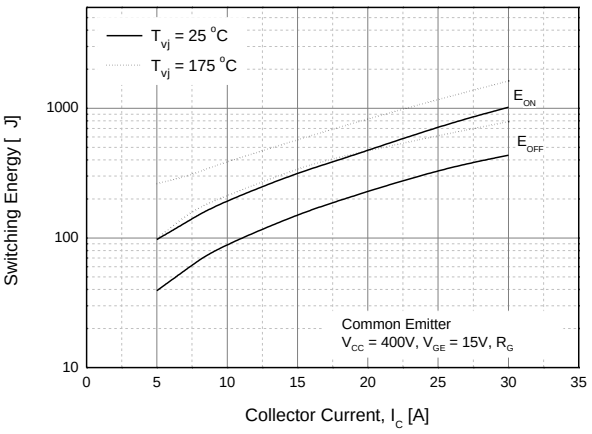


Fig. 11 Turn-off Time vs. Collector Current

Fig. 12 Switching Loss vs. Collector Current



IGBT Characteristics

Fig. 13 Gate Charge Characteristics

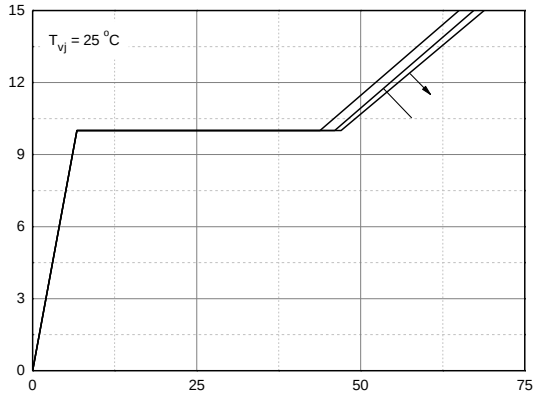


Fig. 14 SOA

Fig. 15 RBSOA

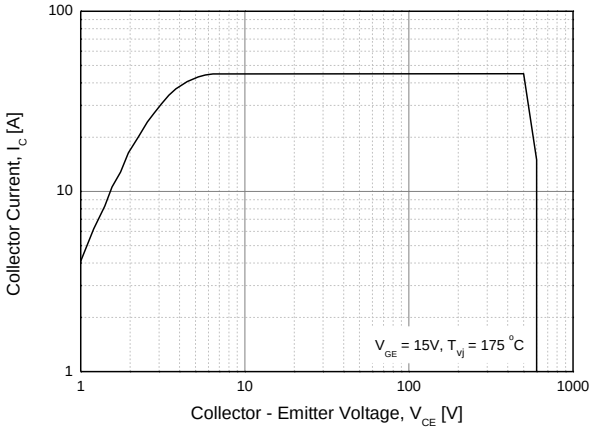
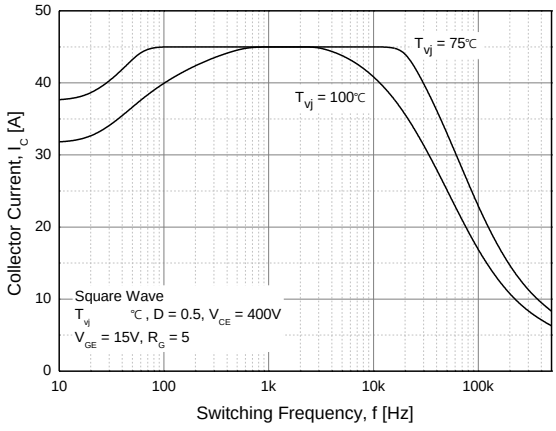


