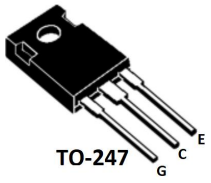
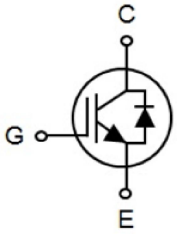
Features

- Low gate charge
- Trench-Stop Technology
- High speed switching
- Saturation voltage:
  $V_{CE(sat),typ}$= 1.4V@60A



Applications

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



Absolute Ratings（Tc=25℃）

Parameter	Symbol		MSG80D60FLC	Unit
Collector-Emitter Voltage	Vces		600	V
Collector Current-continuous	Ic	T_C=25℃	180	A
		T_C=100℃	80	A
Collector Current-pulse(note 1)	I_{CM}		300	A
Gate-emitter voltage	V_{GES}		±30	V
Diode RMS forward current	I_F	T_C=25℃	180	A
		T_C=100℃	80	A
Diode Forward Current-pulse	I_F		300	A
Power Dissipation	P_D		260	W
Operating Temperature Range	T_J		-55~+150	℃
Storage Temperature Range	T_{STG}		-55~150	℃
Maximum Lead Temperature for Soldering Purposes	T_L		300	℃

Electrical Characteristics(TC=25℃，unless otherwise noted)

Parameter	Symbol	Tests conditions	Min	Typ	Max	Units
Off-Characteristics						
Collector-Emitter Voltage	BV_{CES}	I_C=100uA,V_{GE}=0V	600	-	-	V
Zero Gate Voltage Collector Current	I_{CES}	V_{CE}=V_{CES},			25	μA
		V_{GE}=0V，T_J=125℃			250	
Gate-body leakage current	I_{GES}	V_{CE}=0V,V_{GE}=±20V	-	-	±100	nA
Transconductance	gfs	V_{CE}=10V,I_C=50A	30	48	-	S
On-Characteristics						
Gate-Emitter Threshold	$V_{GE(th)}$	VCE=VGE,	3.5	4.5	5.5	V

Voltage		Ic=100uA				
Collector-Emitter saturation Voltage	$V_{CE(sat)}$	V_{GE}=15V,I_C=30A,	-	1.1	-	V
		V_{GE}=15V,I_C=60A,	-	1.4	-	
Dynamic Characteristics						
Input capacitance	C_{ies}	VCE=25V, VGE=0V, f=1.0MHZ	-	3190	-	pF
Output capacitance	C_{oes}		-	175	-	pF
Reverse transfer capacitance	C_{res}		-	43	-	pF
Switching Characteristics						
Turn-On delay time	$t_{d(on)}$	V_{CE}=480V,Ic=60A, R_G=5Ω,V_{GE}=15.0V T_J=25℃ Inductive Load	-	25	-	ns
Turn-On rise time	t_r		-	30	-	ns
Turn-off delay time	$t_{d(off)}$		-	334	-	ns
Turn-off Fall time	t_f		-	224	-	ns
Turn-on energy	E_{on}		-	0.95	-	mJ
Turn-off energy	E_{off}		-	2.90	-	mJ
Total Gate Charge	Q_g	V_{CE}=0.5*V_{CES}, I_C=50A,V_{GE}=15V (note2,3)	-	110	-	nC
Gate to emitter charge	Q_{ge}			21		nC
Gate to collector charge	Q_{gc}		-	42	-	nC
Anti-Parallel Diode Characteristics						
Drain-Source Diode Forward Voltage	V_F	I_F=30A	-	1.2	1.5	V
Diode Reverse Recovery Time	t_{rr}	V_R=480V,I_F=60A, -di$_F$/dt=500A/μs T_J=25℃	-	132	-	ns
Diode Reverse Recovery charge	Q_{rr}		-	1.2	-	μC
Diode Reverse Recovery Current	I_{rr}		-	13.5	-	A

Thermal Characteristics

Parameter	Symbol	Max.	Unit
IGBT Thermal Resistance,Junction to Case	$R_{th(j-c)}$	0.48	K/W
Diode Thermal Resistance,Junction to Case	$R_{th(j-c)}$	1.1	K/W
Thermal Resistance,Junction to Ambient	$R_{th(j-A)}$	40	K/W

