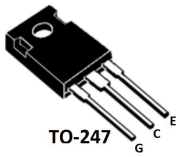
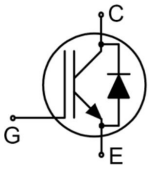
Features

- Low gate charge
- Trench-Stop Technology
- High speed switching
- Saturation voltage:VCE(sat),typ= 1.6V @ IC=50A and TC=25℃



Applications

- General purpose inverters
- Induction heating(IH)
- Welding Converters
- UPS



Absolute Ratings（Tc=25℃）

Parameter	Symbol		Value	Unit
Collector-Emitter Voltage	V_{CES}		650	V
Collector Current-continuous	I_C	T=25℃	120	A
		T=100℃	60	A
Diode Forward current, limited by T_{jmax}	I_F	T=25℃	120	A
		T=100℃	60	A
Collector Current-pulse(note 1)	I_{CM}		240	A
Continuous Gate-Emitter Voltage	V_{GE}		±20	V
Transient Gate-emitter voltage	V_{GE}		±30	V
Surge non repetitive forward current	I_{FSM}		240	A
Power Dissipation	P_D	T_C=25℃	625	W
Operating Temperature Range	T_J		-55~175	℃
Storage Temperature Range	T_{STG}		-55~175	℃
Maximum Lead Temperature for Soldering Purposes	T_L		300	℃

Thermal Characteristic

Parameter	Symbol	Tests conditions	Min	Type	Max	Units
Off-Characteristics						
Collector-Emitter Voltage	BV_{CES}	I_C=250μA,V_{GE}=0V	650	-	-	V

Zero Gate Voltage Collector Current	I_{CES}	V_{CE}=650V,V_{GE}=0V, T_C=25℃	-	0.1	40	μA
Gate-body leakage current	I_{GESF}	V_{CE}=0V,V_{GE}=±20V	-	-	200	nA
Gate-body leakage current	I_{GESR}	V_{CE}=0V,V_{GE}=±20V	-	-	-200	nA
On-Characteristics						
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	V_{CE}=V_{GE}, I_C=250uA	3.0	4.10	5.0	V
Collector-Emitter saturation Voltage	$V_{CE(sat)}$	V_{GE}=15V,I_C=50A	1.30	1.60	1.90	V
Dynamic Characteristics						
Input capacitance	C_{ies}	V_{CE}=25V, V_{GE}=0V, f=1.0MHZ	-	2650	-	pF
Output capacitance	C_{oes}		-	320	-	pF
Reverse transfer capacitance	C_{res}		-	63	-	pF
Switching Characteristics						
Turn-On delay time	$t_{d(on)}$	V_{CC}=400V,I_C=60A, R_G=5Ω, V_{GE}=0.0/15.0V T_C=25℃ Inductive Load	-	23	-	ns
Turn-On rise time	t_r		-	115	-	ns
Turn-off delay time	$t_{d(off)}$		-	90	-	ns
Turn-off Fall time	t_f		-	76	-	ns
Turn-on energy	E_{on}		-	2.6	-	mJ
Turn-off energy	E_{off}		-	1.3	-	mJ
Total switching Energy	E_{total}		-	3.9	-	mJ
Turn-On delay time	$t_{d(on)}$	V_{CC}=400V,I_C=60A, R_G=5Ω, V_{GE}=0.0/15.0V T_C=75℃ Inductive Load	-	26	-	ns
Turn-On rise time	t_r		-	125	-	ns
Turn-off delay time	$t_{d(off)}$		-	115	-	ns
Turn-off Fall time	t_f		-	120	-	ns
Turn-on energy	E_{on}		-	2.7	-	mJ
Turn-off energy	E_{off}		-	2.3	-	mJ
Total switching Energy	E_{total}		-	5.0	-	mJ
Total Gate Charge	Q_g	V_{CE}=480V,I_C=60A, V_{GE}=15V	-	132	-	nC
Gate to emitter Charge	Q_{ge}		-	33	-	nC
Gate to Collector	Q_{gc}		-	55	-	nC

