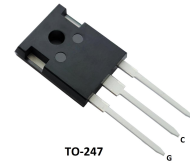


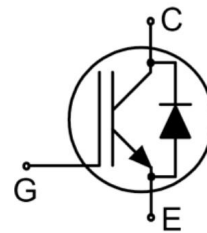
Features

- Low gate charge
- FS Technology
- saturation voltage:
VCE(sat), typ = 2.2V @
IC = 15A and TC = 25° C
- RoHS product



Applications

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



Absolute Ratings (Tc=25°C)

Parameter	Symbol	Value	Unit
Collector-Emmitter Voltage	V _{CES}	1200	V
*Collector Current-continuous	I _C T=25°C T=100°C	30	A
		15	A
Collector Current-pulse(note 1)	I _{CM}	40	A
Diode Continuous forward current	I _F T=100°C	15	A
Diode Maximum Forward Current (Note 1)	I _{FM}	40	A
Gate-Emmitter Voltage	V _{GES}	±30	V
Power Dissipation(TO-247)	P _D T _C =25°C	125	W
Power Dissipation(TO-263)	P _D T _C =25°C	182	W
Operating Temperature Range	T _J	-55~+150	°C
Storage Temperature Range	T _{STG}	-55~+150	°C
Maximum Lead Temperature for Soldering Purposes	T _L	300	°C

*Collector current limited by maximum Junction temperature

Electrical Characteristic(TC=25°C unless otherwise noted)

Parameter	Symbol	Tests conditions	Min	Typ	Max	Units
Off-Characteristics						

Collector-Emmitter Voltage	BV_{CES}	$I_C=500\mu A, V_{GE}=0V$	1200	-	-	V
Zero Gate Voltage Collector Current	I_{CES}	$V_{CE}=1200V, V_{GE}=0V, T_C=25^\circ C$	-	-	0.2	mA
		$T_C=100^\circ C$	-	-	2	mA
Gate-body leakage current, reverse	I_{GESR}	$V_{CE}=0V, V_{GE}=-20V$	-	-	-100	nA
On-Characteristics						
Gate-Emmitter Threshold Voltage	$V_{GE(th)}$	$V_{CE}=V_{GE}, I_C=600\mu A$	4.5	-	6.5	V
Short Collector Current ²	I_{CSC}	$V_{GE}=15V, V_{CE}=600V, T_{sc}<10\mu S, T_C=25^\circ C$	-	80	-	A
Collector-Emmitter saturation Voltage	V_{CESAT}	$V_{GE}=15V, I_C=15A, T_C=25^\circ C$	-	2.2	2.5	V
		$T_C=125^\circ C$	-	2.4	-	V
		$T_C=150^\circ C$	-	2.5	-	V
Dynamic Characteristics						
Input capacitance	C_{ies}	$V_{CE}=25V, V_{GE}=0V, f=1.0MHz,$	-	1030	1800	pF
Output capacitance	C_{oes}		-	80	120	pF
Reverse transfer capacitance	C_{res}		-	50	100	pF
Total Gate Charge	Q_g	$V_{CC}=600V, I_C=15A, V_{GE}=15V$ ^{3,4}	-	70	-	nC
Switching Characteristics						
Turn-On delay time	$t_d(on)$	$V_{CE}=600V, I_C=15A, R_G=10\Omega, \text{Inductive load } T_C=25^\circ C$	-	80	-	ns
Turn-On rise time	t_r		-	65	-	ns
Turn-off delay time	$t_d(off)$		-	180	-	ns
Turn-off Fall time	t_f		-	80	-	ns
Turn-on energy	E_{on}		-	2.2	-	mJ
Turn-off energy	E_{off}		-	1.1	-	mJ
Total switching Energy	E_{tot}		-	3.2	-	mJ
Anti-Paraller Diode Characteristics and Maximum Ratings						
Diode Forward Voltage	V_F	$V_{GE}=0V, I_F=15A.$	-	1.8	2.9	V
Diode Reverse recovery time	t_{rr}	$V_{GE}=0V, V_R=800V, I_F=15A, di_F/dt=750A/\mu s$ ⁴	-	200	-	ns
Reverse recovery charge	Q_{rr}		-	1.1	-	μC

