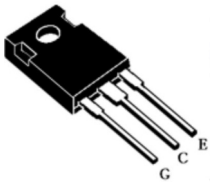
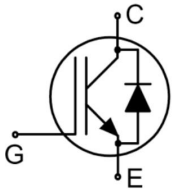
Features

- Low gate charge
- FS Technology
- Short circuit withstand time 10 us
- Saturation voltage:VCE(sat),type=1.7V



Applications

- General purpose inverter
- Induction heating(IH)
- UPS



Order Message

Order codes	Marking	Package
MSG75T65FQC	MSG75T65FQC	TO-247

Absolute Ratings(Tc=25℃)

Parameter	Symbol	Value	Unit
		MSG75T65FQC	
Collector-Emitter Voltage	V_{ce}	650	V
Collector Current-continuous	T=25℃	150	A
	T=100℃	75	A
Collector Current-pulse (note 1)	I_{CM}	300	A
Gate-Emitter Voltage	V_{GES}	±30	V
Turn-off safe area	-	75	A
Power Dissipation	PD Tc=25℃	439	W
Operating and Storage Temperature Range	T_J,T_{STG}	-55~+150	℃
Maximum Lead Temperature for Soldering Purposes	T_L	300	℃

1 Diode RMS forward current，T_C=25℃ 150A T_C=100℃ 75A

Electrical Characteristics

Parameter	Symbol	Tests conditions	Min	Typ	Max	Units
Off-Characteristics						
Collector-Emitter Voltage	BV_{CES}	Ic=250uA,V_{GE}=0V	650	-	-	V
Breakdown Voltage Temperature Coefficient	$\triangle BV_{CES}/\triangle T_J$	Ic=0.5mA,referenced to 25℃	-	0.6	-	V/℃
Zero Gate Voltage Collector Current	I_{CES}	V_{CE}=650V,V_{GE}=0V	-	-	0.2	mA
Gate-body leakage current, forward	I_{GESF}	V_{CE}=0V,V_{GE}=20V	-	-	200	nA
Gate-body leakage current, reverse	I_{GESR}	V_{CE}=0V,V_{GE}=-20V	-	-	-200	nA
On-Characteristics						
Gate Threshold Voltage	$V_{GE(th)}$	V_{CE}=V_{GE},Ic=250uA	4.5	-	6.5	V
Collector-Emitter saturation Voltage	V_{CESAT}	V_{GE}=15V Ic=75A Tc=25℃ Tc=150℃	- -	1.7 2.0	2.2 -	V
Short Collector current(Note 2)	$I_{C(SC)}$	V_{GE}=15V V_{CE}=600V tsc<10usTc=25℃		320		A
Dynamic Characteristics						
Input capacitance	C_{ies}	V_{CE}=25V, V_{GE}=0V, f=1.0MHZ	-	5012	-	pF
Output capacitance	C_{oes}		-	430	-	pF
Reverse transfer capacitance	C_{res}		-	99.6	-	pF

Electrical Characteristics

Parameter	Symbol	Tests conditions	Min	Typ	Max	Units
Switching Characteristics						
Turn-on delay time	$t_{d(on)}$	V_{CE}=400V,Ic=75A, R_G=7.9Ω Tc=25℃ Inductive Load	-	45	-	ns
Turn-On rise time	tr		-	40	-	ns
Turn-Off delay time	$t_{d(off)}$		-	168	-	ns
Turn-Off Fall time	t_f		-	56	-	ns
Turn-on energy	E_{on}		-	2.32	-	mJ
Turn-off energy	E_{off}		-	0.97	-	mJ

Total switching energy	E_{total}		-	3.29	-	mJ
Total Gate Charge	Q_g	V_{CE}=520V, Ic=75A V_{GE}=15V(note 3,4)	-	27.4		nC
Anti-Parallel Diode Characteristics and Maximum Ratings						
Drain-Source Diode Forward Voltage	V_F	V_{GE}=0V,I_F=75A	-	2.2	2.9	V
Diode Reverse recovery time	t_{rr}	VGE=0V,VR=400V IF=75A dI=/dt=600A/us (note 4)	-	75	-	ns
Reverse recovery charge	Q_{rr}		-	664	-	nC
Reverse recovery Current	I_{rr}		-	16	-	A

