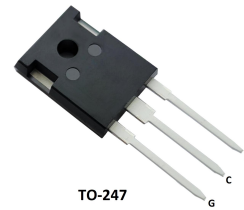


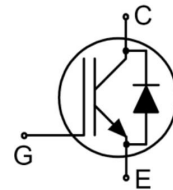
Features

- Low gate charge
- Trench FS Technology,
- Fast switching speed
- Low switching losses
- VCE(sat) with positive temperature coefficient
- RoHS product



Applications

- Charging pile
- UPS
- Solar converters



Absolute Ratings(Tc=25°C)

Parameter	Symbol	Value	Unit
Collector-Emmitter Voltage	V_{ce}	650	V
Collector Current-continuous*	I_C $T=25^{\circ}\text{C}$	150	A
	$T=100^{\circ}\text{C}$	75	A
Collector Current-pulse (note 1)	I_{CM}	300	A
Diode RMS forward current	I_F $T=25^{\circ}\text{C}$	150	A
	$T=100^{\circ}\text{C}$	75	A
Surge non repetitive forward current $t_p=10\text{ ms sinusoidal}$	I_{FSM}	300	A
Gate-EMMiter Voltage	V_{GES}	± 20	V
Power Dissipation	PD $T_c=25^{\circ}\text{C}$	625	W
Operating and Storage Temperature Range	T_J, T_{STG}	$-55 \sim +150$	$^{\circ}\text{C}$
Maximum Lead Temperature for Soldering Purposes	T_L	300	$^{\circ}\text{C}$

*Collector current limited by maximum junction temperature

Electrical Characteristics

Parameter	Symbol	Tests conditions	Min	Typ	Max	Units
Off-Characteristics						
Collector-Emmitter Voltage	BV_{CES}	$I_C=250\mu A, V_{GE}=0V$	650	-	-	V
Zero Gate Voltage Collector Current	I_{CES}	$V_{CE}=650V, V_{GE}=0V$	-	-	80	μA
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	$V_{GE(th)}$	$V_{CE}=V_{GE}, I_C=250\mu A$	3.5	-	6.0	V
Collector-Emmitter saturation Voltage	V_{CESAT}	$V_{GE}=15V, I_C=75A$ $T_C=25^\circ C$	-	1.65	2.1	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

Electrical Characteristics

Parameter	Symbol	Tests conditions	Min	Typ	Max	Units
Switching Characteristics						
Turn-on delay time	$t_{d(on)}$	$V_{CE}=400V, I_C=75A,$ $R_G=5\Omega$ $T_C=25^\circ C$	-	26	-	ns
Turn-On rise time	t_r		-	120	-	ns
Turn-Off delay time	$t_{d(off)}$		-	95	-	ns
Turn-Off Fall time	t_f		-	80	-	ns
Turn-on energy	E_{on}		-	2.8	-	mJ
Turn-off energy	E_{off}		-	1.5	-	mJ
Total switching energy	E_{total}		-	4.4	-	mJ
Turn-on delay time	$t_{d(on)}$	$V_{CE}=400V, I_C=75A,$ $R_G=5\Omega$ $T_C=175^\circ C$	-	28	-	ns
Turn-On rise time	t_r		-	131	-	ns
Turn-Off delay time	$t_{d(off)}$		-	120	-	ns
Turn-Off Fall time	t_f		-	125	-	ns

Turn-on energy	E _{on}		-	3.0	-	mJ
Turn-off energy	E _{off}		-	2.5	-	mJ
Total switching energy	E _{total}		-	5.5	-	mJ
Total Gate Charge	Q _g	V _{CE} =520V, I _c =75A V _{GE} =15V	-	140		nC
Gate to emitter Charge	Q _{ge}		-	28		nC
Gate to collector Charge	Q _{gc}		-	80		nC
Anti-Parallel Diode Characteristics and Maximum Ratings						
Drain-Source Diode Forward Voltage	V _F	V _{GE} =0V,I _F =75A	-	2.0	2.6	V
Diode Reverse recovery time	t _{rr}	V _{GE} =0V,V _R =200V I _F =75A di/dt=200A/us	-	49	-	ns
Reverse recovery charge	Q _{rr}		-	121	-	nC

Thermal Characteristic

Paramer	Symbol	Max	Unit
Junction to Ambient	$R_{th(j-A)}$	40	$^{\circ}C/W$
Junction to Case IGBT	$R_{th(j-c)}$	0.24	$^{\circ}C/W$
Junction to Case Diode	$R_{th(j-c)}$	0.34	$^{\circ}C/W$