charge						
Anti-Parallel Diode Characteristics and Maximum Ratings						
Diode Forward Voltage	V_F	V_{GE}=0V,I_F=40A	-	1.62	2.1	V
Diode Forward Current	I_F	T_C=100℃	-	-	60	A
Diode Reverse recovery time	t_{rr}	V_{GE}=0V,V_R=300V I_F=40A di/dt=200A/us	-	54	-	ns
Reverse recovery charge	Q_{rr}		-	65	-	nC

Thermal Characteristic

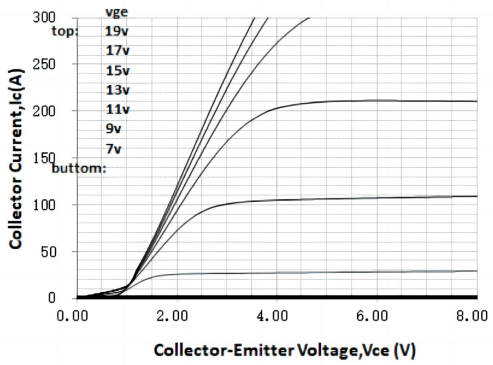
Parameter	Symbol	Max	Unit
IGBT Thermal Resistance,Junction to Case	$R_{th(j-c)}$	0.24	℃/W
Diode Thermal Resistance,Junction to Case	$R_{th(j-c)}$	0.34	℃/W
Thermal Resistance,Junction to Ambient	$R_{th(j-A)}$	40	℃/W

Note:

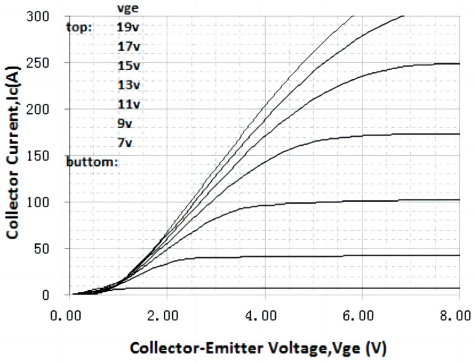
1.Collector current limited by maximum junction temperature

Electrical Characteristics(curves)

