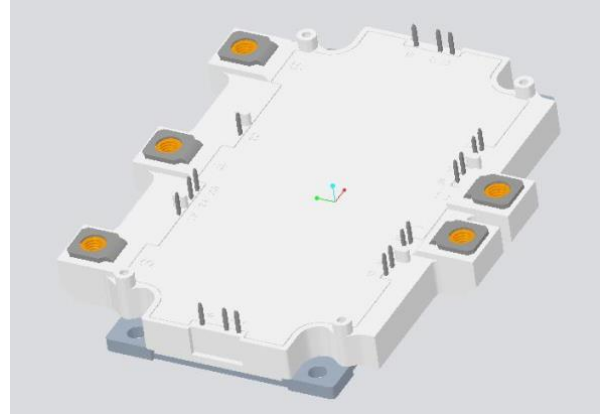


Trench/Field stop IGBT and Fast recovery diode and NTC

Features

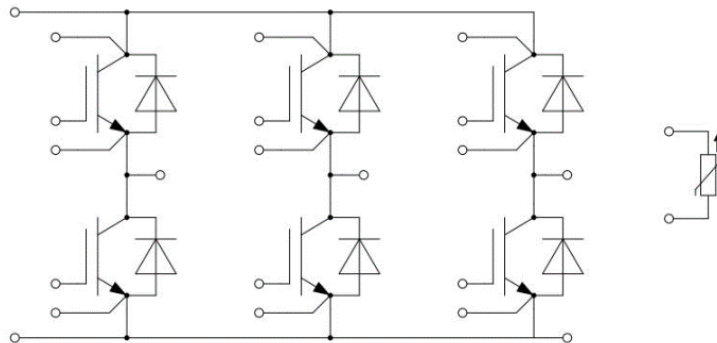
- 650V 400A
- Trench & Field Stop IGBT
- High Short Circuit Capability
- $T_{vjop}=150^{\circ}\text{C}$



Applications

- Converter
- Motor Drives

Equivalent Circuit Schematic



IGBT - Inverter

Maximum Rated Values

Symbol	Description	Conditions	Values	Unit
V_{CES}	Collector-Emitter Voltage	$T_{vj}=25^{\circ}\text{C}$	650	V
V_{GES}	Gate-Emitter Peak Voltage	$T_{vj}=25^{\circ}\text{C}$	± 20	V
I_C	Continuous DC Collector Current	$T_C=100^{\circ}\text{C}$	400	A
I_{CRM}	Repetitive Peak Collector Current	$t_p=1\text{ms}$	800	A
P_{tot}	Total Power Dissipation	$T_C=25^{\circ}\text{C}, T_{vj\max}=175^{\circ}\text{C}$	1774	W

Characteristic Values

Symbol	Description	Conditions	Values			Unit
			Min.	Typ.	Max.	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$V_{GE}=15V, I_C=400A, T_{vj}=25^{\circ}C$	1.2	1.7	2.0	V
		$V_{GE}=15V, I_C=400A, T_{vj}=125^{\circ}C$	---	2.0	--	V
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE}=V_{CE}, I_C=3.2mA$	5.0	5.8	7.0	V
I_{CES}	Collector-Emitter Cut-Off Current	$V_{CE}=650V, V_{GE}=0V$	---	---	0.2	mA
I_{GES}	Gate-Emitter Leakage Current	$V_{GE}=20V, V_{CE}=0V$	---	---	200	nA
$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=300V$ $V_{GE}=\pm 15V$ $I_C=400A$ $R_G=4.7\Omega$ Inductive Load $T_{vj}=25^{\circ}C$	---	0.11	---	us
t_r	Turn-on Rise Time		---	0.10	---	us
$t_{d(off)}$	Turn-off Delay Time		---	0.16	---	us
t_f	Turn-off Fall Time		---	0.08	---	us
E_{on}	Turn-on Switching Loss		---	1.69	---	mJ
E_{off}	Turn-off Switching Loss		---	7.86	---	mJ
I_{SC}	Short Circuit Data	$V_{GE}\leq 15V, V_{CC}=300V$ $t_p=10\mu s, T_{vj}=25^{\circ}C$	---	1982	---	A
R_{thJC}	Thermal Resistance, Junction to Case	Per IGBT	---	---	0.086	K/W
T_{vjop}	Temperature under switching conditions		-40	---	150	$^{\circ}C$