Order Message

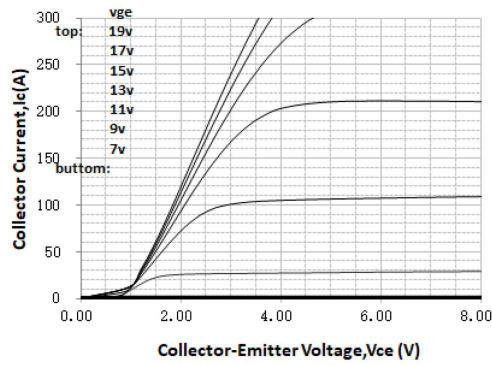
Order codes	Marking	Package
MSG75C65HHC0	MSG75C65HHC0	TO-247

Notes:

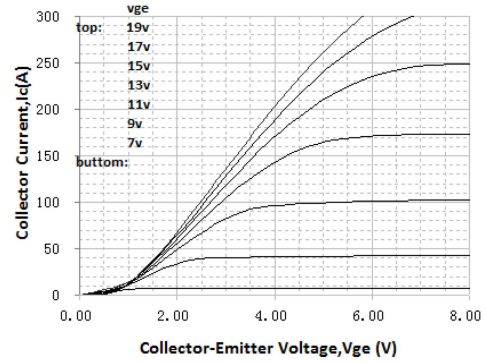
1: Pulse width limited by maximum junction temperature

Electrical Characteristics(curves)

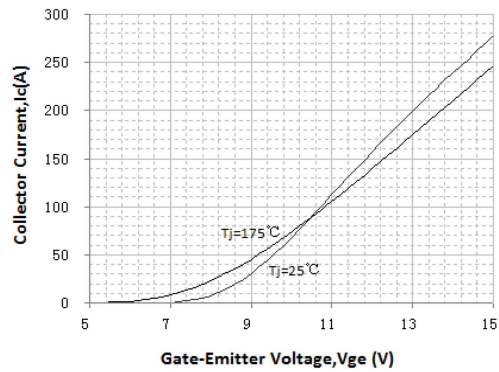
Output Characteristics (25°C)



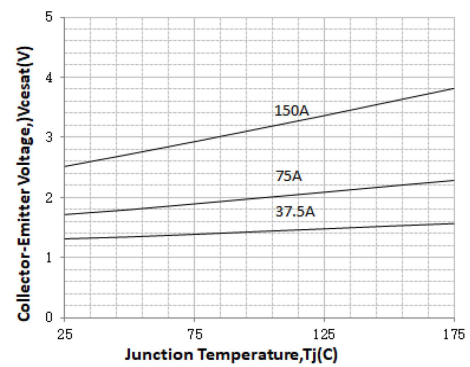
Output Characteristics (175°C)