Thermal Characteristics

Symbol	Parameter	Max		Units
		TO-247	TO-263	
$R_{th\ j-c}$	Thermal Resistance, Junction to case	2	0.82	$^{\circ}C/W$
$R_{th\ j-a}$	Thermal Resistance, Junction to Ambient	48	62.5	$^{\circ}C/W$

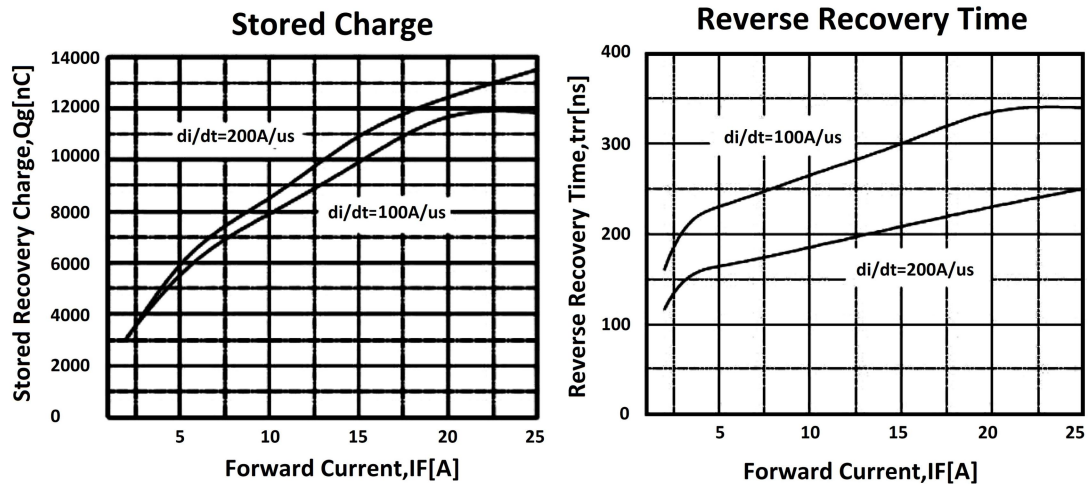
Notes:

- 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 $\leq 300\mu s$, Duty Cycle $\leq 2\%$
- 4: Essentially independent of operating temperature

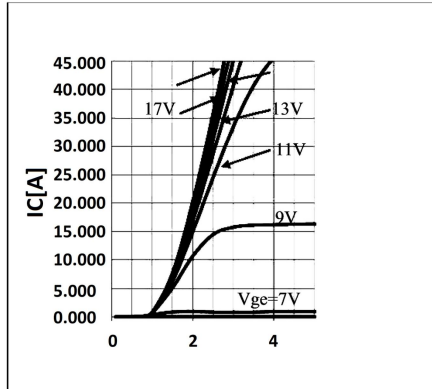
Order Message

Marking	Package
MSG15T120FPC	TO-247
MSG15T120FPE	TO-263

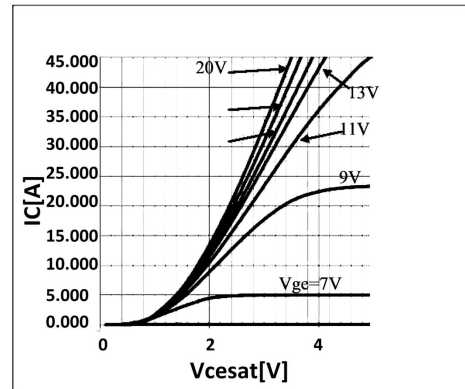
Electrical Characteristics(curves)



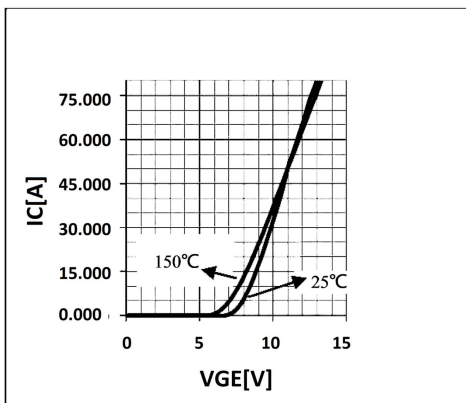
Typical Output Characteristics, $T_j=25^\circ\text{C}$