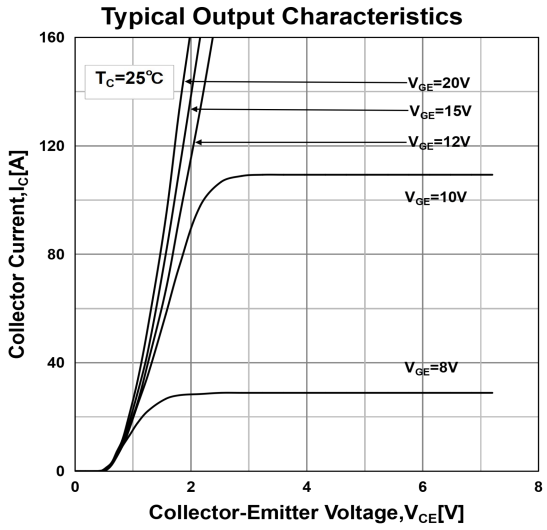
Notes:

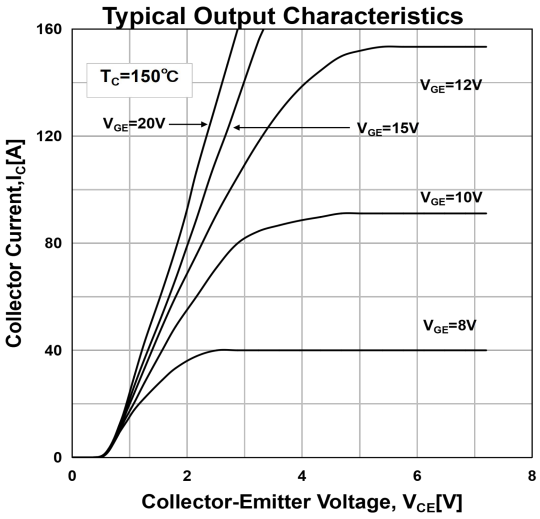
1：Pulse width limited by maximum junction temperature

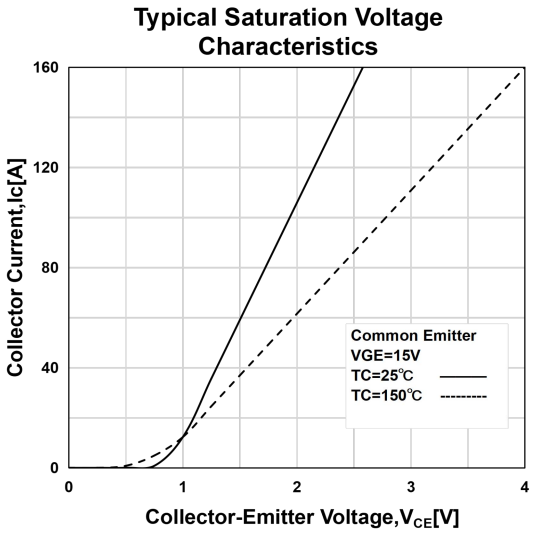
2：Pulse Test：Pulse Width ≤300μs,Duty Cycle≤2%

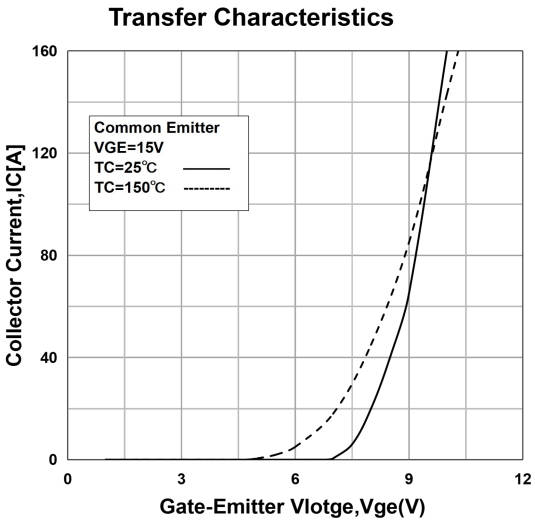
3：Essentially independent of operating temperature

