

Econo Dual module with Trench/Fieldstop IGBT and Fast recovery diode and NTC

Features

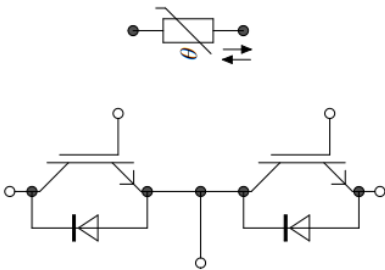
- 1200V 450A
- Trench & Field Stop IGBT
- High Short Circuit Capability
- Low Switching Loss
- Positive Temperature Coefficient



Applications

- Solar Inverter
- UPS
- Motor Drives
- Servo Driver

Equivalent Circuit Schematic



IGBT - Inverter
Maximum Rated Values

Symbol	Description	Conditions	Values	Unit
V_{CES}	Collector-Emitter Voltage	$T_{vj}=25^{\circ}C$	1200	V
V_{GES}	Gate-Emitter Peak Voltage	$T_{vj}=25^{\circ}C$	± 30	V
I_C	Continuous DC Collector Current	$T_C=100^{\circ}C$	450	A
I_{CRM}	Repetitive Peak Collector Current	$t_p=1ms$	900	A
P_{tot}	Total Power Dissipation	$T_C=25^{\circ}C, T_{vj\ max}=175^{\circ}C$	2080	W

Characteristic Values

Symbol	Description	Conditions	Values			Unit
			Min.	Typ.	Max.	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$V_{GE}=15V, I_C=450A, T_{vj}=25^{\circ}C$	---	1.75	2.1	V
		$V_{GE}=15V, I_C=450A, T_{vj}=125^{\circ}C$	---	2.15	---	V
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE}=V_{CE}, I_C=17mA$	---	5.9	---	V
I_{CES}	Collector-Emitter Cut-Off Current	$V_{CE}=1200V, V_{GE}=0V$	---	---	5	mA
I_{GES}	Gate-Emitter Leakage Current	$V_{GE}=30V, V_{CE}=0V$	---	---	400	nA
R_{Gint}	Internal Gate resistor		---	1.5	---	Ω
Q_G	Gate Charge	$V_{GE}=-15V.....+15V$	---	7.4	---	μC
C_{ies}	Input capacitance	$f=1MHz, V_{CE}=25V, V_{GE}=0V$	---	133	---	nF
C_{res}	Reverse transfer capacitance		---	1.5	---	nF
$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=600V$ $V_{GE}=\pm 15V$ $I_C=450A$ $R_G=1.3\Omega$ Inductive Load $T_{vj}=25^{\circ}C$	---	370	---	ns
t_r	Turn-on Rise Time		---	160	---	ns
$t_{d(off)}$	Turn-off Delay Time		---	510	---	ns
t_f	Turn-off Fall Time		---	90	---	ns
E_{on}	Turn-on Switching Loss		---	52	---	mJ
E_{off}	Turn-off Switching Loss		---	39	---	mJ
I_{SC}	Short Circuit Data	$V_{GE}=15V, V_{CC}=800V$ $t_p=10\mu s, T_{vj}=150^{\circ}C$	---	1800	---	A
R_{thJC}	Thermal Resistance, Junction to Case	Per IGBT	---	0.07	---	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	$T_{vj}=25^{\circ}C$	1200	V
I_F	Continuous DC Forward Current		450	A
I_{FRM}	Repetitive Peak Collector Current	$t_p=1ms$	900	A

Characteristic Values

Symbol	Description	Conditions	Values			Unit
			Min.	Typ.	Max.	
V_F	Forward Voltage	$I_F=450A, V_{GE}=0V, T_{vj}=25^{\circ}C$	---	2.25	---	V
		$I_F=450A, V_{GE}=0V, T_{vj}=125^{\circ}C$	---	2.35	---	V
I_{RM}	Peak Reverse Recovery Current	$I_F=450A, V_R=600V, V_{GE}=-15V$ $T_{vj}=25^{\circ}C$	---	120	---	A
Q_r	Recovered Charge		---	14.5	---	uC
E_{rec}	Reverse Recovery Energy		---	4.5	---	mJ
R_{thJC}	Thermal Resistance, Junction to Case	Per Diode	---	0.09	---	K/W
T_{vjop}	Temperature under switching conditions		-40	---	150	$^{\circ}C$

