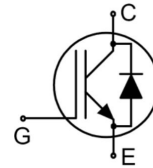
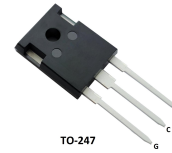
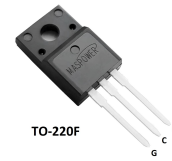


Features

- Low gate charge
- Trench FS Technology
- Fast switching speed
- Low switching losses



Applications

- PFC
- UPS
- Inverter
- Welding Machine

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit	
Collector-emitter voltage	V_{CES}	650	V	
Gate-emitter voltage	V_{GES}	± 30		
Collector current*	I_C	$T_C=25^\circ\text{C}$	60	
		$T_C=100^\circ\text{C}$	30	
Pulsed collector current, pulse time limited by T_{jmax} (note1)	I_{CM}	120	A	
Diode forward current	I_F	$T_C=25^\circ\text{C}$		60
		$T_C=100^\circ\text{C}$		30
Diode pulsed current, Pulse time limited by T_{jmax}	I_{FM}	120		
Power dissipation(TO-220F)	P_D	35	W	
Power dissipation(TO-247)	P_D	230	W	
Operating Junction and storage temperature rang(note2)	T_J	-55 to 175	$^\circ\text{C}$	
	T_{stg}	-55 to 175		

Electrical Characteristics ($T_C = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
Collector-emitter breakdown voltag	BV_{CES}	$I_C = 500\mu\text{A}, V_{GE} = 0\text{V}$	650	-	-	V
Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}, I_C = 250\mu\text{A}$	3.5	4.5	5.5	
Zero gate voltage collector current	I_{CES}	$V_{CE} = 650\text{V}, V_{GE} = 0\text{V}$	-	-	50	μA
Gate-emitter leakage current	I_{GES}	$V_{GE} = 20\text{V}, V_{CE} = 0\text{V}$	-	-	± 200	nA
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = 30\text{A}, V_{GE} = 15\text{V}, T_C = 25^\circ\text{C}$	-	1.7	-	V
Dynamic and Switching Characteristi						

Total gate charg	Q_g	$V_{CE} = 520V, I_C = 30A,$ $V_{GE} = 15V$	-	62	-	nC
Gate emitter charge	Q_{ge}		-	9.5	-	nC
Gate Collector Charge	Q_{gc}		-	33	-	nC
Input capacitanc	C_{ies}	$V_{CE} = 25V, V_{GE} = 0V,$ $f = 1MHz$	-	955	-	pF
Reverse transfer capacitanc	C_{res}		-	107	-	
Output capacitance	C_{oes}		-	33	-	
Turn-on delay time	$t_{d(on)}$	$V_{GE} = 15V, V_{CC} = 400V,$ $I_C = 30A, R_G = 10\Omega,$ Inductive Load, $T_C = 25^\circ C$	-	11	-	nS
Rise tim	t_r		-	42	-	
Turn-off delay time	$t_{d(off)}$		-	89	-	
Fall time	t_f		-	73	-	mJ
Turn-on switching energy	E_{on}		-	0.53	-	
Turn-off switching energy	E_{off}		-	0.55	-	
Total switching energ	E_{ts}	-	1.0	-		
Turn-on delay time	$t_{d(on)}$	$V_{GE} = 15V, V_{CC} = 400V,$ $I_C = 30A, R_G = 10\Omega,$ Inductive Load, $T_C = 150^\circ C$	-	10	-	nS
Rise tim	t_r		-	44	-	
Turn-off delay time	$t_{d(off)}$		-	114	-	
Fall time	t_f		-	130	-	mJ
Turn-on switching energy	E_{on}		-	0.52	-	
Turn-off switching energ	E_{off}		-	0.79	-	
Total switching energ	E_{ts}	-	1.30	-		
Diode Characteristics (Tc =25°C unless otherwise specified)						
Forward voltag	V_F	$I_F=20A, T_C=25^\circ C$	-	1.4	-	V
Reverse recovery time	t_{rr}	$I_F=30A, di/dt=200A/\mu S$ $T_C=25^\circ C$	-	50	-	nS
Reverse recovery current	I_{rr}		-	2.5	-	A
Reverse recovery charge	Q_{rr}		-	0.31	-	uC

Thermal Characteristics

Parameter	Symbol	Value		Unit
Thermal resistance junction-to-ambien	$R_{\theta JA}$	62.5		°C/W
Thermal resistance junction-to-case for IGBT	$R_{\theta JC}$	3.57	0.65	
Thermal resistance junction-to-case for Diode	$R_{\theta JC}$	7.7	40	

*Collector current limited by maximum junction temperature.

