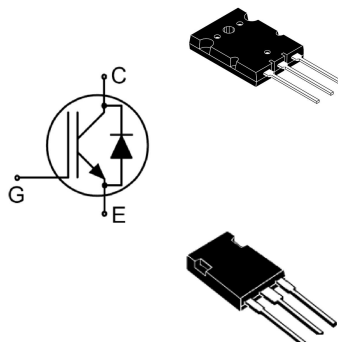


Feature

- Low gate charge
- Trench FS Technology,
- saturation voltage: $V_{CE(sat)}$, typ=1.85V@ $I_C=100A$ and $T_C=25^{\circ}C$
- ROHS product



Applications

- UPS
- Solar inverter

Maximum Ratings

Parameter	Symbol	Rating	Unit
Collector-emitter voltage	V_{CE}	1000	V
*DC collector current, limited by T_{vjmax}	I_C	200	A
		100	A
Pulsed collector current	$I_{C(pulse)}$	300	A
Diode forward current, limited by T_{vjmax}	I_F	200	A
		100	A
Gate-emitter voltage	V_{GE}	$\pm 20V$	V
Power dissipation	P_D	1304	W
Operating Junction temperature range	T_{vj}	-55~175	$^{\circ}C$
Storage temperature range	T_{stg}	-55~175	$^{\circ}C$
Maximum lead Temperature for Soldering Purposes	T_L	300	$^{\circ}C$

*Collector current limited by maximum junction temperature

Thermal Characteristics

Parameter	Symbol	Rating	Unit
Thermal resistance junction-to-ambient	$R_{th(j-a)}$	34.5	$^{\circ}C/W$
Thermal resistance junction-to-case for IGBT	$R_{th(j-c)}$	0.115	
Thermal resistance junction-to-case for Diode	$R_{th(j-c)}$	0.575	

Electrical Characteristics (T_{vj} = 25°C unless otherwise specified)

Static Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-emitter breakdown voltage	V _{(BR)CES}	V _{GE} =0V, I _C =0.25mA	1000	-	-	V
Breakdown Voltage Temperature Coefficient	$\frac{\Delta BV_{CES}}{\Delta T_J}$	I _C =0.5mA, referenced to 25°C	-	0.6	-	V/°C
Collector-emitter saturation voltage	V _{CE(sat)}	V _{GE} =15V, I _C =100A T _j =25°C	-	1.85	2.3	V
Gate-emitter threshold voltage	V _{GE(th)}	I _C =0.6mA, V _{CE} =V _{GE}	4.5	-	6.5	V
Zero gate voltage collector current	I _{CES}	V _{CE} =1000V, V _{GE} =0V T _j =25°C	-	-	200	μA
Gate-emitter leakage current	I _{GES}	V _{CE} =0V, V _{GE} =±20V	-	-	±200	nA

Dynamic Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Input capacitance	C _{ies}	V _{CE} =25V V _{GE} =0V f=1MHz	-	5500	-	pF
Output capacitance	C _{oes}		-	305	-	
Reverse transfer capacitance	C _{res}		-	64	-	
Total gate charge	Q _g	V _{CE} =720V, I _C =100A V _{GE} =15V	-	136	-	nC
Gate-emitter charge	Q _{ge}		-	45	-	nC
Gate-collector charge	Q _{gc}		-	55	-	nC
Gate resistance	R _g	f=1MHz, open collector		1.3		Ω
Short current	I _{SC}	V _{GE} =15V V _{CE} =450V t _{sc} <10μs		375		A

Switching Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-Source Diode Forward Voltage	V _F	V _{GE} =0V I _F =100A	-	2.3	3.0	V
Turn-on delay time	t _{d(on)}	V _{GE} = 15V, V _{CC} = 500V, I _C = 100A, R _G = 10Ω, T _{vj} = 25°C Inductive Load	-	49	-	ns
Rise time	t _r		-	173	-	
Turn-off delay time	t _{d(off)}		-	122	-	
Fall time	t _f		-	124	-	