NTC-Thermistor Characteristic Values

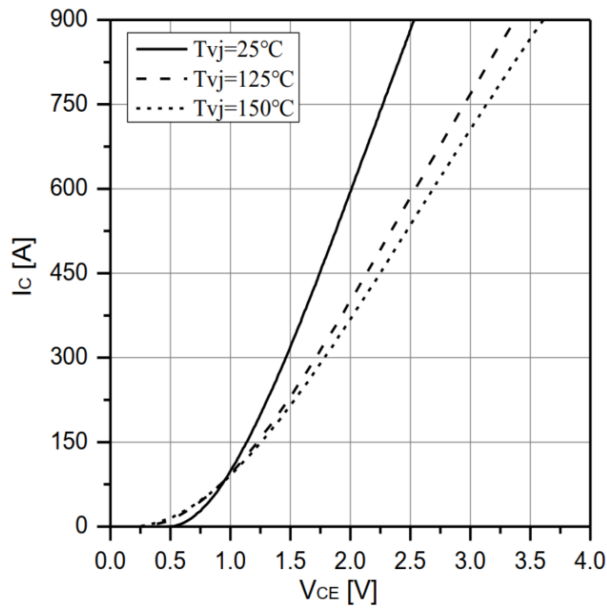
Symbol	Description	Conditions	Values			Unit
			Min.	Typ.	Max.	
R_{25}	Rated Resistance	$T_C=25^{\circ}C$	---	5	---	K Ω
$B_{25/50}$	B Value	$R_2 = R_{25} \exp [B_{25/50}(1/T_2 - 1/(298 K))]$	---	3380	---	K

Module

Symbol	Description	Conditions	Values	Unit
V_{ISOL}	Isolation Test Voltage	RMS, f=50Hz, t=60s	2500	V
	Material of Module Baseplate		Cu	
	Internal Isolation		Al_2O_3	
	Creepage Distance	Terminal to Terminal	14.5	mm
	Clearance	Terminal to Terminal	12.5	mm
L_S	Stray inductance module		20	nH
T_{stg}	Storage temperature		-40~125	$^{\circ}C$
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		350	g

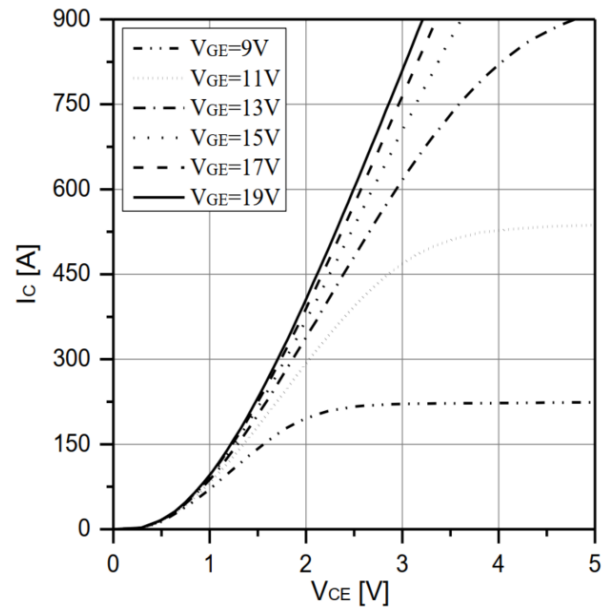
Typical Characteristics

Fig. 1



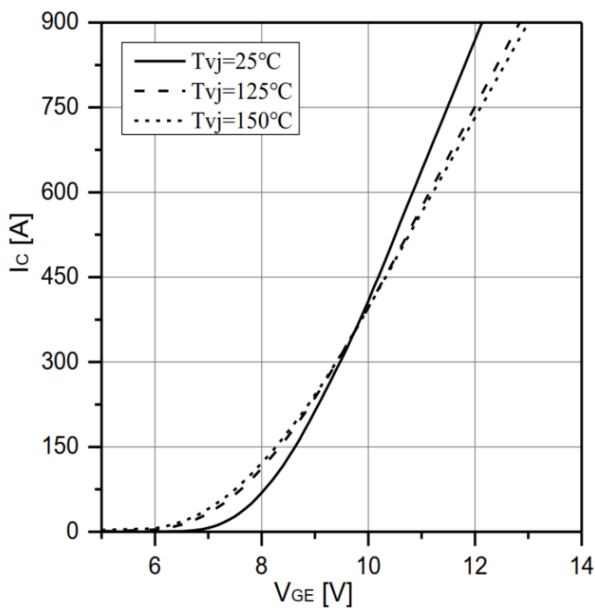
Output characteristic IGBT, Inverter (typical)
 $I_C = f(V_{CE})$, $V_{GE} = 15\text{ V}$