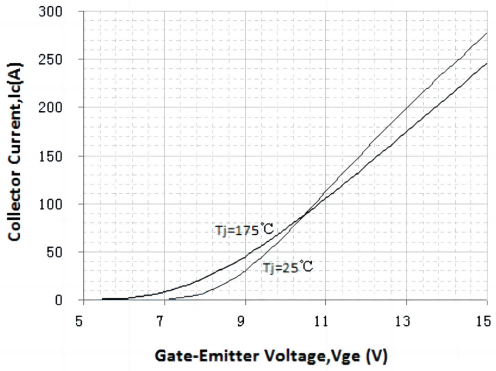
Output Characteristics（25℃）



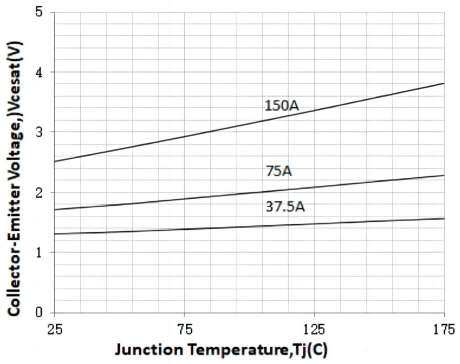
Output Characteristics（175℃）



Transfer Characteristics

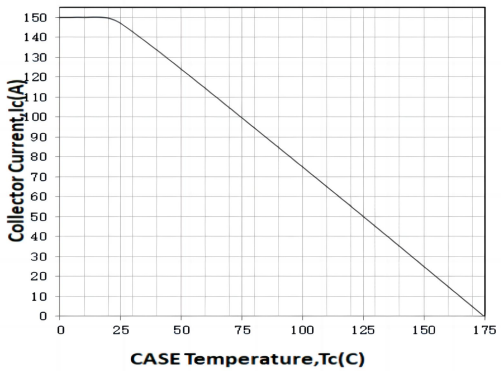


VCESAT vs. Tj



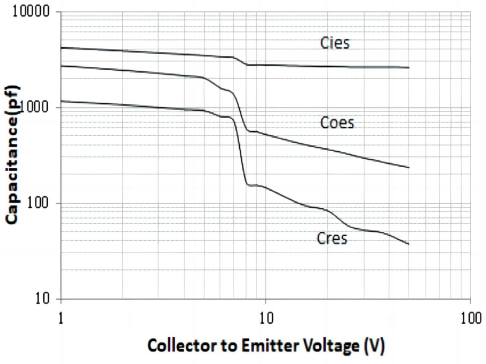
Colletcor current vs.case temperature

Vge≥15V，Tj≤175℃

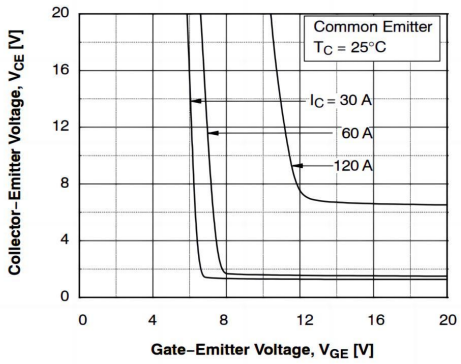


Capacitance Characteristic

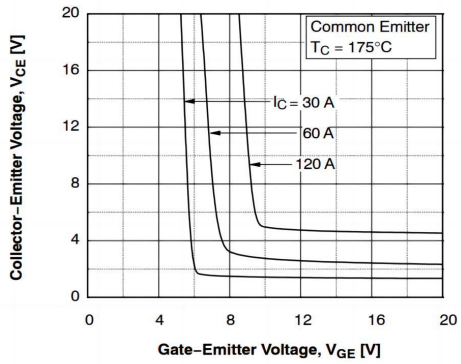
Vge =0V,f=1.0MHZ



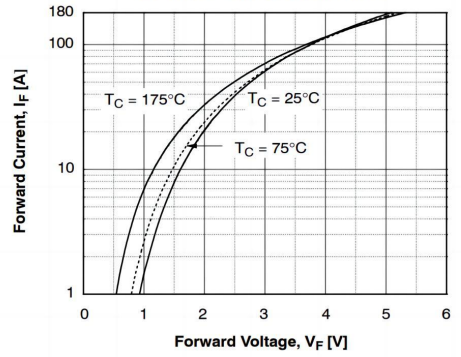
Saturation Voltage vs. V_{GE}(25℃)



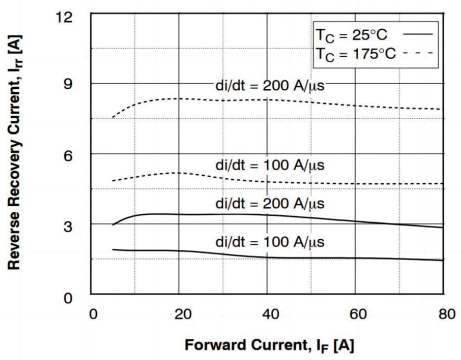
Saturation Voltage vs. V_{GE}(175℃)



