

IGBT Modules

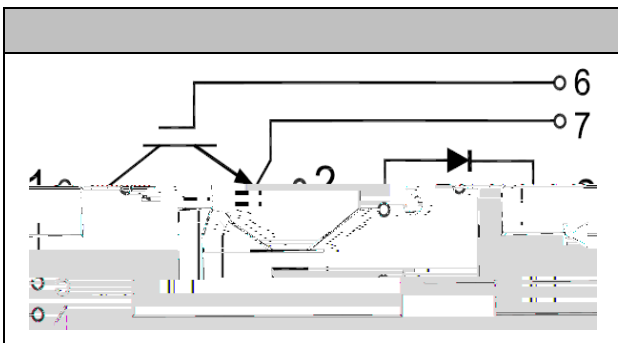
V_{CES}	1200V
I_c	300A

Applications

- Inverter for motor drive
- AC and DC servo drive amplifier
- UPS (Uninterruptible Power Supplies)
- Soft switching welding machine

Features

- Low $V_{ce(sat)}$ with Trench technology
- $V_{ce(sat)}$ with positive temperature coefficient
- High short circuit capability(10us)
- Including ultra fast & soft recovery anti-parallel FWD
- Low inductance
- Maximum junction temperature 175



● IGBT

Absolute Maximum Ratings

Parameter	Symbol	Conditions	Value	Unit
Collector-Emitter Voltage	V_{CES}	$V_{GE}=0V, I_c=1mA, T_{vj}=25^{\circ}C$	1200	V
Continuous Collector Current	I_c	$T_c=100^{\circ}C$	300	A
Repetitive Peak Collector Current	I_{CRM}	$t_p=1ms$	600	A
Gate-Emitter Voltage	V_{GES}	$T_{vj}=25^{\circ}C$	± 20	V
Total Power Dissipation	P_{tot}	$T_c=25^{\circ}C$ $T_{vjmax}=175^{\circ}C$	1700	W

Characteristic values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Gate-emitter Threshold Voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}, I_C=8mA, T_{vj}=25^{\circ}C$	5.2	5.8	6.4	V
Collector-Emitter Cut-off Current	I_{CES}	$V_{CE}=1200V, V_{GE}=0V, T_{vj}=25$			1.0	mA
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=300A, V_{GE}=15V, T_{vj}=25^{\circ}C$		1.85	2.20	V
		$I_C=300A, V_{GE}=15V, T_{vj}=125^{\circ}C$		2.20		
		$I_C=300A, V_{GE}=15V, T_{vj}=150^{\circ}C$		2.30		
Gate Charge	Q_G			2.6		uC
Internal Gate Resistor	R_{Gint}			2.5		
Input Capacitance	C_{ies}	$V_{CE}=25V, V_{GE}=0V,$		18.4		nF
Reverse Transfer Capacitance	C_{res}	$f=1MHz, T_{vj}=25$		0.9		nF
Gate-Emitter leakage current	I_{GES}	$V_{CE}=0V, V_{GE}=20V, T_{vj}=25^{\circ}C$			400	nA
Turn-on Delay Time	$t_{d(on)}$	$I_C=300A$ $V_{CE}=600V$ $V_{GE}=\pm 15V$ $R_G=1.8\Omega$ $T_{vj}=25^{\circ}C$		174		ns
Rise Time	t_r			38		ns
Turn-off Delay Time	$t_{d(off)}$			425		ns
Fall Time	t_f			104		ns
Energy Dissipation During Turn-on Time	E_{on}			17.4		mJ
Energy Dissipation During Turn-off Time	E_{off}			21.0		mJ
Turn-on Delay Time	$t_{d(on)}$	$I_C=300A$ $V_{CE}=600V$ $V_{GE}=\pm 15V$ $R_G=1.8\Omega$ $T_{vj}=125^{\circ}C$		185		ns
Rise Time	t_r			42		ns
Turn-off Delay Time	$t_{d(off)}$			495		ns
Fall Time	t_f			170		ns
Energy Dissipation During Turn-on Time	E_{on}			26.5		mJ
Energy Dissipation During Turn-off Time	E_{off}			31.4		mJ
Turn-on Delay Time	$t_{d(on)}$	$I_C=300A$ $V_{CE}=600V$ $V_{GE}=\pm 15V$ $R_G=1.8\Omega$ $T_{vj}=150^{\circ}C$		191		ns
Rise Time	t_r			45		ns
Turn-off Delay Time	$t_{d(off)}$			437		ns
Fall Time	t_f			112		ns
Energy Dissipation During Turn-on Time	E_{on}			29.3		mJ
Energy Dissipation During Turn-off Time	E_{off}			33.5		mJ
SC Data	I_{sc}	$T_p \leq 10\mu s, V_{GE}=15V,$ $T_{vj}=150^{\circ}C, V_{cc}=900V,$ $V_{CEM} \leq 1200V$		1500		A



● **Diode**

Absolute Maximum Ratings

	Symbol	Conditions	Value	Unit
Repetitive Peak Reverse Voltage	V_{RRM}	$T_{vj}=25^{\circ}C$	1200	V
Continuous DC Forward Current	I_F		300	A
Repetitive Peak Forward Current	I_{FRM}	$t_p=1ms$	600	A
I^2t -value	I^2t	$V_R=0, t_p=10ms, T_j=125^{\circ}C$	18200	A ² s
		$V_R=0, t_p=10ms, T_j=150^{\circ}C$	17000	

Characteristic values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Forward Voltage	V_F	$I_F=300A, T_{vj}=25^{\circ}C$		2.10		V
		$I_F=300A, T_{vj}=125^{\circ}C$		2.15		
		$I_F=300A, T_{vj}=150^{\circ}C$		2.17		
Recovered Charge	Q_{rr}	$I_F=300A$		34.0		uC
Peak Reverse Recovery Current	I_{rr}	$V_R=600V$ $di_F/dt=6500A/us$ $T_{vj}=25^{\circ}C$		375		A

**● Module Characteristics** $T_C=25^{\circ}\text{C}$ unless otherwise specified

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Isolation voltage	V_{isol}	$t=1\text{min}, f=50\text{Hz}$	2500			V
Maximum Junction Temperature	T_{jmax}				175	$^{\circ}\text{C}$
Operating Junction Temperature	T_{vjop}		-40		150	$^{\circ}\text{C}$
Storage Temperature	T_{stg}		-40		125	$^{\circ}\text{C}$
Thermal Resistance Junction-to Case	$R_{\theta\text{JC}}$	per IGBT				K/W
		per Diode				
Thermal Resistance Case-to Sink	$R_{\theta\text{CS}}$	Conductive grease applied		0.035		K/W
Comparative Tracking Index	CTI			>400		
Module Electrodes Torque	M_t	Recommended(M6)	3.0		5.0	N·m
Module-to-Sink Torque	M_s	Recommended(M6)	3.0		5.0	N·m
Weight of Module	G			315		g