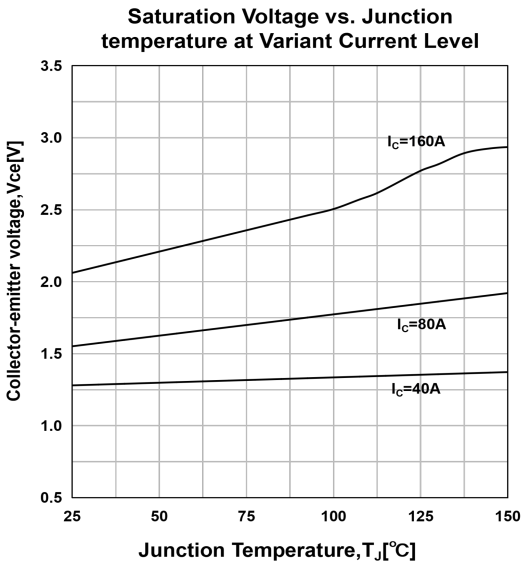
Electrical Characteristics(curves)

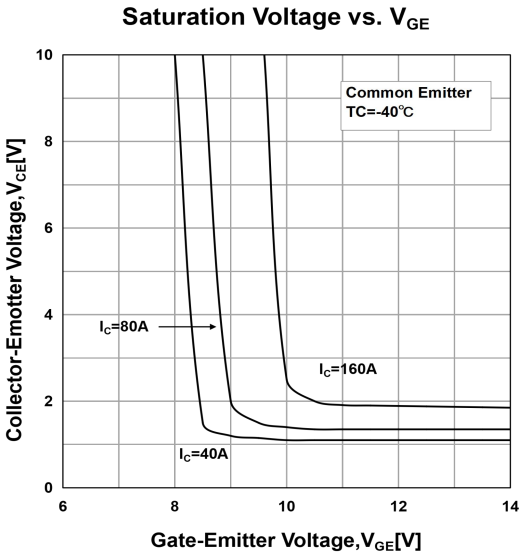




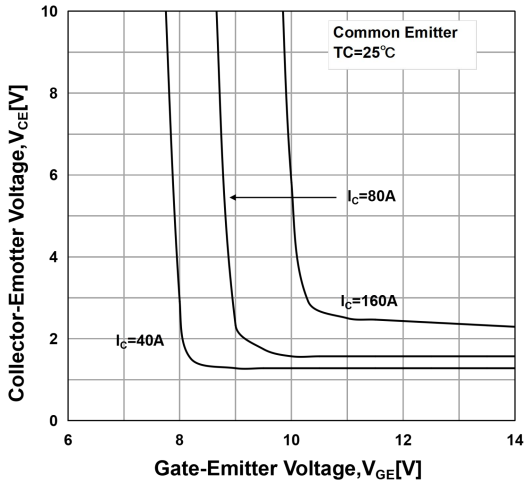




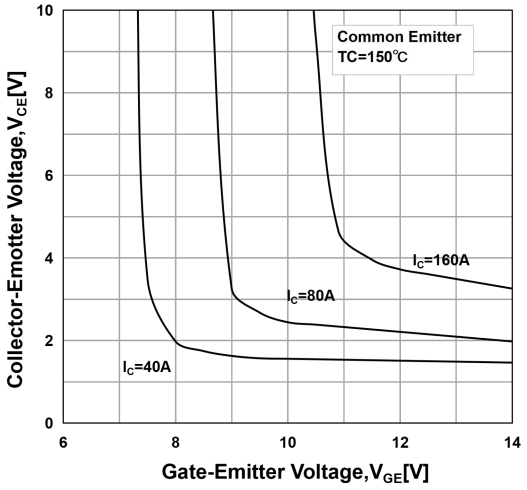




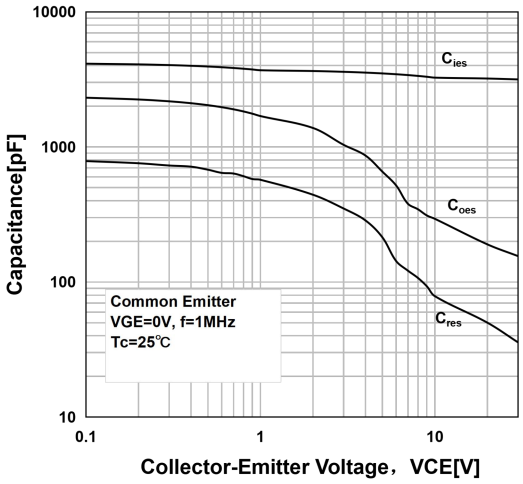
Saturation Voltage vs. V_{GE}



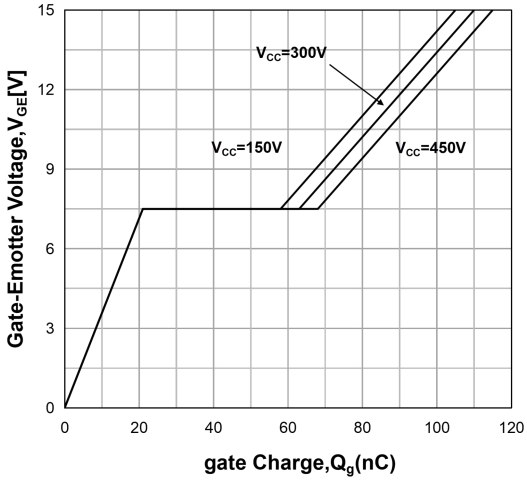
Saturation Voltage vs. V_{GE}



