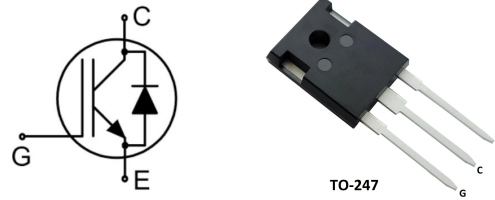


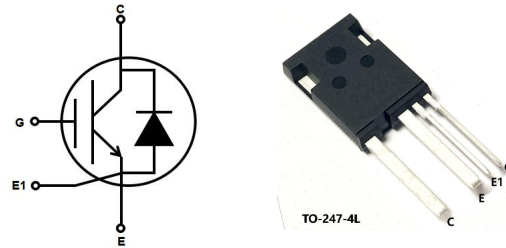
MSG75T65HFC0/MSG75T65HFC6

Features

- Low gate charge
- Trench FS Technology
- Fast switching speed
- Low switching losses
- Low $V_{CE(sat)}$
- Lower EMC interference
- RoHS product



MSG75T65HFC0



MSG75T65HFC6

Applications

- Charging pile
- UPS
- Solar converters

Absolute Ratings($T_c=25^\circ\text{C}$)

Parameter	Symbol	conditions	Value	Unit
Collector-Emitter 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	I_{FSM}	$t_p=10\text{ ms, sine}$	300	A
Gate-Emitter Voltage	V_{GES}		± 20	V
Power Dissipation	PD	$T_c=25^\circ\text{C}$	625	W
Operating Temperature Range	T_J		$-55\sim+175$	$^\circ\text{C}$
Storage Temperature Range	T_{STG}		$-55\sim+175$	$^\circ\text{C}$
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-Emitter Voltage	BV _{CES}	I _C =250uA,V _{GE} =0V	650	-	-	V
Zero Gate Voltage Collector Current	I _{CES}	V _{CE} =650V,V _{GE} =0V	-	-	80	uA
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 =600uA	3.5	-	6.5	V
Collector-Emitter saturation Voltage	V _{CESAT} TO-247	V _{GE} =15V I _C =50A T _C =25°C	1.5	-	1.90	V
Collector-Emitter saturation Voltage	V _{CESAT} TO-247-4L		1.25	-	1.65	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 TO-247	$V_{GE}=0V, I_F=30A$	-	1.5	-	V
Drain-Source Diode Forward Voltage	V_F TO-247-4L		-	1.3	-	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

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

Order Message

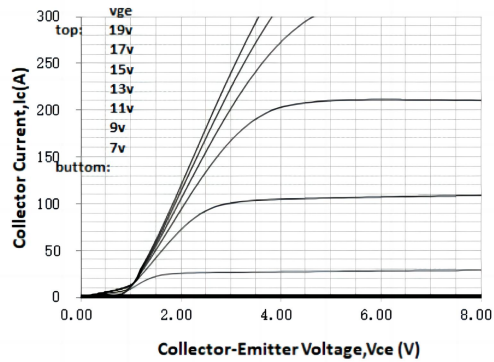
Order codes	Marking	Package
MSG75T65HFC0	MSG75T65HFC0	TO-247
MSG75T65HFC6	MSG75T65HFC6	TO-247-4L

Notes:

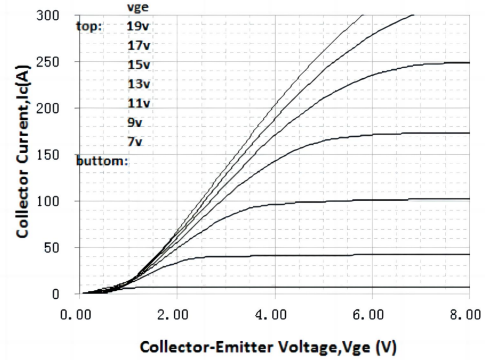
1: Pulse width limited by maximum junction temperature

Electrical Characteristics(curves)

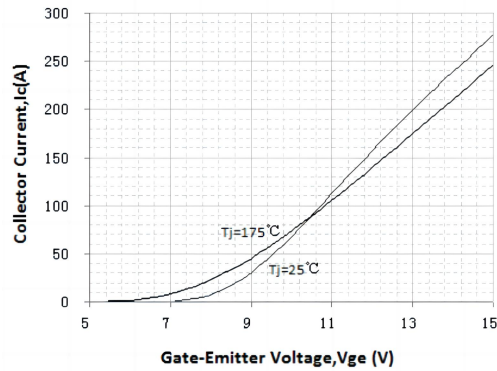
Output Characteristics (25°C)