Turn-on switching energy	Eon		-	4.5	-	mJ
Turn-off switching energy	Eoff		-	1.74	-	
Total switching energy	Etot		-	6.24	-	
Turn-on delay time	td(on)	$V_{GE} = 15V, V_{CC} = 500V,$ $I_C = 100A, R_G = 10\Omega, T_{vj} = 175^\circ C$ Inductive Load	-	56	-	ns
Rise time	t _r		-	250	-	
Turn-off delay time	td(off)		-	142	-	
Fall time	t _f		-	231	-	
Turn-on switching energy	Eon		-	4.76	-	mJ
Turn-off switching energy	Eoff		-	2.42	-	
Total switching energy	Ets		-	7.18	-	
Reverse recovery time	trr	$T_J = 25^\circ C \quad I_F = 100A \quad V_R = 500V$ $V_{GE} = 0V$ $di_F/dt = 200A/\mu s$	-	159	-	ns
Reverse recovery charge	Qrr		-	1161	-	nC
Reverse recovery current	Irrm		-	6.148	-	A
Reverse recovery time	trr	$T_J = 175^\circ C \quad I_F = 100A \quad V_R = 500V$ $V_{GE} = 0V$ $di_F/dt = 200A/\mu s$	-	355	-	ns
Reverse recovery charge	Qrr		-	5050	-	nC
Reverse recovery current	Irrm		-	13.5	-	A

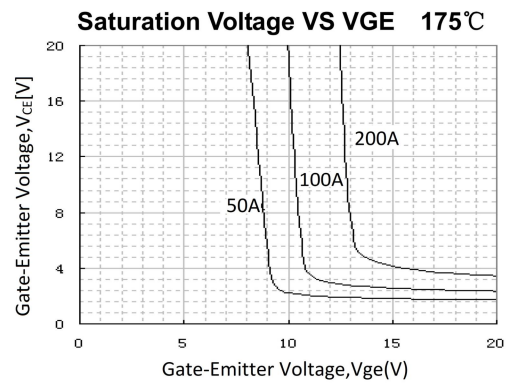
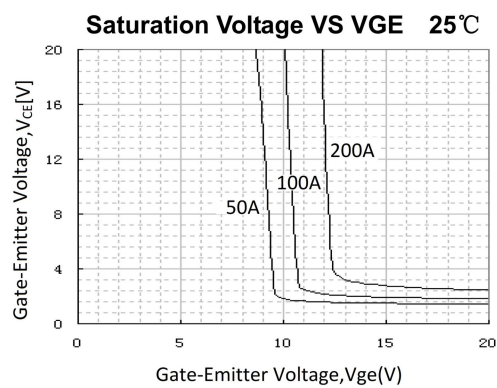
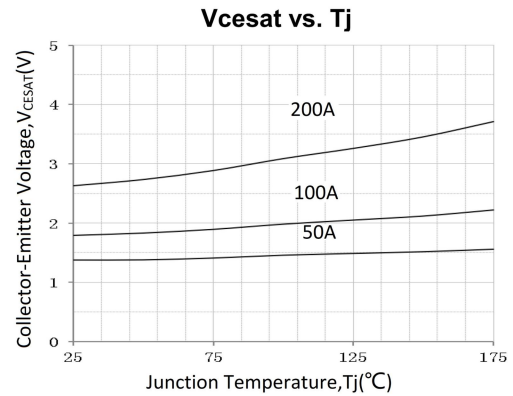
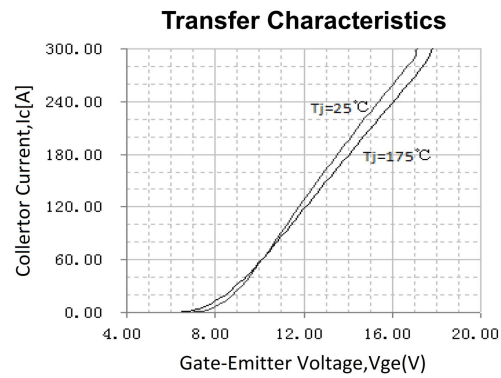
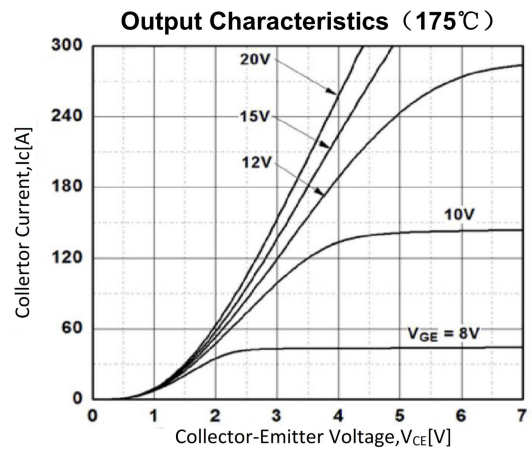
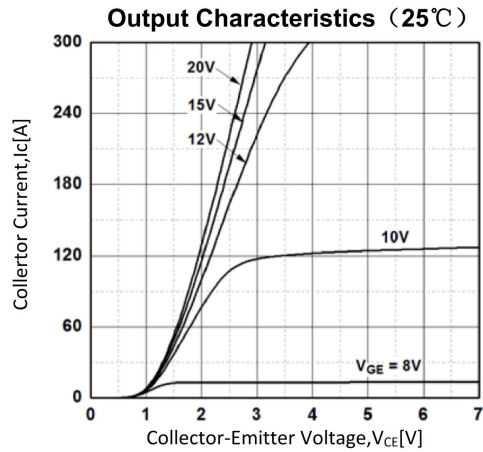
Order Message