**Diode - Inverter
Maximum Rated Values**

Symbol	Description	Conditions	Values	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	$T_{vj}=25^{\circ}C$	650	V
I_F	Continuous DC Forward Current		400	A
I_{FRM}	Repetitive Peak Collector Current	$t_p=1ms$	800	A

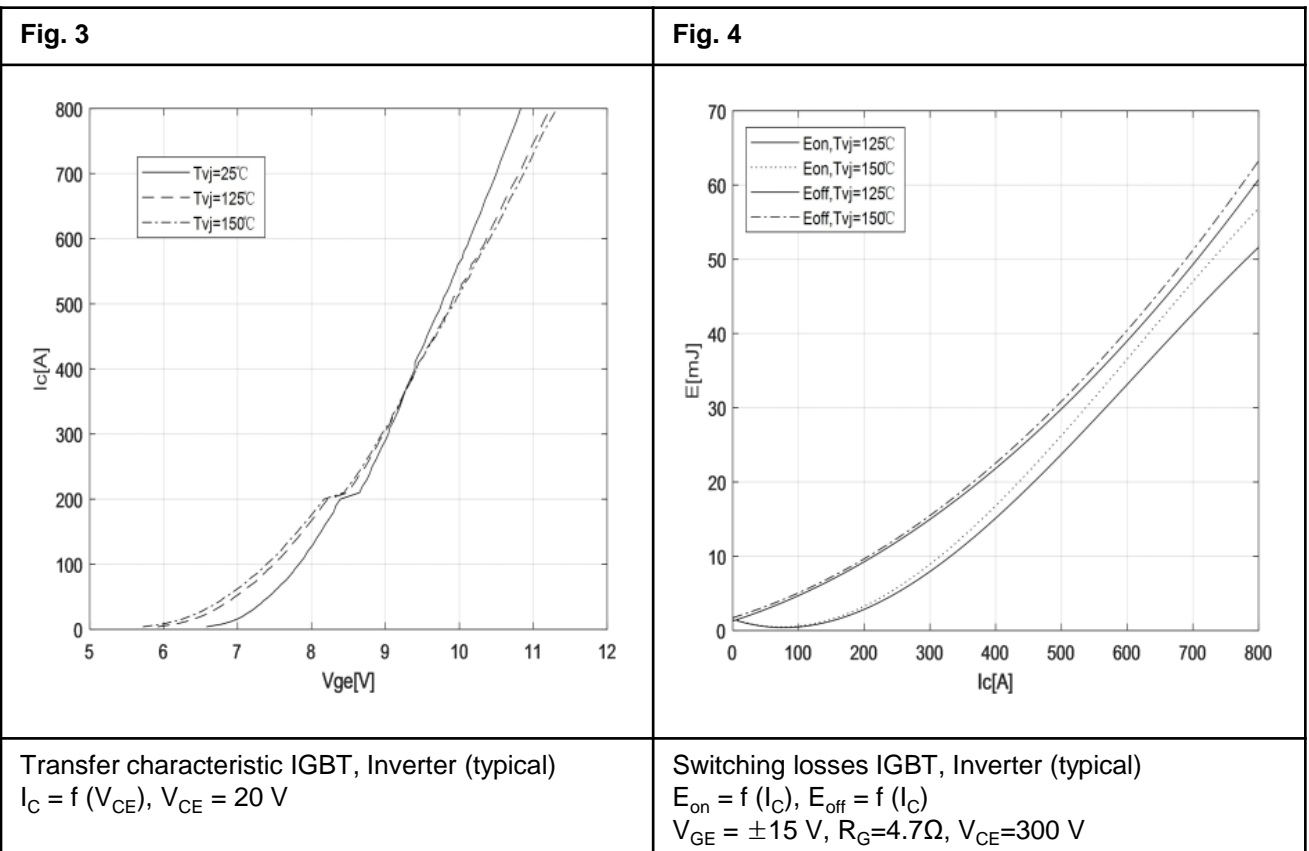
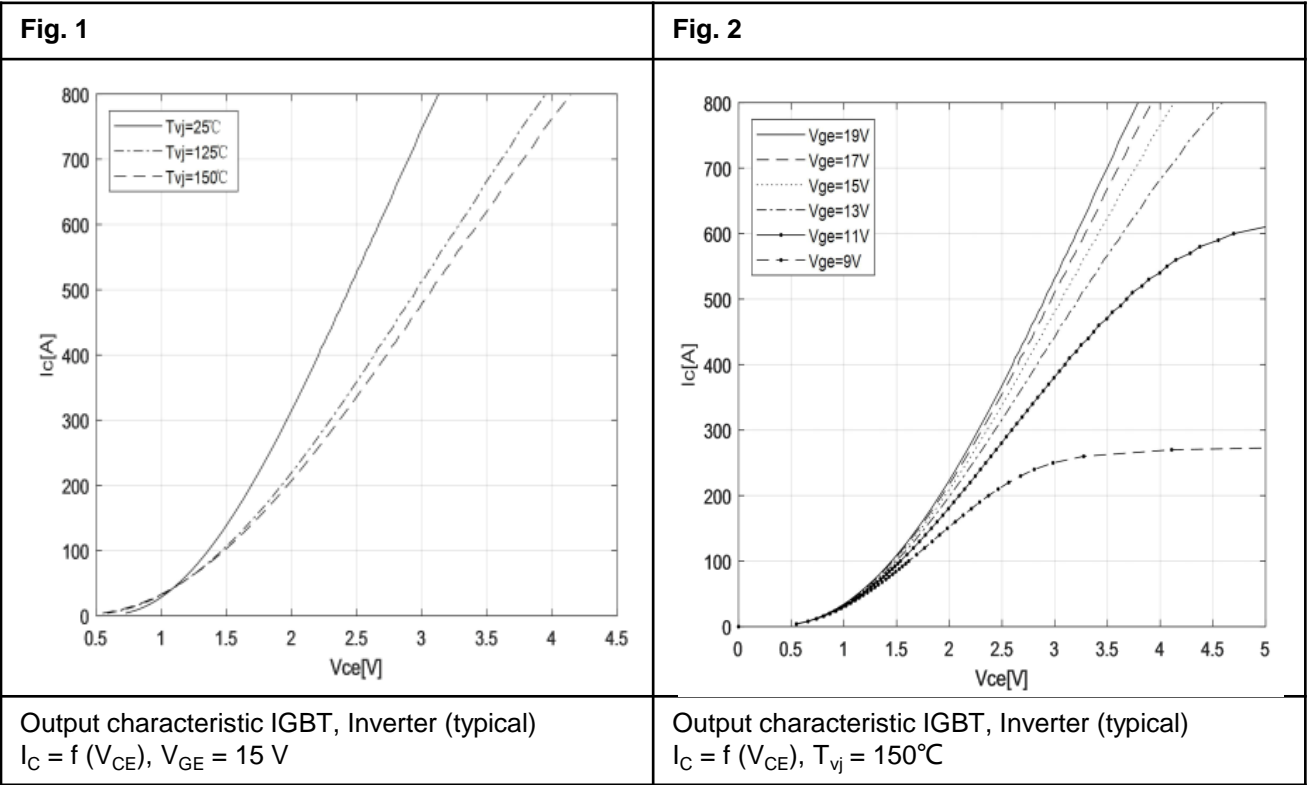
Characteristic Values