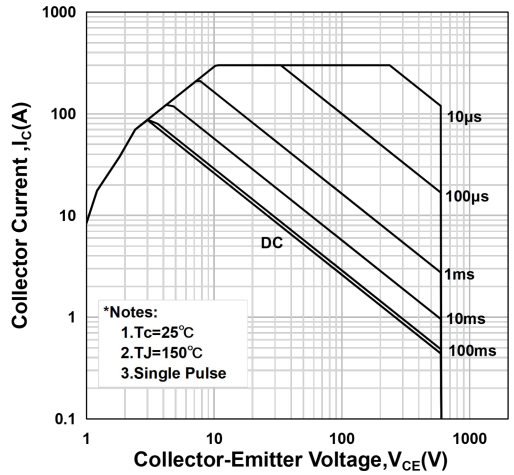
Capacitance Characteristics



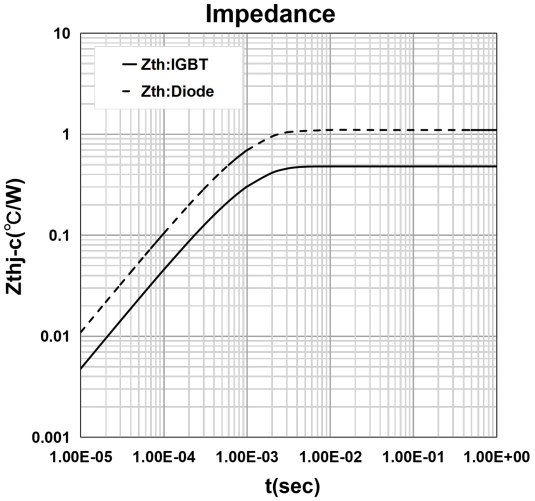
Gate Charge Characteristics



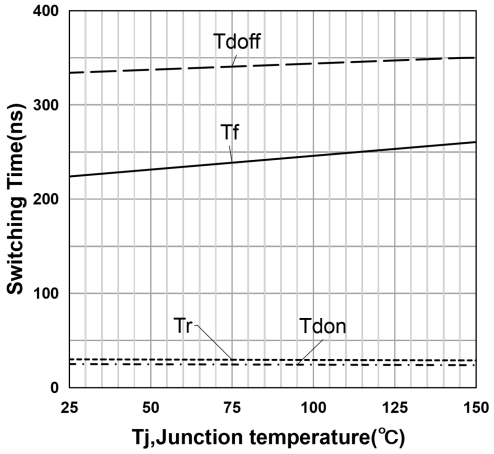
Foward Bias Safe Operating Area



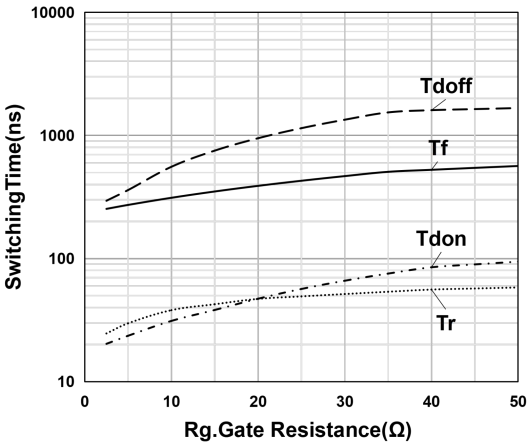
Maximum Transient Thermal Impedance



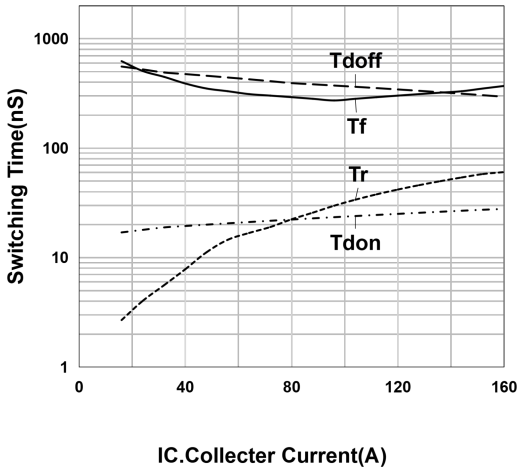