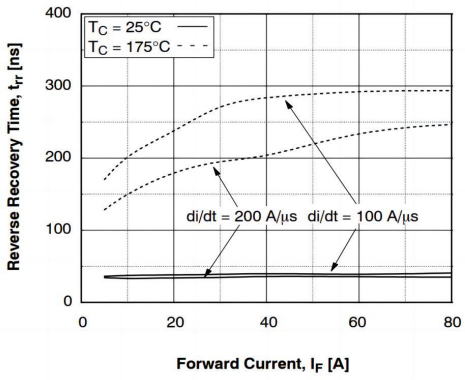
Forward Characteristics



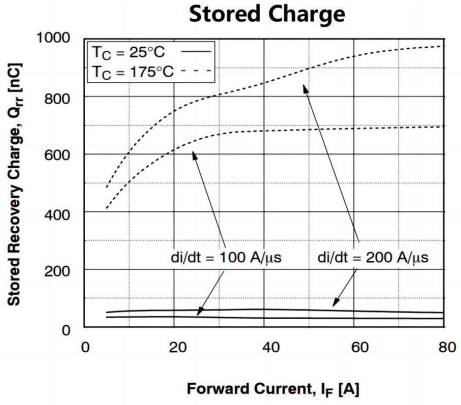
Reverse Recovery Current



Reverse Recovery Time

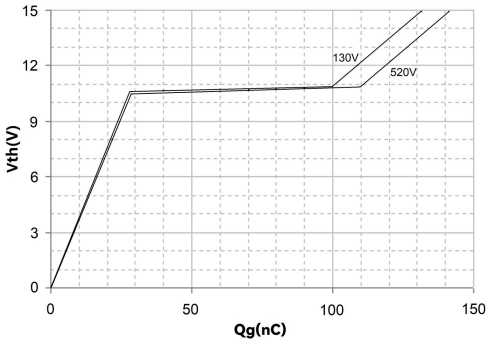


Stored Charge



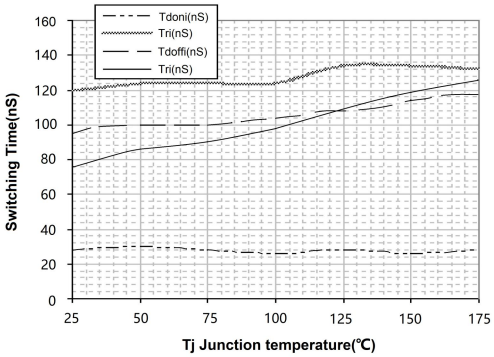
Gate Charge Characteristics

Vge=15V, Ic=75A



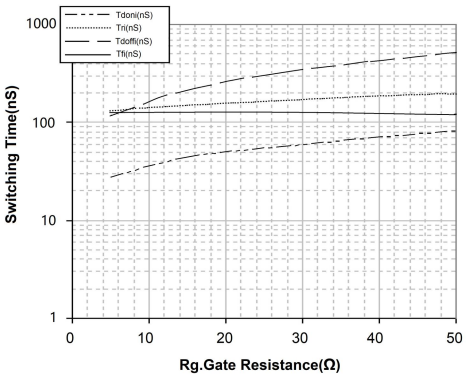
Switching Time vs.Tj

Vge=15V，Vce=400V，Ic=75A，Rg=5Ω



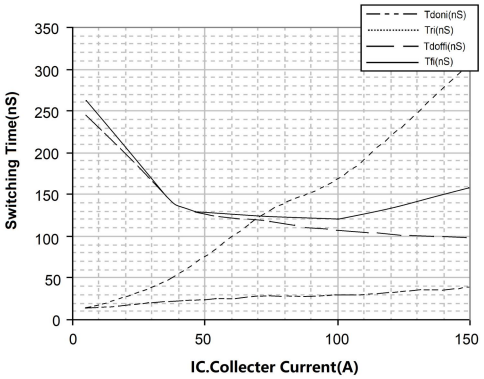
Switching Time vs. Rg(175℃)