Symbol	Description	Conditions	Values			Unit
			Min.	Typ.	Max.	
V _F	Forward Voltage	I _F =400A, V _{GE} =0V, T _{vj} =25°C	1.2	1.6	2.0	V
		I _F =400A, V _{GE} =0V, T _{vj} =125°C	---	1.7	---	V
I _{RM}	Peak Reverse Recovery Current	I _F =400A, V _R =300V, V _{GE} =-15V T _{vj} =25°C	---	80	---	A
Q _r	Recovered Charge		---	6.31	---	uC
E _{rec}	Reverse Recovery Energy		---	1.77	---	mJ
R _{thJC}	Thermal Resistance, Junction to Case	Per Diode	---	---	0.312	K/W
T _{vjop}	Temperature under switching conditions		-40	---	150	°C

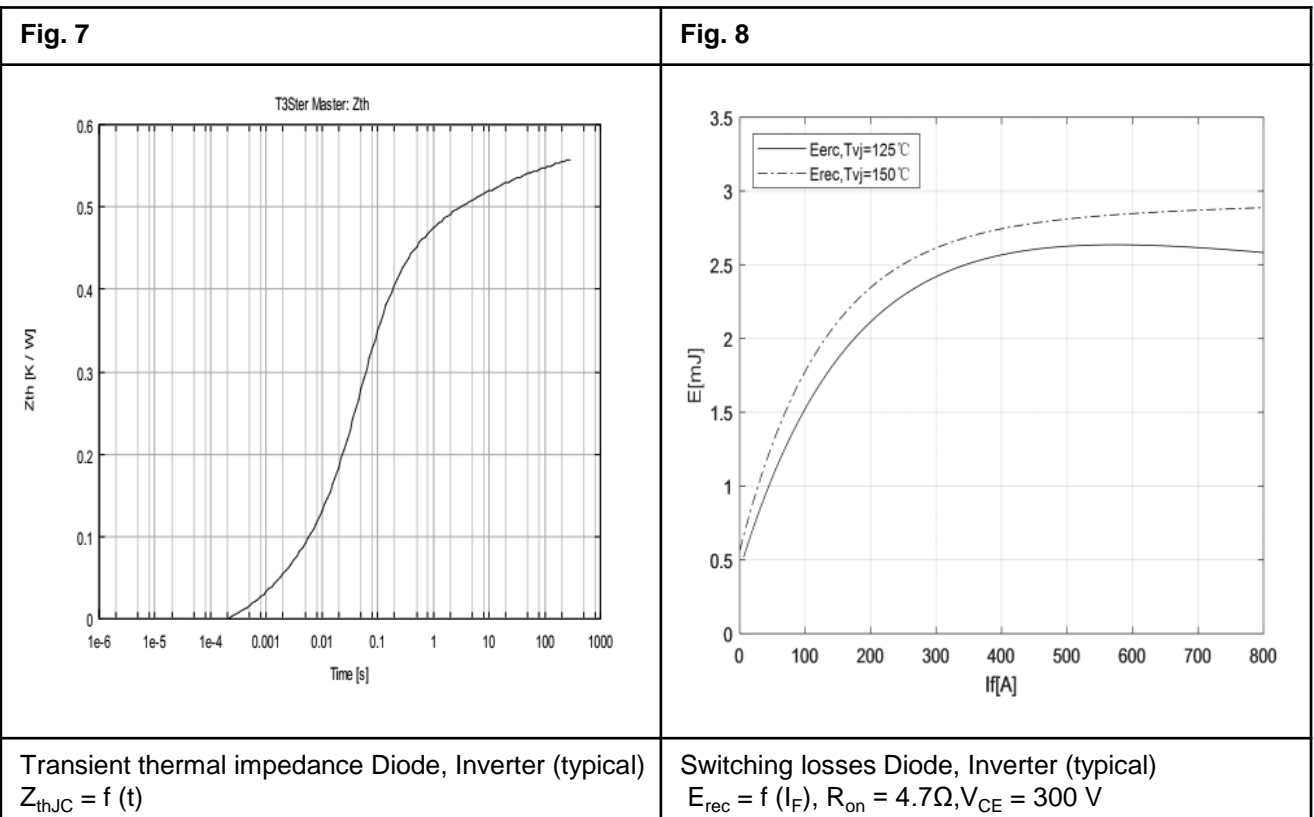
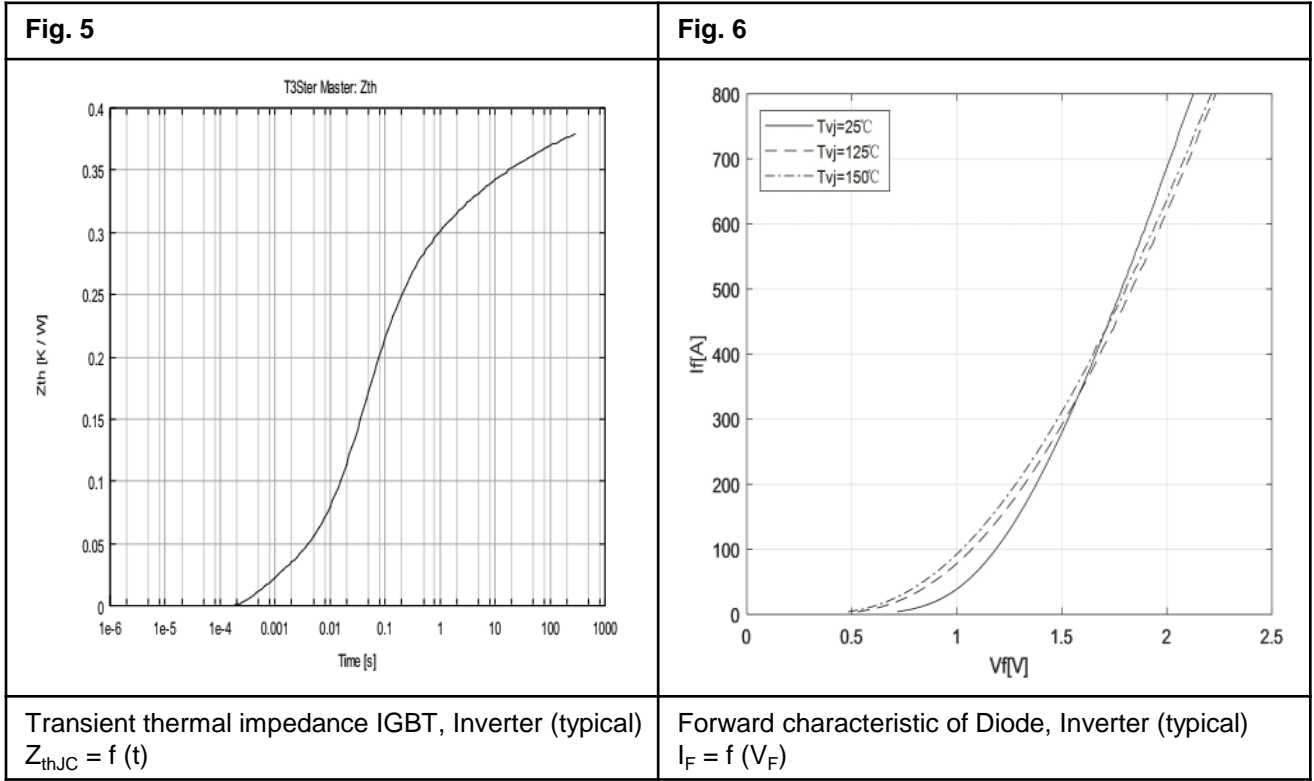
Module