Order codes	Package	Packaging
MSG100T100FLN	TO-247plus	Tube
MSG100T100FQW	TO-264	Tube

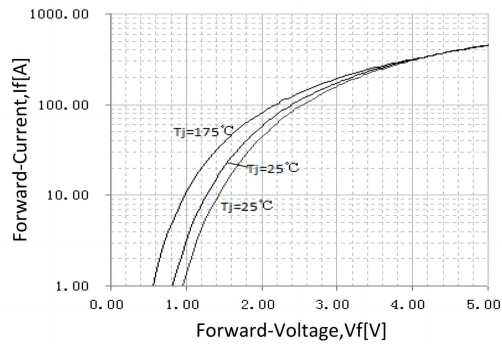
Notes:

1. Pulse width limited by maximum junction temperature
2. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycles 2%
3. Essentially independent of operating temperature

Electrical Characteristics

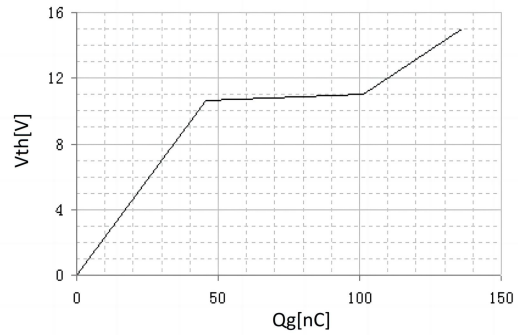


Diode Characteristic



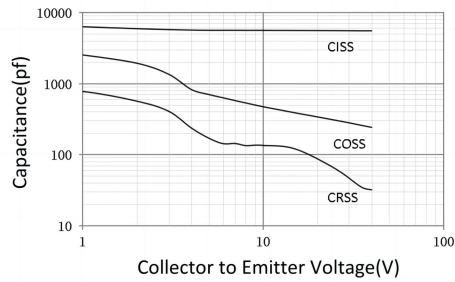
Gate Charge Characteristics

$V_{GE}=15\text{V}$, $I_C=100\text{A}$ $V_{CE}=500\text{V}$



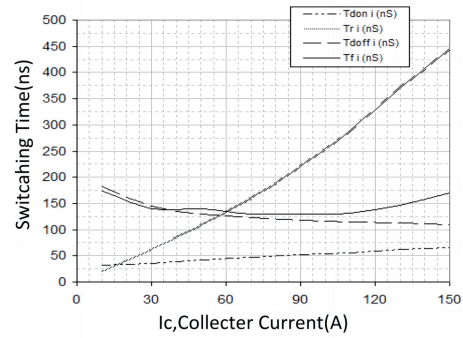
Capacitance Characteristic

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



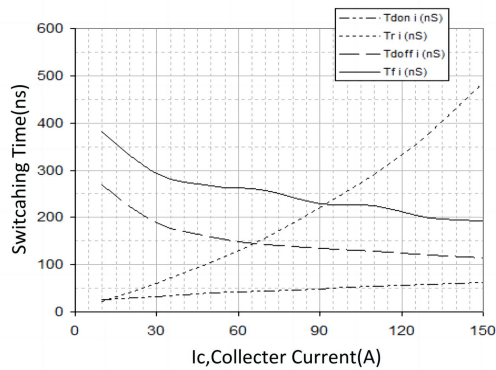
Switching Time vs. I_C (25°C)

$V_{CE}=500\text{V}$, $V_{GE}=15\text{V}$, $I_C=100\text{A}$ $R_G=10\Omega$



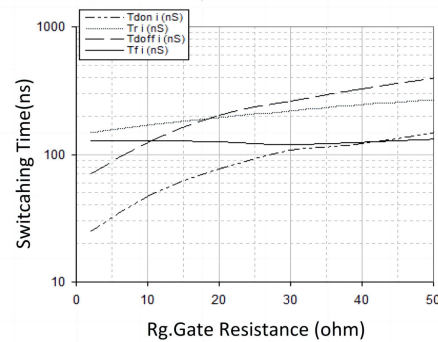
Switching Time vs. I_C (175°C)

$V_{CE}=500\text{V}$, $V_{GE}=15\text{V}$, $R_G=10\Omega$



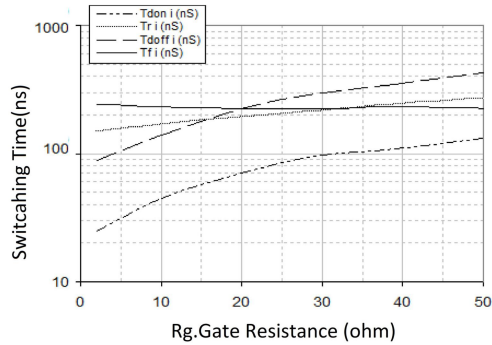
Switching Time vs. R_G (25°C)

$V_{GE}=15\text{V}$, $I_C=100\text{A}$ $V_{CE}=500\text{V}$



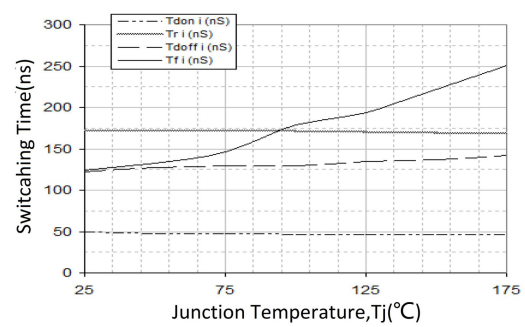
Switching Time vs. Rg(175°C)

