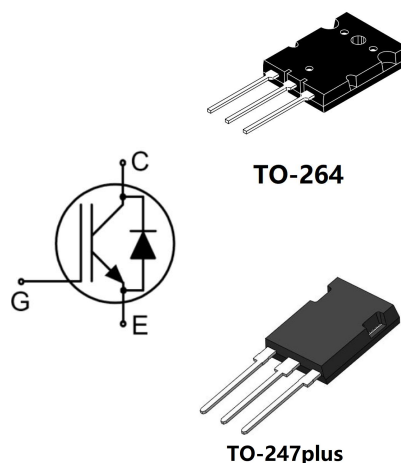


Features

- $V_{CE(sat)(typ.)} = 1.85V @ V_{GE} = 15V, I_C = 75A$
- High speed switching
- Higher system efficiency
- Soft current turn-off waveforms

Applications

- UPS
- AC & DC motor controls
- general purpose inverter .



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

Parameter	Symbol	Value	Unit
Collector-Emitter Voltage	V_{ce}	1200	V
Collector Current-continuous	I_C $T=25^{\circ}C$ $T=100^{\circ}C$	115	A
		75	A
Diode forward current	I_F $T_C=100^{\circ}C$	75	A
Collector Current-pulse (note 1)	I_{CM}	230	A
Gate-Emitter Voltage	V_{GES}	± 30	V
Power Dissipation(TO-264)	PD $T_C=25^{\circ}C$ $T_C=100^{\circ}C$	625	W
		250	W
Power Dissipation(TO-247plus)	PD $T_C=25^{\circ}C$ $T_C=100^{\circ}C$	882	W
		441	W
Operating and Storage Temperature Range	T_J, T_{STG}	$-55 \sim +150$	$^{\circ}C$
Diode Maximum Forward Current (Note 1)	I_{FM}	250	A
Short Circuit Withstand Time	t_{sc}	10	μs
Maximum Lead Temperature for Soldering Purposes	T_L	300	$^{\circ}C$

Electrical Characteristics

Parameter	Symbol	Tests conditions	Min	Typ	Max	Units
Off-Characteristics						

Collector-Emitter Voltage	BV_{CES}	$I_C=250\mu A, V_{GE}=0V$	1200	-	-	V
Zero Gate Voltage Collector Current	I_{CES}	$V_{CE}=1200V, V_{GE}=0V, T_C=25^{\circ}C$	-	-	100	μA
Gate-body leakage current, forward	I_{GESF}	$V_{CE}=0V, V_{GE}=30V$	-	-	100	nA
Gate-body leakage current, reverse	I_{GESR}	$V_{CE}=0V, V_{GE}=-30V$	-	-	-100	nA
On-Characteristics						
Gate Threshold Voltage	$V_{GE(th)}$	$V_{CE}=V_{GE}, I_C=250\mu A$	4.5	-	6.5	V
Collector-Emitter saturation Voltage	V_{CESAT}	$V_{GE}=15V, I_C=75A$	-	1.85	2.5	V
		$V_{GE}=15V, I_C=75A, T_C=125^{\circ}C$		2.25		
		$V_{GE}=15V, I_C=115A$		2.15		
Dynamic Characteristics						
Input capacitance	C_{ies}	$V_{GS}=30V, V_{DS}=0V, f=1MHz$	-	7348	-	pF
Output capacitance	C_{oes}		-	312	-	pF
Reverse transfer capacitance	C_{res}		-	38	-	pF

Electrical Characteristics

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Switching Characteristics						
Turn-on delay time	$t_{d(on)}$	$V_{CC}=600V, I_C=75A, R_G=10\Omega, V_{GE}=15V, \text{ Inductive Load } T_C=25^\circ C$	-	205	-	ns
Turn-On rise time	t_r		-	470	-	ns
Turn-Off delay time	$t_{d(off)}$		-	130	-	ns
Turn-Off Fall time	t_f		-	295	-	ns
Turn-on switching Loss	E_{on}		-	19.1	-	mJ
Turn-off switching Loss	E_{off}		-	6	-	mJ
Total switching Loss	E_{ts}		-	25.1	-	mJ
Turn-on delay time	$t_{d(on)}$	$V_{CC}=600V, I_C=75A, R_G=10\Omega, V_{GE}=15V, \text{ Inductive Load } T_C=125^\circ C$	-	190	-	ns
Turn-On rise time	t_r		-	365	-	ns
Turn-Off delay time	$t_{d(off)}$		-	170	-	ns
Turn-Off Fall time	t_f		-	345	-	ns
Turn-on switching Loss	E_{on}		-	15.7	-	mJ

