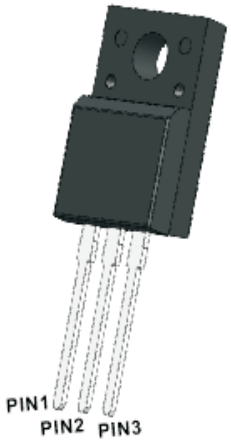
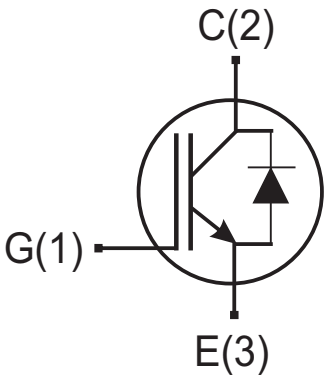
650V,5A,Field Stop , IGBT

TO-220F-3L(*Prefix :F)

V_{CES}	650V
I_C (Tc 100℃)	5A
$V_{CE(sat)(typ)}$	1.5V



RoHS COMPLIANT



SYMBOL

DESCRIPTION
- Positive temperature coefficient
- Low VCEsat
- Low saturation voltage
- High switching frequency
- Easy paralleling
- Rohs Compliant

APPLICATIONS
- Motor drives
- Inverters
- Uninterruptible Power Supplies
- Converters

ABSOLUTE MAXIMUM RATINGS (TA=25°C, unless otherwise specified)

PARAMETER		Symbols	RATINGS	Units
Collector-emitter voltage		V_{CES}	650	V
Gate-emitter voltage		V_{GES}	±20	V
Continuous Drain Current	Tc=25°C	I_C	10	A
	Tc=100°C		5	
Pulsed Drain Current		I_{CM}	20	A
Diode Forward Current	Tc=25°C	I_F	10	A
	Tc=100°C		5	
Power Dissipation (Tc = 25°C)		P_D	25	W
Operating junction temperature		T_j	-55 ~ +150	°C
storage temperature		T_{stg}	-55 ~ +150	°C

Thermal Resistance

PARAMETER	Symbols	RATINGS	Units
Thermal resistance IGBT junction – case.	R_{thJC}	5.0	°C/W
Thermal resistance Diode junction – case.	R_{thJC}	5.0	°C/W
Thermal resistance, junction – ambient	R_{thJA}	65	°C/W

ELECTRICAL CHARACTERISTICS (TA=25°C, unless otherwise specified)

PARAMETER	Symbols	TEST CONDITIONS	Min	Typ	Max	Units
OFF CHARACTERISTICS						
Collector-emitter breakdown voltage	$V_{(BR)CES}$	V_{GE}=0V,I_{CE}=0.25mA	650			V
Zero gate voltage collector current	I_{CES}	V_{CE}=650V,V_{GE}=0V			1	uA
Gater-emitter leakage currentt	I_{GES}	V_{GE}=±20V,V_{CE}=0V			±100	nA
Collector-emitter saturation voltage	$V_{CE(sat)}$	V_{GE}=15V,IC=5A		1.5	2.0	V
Gate-emitter threshold voltage	$V_{GE(TH)}$	V_{GE}=V_{CE},IC=0.25mA	4.5		6.5	V
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ies}	V_{CE}=25V,		259		pF
Output Capacitance	C_{oes}	V_{GE}=0V,		31.3		pF
Reverse Transfer Capacitance	C_{res}	f=1.0MHz		10.3		pF
Gate resistance	RG	V_{DS}=0V,f=1.0MHz		2.0		Ω
Dynamic						
COSS Stored Energy	E_{TS}	VCE =400V,IC = 5A		197		mJ
Turn-On Energy (Body Diode)	E_{ON}	VGE =15V,Rg=60Ω		132		mJ
Turn-Off Energy (Body Diode)	E_{OFF}	Tj =25 ℃		65		mJ
Turn-On Delay Time (Note 1)	$t_{D(ON)}$	VCE =400V,IC = 5A		22		ns
Turn-On Rise Time	t_R	VGE =15V,Rg=60Ω		15		ns
Turn-Off Delay Time	$t_{D(OFF)}$	Tj =25 ℃		104		ns
Turn-Off Fall Time	t_F			32		ns
FRD electrical parameters						
Reverse Not Repeating Peak Voltage	VRSM	IR=5uA		650		V
Forward Voltage Drop	VF	V_{GE}=0V,IF=2.5A		1.5	1.8	V
Reverse Recovery Time	TRR	IF=0.5A,IR=1.0A Irr=0.25A			60	ns
Maximum Reverse Recovery Time	trr	IF=8A,VR=400V, DIF/Dt=200A/us		70		ns
Maximum Reverse Recovery Current	IRRM			4.0		A
Reverse Recovery Charge	QRR			145		nc