Switching Time vs. Tj
Vge=15V,VCE=480V,IC=60A,Rg=5Ω



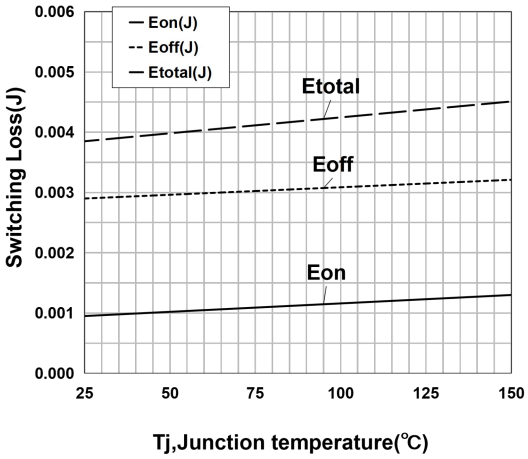
Switching Time Vs. Rg(150℃)
Vge=15V,VCE=480V,Ic=60A



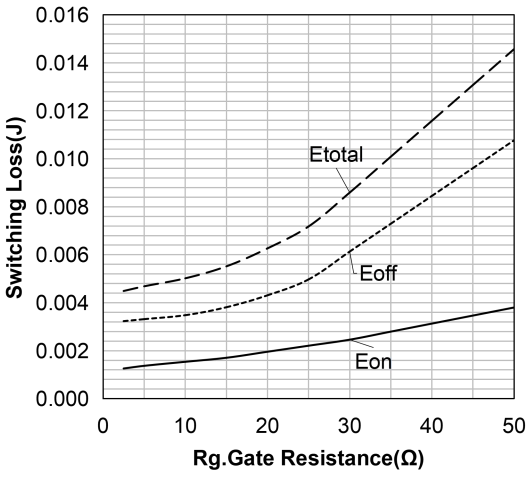
Switching Time vs. IC(150℃)
Vce=480V,Vge=15V,Rg=5Ω



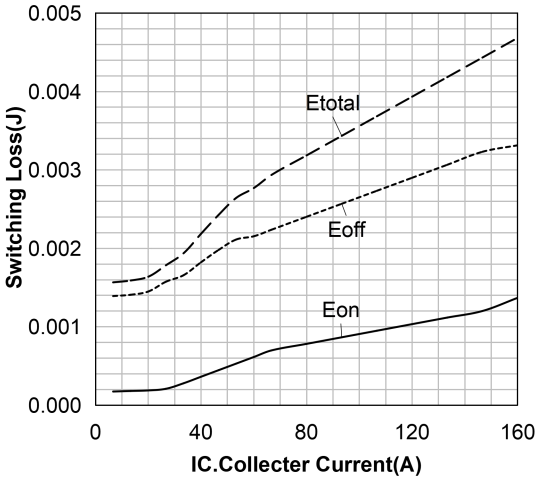
Switching Loss vs. Tj
Vge=15V,Vce=480V,IC=60A,Rg=5Ω