Turn-off switching Loss	E _{off}		-	7.4	-	mJ
Total switching Loss	E _{ts}		-	23.1	-	mJ
Total Gate Charge	Q _g	V _{CC} =600V, I _c =75A V _{GE} =15V	-	270	-	nC
Gate to emitter charge	Q _{ge}		-	105	-	nC
Gate to collector charge	Q _{gc}		-	140	-	nC
Anti-Parallel Diode Characteristics and Maximum Ratings						
Drain-Source Diode Forward Voltage	V _F	I _F =75A	-	2.1	3.2	V
Diode Reverse recovery time	t _{rr}	V _{CE} =400V I _F =75A di/dt=200A/us	-	530	-	ns
Reverse recovery charge	Q _{rr}		-	1890	-	nC
Diode Reverse recovery Current	I _{RRM}		-	8.5	-	A

Thermal Characteristic

Parameter	Symbol	Max		Unit
		TO-264	TO-247 plus	
Thermal Resistance, Junction to Case (IGBT)	$R_{th(j-c)}$	0.2	0.17	$^{\circ}C/W$
Thermal Resistance, Junction to Case (Diode)	$R_{th(j-c)}$	0.4	0.32	$^{\circ}C/W$
Thermal Resistance, Junction to Ambient	$R_{th(j-A)}$	25	40	$^{\circ}C/W$

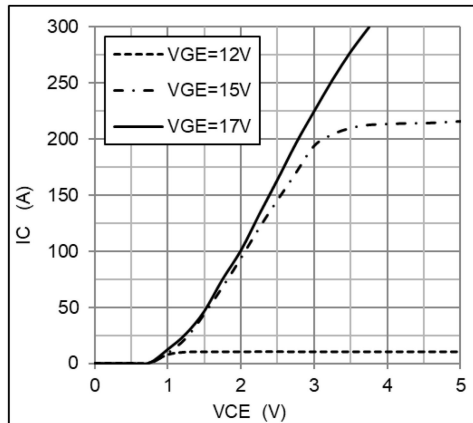
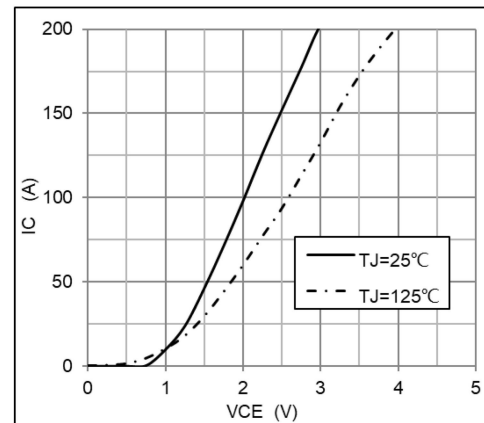
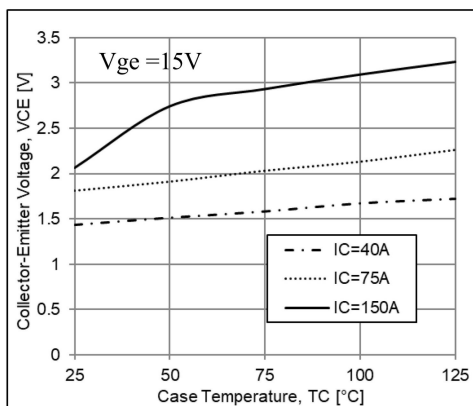
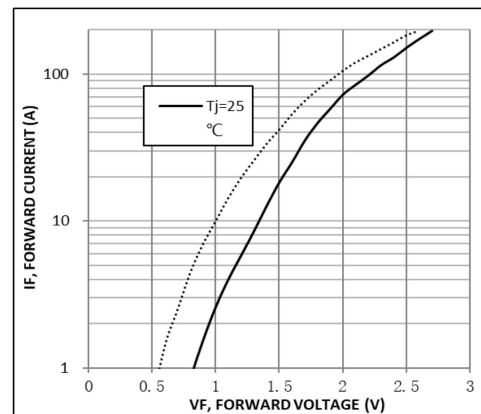
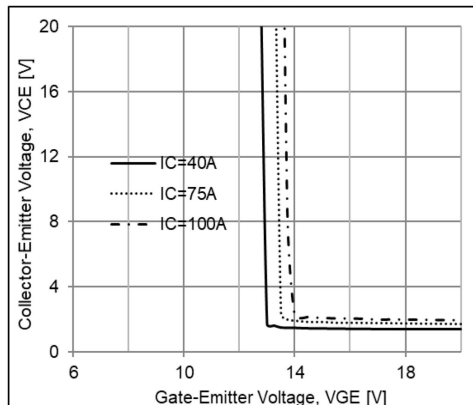
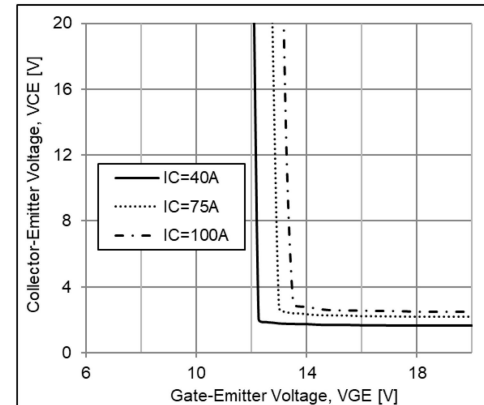
Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature