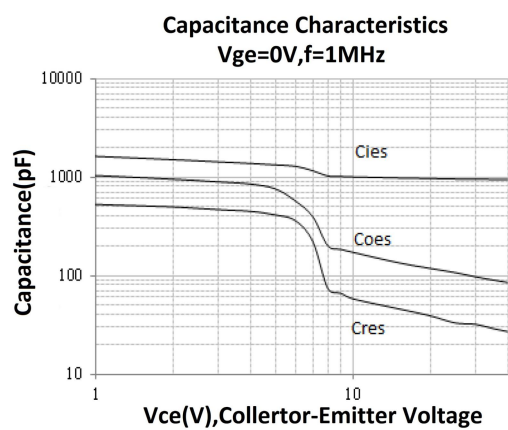
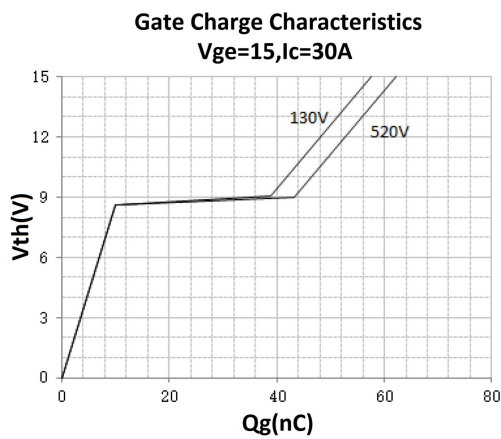
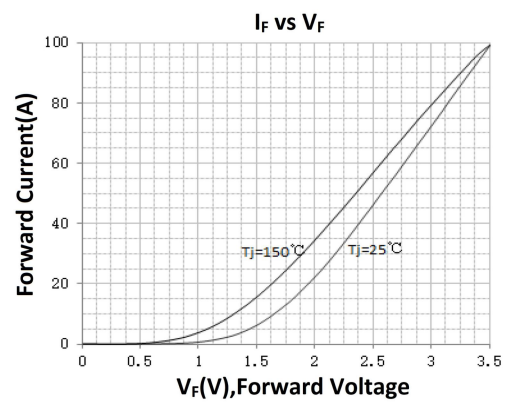
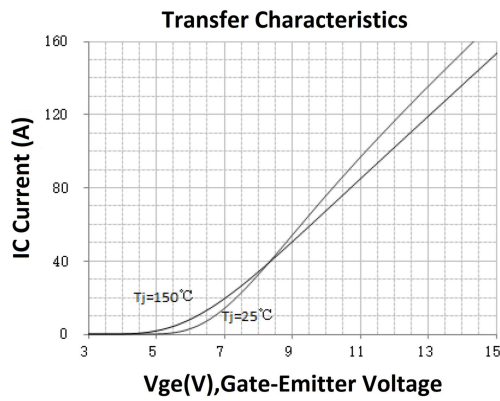
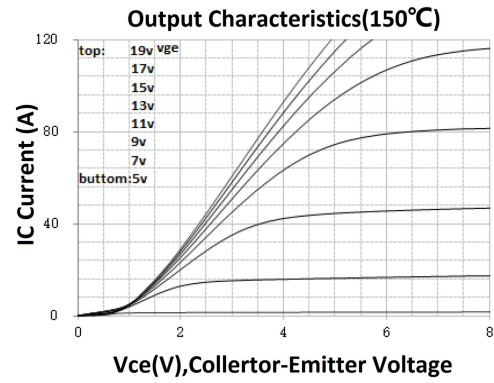
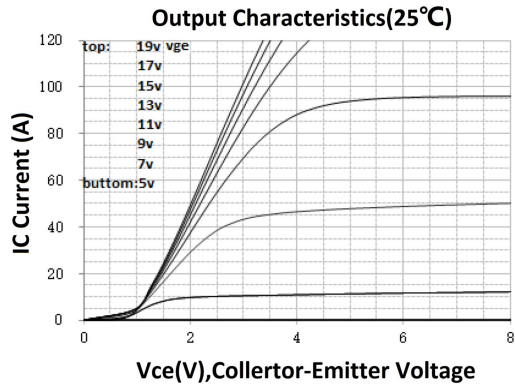
1: Pulse width limited by maximum junction temperature.