Thermal Characteristic

Parameter	Symbol	Max	Unit
Thermal Resistance,Junction to Case	Rth(j-c)	0.23	℃/W
Thermal Resistance,Junction to Ambient	Rth(j-A)	33	℃/W

Notes:

1: Pulse width limited by maximum junction temperature

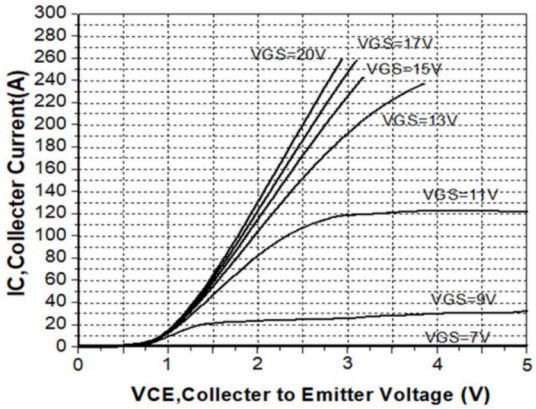
2: Allowed number of short circuits:<1000; time between short circuits:>1s.

3: Pulse Test: Pulse Width s300us, Duty Cycles2%

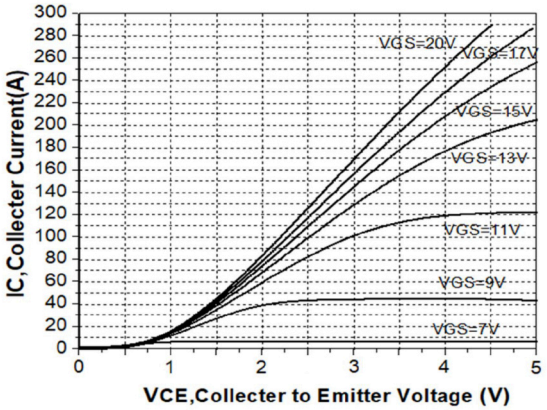
4: Essentially independent of operating temperature

Electrical Characteristics(curves)