VGE=15V, IC=100A VCE=500V



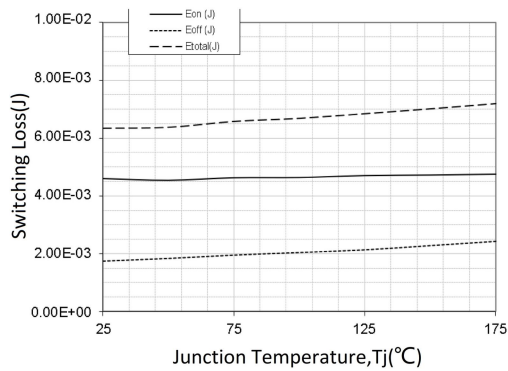
Switching Time vs. Tj

VGE=15V, IC=100A VCE=500V Rg=10Ω



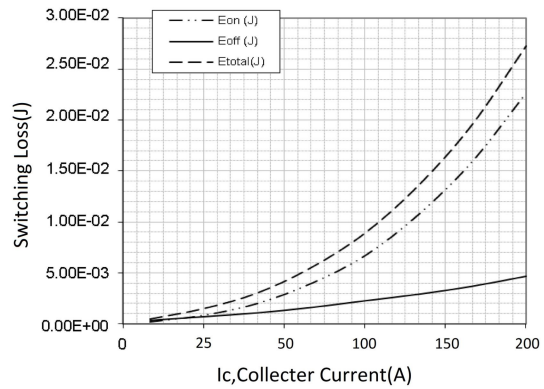
Switching Loss vs. Tj

VGE=15V, IC=100A VCE=500V Rg=10Ω



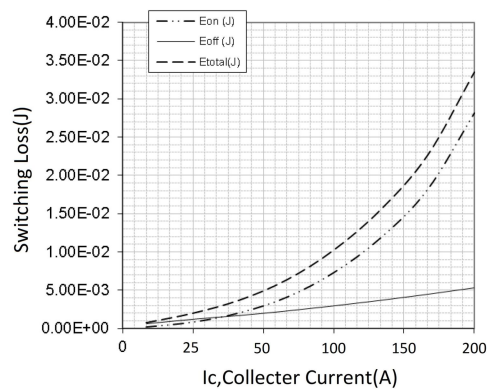
Switching Loss vs. IC(25°C)

VGE=15V, VCE=500V Rg=10Ω



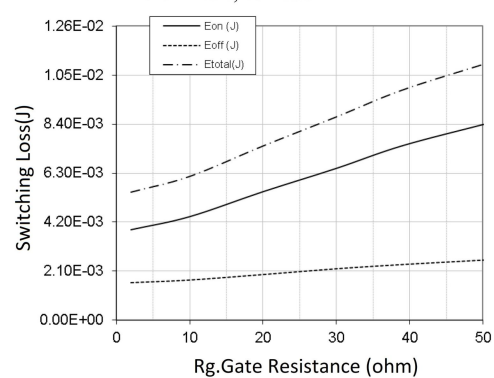
Switching Loss vs. IC(175°C)

VGE=15V, VCE=500V Rg=10Ω



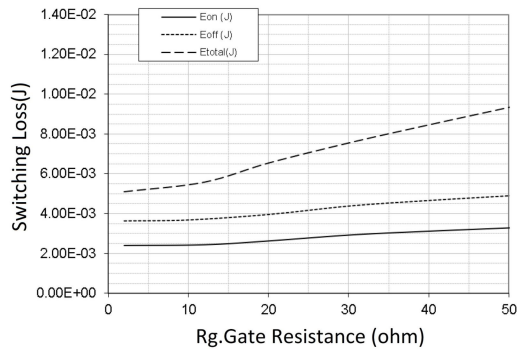
Switching Loss vs. Rg(25°C)

VGE=15V, IC=100A VCE=500V



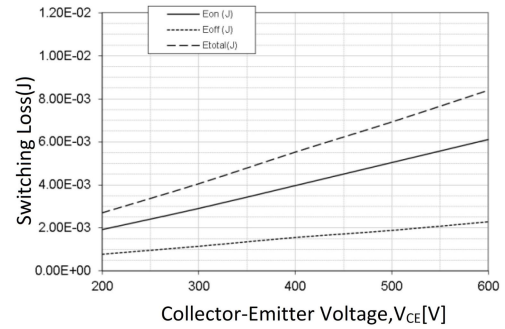
Switching Loss vs. $R_g(175^\circ\text{C})$