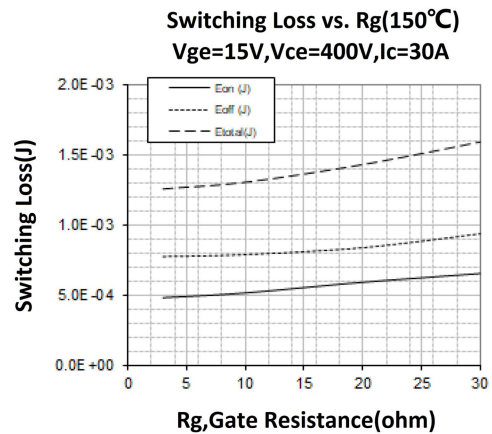
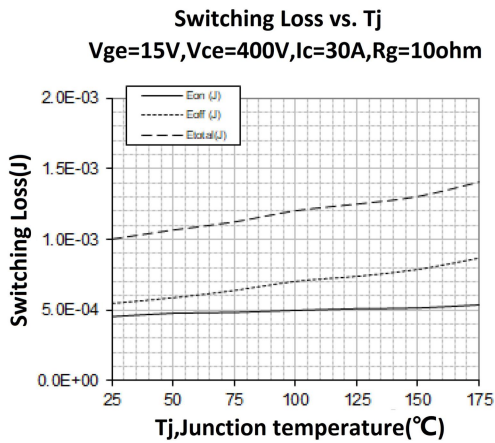
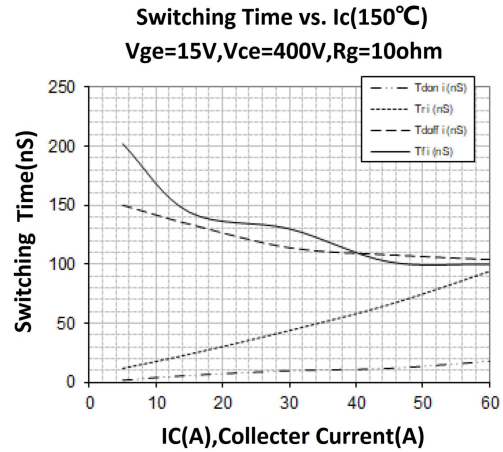
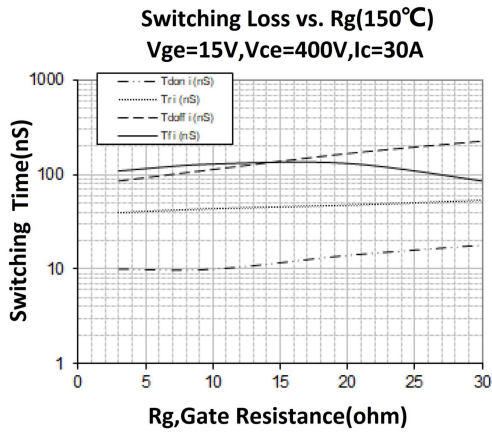
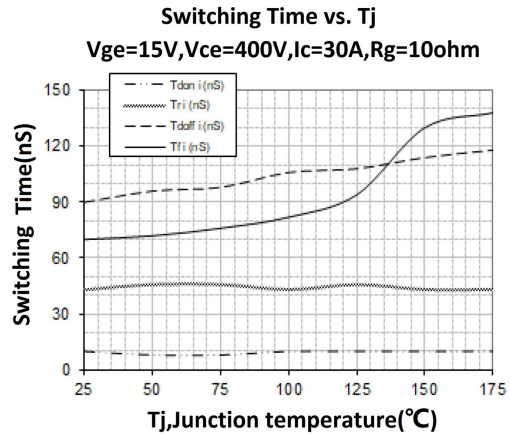
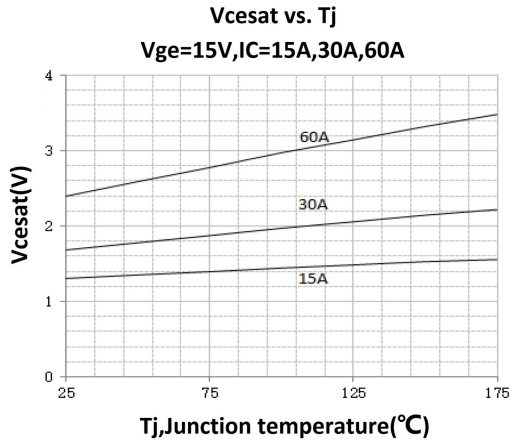
2: Under overload condition, it is allowed to operate at the maximum junction temperature $T_{vjop}=175^\circ C$, and the maximum duty ratio is less than 20% (lasting for 60 s at most)