Output Characteristics（25℃）

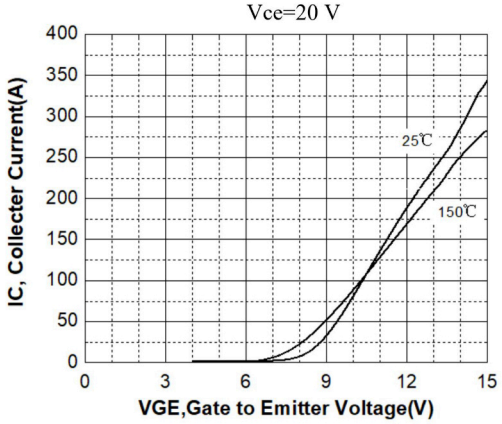


Output Characteristics（150℃）



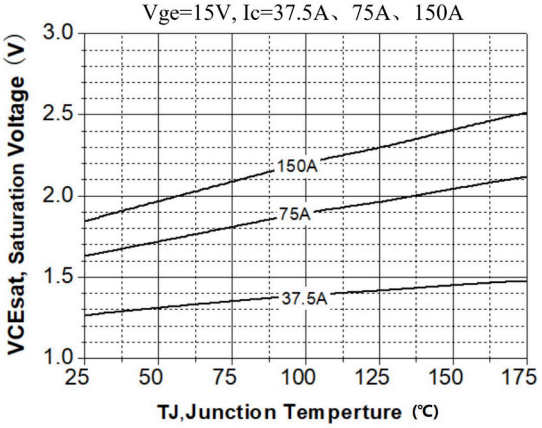
Transfer Characteristics

Vce=20 V



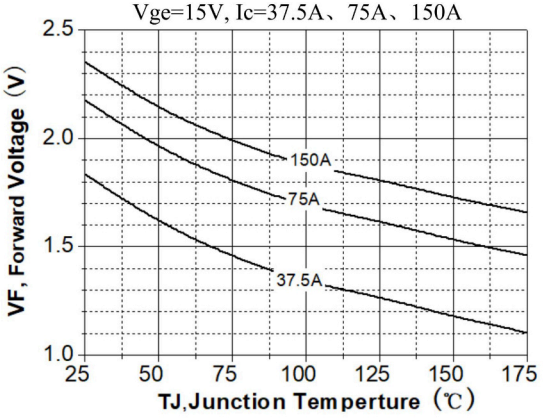
Vcesat vs. Tj

Vge=15V, Ic=37.5A、75A、150A



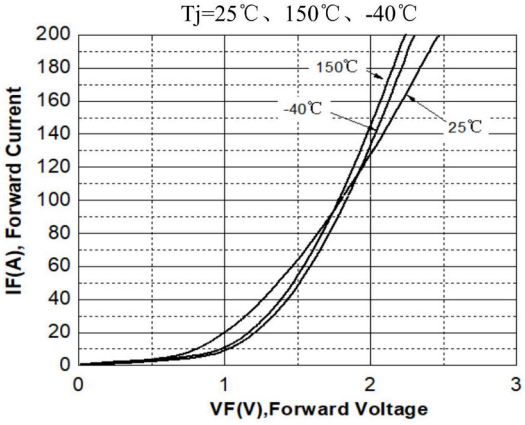
VF vs. Tj

Vge=15V, Ic=37.5A、75A、150A



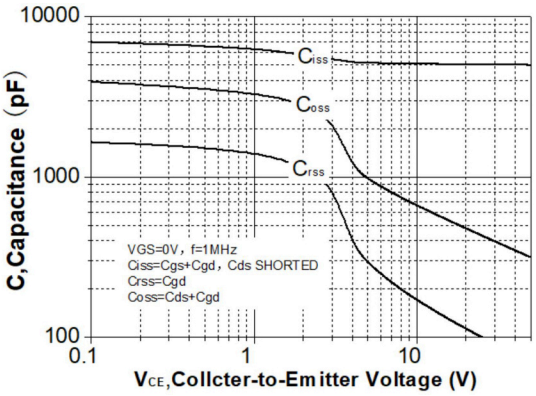
Diode Characteristic

Tj=25℃、150℃、-40℃



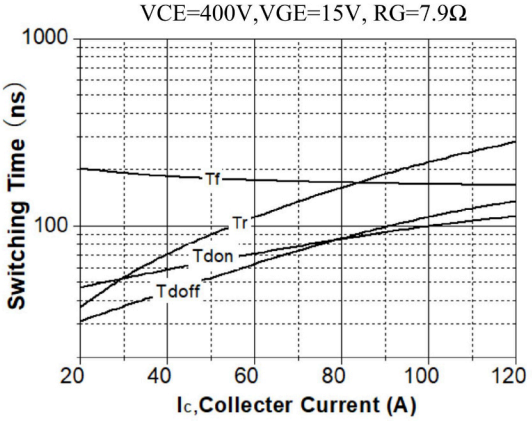
Capacitance Characteristic

Vce=25V,VGE =0V,f=1.0MHZ



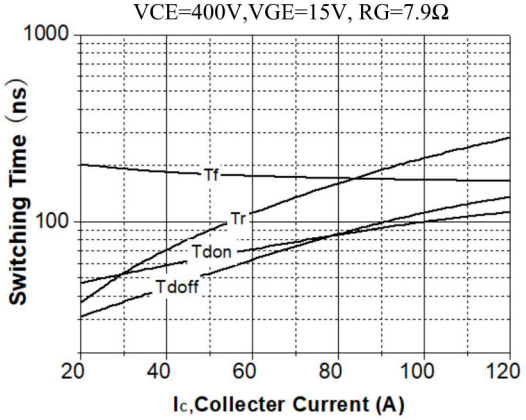
Switching Time vs. IC(25℃)

VCE=400V,VGE=15V, RG=7.9Ω



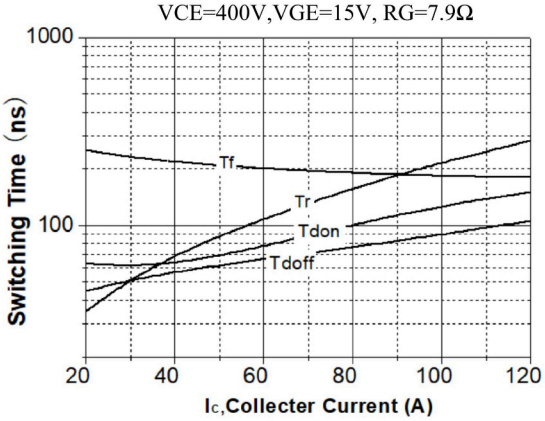
Switching Time vs. IC(25℃)