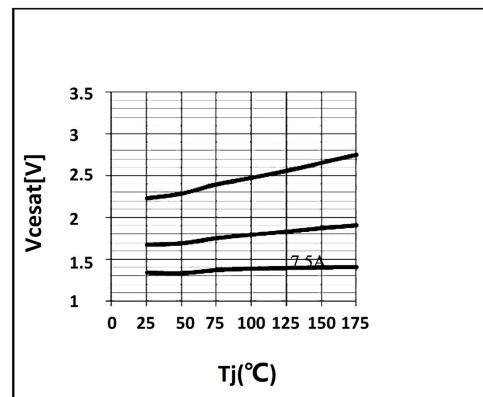
Typical Output Characteristics, $T_j=150^\circ\text{C}$



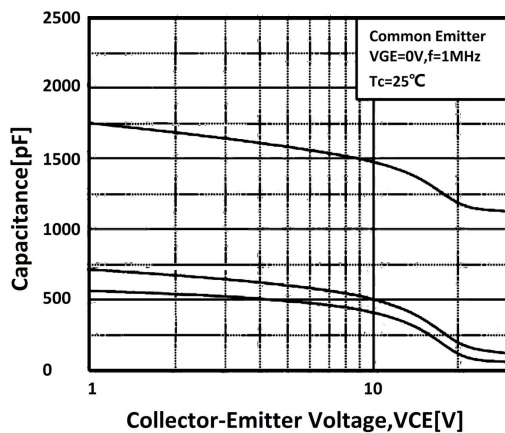
Typical Saturation Voltage Characteristics



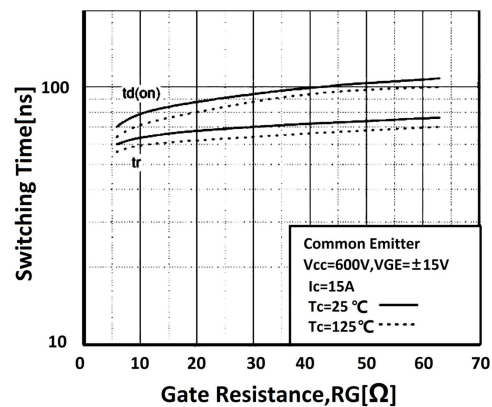
Saturation Voltage vs. Case Temperature at Vaian Current Level



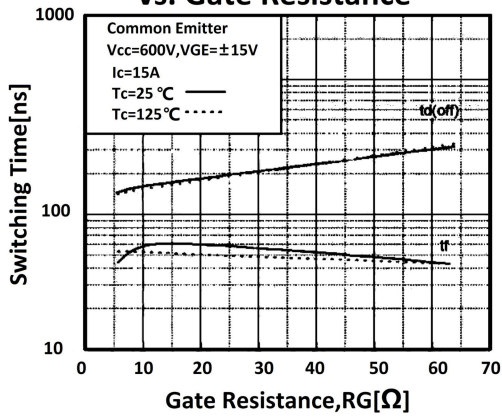
Capacitance Characteristics



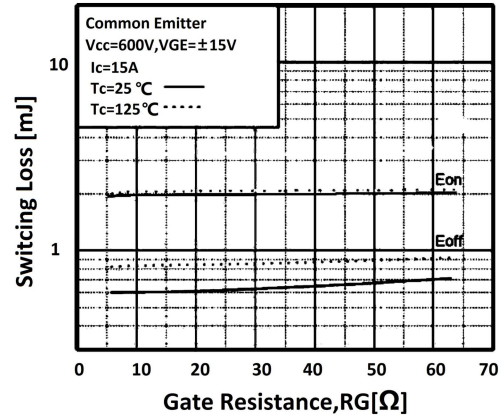
Turn-On Characteristics vs. Gate Resistance



