

34mm Half Bridge IGBT Module

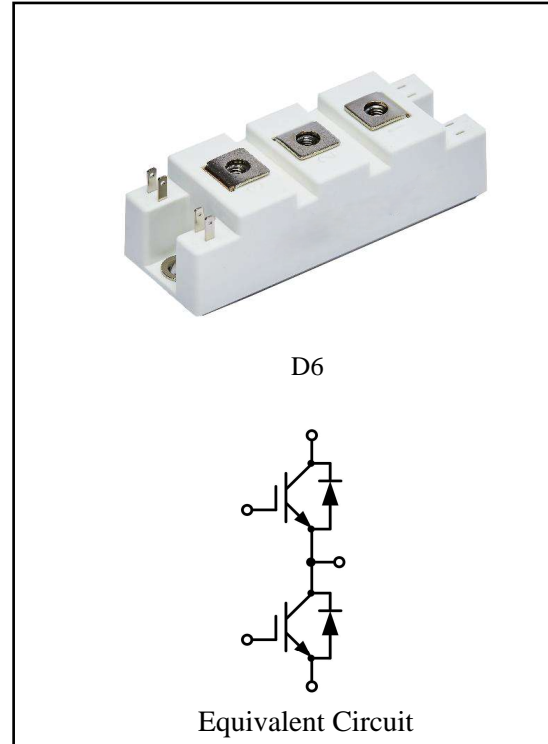
$V_{CES}=1200V$, $I_{Cnom}=50A/I_{CRM}=100A$

Features :

- 1200V Trench / Field Stop process
- Low switching losses
- Positive temperature coefficient

Applications:

- Inverter welding machine
- induction heating
- high-frequency switch power supply
- inverter



IGBT, Inverter

Maximum Ratings

Parameter	Conditions	Symbol	Value	Unit
Collector-Emitter voltage	$T_{vj}=25^{\circ}C$	V_{CES}	1200	V
Continuous DC collector current	$T_C=100^{\circ}C, T_{vj\ max}=175^{\circ}C$	$I_{C\ nom}$	50	A
Repetitive peak collector current	$t_p=1\ ms$	I_{CRM}	100	A
Gate emitter voltage		V_{GE}	± 20	V

Characteristic Values

Parameter	Conditions	Symbol	Value			Unit
			Min.	Typ.	Max.	
Collector-Emitter saturation voltage	$V_{GE}=15V, I_C=50A$ $V_{GE}=15V, I_C=50A$ $V_{GE}=15V, I_C=50A$	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	V_{CEsat}	2.18 2.75 2.87	2.65	V
Gate-Emitter threshold voltage	$I_C = 1.7mA, V_{GE} = V_{CE}$	$T_{vj}=25^{\circ}C$	$V_{GE(th)}$	5.20	5.80	6.40
Gate charge	$V_{GE}=-15V...+15V$		Q_G	0.27		μC
Internal gate resistor			R_{Gint}	2.7		Ω
Input capacitance	$f=1MHz, V_{CE}=25V, V_{GE}=0V$	$T_{vj}=25^{\circ}C$	C_{ies}	3.0		nF
Reverse transfer capacitance			C_{res}	0.14		
Collector-emitter cut-off current	$V_{CE}=1200V, V_{GE}=0V$	$T_{vj}=25^{\circ}C$	I_{CES}		1	mA
Gate-emitter leakage current	$V_{CE}=0V, V_{GE}=20V$	$T_{vj}=25^{\circ}C$	I_{GES}		100	nA
Turn-on delay time	$I_C=50A, V_{CE}=600V$ $V_{GE}=\pm 15V, R_G=15\Omega$ (inductive load)	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	t_{don}	60 64 64		ns
Rise time	$I_C=50A, V_{CE}=600V$ $V_{GE}=\pm 15V, R_G=15\Omega$ (inductive load)	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	t_r	36 42 45		
Turn-off delay time	$I_C=50A, V_{CE}=600V$ $V_{GE}=\pm 15V, R_G=15\Omega$ (inductive load)	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	t_{doff}	158 181 209		
Fall time	$I_C=50A, V_{CE}=600V$ $V_{GE}=\pm 15V, R_G=15\Omega$ (inductive load)	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	t_f	111 129 199		
Turn-on energy loss per pulse	$I_C=50A, V_{CE}=600V$ $V_{GE}=\pm 15V, R_G=15\Omega$ (inductive load)	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	E_{on}	3.27 5.01 6.31		mJ
Turn-off energy loss per pulse	$I_C=50A, V_{CE}=600V$ $V_{GE}=\pm 15V, R_G=15\Omega$ (inductive load)	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	E_{off}	1.91 2.36 2.72		
SC data	$V_{GE}\leq 15V, V_{CC}=800V$ $V_{CEmax}=V_{CES}-L_{sCE} \cdot di/dt$	$t_p\leq 10\mu s, T_{vj}=150^{\circ}C$	I_{sc}	164		A
Temperature under switching conditions			$T_{vj op}$	-40	150	$^{\circ}C$