Fig. 16 Transient Thermal Impedance of IGBT

Fig. 17 Load Current vs. Frequency



DIODE Characteristics

Fig. 18 Diode Conduction Characteristics

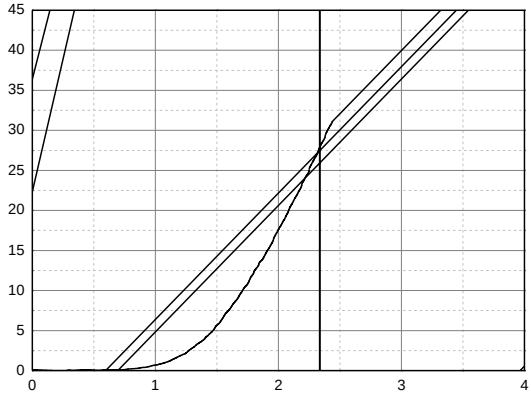


Fig. 19 Reverse Recovery Current vs. Forward Current

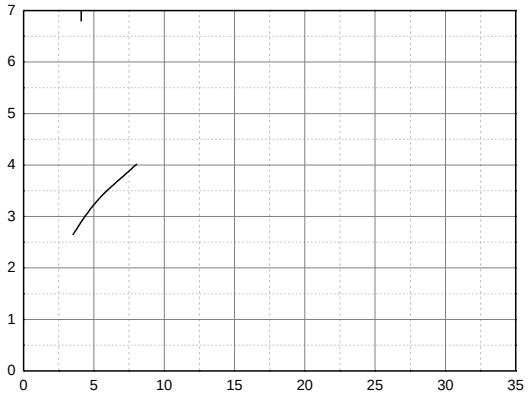


Fig. 20 Reverse Recovery Charge vs. Forward Current

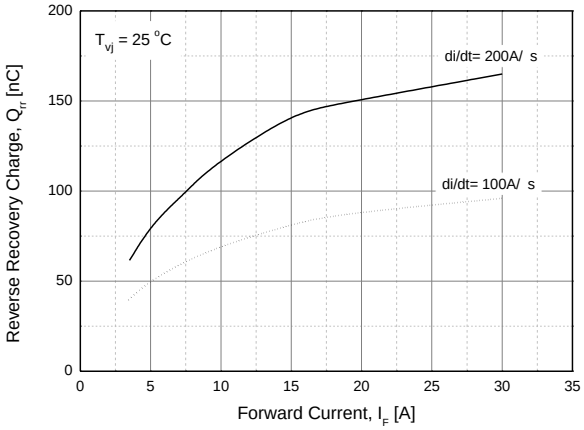
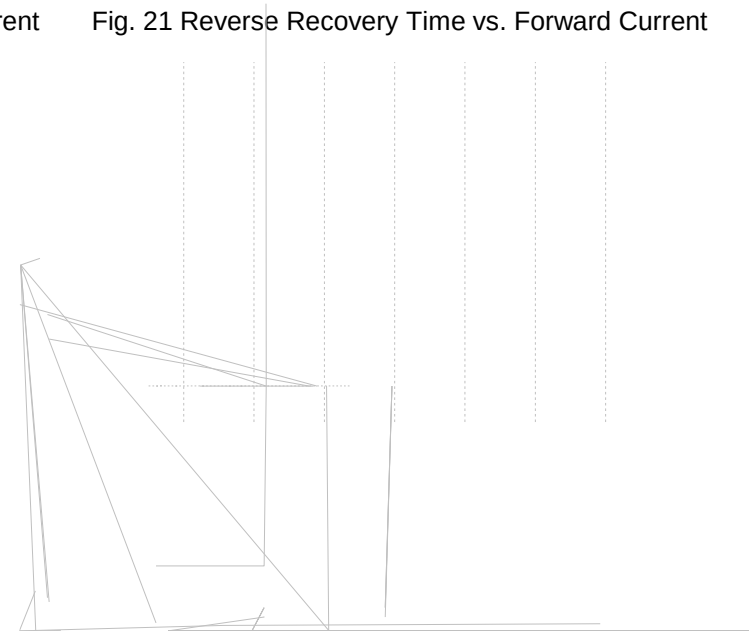
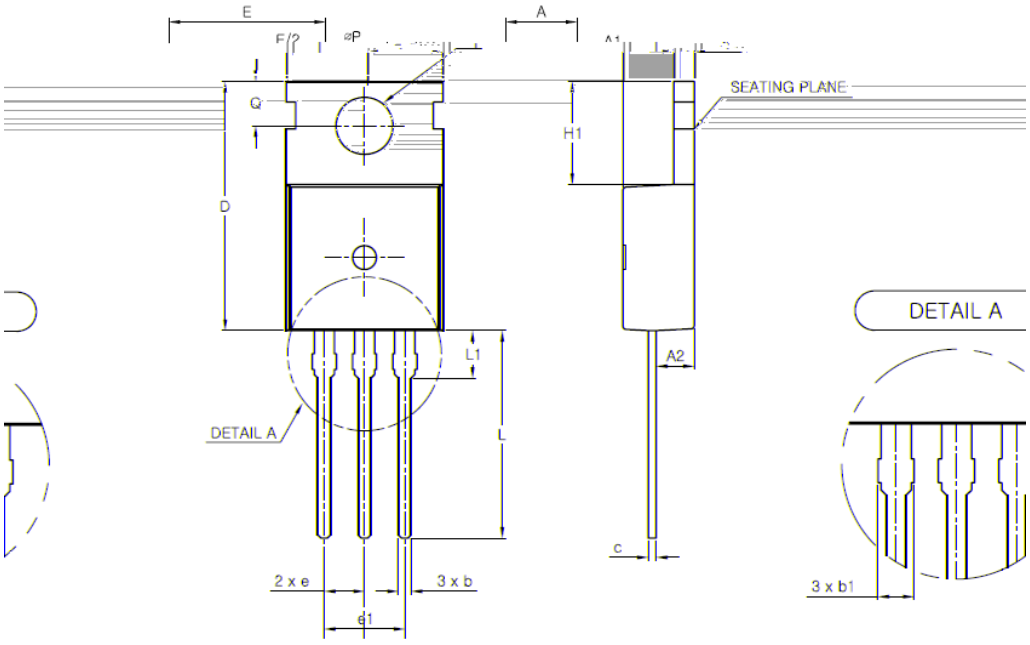


Fig. 21 Reverse Recovery Time vs. Forward Current



TO-220AB-3L MECHANICAL DATA



SYMBOL	MIN	MAX
A	4.30	4.70
A1	1.22	1.40
A2	2.20	2.79
b	0.70	0.91
b1	1.15	1.62
c	0.36	0.60
D	14.99	15.90
E	9.70	10.41
e	2.54 TYP	
e1	5.08 BSC	
H1	5.97	6.70
L	12.88	13.97
L1	3.31	3.81
ØP	3.40	3.88
Q	2.60	2.90

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