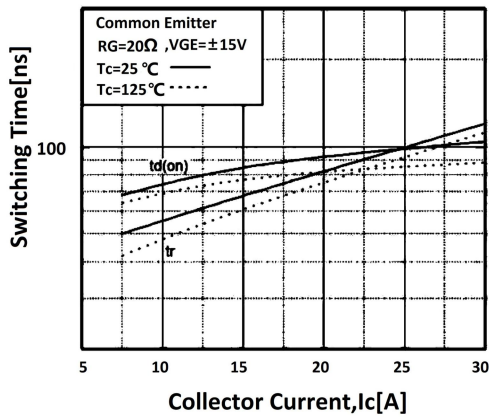
Turn-off Characteristics vs. Gate Resistance



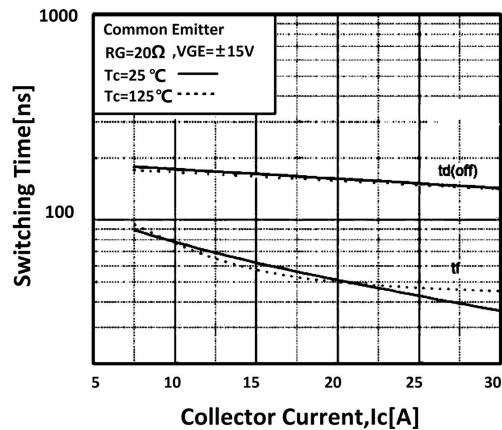
Switching Loss vs. Gate Resistance



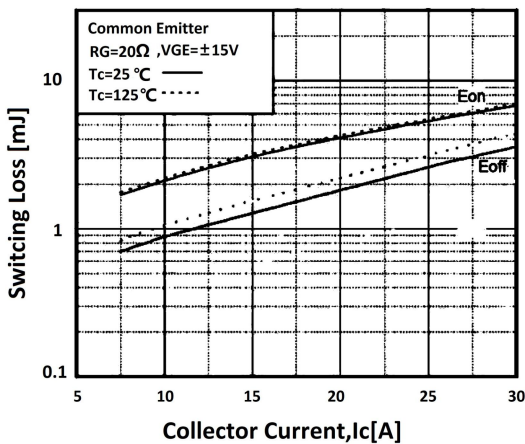
Turn-On Characteristics vs. Collector Current



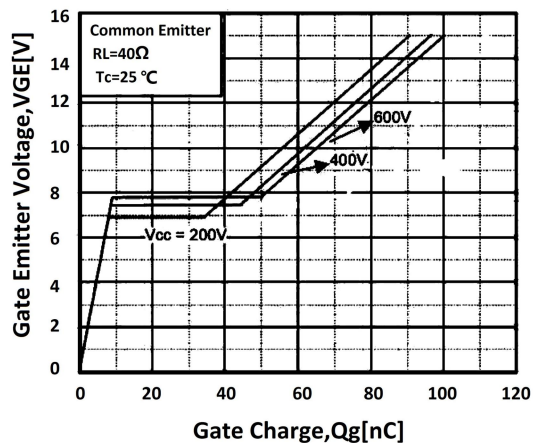
Turn-off Characteristics vs. Collector Current