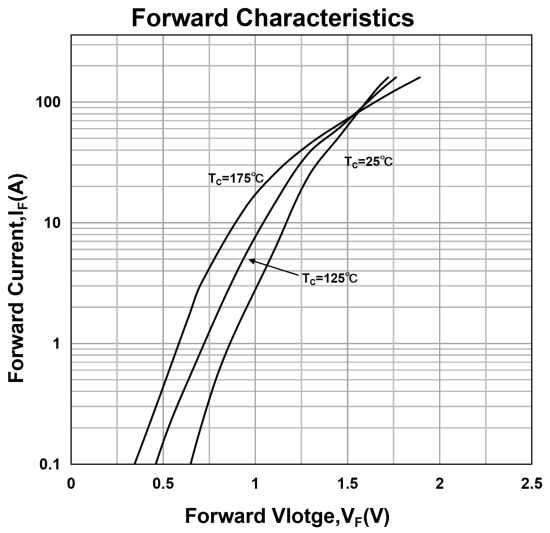


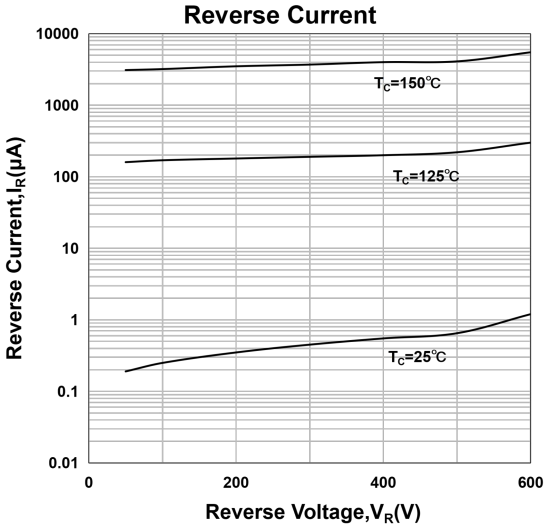
Switching Loss vs. Rg(150℃)
Vge=15V,VCE=480V,IC=60A

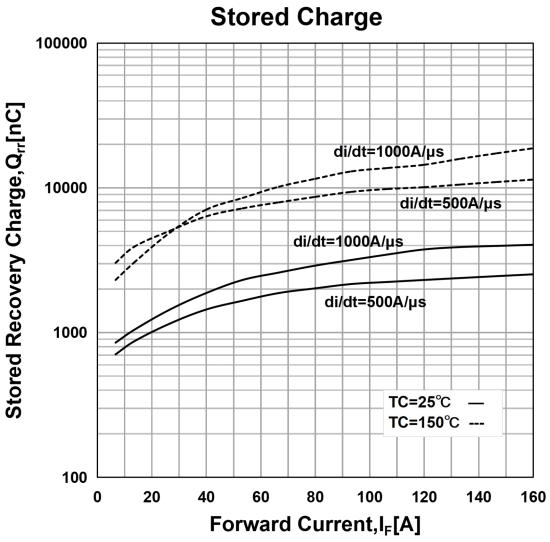


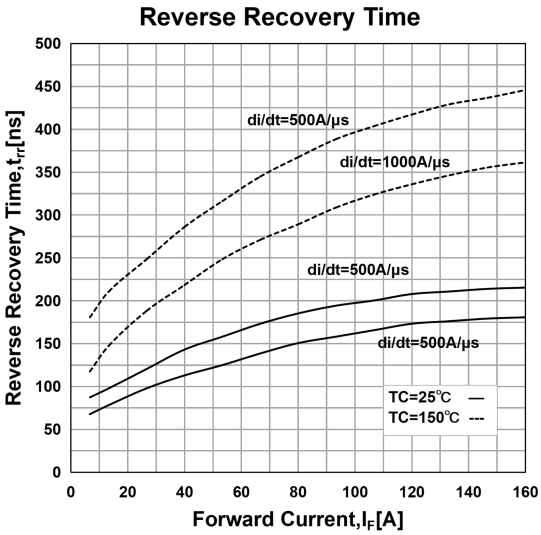
Switching Loss vs. I_C(150℃)
Vge=15V,VCE=480V,Rg=5Ω