Notes:
1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating temperature.

Typical Characteristics

Fig.1 Drain Current vs. Gate-Source Voltage

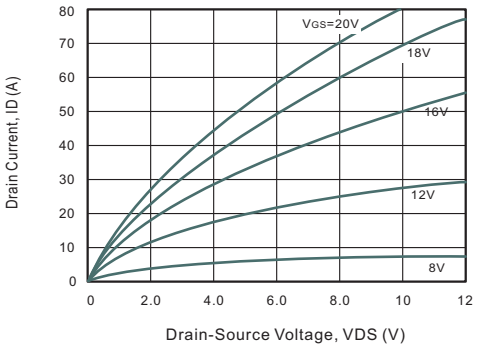


Fig.2 Capacitance Characteristics

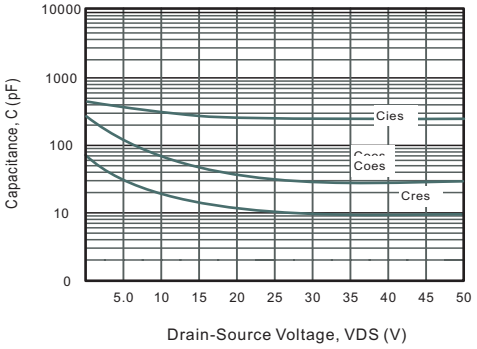


Fig.3 Power Dissipation

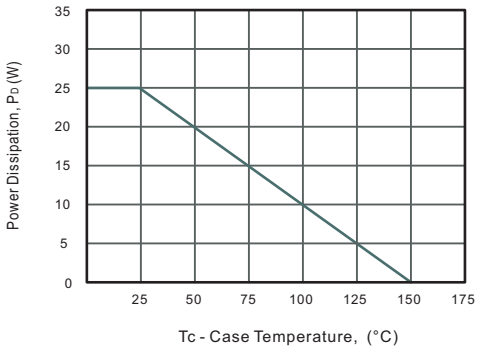


Fig.4 Drain Current Derating

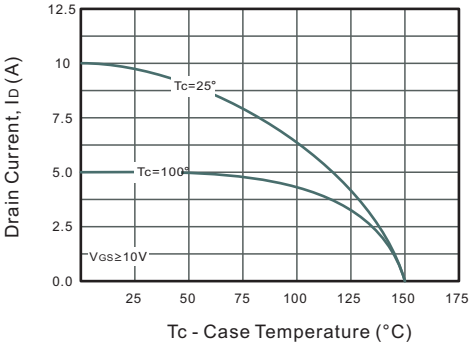
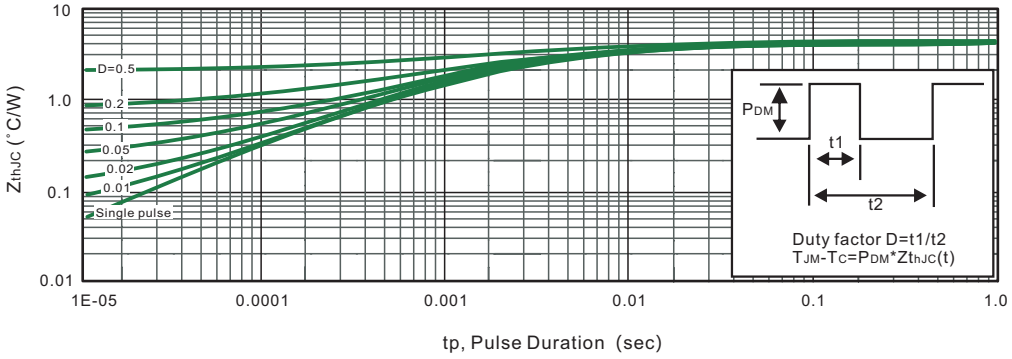
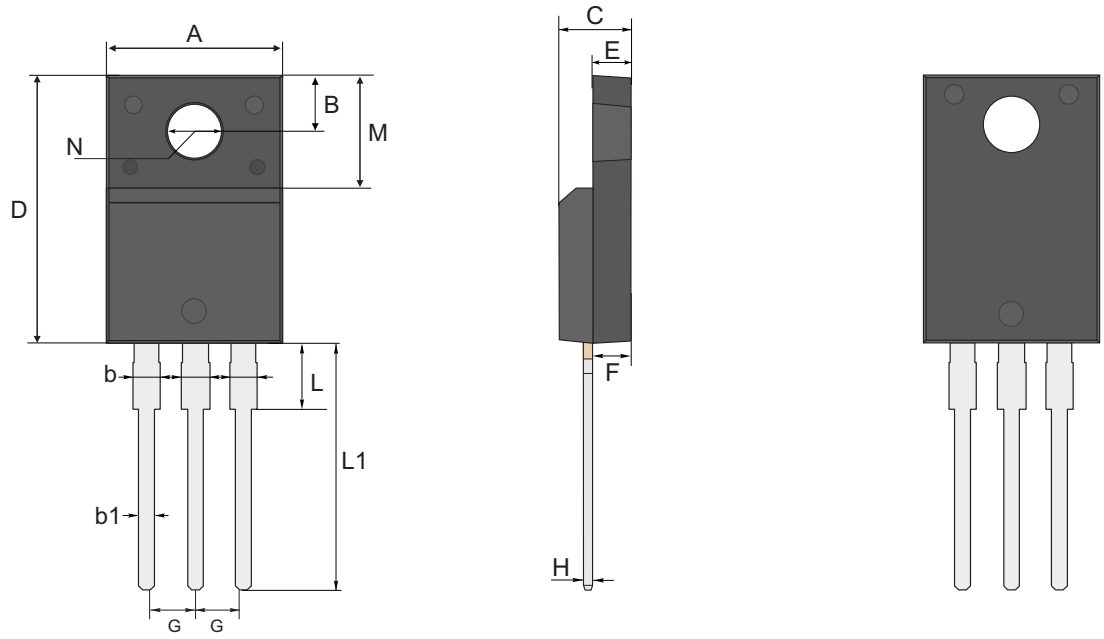


Fig.5 Max. Transient Thermal Impedance



Package Outline
Through Hole Package ; 3 leads

TO-220F-3L



TO-220F-3L Mechanical data

UNIT		A	B	b	b1	C	D	E	F	G	H	L	L1	M	N
mm	max	10.28	3.37	1.44	0.9	4.9	16.07	2.74	2.74	2.64	0.6	2.85	13.7	6.98	3.18 typ.
	typ	10.18	3.27	1.34	0.8	4.7	15.87	2.54	2.54	2.54	0.5	2.65	13.5	6.68	
	min	10.08	3.17	1.24	0.7	4.5	15.67	2.34	2.34	2.44	0.4	2.45	13.3	6.38	
mil	max	405	133	57	35	193	633	108	108	104	24	112	539	275	125 typ.
	typ	401	129	53	31	185	625	100	100	100	20	104	531	263	
	min	397	125	49	28	177	617	92	92	96	16	96	524	251	

Marking

Type number	Marking code
GF05ND65ST	GF05ND65ST

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