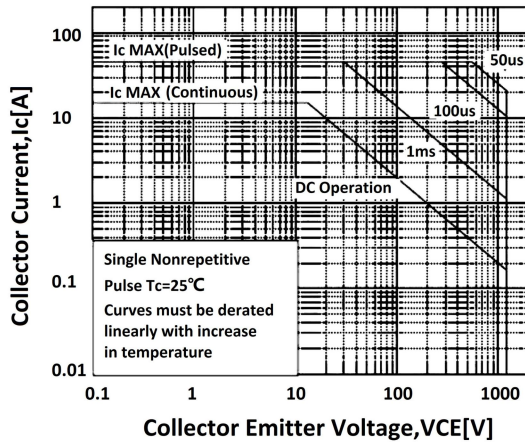
Switching Loss vs. Collector Current



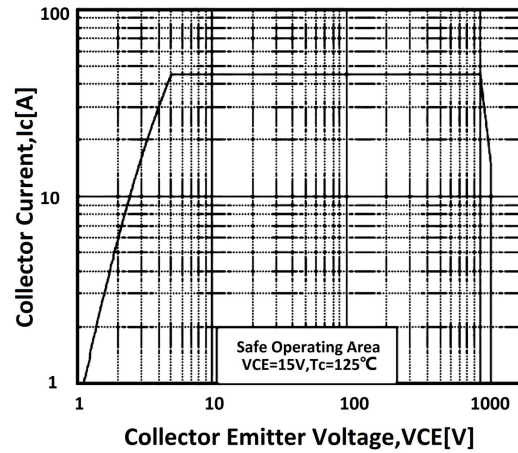
Gate Charge Characteristics



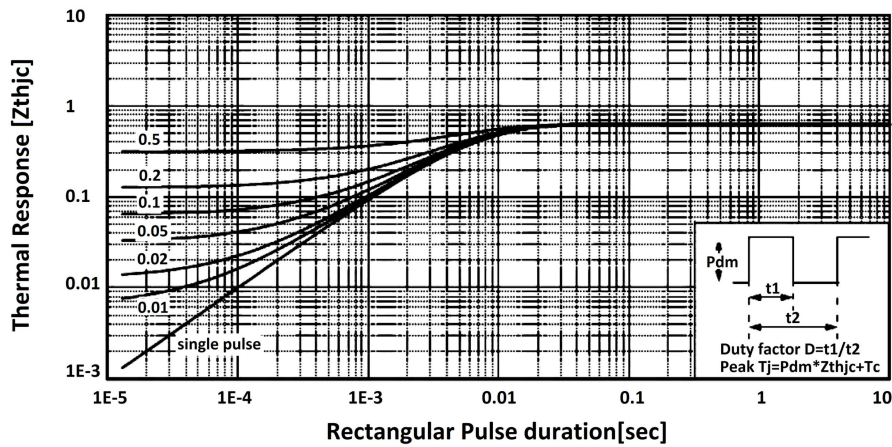
SOA Characteristics



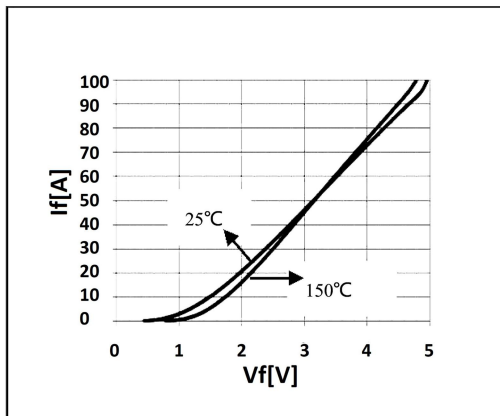
Turn-Off SOA