Transfer Characteristics

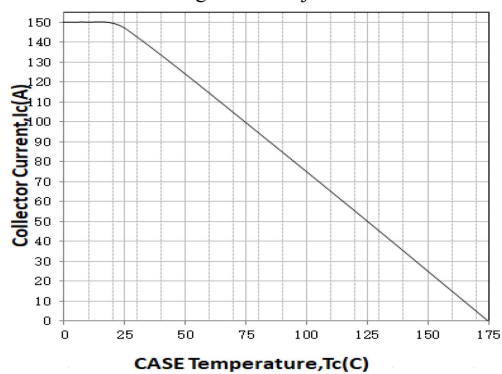


VCESAT vs. Tj



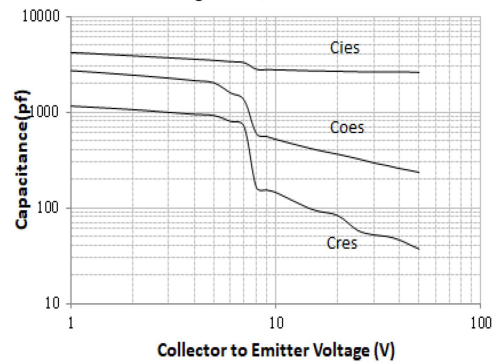
Collector current vs. case temperature

$V_{ge} \geq 15\text{V}$, $T_j \leq 175^\circ\text{C}$



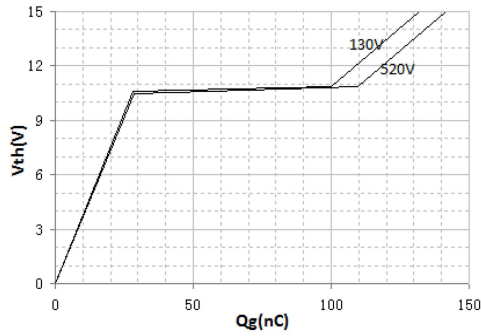
Capacitance Characteristic

$V_{ge} = 0\text{V}$, $f = 1.0\text{MHz}$



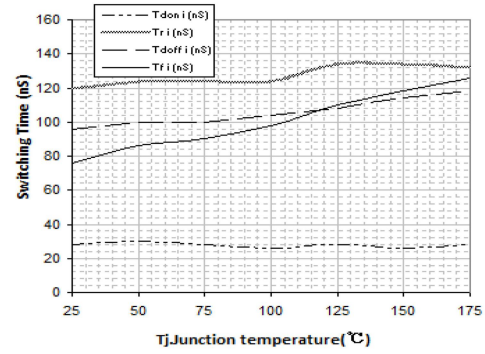
Gate Charge Characteristics

$V_{ge}=15V, I_c=75A$



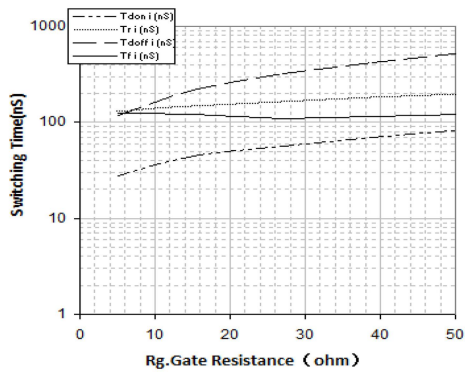
Switching Time vs. T_j

$V_{ge}=15V, V_{ce}=400V, I_c=75A, R_g=5\Omega$



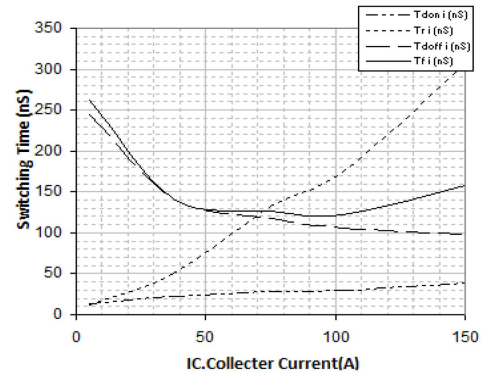
Switching Time vs. $R_g(175^\circ C)$

$V_{ge}=15V, V_{ce}=400V, I_c=75A$



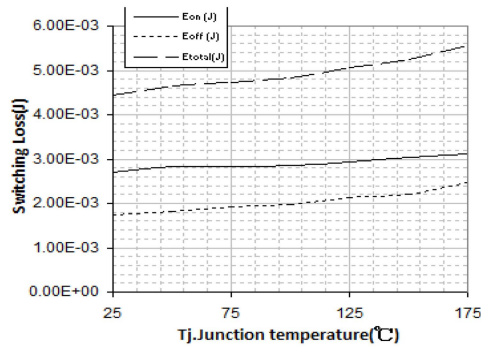
Switching Time vs. $I_c(175^\circ C)$

$V_{ce}=400V, V_{ge}=15V, R_g=5\Omega$



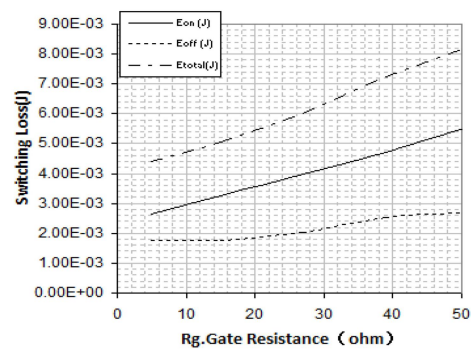
Switching Loss vs. T_j

$V_{ge}=15V, V_{ce}=400V, I_c=75A, R_g=5\Omega$



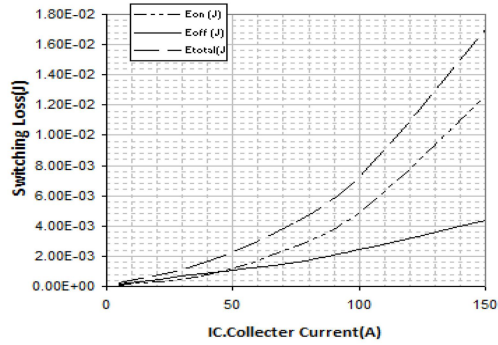
Switching Loss vs. $R_g(175^\circ C)$

$V_{ge}=15V, V_{ce}=400V, I_c=75A$



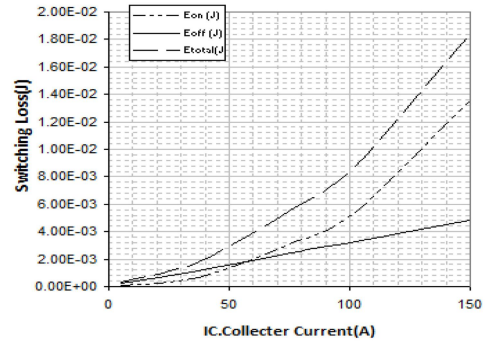
Switching Loss vs. IC(25°C)

Vce=400V, Vge=15V, Rg=5Ω



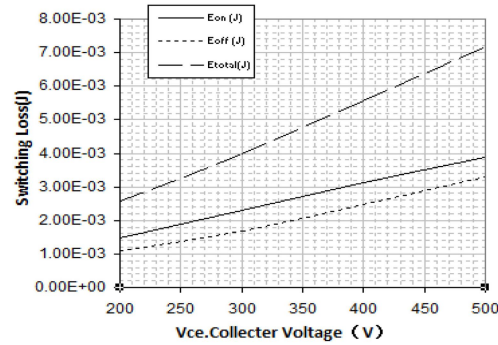
Switching Loss vs. IC(175°C)

Vce=400V, Vge=15V, Rg=5Ω

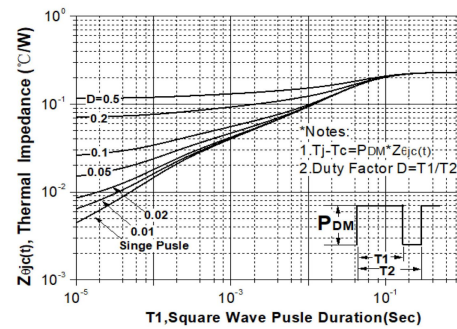