Diode, Inverter

Maximum Ratings

Parameter	Conditions	Symbol	Value	Unit
Repetitive peak reverse voltage	$T_{vj}=25^{\circ}\text{C}$	V_{RRM}	1200	V
Continuous DC forward current		I_F	50	A
Repetitive peak forward current	$t_p=1\text{ms}$	I_{FRM}	100	A
I^2t -value	$t_p=10\text{ms}$, $\sin 180^{\circ}$, $T_{vj}=125^{\circ}\text{C}$	I^2t	613	A^2s

Characteristic Values

Parameter	Conditions	Symbol	Value			Unit
			Min.	Typ.	Max.	
Forward voltage	$I_F=50\text{A}$, $V_{GE}=0\text{V}$ $T_{vj}=25^{\circ}\text{C}$	V_F		2.20	2.70	V
	$I_F=50\text{A}$, $V_{GE}=0\text{V}$ $T_{vj}=125^{\circ}\text{C}$			1.74		
	$I_F=50\text{A}$, $V_{GE}=0\text{V}$ $T_{vj}=150^{\circ}\text{C}$			1.65		
Peak reverse recovery current	$I_F=50\text{A}$, $-di_F/dt=1226\text{A}/\mu\text{s}$ ($T_{vj}=150^{\circ}\text{C}$) $V_R=600\text{V}$, $V_{GE}=-15\text{V}$ $T_{vj}=25^{\circ}\text{C}$	I_{RM}		14		A
	$T_{vj}=125^{\circ}\text{C}$			27		
	$T_{vj}=150^{\circ}\text{C}$			29		
Recovered charge	$I_F=50\text{A}$, $-di_F/dt=1226\text{A}/\mu\text{s}$ ($T_{vj}=150^{\circ}\text{C}$) $V_R=600\text{V}$, $V_{GE}=-15\text{V}$ $T_{vj}=25^{\circ}\text{C}$	Q_r		1.91		μC
	$T_{vj}=125^{\circ}\text{C}$			5.51		
	$T_{vj}=150^{\circ}\text{C}$			6.60		
Reverse recovered energy	$I_F=50\text{A}$, $-di_F/dt=1226\text{A}/\mu\text{s}$ ($T_{vj}=150^{\circ}\text{C}$) $V_R=600\text{V}$, $V_{GE}=-15\text{V}$ $T_{vj}=25^{\circ}\text{C}$	E_{rec}		0.61		mJ
	$T_{vj}=125^{\circ}\text{C}$			1.64		
	$T_{vj}=150^{\circ}\text{C}$			1.96		
Temperature under switching conditions		$T_{vj\text{ op}}$	-40		150	$^{\circ}\text{C}$

Module

Parameter	Conditions	Symbol	Value			Unit
Isolation test voltage	RMS, $f=50\text{Hz}$, $t=1\text{min}$	V_{ISOL}	2500			V
Internal isolation			Al_2O_3			
Storage temperature		T_{stg}	-40		125	$^{\circ}\text{C}$
Mounting torque for modul mounting		M	3.0		6.0	Nm
Weight		W		155		g

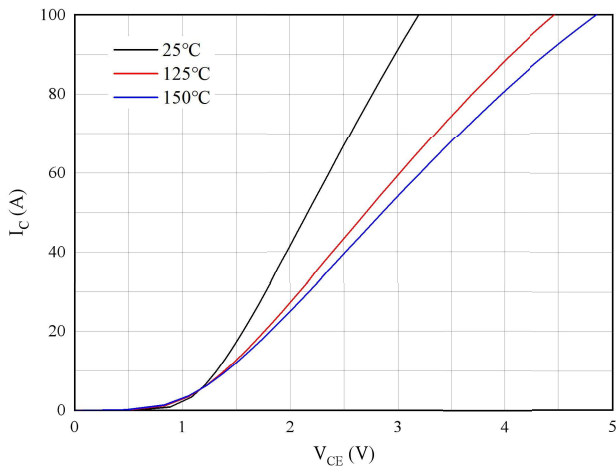


Fig 1. Typical output characteristics ($V_{GE}=15V$)