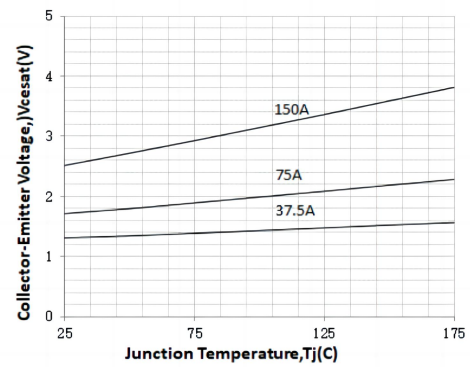
Output Characteristics (175°C)



Transfer Characteristics

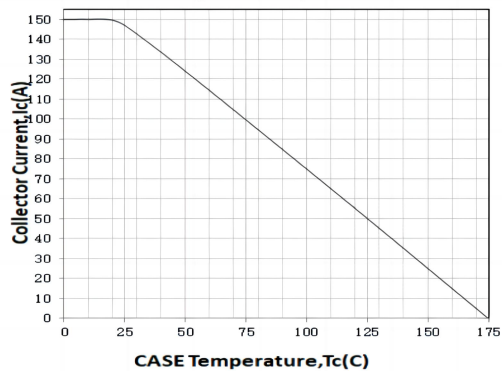


VCESAT vs. T_j



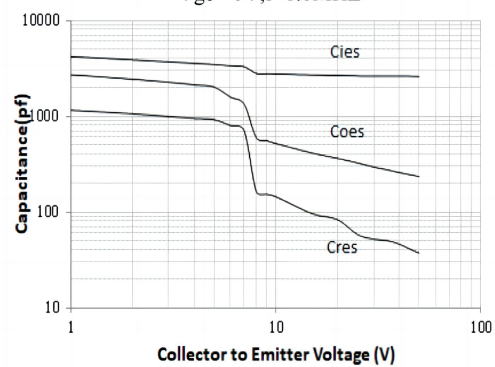
Collector current vs. case temperature

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

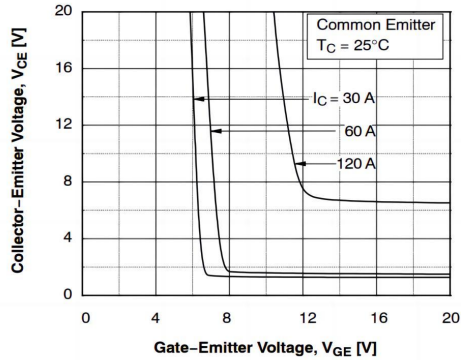


Capacitance Characteristic

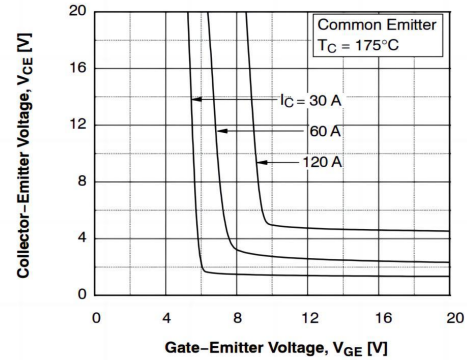
$V_{ge} = 0V, f = 1.0MHz$



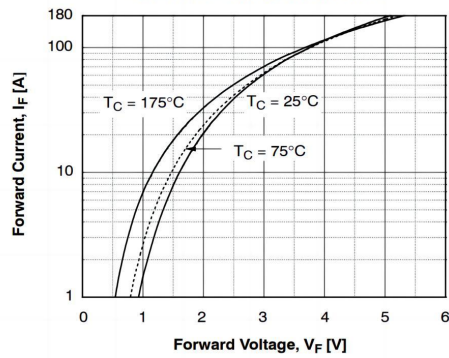
Saturation Voltage vs. V_{GE} (25°C)



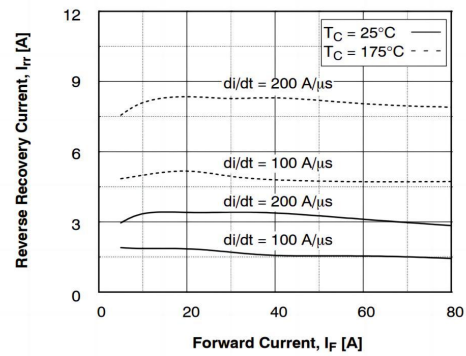
Saturation Voltage vs. V_{GE} (175°C)