Vge=15V,Vce=400V, Ic=75A



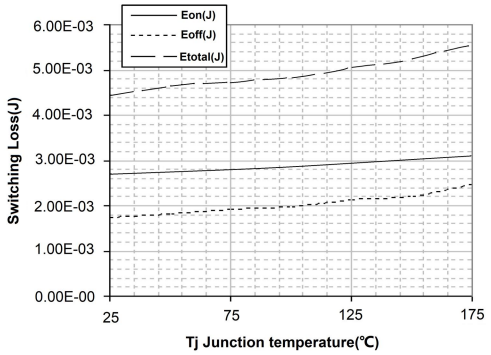
Switching Time vs. IC(175℃)

Vce=400V,Vge=15V, Rg=5Ω



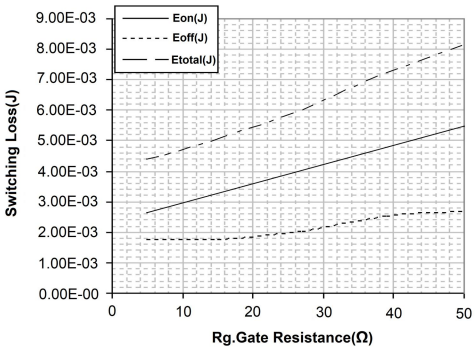
Switching Loss vs. Tj

Vge=15V，Vce=400V，Ic=75A，Rg=5Ω



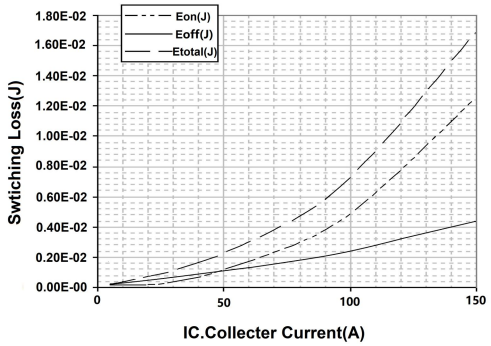
Switching Loss vs. Rg(175℃)

Vge=15V,Vce=400V, Ic=75A



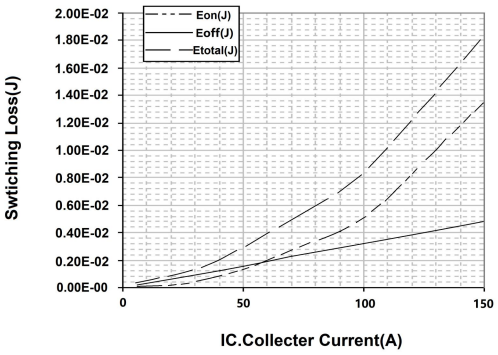
Switching Loss vs. IC(25℃)

Vce=400V,Vge=15V, Rg=5Ω



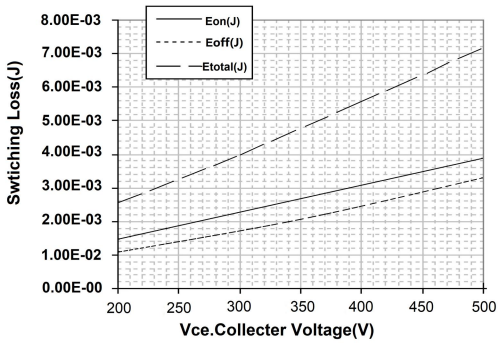
Switching Loss vs. IC(175℃)

Vce=400V,Vge=15V, Rg=5Ω

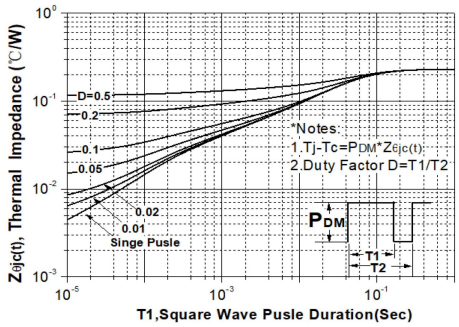


Switching Loss vs. VCE(175℃)