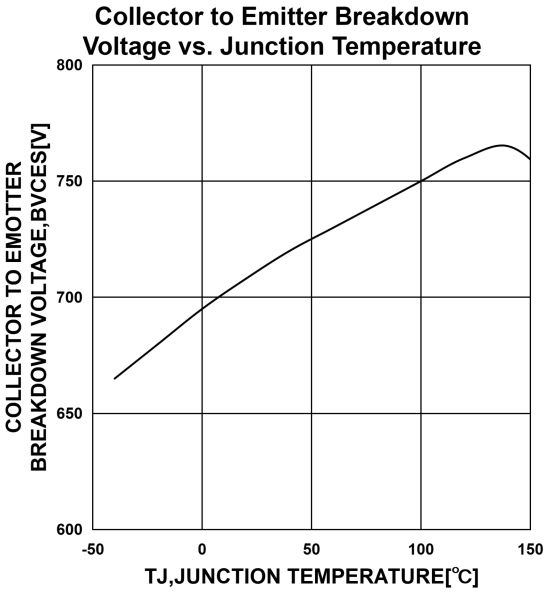



Forward Characteristics
Forward Current,I_F(A)
100
10
1
0.1
0
0.5
1
1.5
2
2.5
Forward Vlotge,V_F(V)
T_c=175℃
T_c=25℃
T_c=125℃

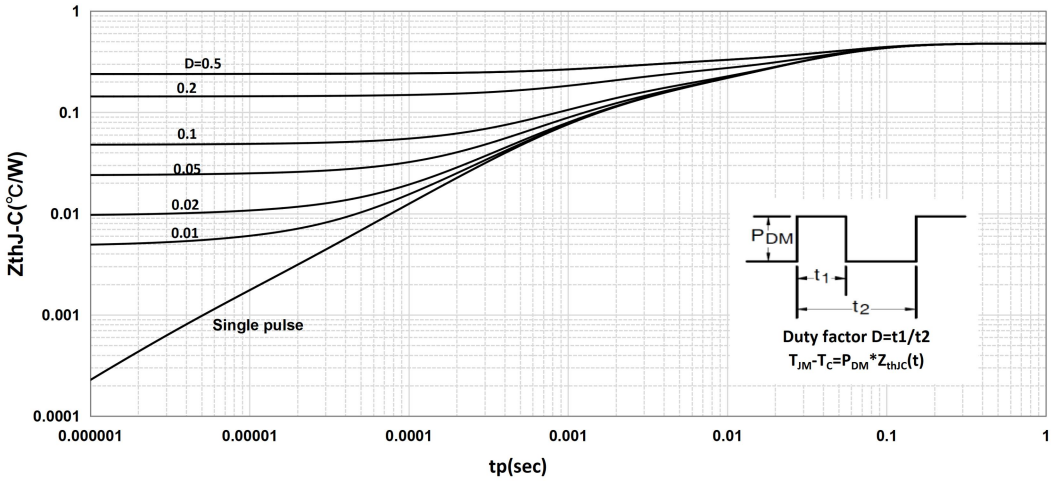

Reverse Current
Reverse Current,I_R(μA)
10000
1000
100
10
1
0.1
0.01
0
200
400
600
Reverse Voltage,V_R(V)
T_c=150℃
T_c=125℃
T_c=25℃


Stored Charge
Stored Recovery Charge,Q_{rr}[nC]
100000
10000
1000
100
0
20
40
60
80
100
120
140
160
Forward Current,I_F[A]
di/dt=1000A/μs
di/dt=500A/μs
di/dt=1000A/μs
di/dt=500A/μs
TC=25℃
TC=150℃