Switching Loss vs. VCE(175°C)

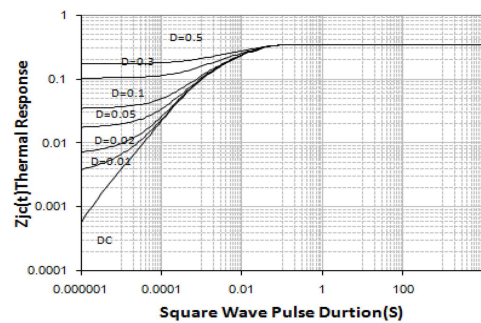
Vge=15V, Ic=75A, Rg=5Ω



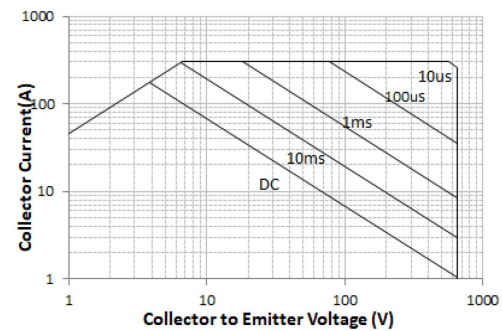
Transient Thermal Impedance for IGBT



Transient Thermal Impedance for FRD



Safe Operating Area For TO-247



The drawing illustrates the mechanical specifications of the TO-247 package in three views:

- Top View:** Shows the square base with a central mounting hole (6.15BSC). Dimensions include a width of 15.49 mm (16.26 mm including mounting tabs), a height of 20.80 mm (21.46 mm including mounting tabs), and a central hole diameter of 4.70 mm. Pin dimensions include a pin width of 2.59 mm (3.43 mm including tab), a pin pitch of 2.54 mm, and a maximum pin length of 4.5 mm. The mounting hole diameter is 6.15 mm (BSC).
- Side View:** Shows the package height of 19.81 mm (20.32 mm including mounting tabs) and a base thickness of 0.38 mm (0.89 mm including mounting tabs). The pin diameter is 2.21 mm (2.59 mm including mounting tabs).
- Front View:** Shows the package height of 13.08 mm (13.46 mm minimum) and a pin diameter of 3.56 mm (3.66 mm minimum). The mounting hole diameter is 6.15 mm (BSC).

Key dimensions and tolerances are provided in millimeters (mm). The package is labeled TO-247.