Fig. 2



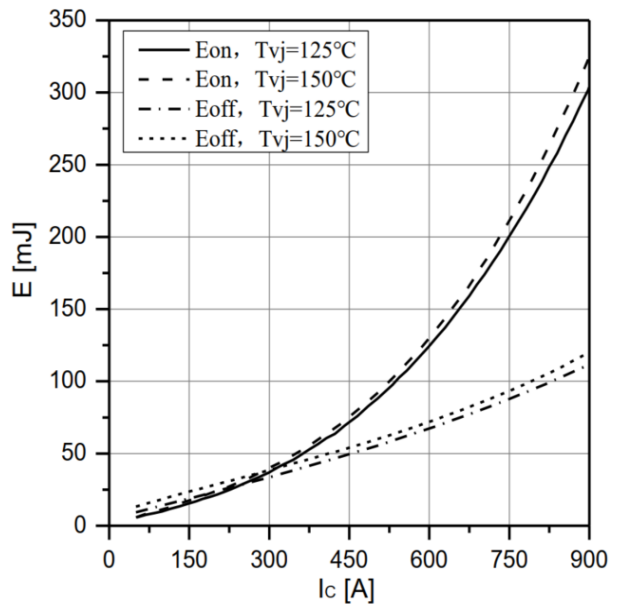
Output characteristic IGBT, Inverter (typical)
 $I_C = f(V_{CE})$, $T_{vj} = 150^\circ\text{C}$

Fig. 3



Transfer characteristic IGBT, Inverter (typical)
 $I_C = f(V_{GE})$, $V_{CE} = 20\text{ V}$

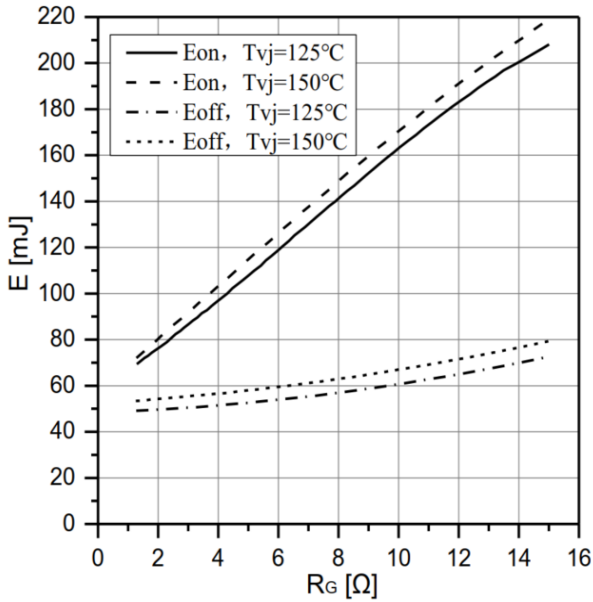
Fig. 4



Switching losses IGBT, Inverter (typical)
 $E_{on} = f(I_C)$, $E_{off} = f(I_C)$
 $V_{GE} = \pm 15\text{ V}$, $R_G = 4.7\Omega$, $V_{CE} = 600\text{ V}$

Typical Characteristics

Fig. 5

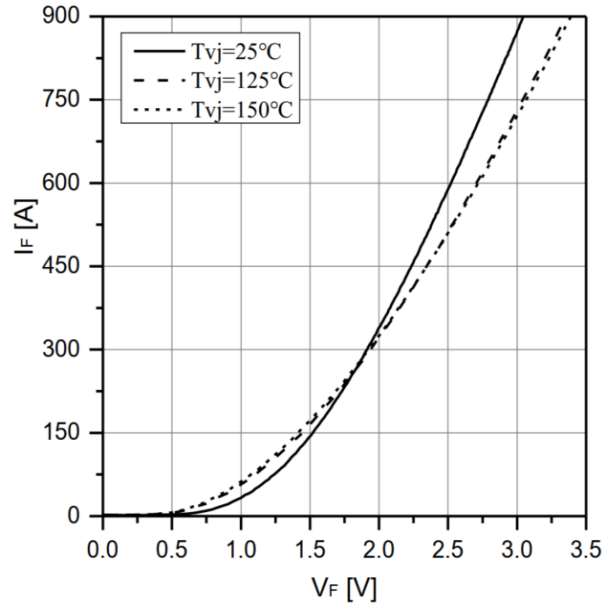


Switching losses IGBT, Inverter (typical)