VCE=400V,VGE=15V, RG=7.9Ω



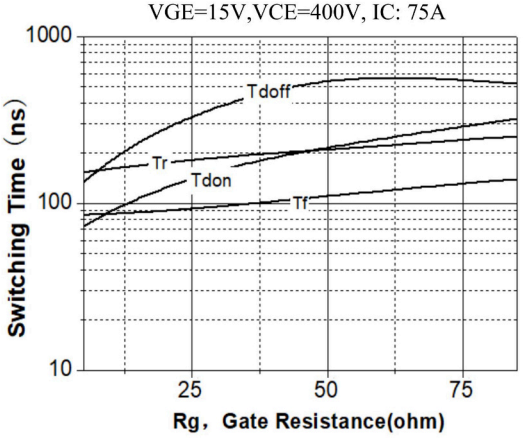
Switching Time vs. IC(150℃)

VCE=400V,VGE=15V, RG=7.9Ω



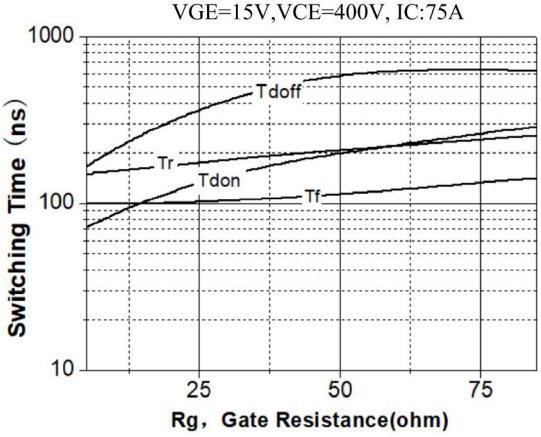
Switching Time vs. Rg(25℃)

VGE=15V,VCE=400V, IC: 75A



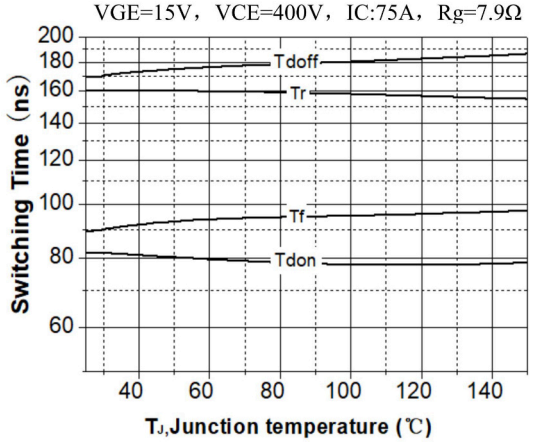
Switching Time vs. Rg(150℃)

