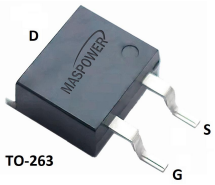
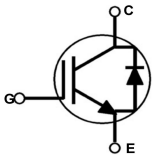
Features

- Low Gate charge
- FS Technology
- VCE(sat) (typ.)= 1.9V @ I_C = 20A
- High Input Impedance
- Short circuit withstand time 10 μs



Applications

- PFC
- UPS
- Inverter



Absolute Maximum Ratings

Parameter		Symbol	Value	Unit
Collector-Emitter voltage		V_{CES}	1200	V
Gate-emitter voltage		V_{GES}	±30	
Collector current	T_C=25°C	I_C	40	A
	T_C=100°C		20	
Pulsed collector current, pulse time limited by Tjmax		I_{CM}	60	
Diode forward current @ T_C = 100°C		I_F	20	
Diode pulsed current, Pulse time limited by Tjmax		I_{FM}	120	
Power dissipation	T_C=25°C	P_D	227	W
	T_C=100°C		132	
Operating Junction and storage temperature rang		T_J	-55 to150	°C
		T_{stg}	-55 to150	
Maximum Lead Temperature for Soldering Purposes		TL	300	℃

Electrical Characteristics (Tc =25°C unless otherwise specified)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
Collector-emitter breakdown voltage	BV_{CES}	I_C = 500μA, V_{GE} = 0V	1200	-	-	V
Gate-emitter threshold voltage	$V_{GE(th)}$	V_{CE} = V_{GE}, I_C = 250μA	5.0	-	7.0	
Zero gate voltage collector current	I_{CES}	V_{CE} = 1200V, V_{GE} = 0V	-	-	200	μA
Gate-emitter leakage current	I_{GES}	V_{GE} = 20V, V_{CE} = 0V	-	-	100	nA
Collector-emitter saturation voltage	$V_{CE(sat)}$	I_C = 20A V_{GE} = 15V T_C = 25°C	-	1.9	2.5	V
		I_C = 20A, V_{GE} = 15V, T_C = 150°C	-	2.1	-	
Dynamic and Switching Characteristics						

Input capacitance	C_{ies}	VCE=25V,VGE=0V,f=1.0MHz	-	4670	-	pF
Reverse transfer capacitance	C_{res}		-	100	-	
Output capacitance	C_{oes}		-	232	-	
Total gate charge	Q_g	V_{CE} = 600V, I_C = 20A, V_{GE} = 15V	-	160	-	nC
Turn-on delay time	$t_{d(on)}$	V_{GE} = 15V, V_{CC} = 600V, I_C = 20A, R_G = 10Ω, Inductive Load, T_C = 25°C	-	100	-	ns
Rise time	t_r		-	80	-	
Turn-off delay time	$t_{d(off)}$		-	230	-	
Fall time	tf		-	110	-	
Turn-on switching energy	E_{on}		-	2.4	-	mJ
Turn-off switching energy	E_{off}		-	1.5	-	
Total switching energy	E_{ts}		-	3.9	-	
Turn-on delay time	$t_{d(on)}$	V_{GE} = 15V, V_{CC} = 600V, I_C = 20A, R_G = 10Ω, Inductive Load, T_C =1 25°C	-	96.2	-	ns
Rise time	t_r		-	77.6	-	
Turn-off delay time	$t_{d(off)}$		-	239	-	
Fall time	tf		-	124.3	-	
Turn-on switching energy	E_{on}		-	3.1	-	mJ
Turn-off switching energy	E_{off}		-	1.63	-	
Total switching energy	E_{ts}		-	4.73	-	
Diode Characteristics (Tc =25℃ unless otherwise specified)						
Forward voltage	V_F	I_F=20A,T_C=25℃	-	2.3	3.5	V
		I_F=20A,T_C=125℃	-	2.45	-	
Reverse recovery time	t_{rr}	I_F=20A,di/dt=100A/μs T_C=25℃	-	240	-	ns
Reverse recovery current	I_{rr}		-	4.5	-	A
Reverse recovery charge	Q_{rr}		-	1500	-	nC
Reverse recovery time	t_{rr}	I_F=20A,di/dt=100A/μs T_C=125℃	-	240	-	ns
Reverse recovery current	I_{rr}		-	4.5	-	A
Reverse recovery charge	Q_{rr}		-	1500	-	nC

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 ≤300μs,Duty Cycle≤2%

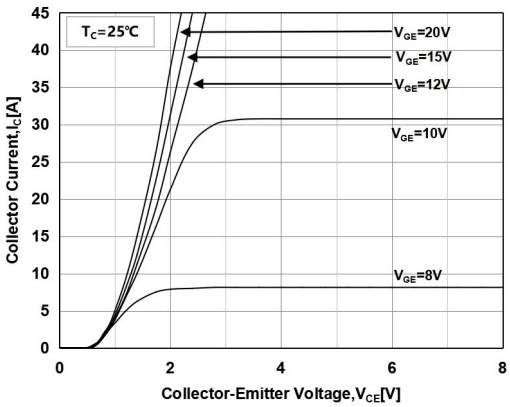
4：Essentially independent of operating temperature