Order Message

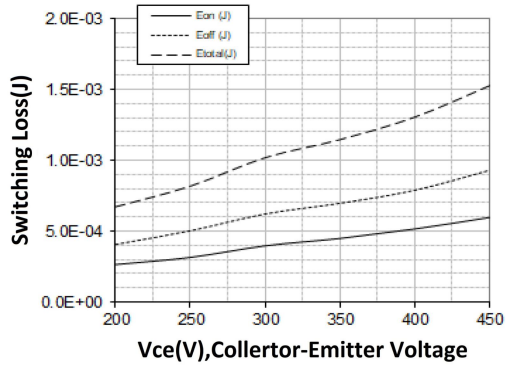
Order codes	Package	Packaging
MSG30T65HHT1	TO-220F	Tube
MSG30T65HHC0	TO-247	Tube

Typical Performance Characteristic

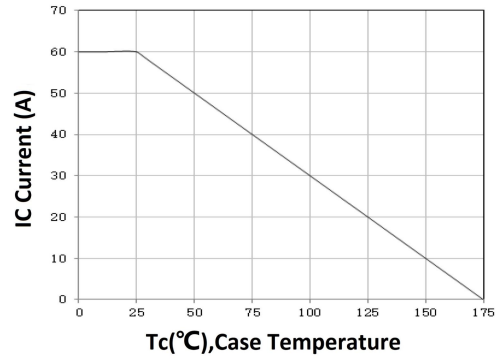




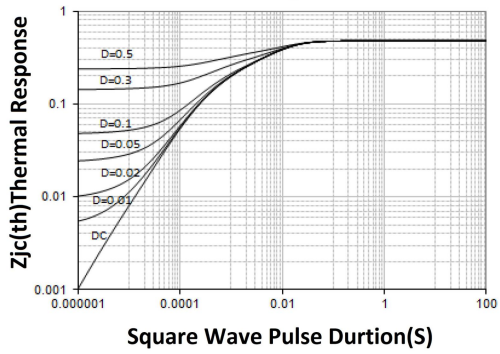
Switching Loss vs. Vce(150°C)
Vge=15V, Ic=30A, Rg=10ohm