VGE=15V,VCE=400V, IC:75A



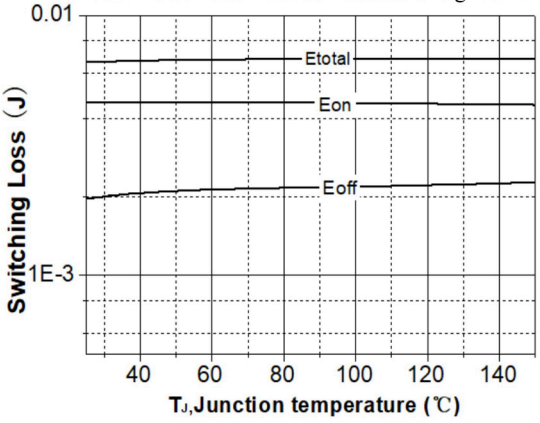
Switching Time vs.Tj

VGE=15V，VCE=400V，IC:75A，Rg=7.9Ω



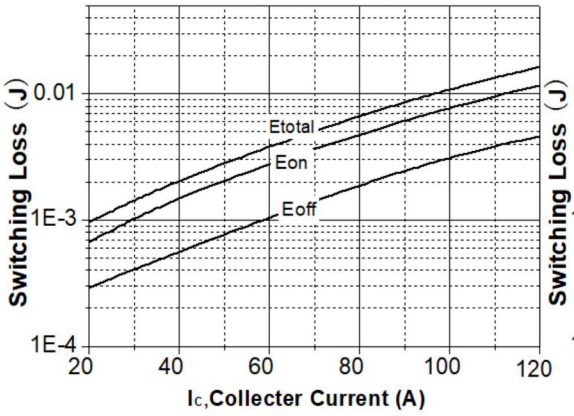
Switching Loss vs. Tj

VGE=15V，VCE=400V，IC:75A ，Rg=7.9Ω



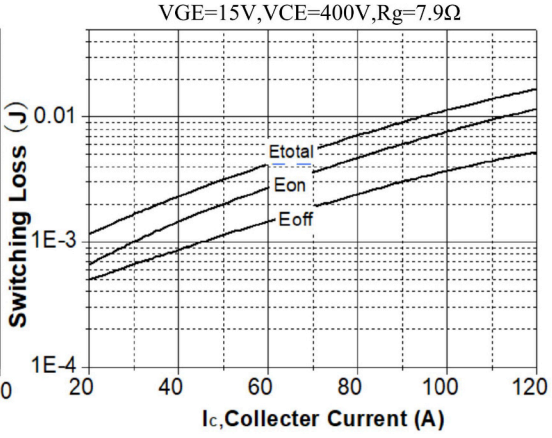
Switching Loss vs. IC(25℃)

VGE=15V,VCE=400V,Rg=7.9Ω



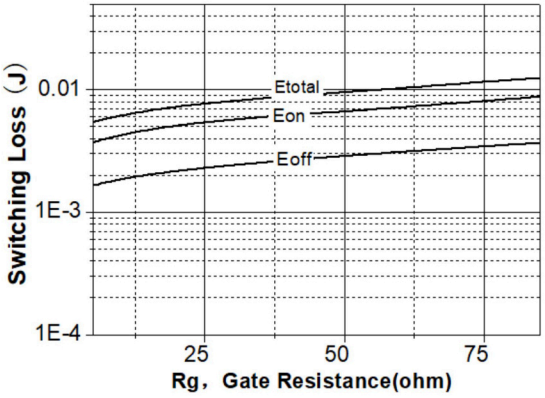
Switching Loss vs. IC(150℃)

VGE=15V,VCE=400V,Rg=7.9Ω



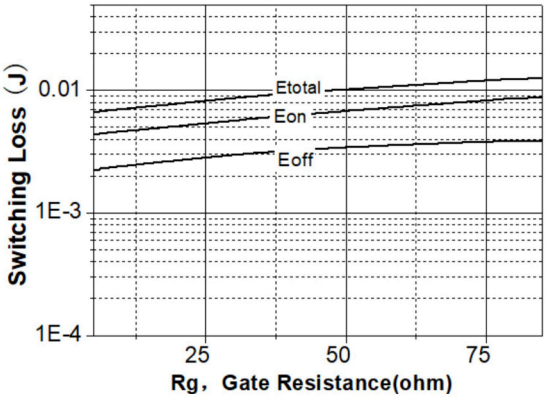
Switching Loss vs. Rg(25℃)

VGE=15V,VCE=400V, IC:75A



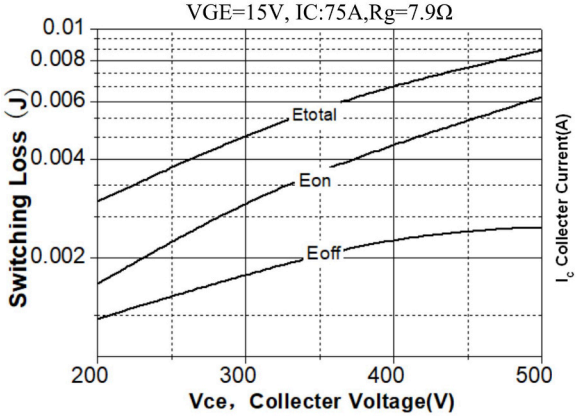
Switching Loss vs. Rg(150℃)