$V_{GE}=15\text{V}$, $I_C=100\text{A}$ $V_{CE}=500\text{V}$



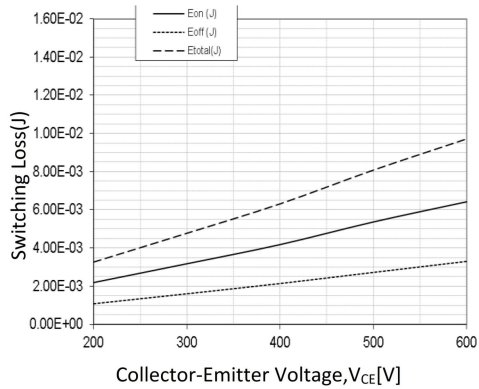
Switching Loss vs. $V_{CE}(25^\circ\text{C})$

$V_{GE}=15\text{V}$, $I_C=100\text{A}$ $R_g=10\ \Omega$

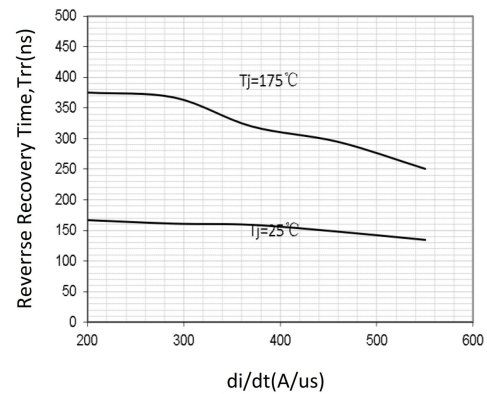


Switching Loss vs. $V_{CE}(175^\circ\text{C})$

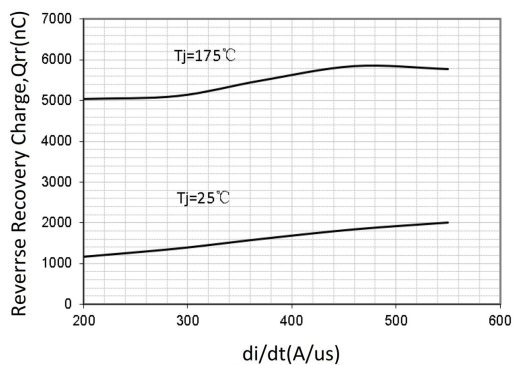
$V_{GE}=15\text{V}$, $I_C=100\text{A}$, $R_g=10\ \Omega$