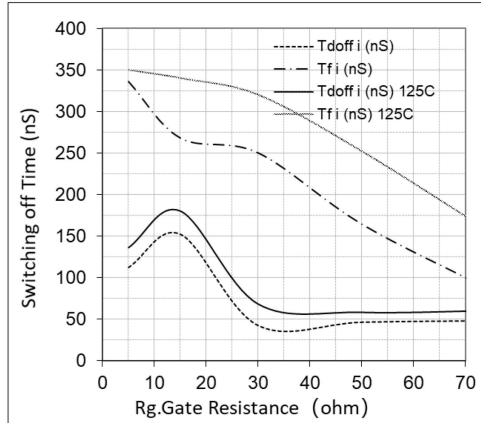
Order Message

Marking	Package
MSG75T120FQW	TO-264
MSG75T120FQC1	TO-247plus

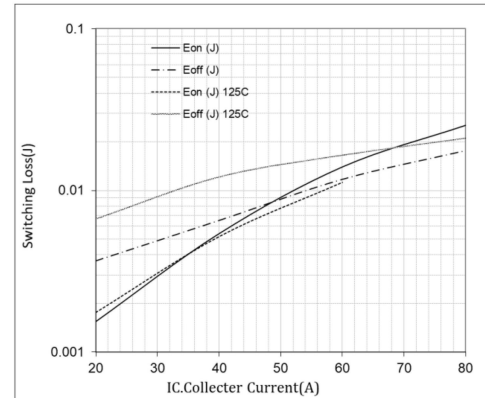
Electrical Characteristics(curves)

Typical Output Characteristics
 $T_c = 25^\circ\text{C}$

Typical Saturation Voltage Characteristics
 $V_G = 15\text{V}$

Saturation Voltage vs. Case Temperature at Variant Current Level

Forward Characteristics

Saturation Voltage vs. VGE
 $T_c = 25^\circ\text{C}$

Saturation Voltage vs. VGE
 $T_c = 25^\circ\text{C}$


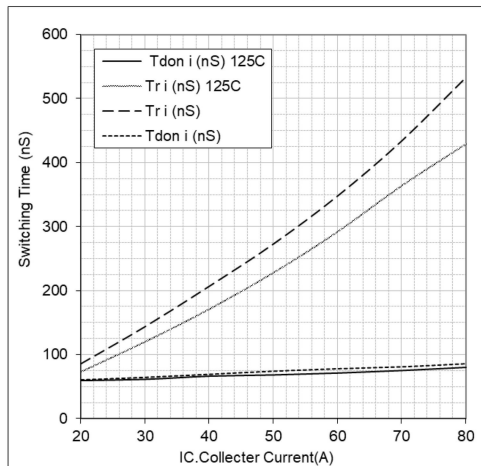
Turn-Off Characteristics vs. Gate Resistance
(VCC=600V, VGE=±15V, IC=75A)