$E_{on} = f(I_C)$, $E_{off} = f(I_C)$

$V_{GE} = \pm 15 \text{ V}$, $I_C = 600 \text{ A}$, $V_{CE} = 600 \text{ V}$

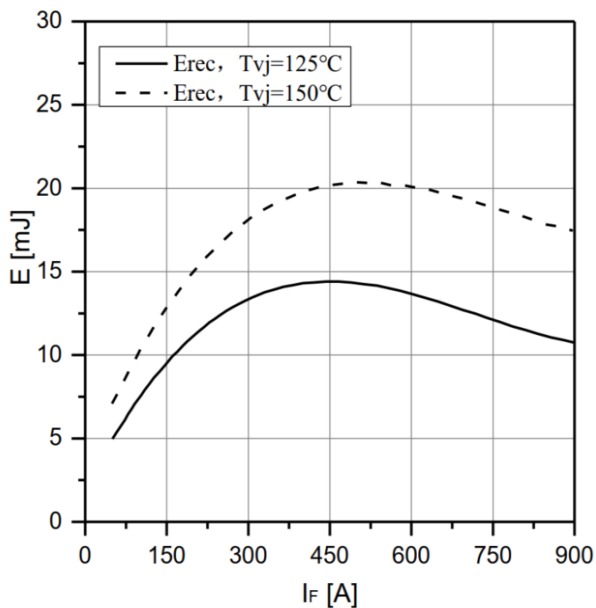
Fig. 6



Forward characteristic of Diode, Inverter (typical)

$I_F = f(V_F)$

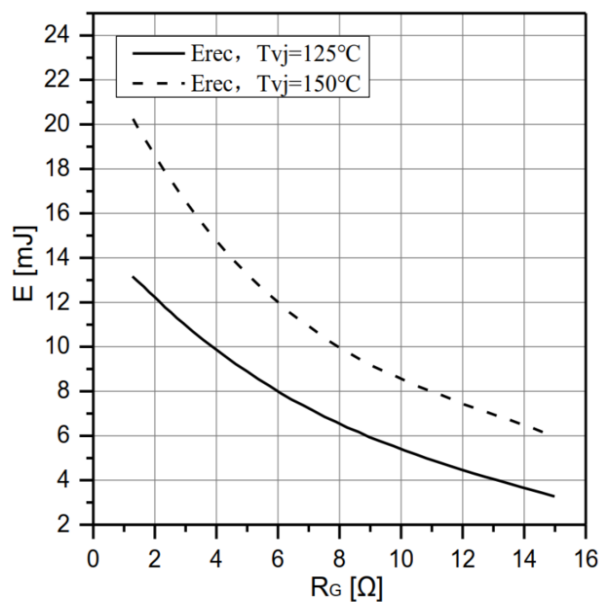
Fig. 7



Switching losses Diode, Inverter (typical)

$E_{rec} = f(I_F)$, $R_{on} = 4.7 \Omega$, $V_{CE} = 600 \text{ V}$

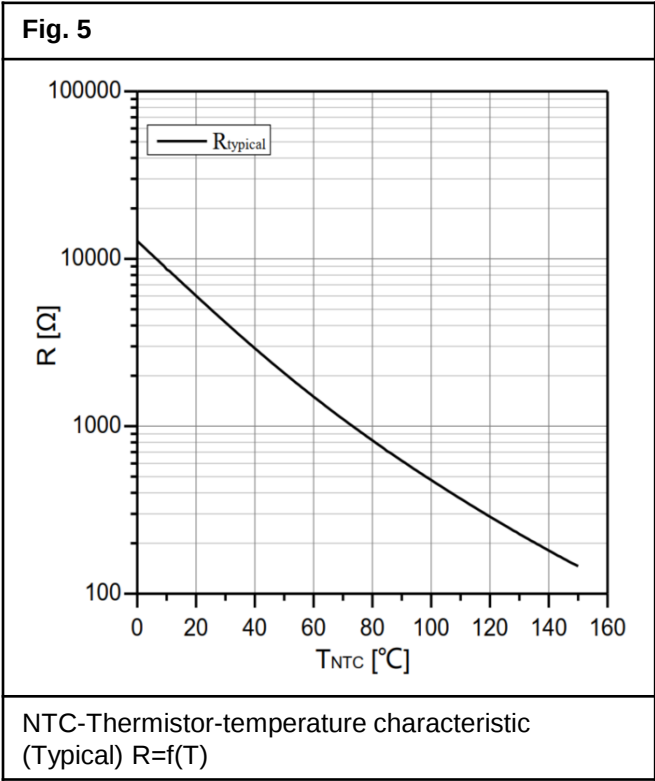
Fig. 8



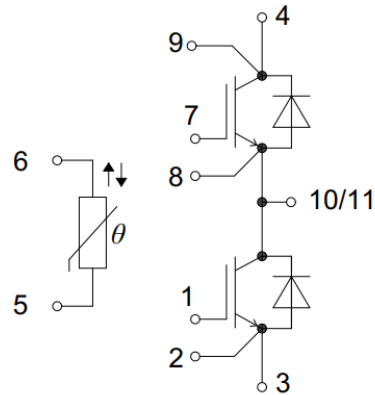
Switching losses Diode, Inverter (typical)

$E_{rec} = f(I_F)$, $I_F = 450 \text{ A}$, $V_{CE} = 600 \text{ V}$

Typical Characteristics



Circuit Diagram



Package Outlines (mm)