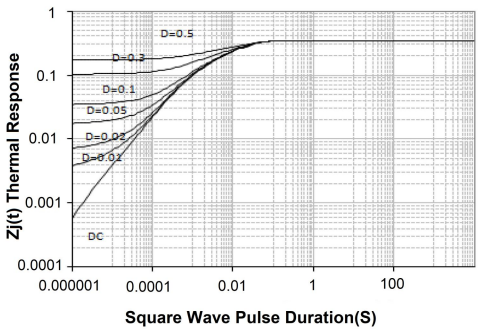
Vge=15V，Ic=75A，Rg=5Ω



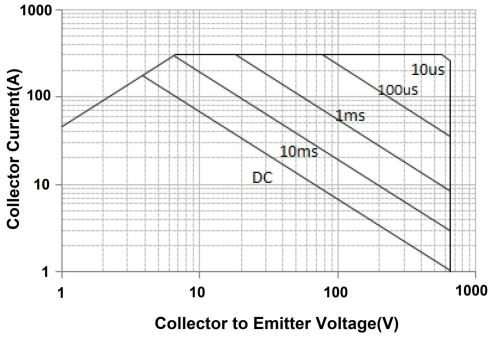
Transient Thermal Impedance for IGBT



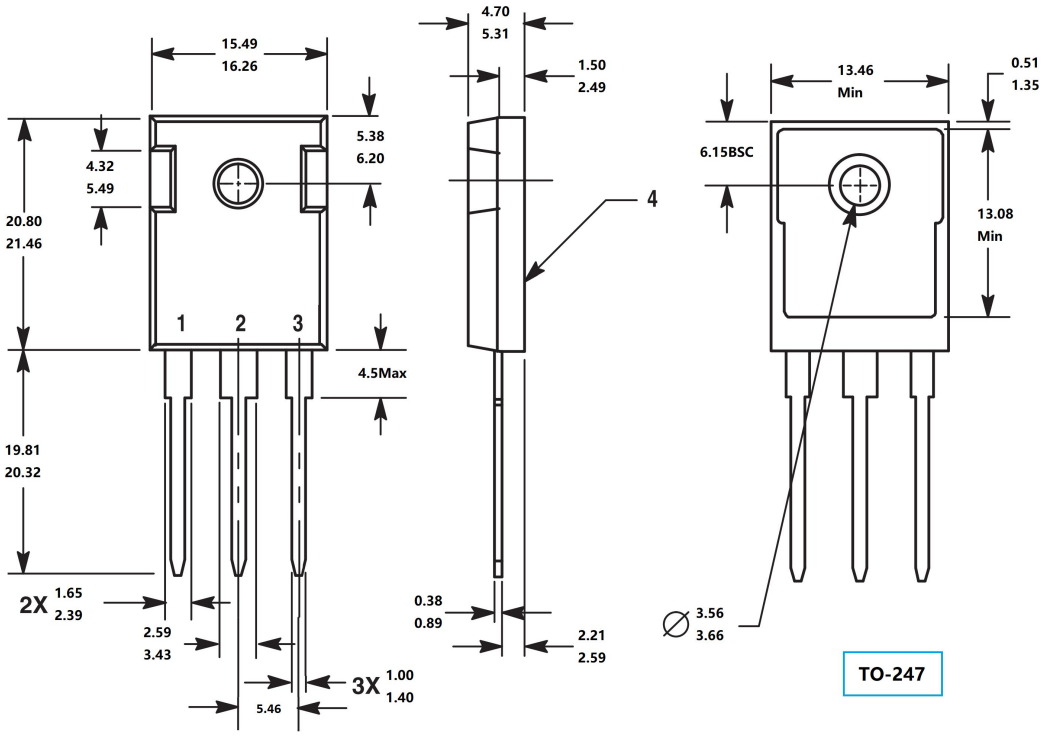
Transient Thermal Impedance for FRD



Safe Operating Area For TO-247



Package Mechanical DATA



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