Symbol	Description	Conditions	Values	Unit
V _{ISOL}	Isolation Test Voltage	RMS, f=0Hz, t=1.2 sec	4.7	KV
	Material of Module Baseplate		Cu	
	Internal Isolation		Al ₂ O ₃	
	Creepage Distance	Terminal to Heatsink	12.0	mm
		Terminal to Terminal	6.1	
	Clearance	Terminal to Heatsink	12.0	mm
		Terminal to Terminal	6.1	
L _s	Stray inductance module		15	nH
T _{stg}	Storage temperature		-40~125	°C
M	Mounting torque for module mounting	Screw M5 - Mounting according to valid application note	3.0 ~ 6.0	N·m
M	Mounting torque for module mounting	Screw M6 - Mounting according to valid application note	3.0 ~ 6.0	N·m
G	Weight		485	g

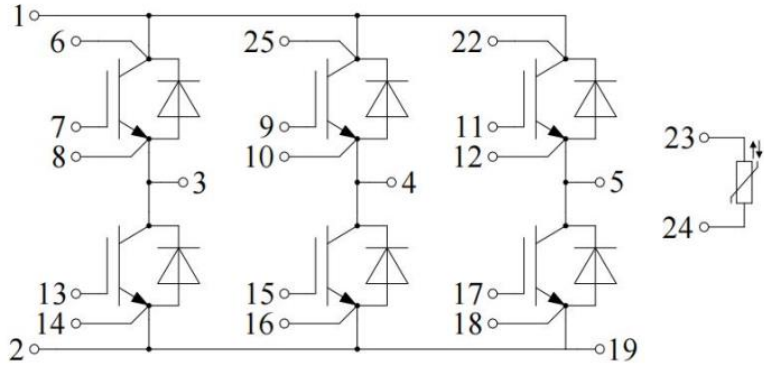
Typical Characteristics



Typical Characteristics



Circuit Diagram



Package Outlines (mm)