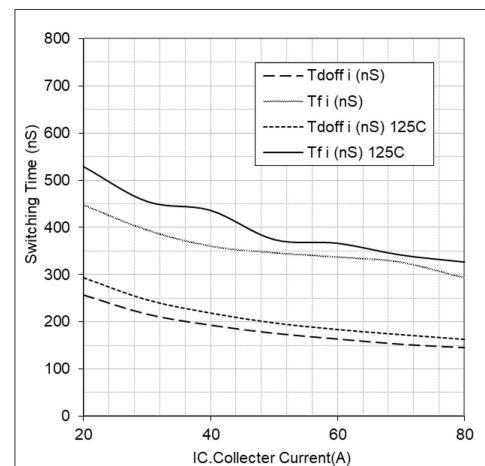
Switching Loss vs. Collector Current
(VGE=±15V, RG= 10 ohm, VCC=600V)



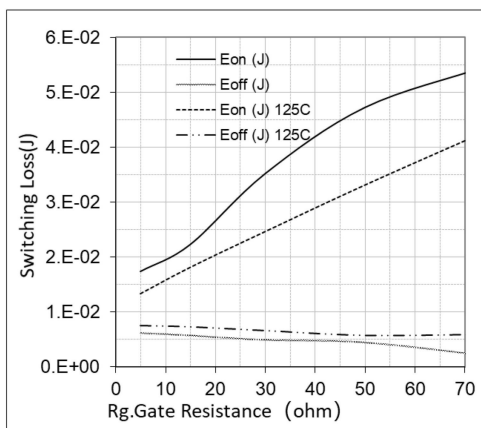
Turn-On Characteristics vs. Collector Current
(VGE=±15V, RG=5 OHM, VCC=600V)



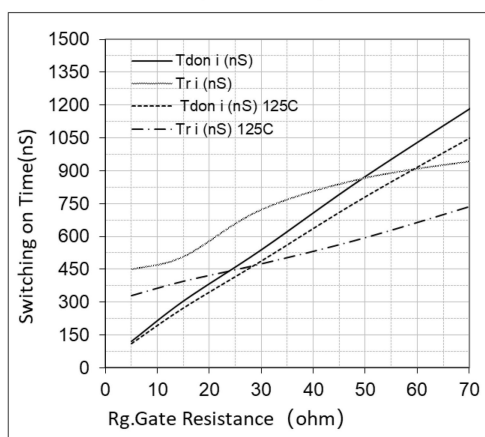
Turn-Off Characteristics vs. Collector Current
(VGE=±15V, RG=5 OHM, VCC=600V)



Switching Loss vs. Gate Resistance
(VCC=600V, VGE= ±15V, IC=75A,)

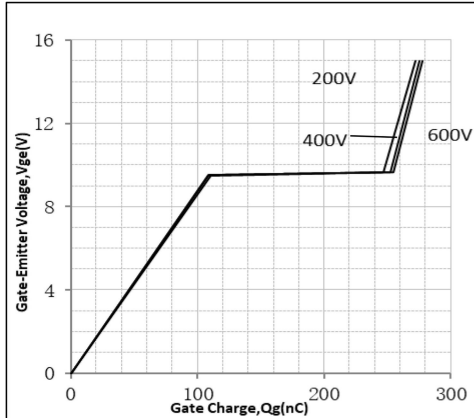


Turn-On Characteristics vs. Gate Resistance
(VCC=600V, VGE= ±15V, IC=75A)



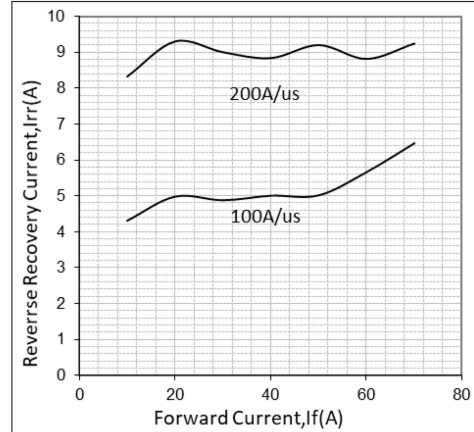
Gate Charge Characteristics

$R_L=10\ \Omega$ $T_C=25^\circ\text{C}$ $V_{CC}=600, 400\text{V}$ 200V



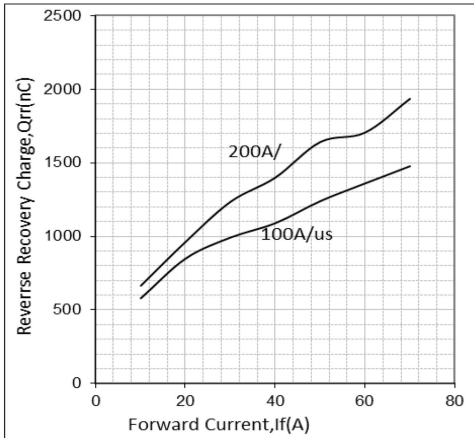
Reverse Recovery Current

$V_{CC}=400\text{V}$, $R_G=10\ \Omega$, $V_G=\pm 15\text{V}$ $I_L=500\ \mu\text{H}$