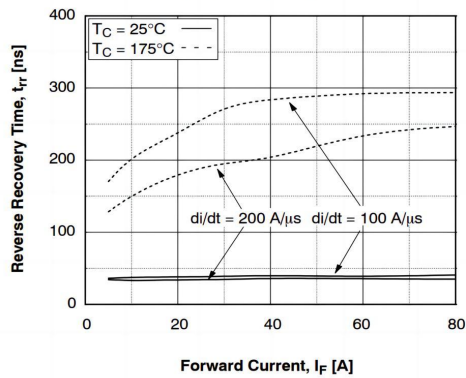
Forward Characteristics



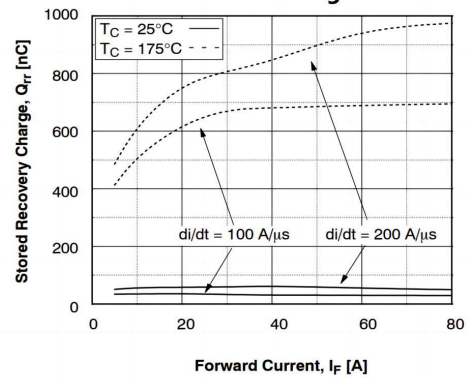
Reverse Recovery Current



Reverse Recovery Time

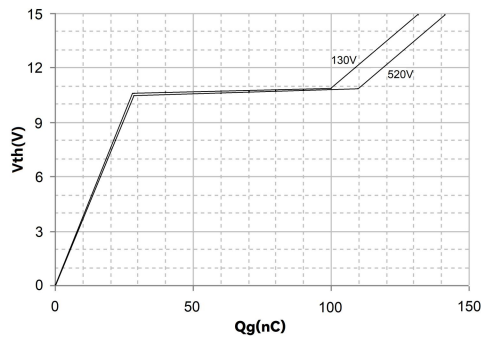


Stored Charge



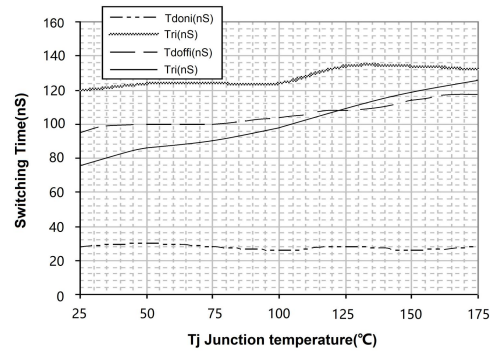
Gate Charge Characteristics

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



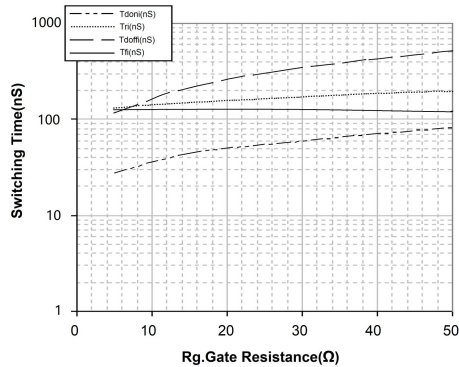
Switching Time vs. T_j

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



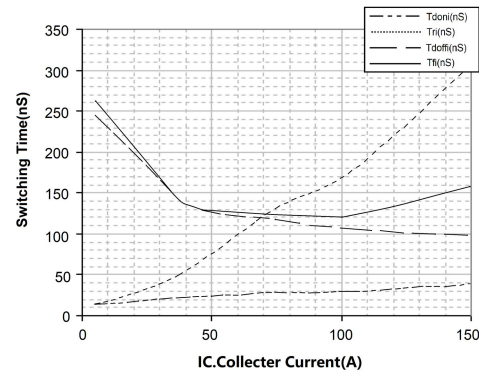
Switching Time vs. $R_g(175^\circ C)$

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



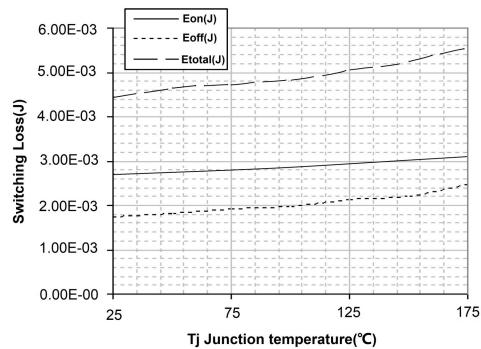
Switching Time vs. $I_c(175^\circ C)$

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