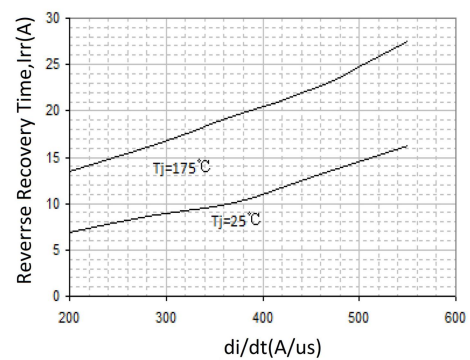
Reverse Recovery Time VS di/dt



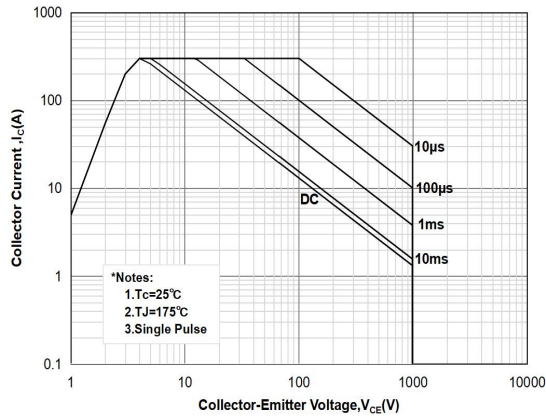
Reverse Recovery Charge VS di/dt



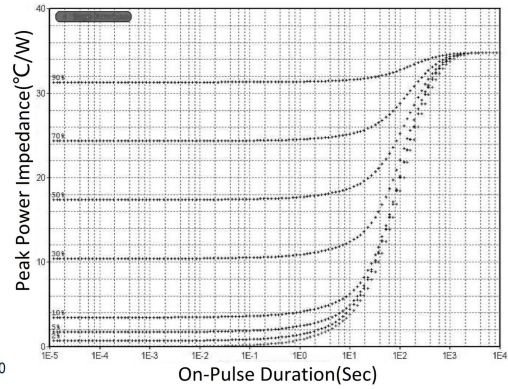
Reverse Recovery Current VS di/dt



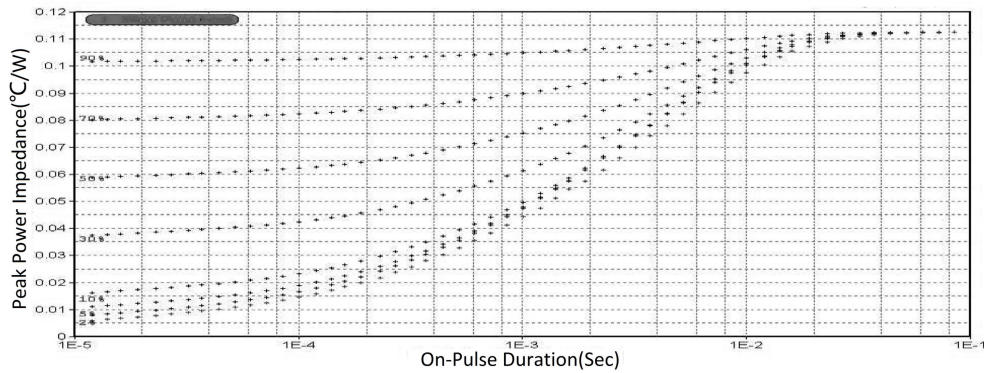
Forward Bias SOA



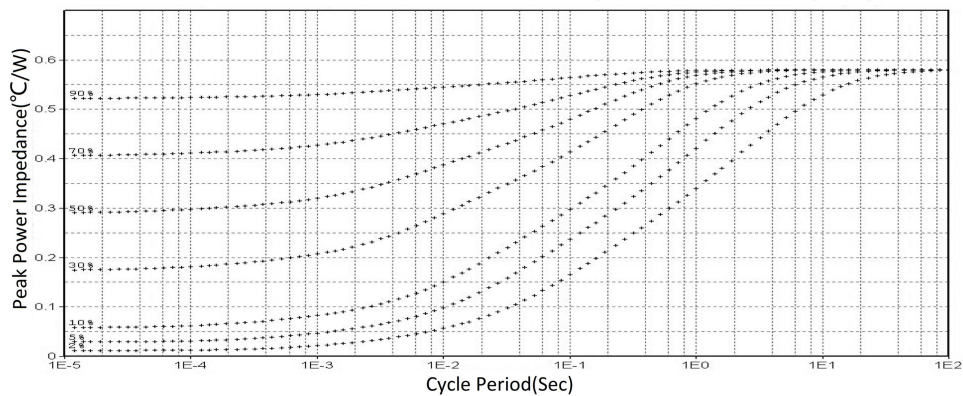
Normalized Maximum Transient Thermal Impedance for IGBT(RJA)