VGE=15V,VCE=400V, IC:75A



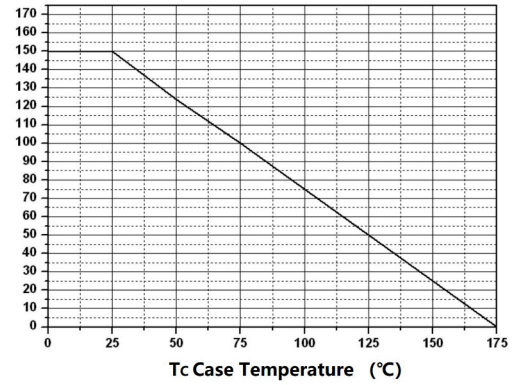
Switching Loss vs. VCE(150℃)

VGE=15V, IC:75A,Rg=7.9Ω



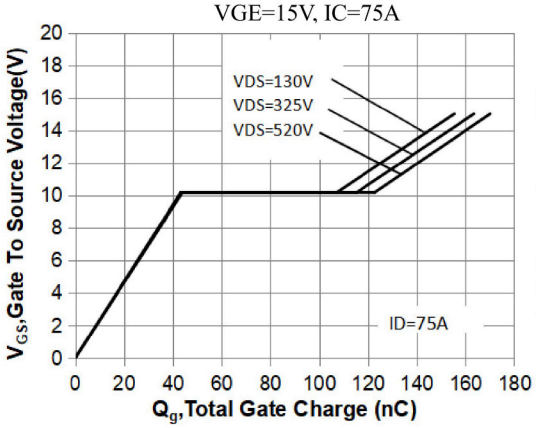
Colletcor current vs.case temperature

VGE≥15V，Tj≤175℃



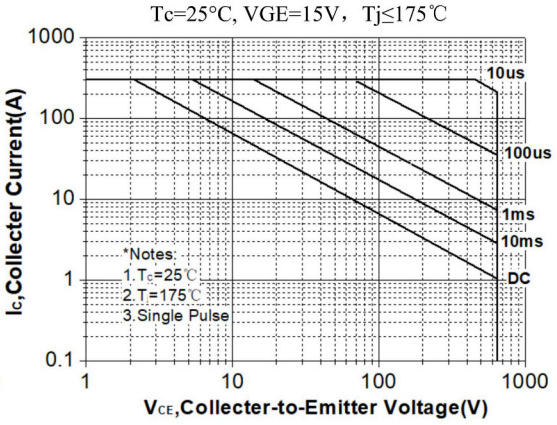
Gate Charge Characteristics

VGE=15V, IC=75A



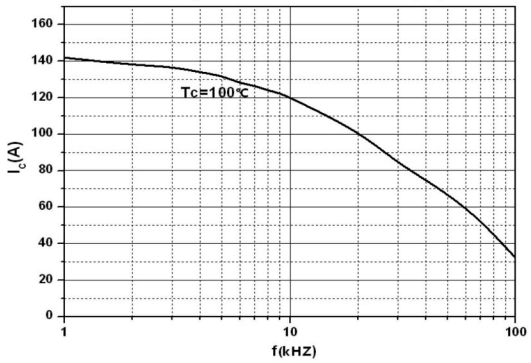
Safe Operating Area For TO-247

Tc=25°C, VGE=15V，Tj≤175℃

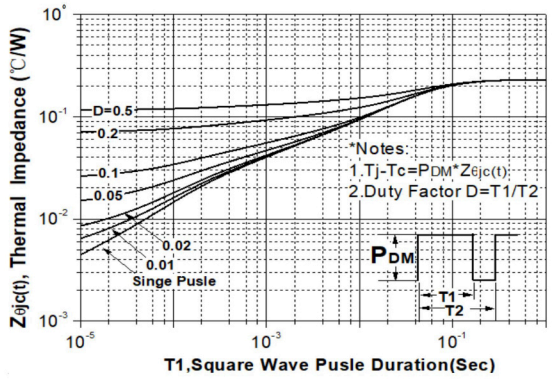


Ic vs. f

Vcc=400V Rg=4.7Ω VGE=15V duty cycle=0.5



Transient Thermal Impedance for TO-247



Package Mechanical DATA