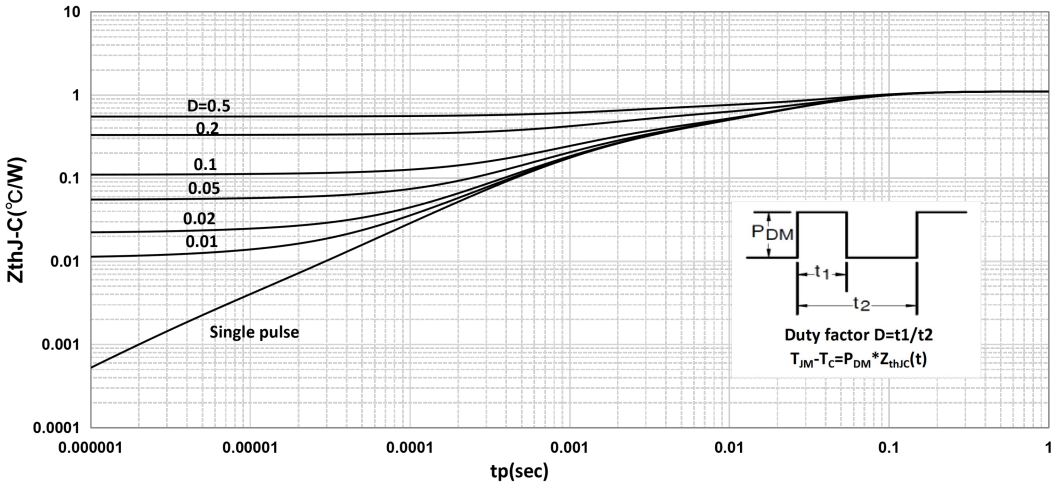

Reverse Recovery Time
Reverse Recovery Time,t_{rr}[ns]
500
450
400
350
300
250
200
150
100
50
0
0
20
40
60
80
100
120
140
160
Forward Current,I_F[A]
di/dt=500A/μs
di/dt=1000A/μs
di/dt=500A/μs
di/dt=500A/μs
TC=25℃
TC=150℃


Collector to Emitter Breakdown
Voltage vs. Junction Temperature
COLLECTOR TO EMOTTER
BREAKDOWN VOLTAGE,BVCES[V]
800
750
700
650
600
-50
0
50
100
150
TJ,JUNCTION TEMPERATURE[℃]

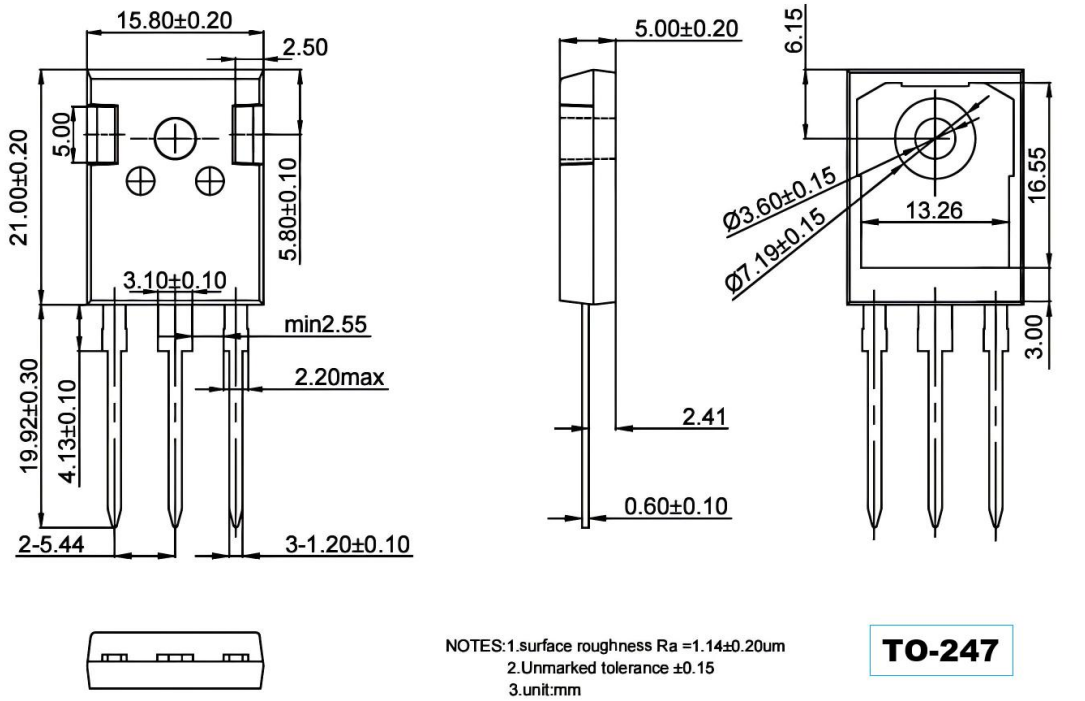
Transient Thermal Impedance-IGBT



Transient Thermal Impedance-FRD



Package Mechanical DATA



NOTES:1.surface roughness Ra =1.14±0.20um
2.Unmarked tolerance ±0.15
3.unit:mm

TO-247