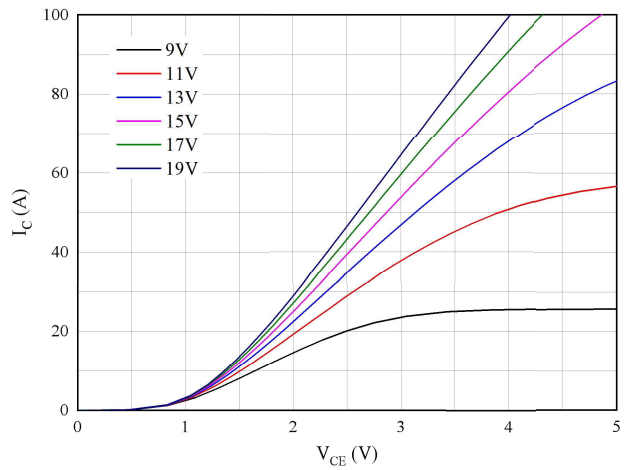


Fig 2. Typical output characteristics ($T_{vj}=150^{\circ}C$)

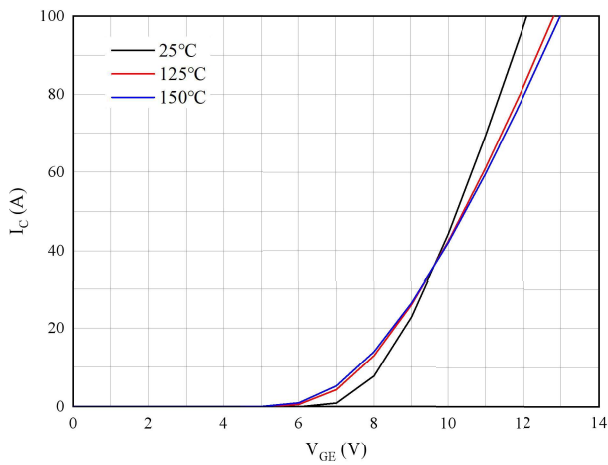


Fig 3. Typical transfer characteristic ($V_{CE}=20V$)

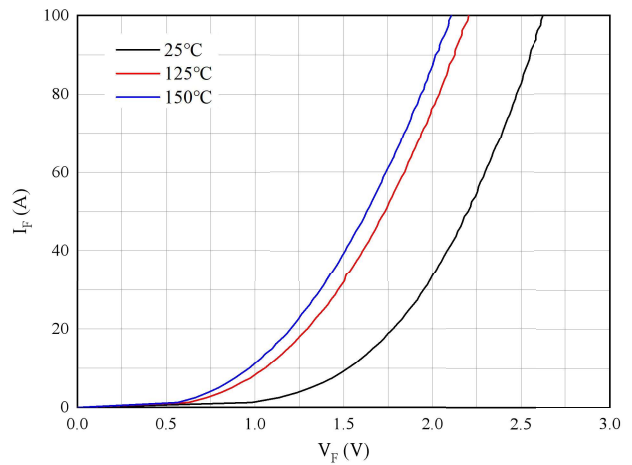


Fig 4. Forward characteristic of Diode

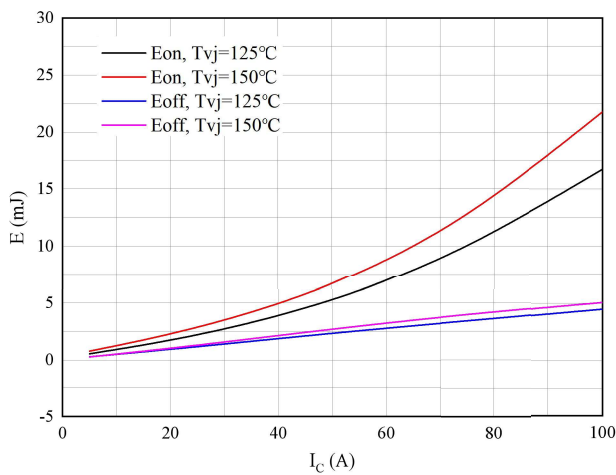


Fig 5. Switching losses of IGBT
 $V_{GE}=\pm 15V$ $R_{Gon}=15\Omega$ $R_{Goff}=15\Omega$ $V_{CE}=600V$