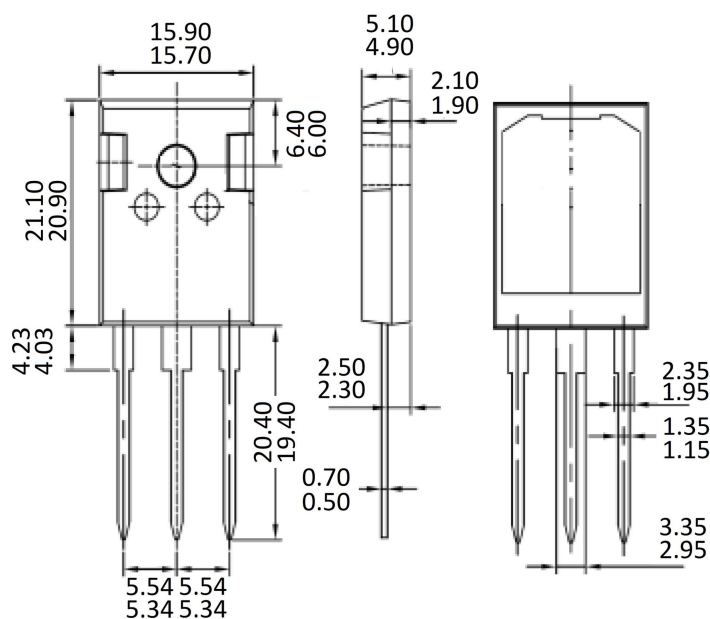
Normalized Maximum Transient Thermal Impedance for IGBT(RJC)



Normalized Maximum Transient Thermal Impedance for FRED(RJC)

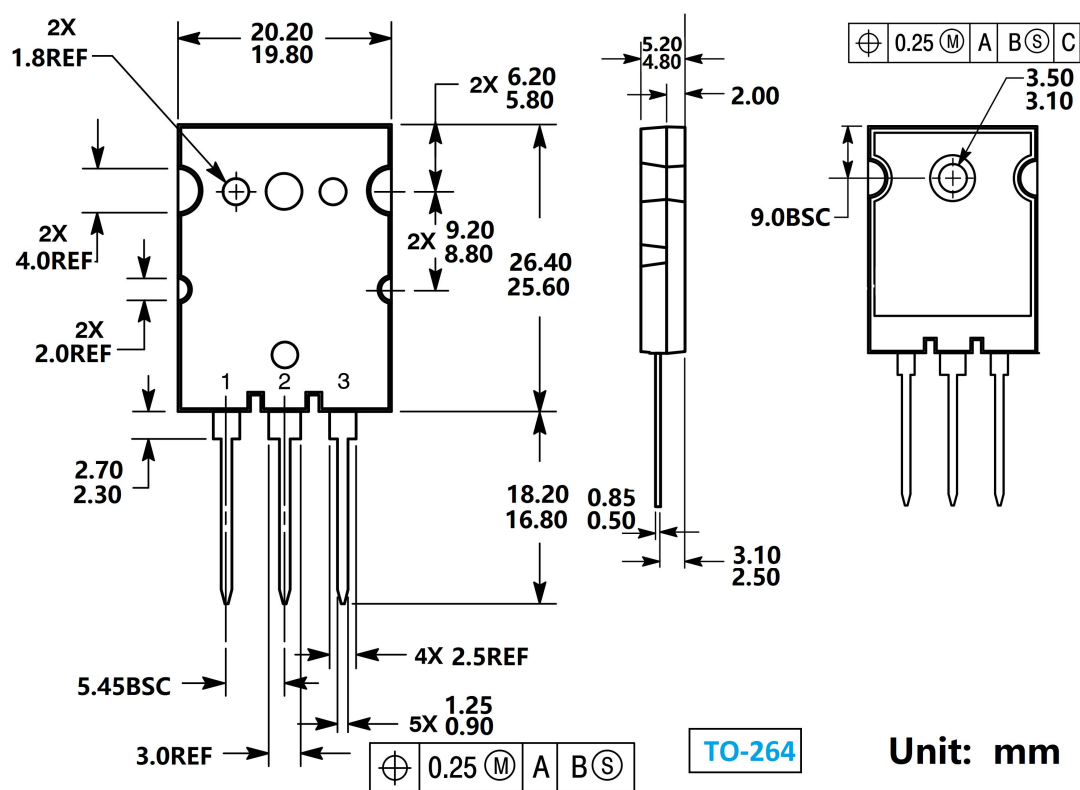


Package outline dimension



TO-247plus

Unit:mm



TO-264

Unit: mm