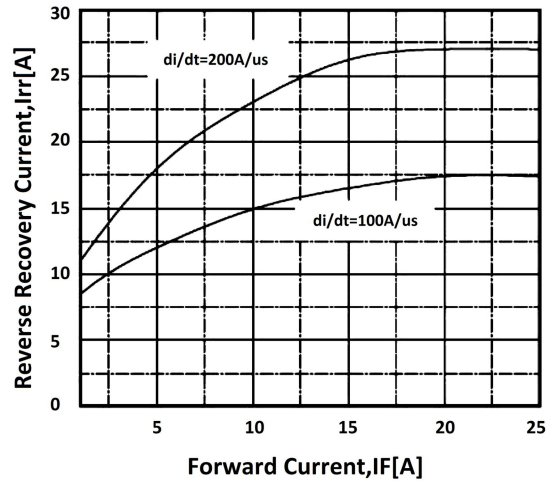
Transient Thermal Impedance



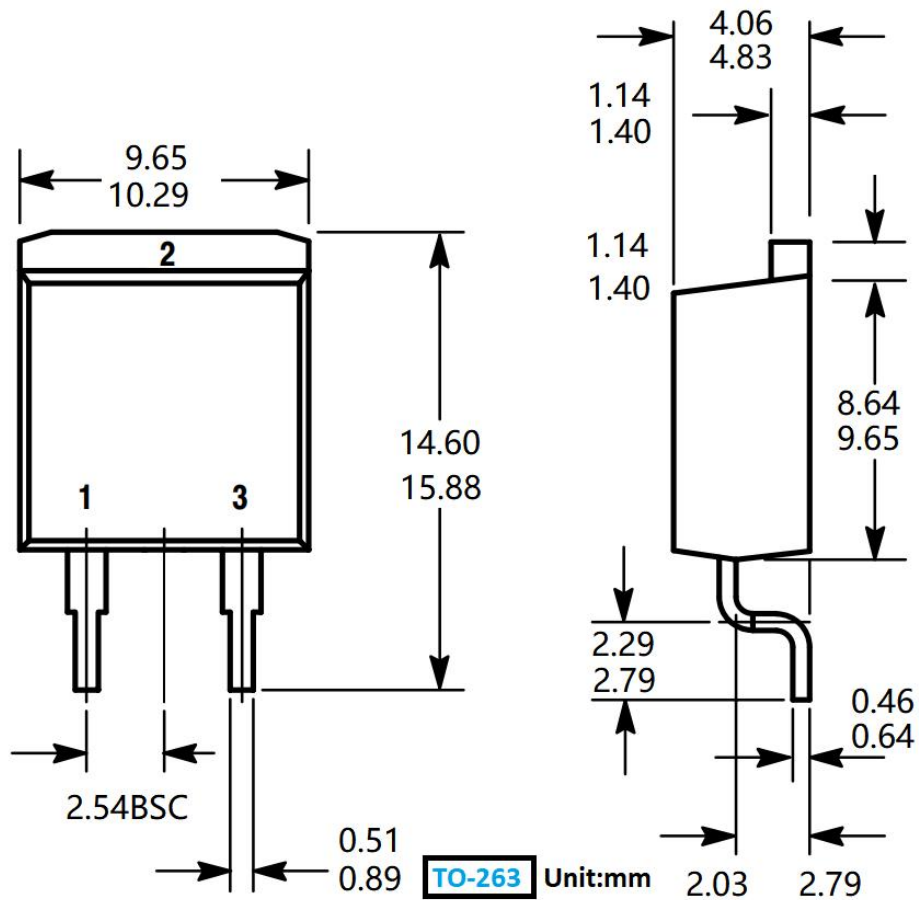
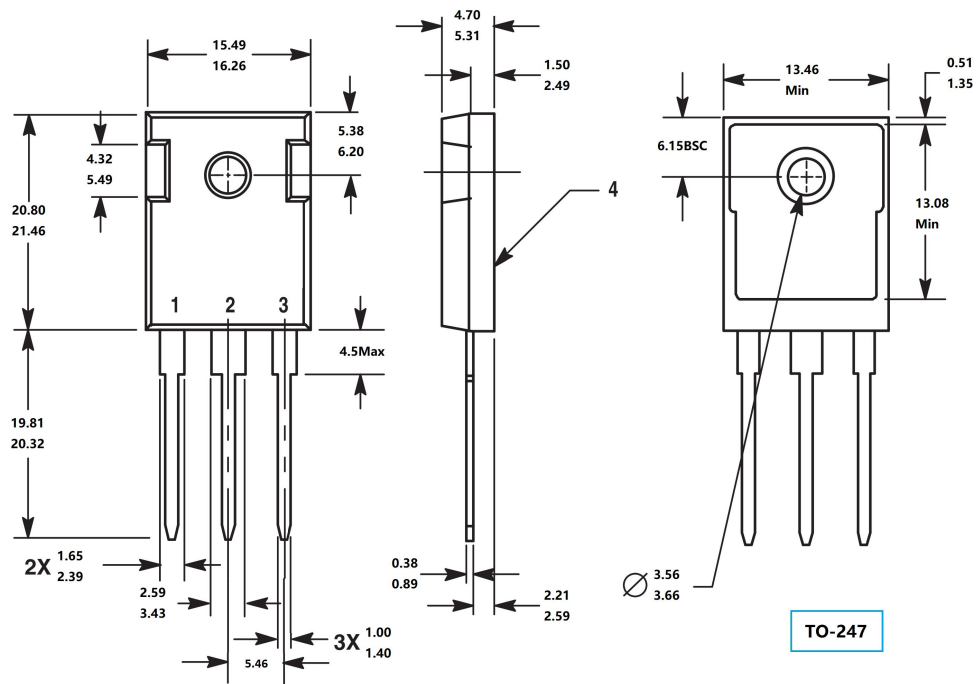
Forward Characteristics



Reverse Recovery Current



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