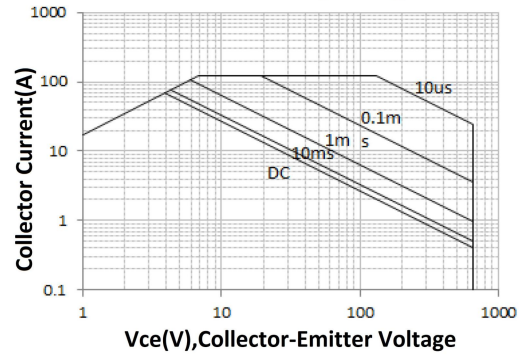
Collector current vs. case temperature



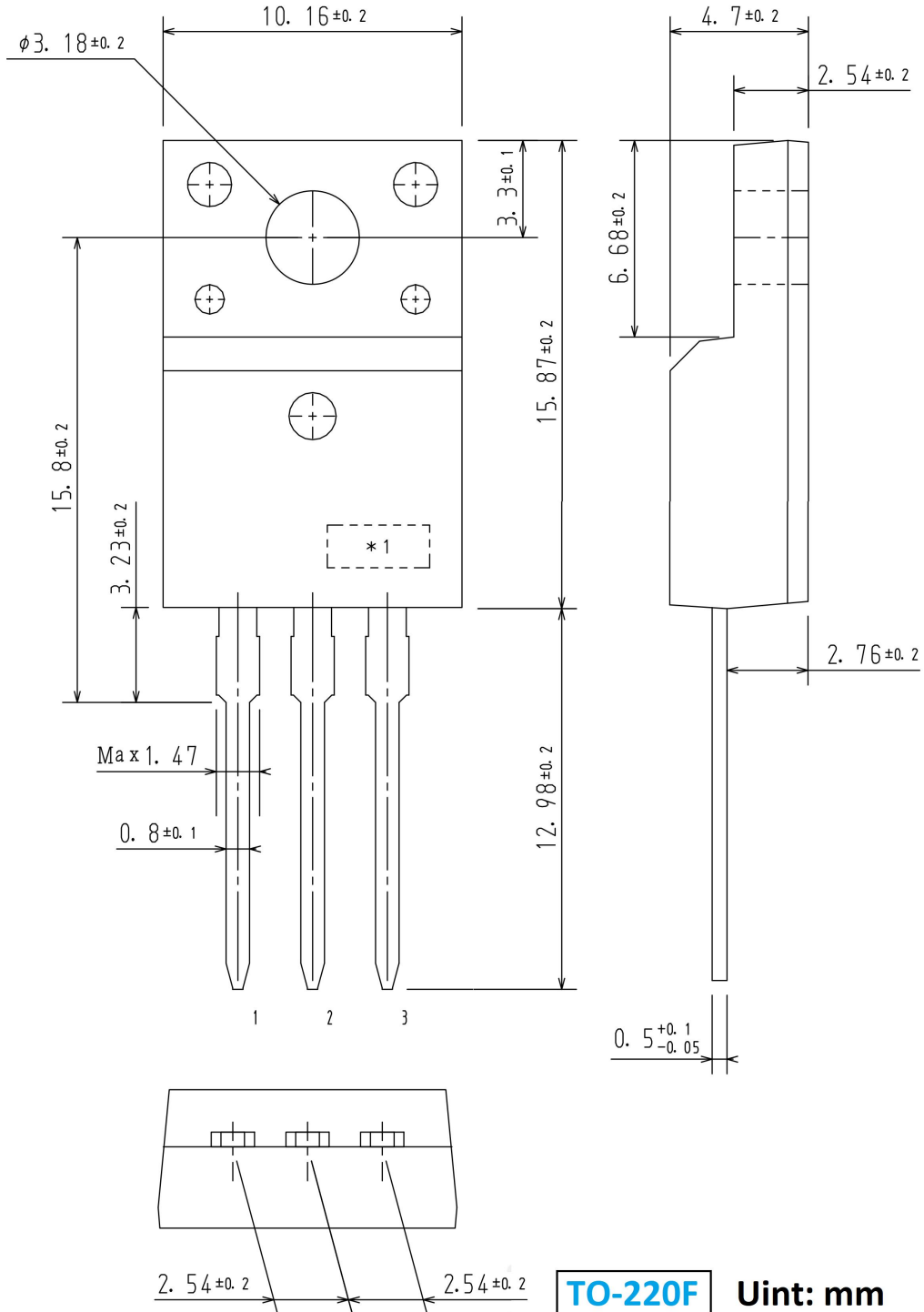
Transient Thermal Impedance for IGBT



Forward Bias Safe Operating Area



Package outline dimension



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[MS13N20HGD0](#) [MS140N30HGB3](#) [MS140N30HGC0](#) [MS15N100HGC0](#) [MS15N100HGT1](#) [MS15N120HGC0](#) [MS170N15IDC0](#)
[MS170N25HGF4](#) [MS170N65HGF4](#) [MS18N100HGC0](#) [MS18N20FT](#) [MS20N50FS](#) [MS30N100HGC0](#) [MS33N10FT](#) [MS33N20HGC0](#)
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