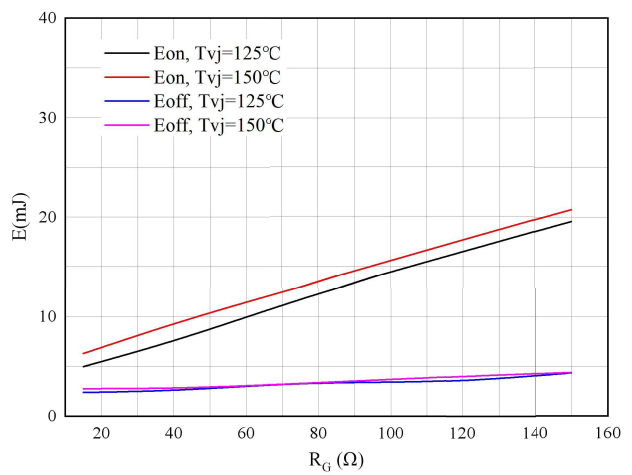


Fig 6. Switching losses of IGBT
 $V_{GE}=\pm 15V$ $I_C=50A$ $V_{CE}=600V$

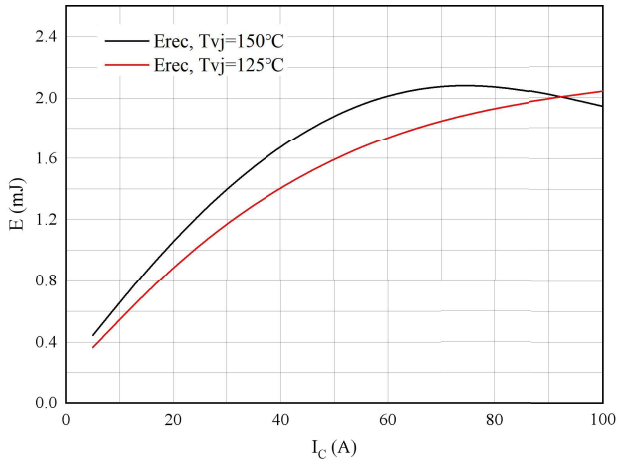


Fig 7. Switching losses of Diode
 $R_{Gon}=15\ \Omega$, $V_{CE}=600\text{V}$

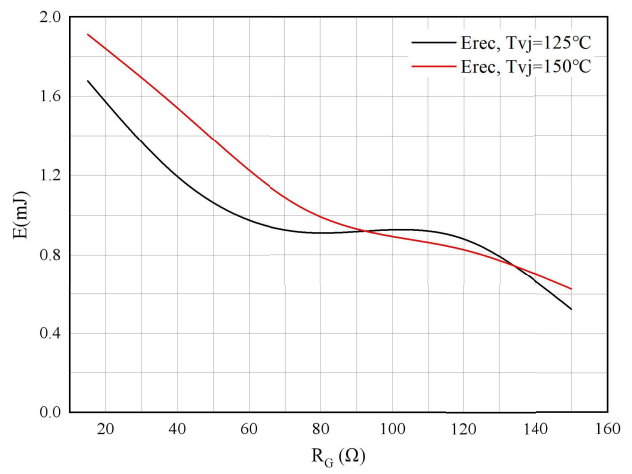


Fig 8. Switching losses of Diode
 $I_F=50\text{A}$, $V_{CE}=600\text{V}$

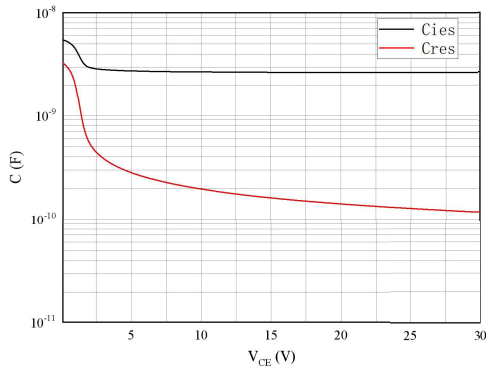
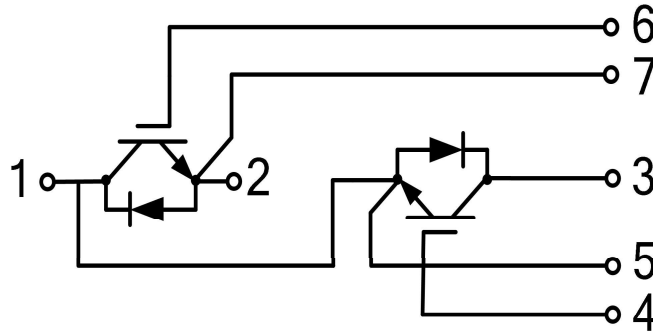


Fig 9. Capacitance characteristic

Circuit diagram



Package outlines

