Electrical Characteristics of IGBT @ Inverter T_C = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
Off Characteristics						
BV_{CES}	Collector-Emitter Breakdown Voltage	V_{GE} = 0V, I_C = 250μA	600	--	--	V
$\Delta B_{VCES}/\Delta T_J$	Temperature Coeff. of Breakdown Voltage	V_{GE} = 0V, I_C = 1mA	--	0.6	--	V/°C
I_{CES}	Collector Cut-Off Current	V_{CE} = V_{CES}, V_{GE} = 0V	--	--	250	μA
I_{GES}	Gate - Emitter Leakage Current	V_{GE} = V_{GES}, V_{CE} = 0V	--	--	± 100	nA
On Characteristics						
$V_{GE(th)}$	Gate - Emitter Threshold Voltage	I_C = 15mA, V_{CE} = V_{GE}	5.0	6.5	8.5	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	I_C = 15A, V_{GE} = 15V	--	2.1	2.7	V
Dynamic Characteristics						
C_{ies}	Input Capacitance	V_{CE} = 30V, V_{GE} = 0V, f = 1MHz	--	935	--	pF
C_{oes}	Output Capacitance		--	81	--	pF
C_{res}	Reverse Transfer Capacitance		--	18	--	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{CC} = 300 V, I_C = 15A, R_G = 13Ω, V_{GE} = 15V, Inductive Load, T_C = 25°C	--	65	130	ns
t_r	Rise Time		--	80	160	ns
$t_{d(off)}$	Turn-Off Delay Time		--	80	160	ns
t_f	Fall Time		--	100	200	ns
E_{on}	Turn-On Switching Loss		--	0.3	--	mJ
E_{off}	Turn-Off Switching Loss		--	0.3	--	mJ
$t_{d(on)}$	Turn-On Delay Time	V_{CC} = 300 V, I_C = 15A, R_G = 13Ω, V_{GE} = 15V, Inductive Load, T_C = 125°C	--	70	140	ns
t_r	Rise Time		--	80	160	ns
$t_{d(off)}$	Turn-Off Delay Time		--	90	180	ns
t_f	Fall Time		--	210	350	ns
E_{on}	Turn-On Switching Loss		--	0.33	--	mJ
E_{off}	Turn-Off Switching Loss		--	0.5	--	mJ
T_{sc}	Short Circuit Withstand Time	V_{CC} = 300 V, V_{GE} = 15V @ T_C = 100°C	10	--	--	μs
Q_g	Total Gate Charge	V_{CE} = 300 V, I_C = 15A, V_{GE} = 15V	--	45	60	nC
Q_{ge}	Gate-Emitter Charge		--	9	15	nC
Q_{gc}	Gate-Collector Charge		--	17	30	nC

Electrical Characteristics of DIODE @ Inverter T_C = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Units
V_{FM}	Diode Forward Voltage	I_F = 15A	T_C = 25°C	--	1.9	2.8	V
			T_C = 100°C	--	2.0	--	
t_{rr}	Diode Reverse Recovery Time	I_F = 15A di / dt = 30 A/μs	T_C = 25°C	--	75	150	ns
			T_C = 100°C	--	100	--	
I_{rr}	Diode Peak Reverse Recovery Current		T_C = 25°C	--	1.0	2.0	A
			T_C = 100°C	--	1.3	--	
Q_{rr}	Diode Reverse Recovery Charge		T_C = 25°C	--	40	150	nC
			T_C = 100°C	--	65	--	

Electrical Characteristics of DIODE @ Converter T_C = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Units
V_{FM}	Diode Forward Voltage	I_F = 20A	T_C = 25°C	--	1.1	1.5	V
			T_C = 100°C	--	1.0	--	
I_{RRM}	Repetitive Reverse Current	$V_R = V_{RRM}$	T_C = 25°C	--	--	8	mA
			T_C = 100°C	--	5	--	

Thermal Characteristics

	Symbol	Parameter	Typ.	Max.	Units
Inverter	$R_{\theta JC}$	Junction-to-Case (IGBT Part, per 1/6 Module)	--	1.7	°C/W
	$R_{\theta JC}$	Junction-to-Case (DIODE Part, per 1/6 Module)	--	2.5	°C/W
Brake	$R_{\theta JC}$	Junction-to-Case (IGBT Part)	--	1.7	°C/W
	$R_{\theta JC}$	Junction-to-Case (DIODE Part)	--	2.5	°C/W
Converter	$R_{\theta JC}$	Junction-to-Case (DIODE Part, per 1/6 Module)	--	1.5	°C/W
Weight		Weight of Module	60	--	g

NTC Thermistor Characteristics

	Symbol	Parameter	Tol.	Typ.	Units
Thermistor	R25	Rated Resistance @ Tc = 25°C	+/- 5 %	4.7	KΩ
	B(25/100)	B - Value	+/- 3 %	3530	