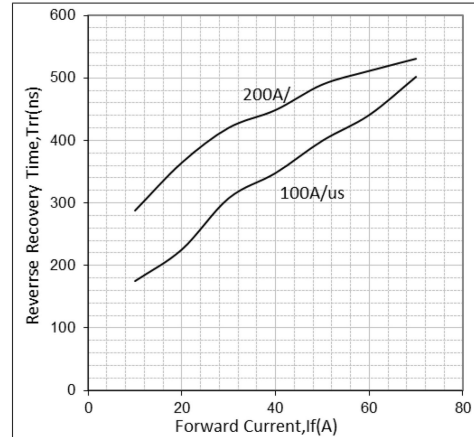
Stored Charge

$V_{CC}=600\text{V}$, $R_G=10\ \Omega$, $V_G=\pm 15\text{V}$ $I_L=500\ \mu\text{H}$

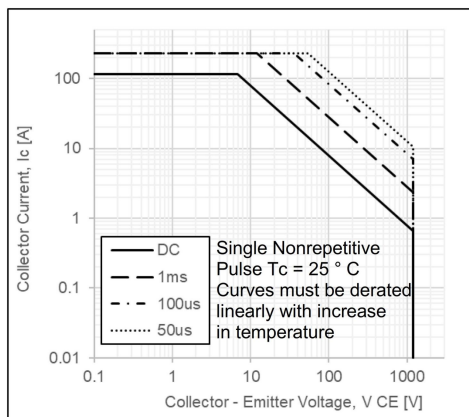


Reverse Recovery Time

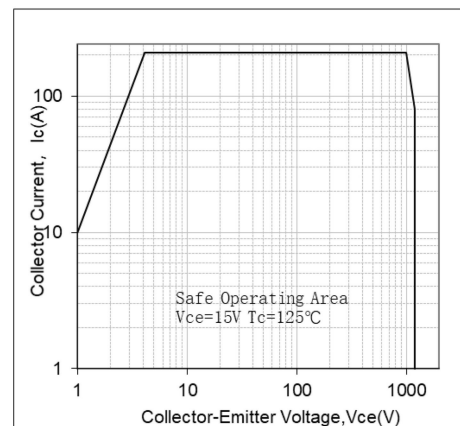
$V_{CC}=400\text{V}$, $R_G=10\ \Omega$, $V_G=\pm 15\text{V}$ $I_L=500\ \mu\text{H}$

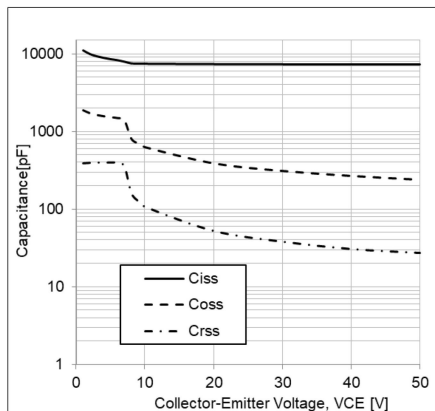
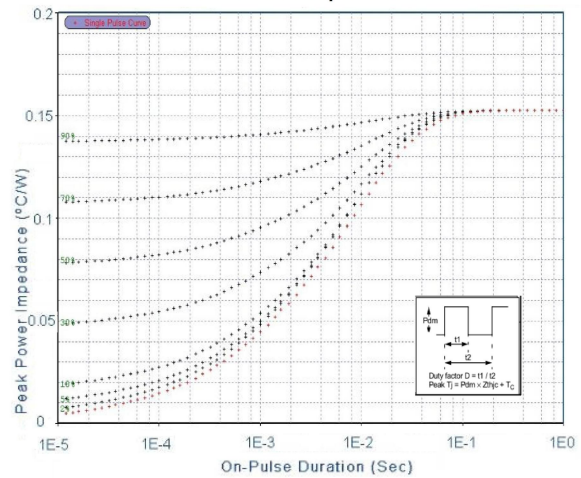


SOA Characteristics



Turn Off SOA



Capacitance Characteristics

Transient Thermal Impedance of IGBT


Package Mechanical DATA