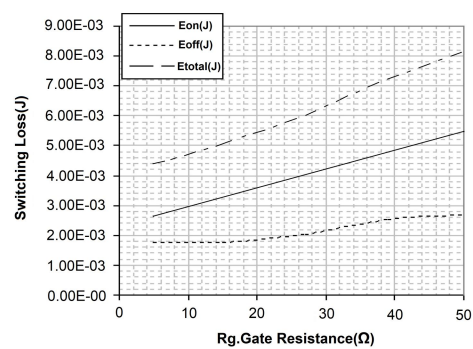
Switching Loss vs. T_j

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



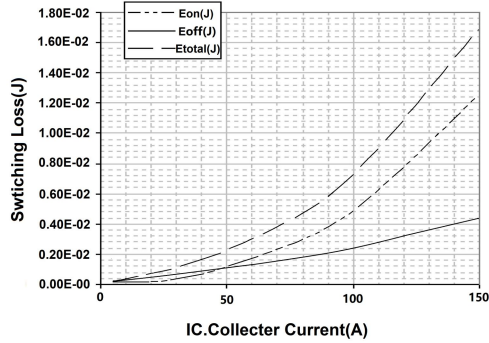
Switching Loss vs. $R_g(175^\circ C)$

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



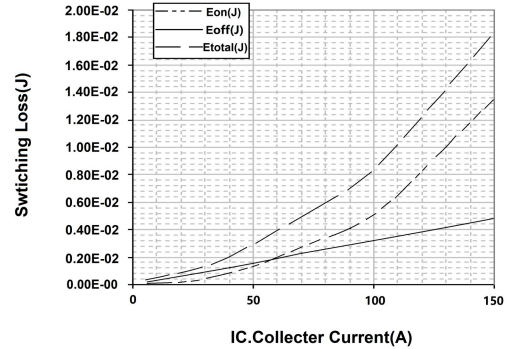
Switching Loss vs. IC(25°C)

Vce=400V, Vge=15V, Rg=5Ω



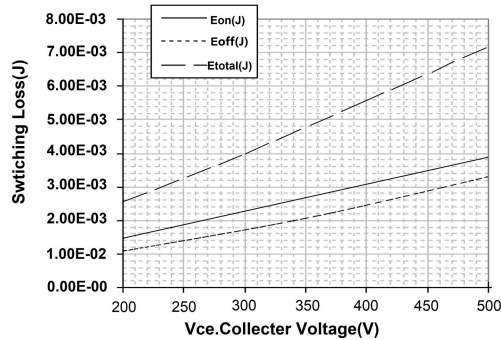
Switching Loss vs. IC(175°C)

Vce=400V, Vge=15V, Rg=5Ω

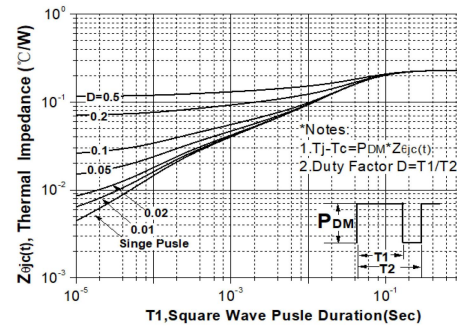


Switching Loss vs. VCE(175°C)

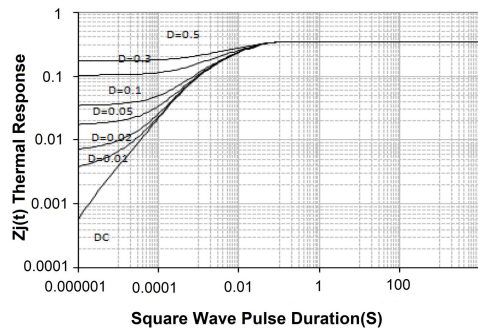
Vge=15V, Ic=75A, Rg=5Ω



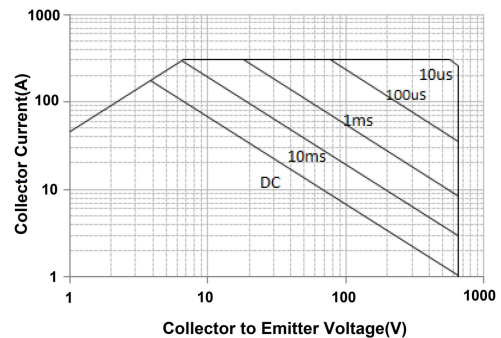
Transient Thermal Impedance for IGBT



Transient Thermal Impedance for FRD



Safe Operating Area For TO-247



Package Mechanical DATA