Thermal Characteristics

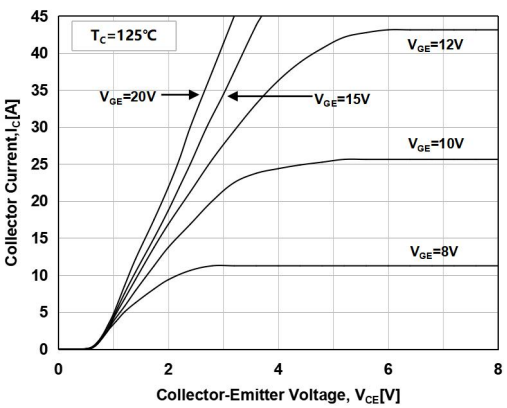
Parameter	Symbol	Value	Unit
Thermal resistance junction-to-ambient	$R_{\theta JA}$	62.5	°C/W
Thermal resistance junction-to-case for IGBT	$R_{\theta JC}$	0.55	
Thermal resistance junction-to-case for Diod	$R_{\theta JC}$	0.65	

Typical Performance Characteristic

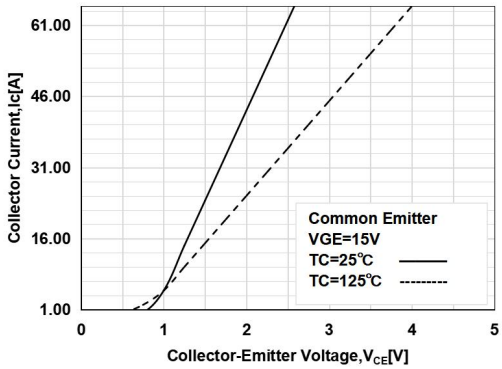
Typical Output Characteristics



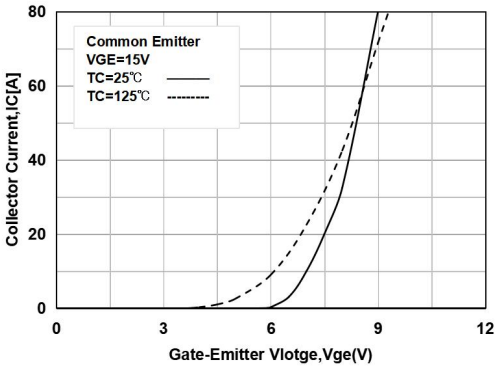
Typical Output Characteristics



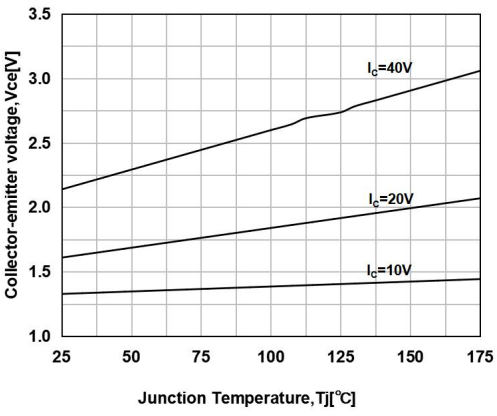
Typical Saturation Voltage Characteristics



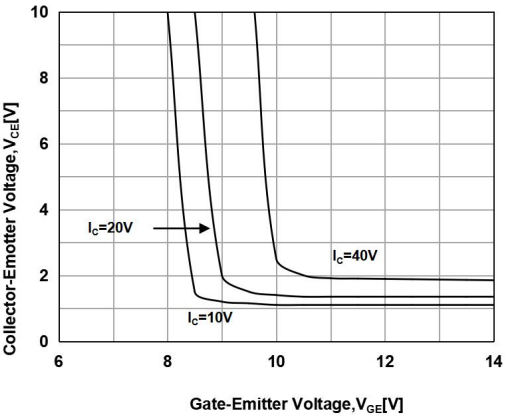
Transfer Characteristics



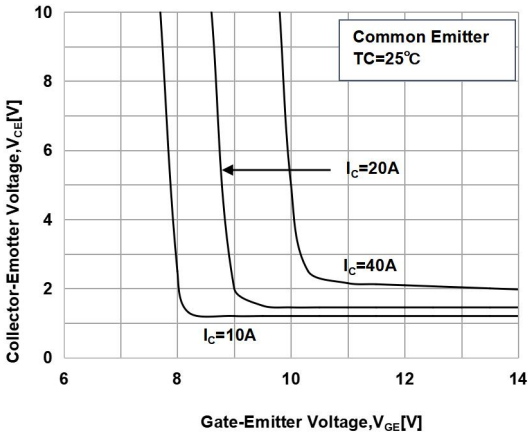
Saturation Voltage vs. Junction temperature at Variant Current Level



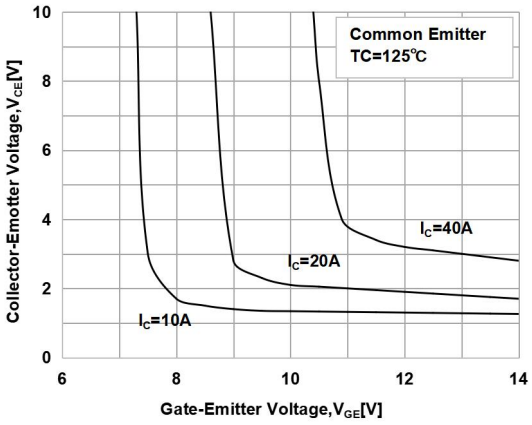
Saturation Voltage vs. V_{GE}



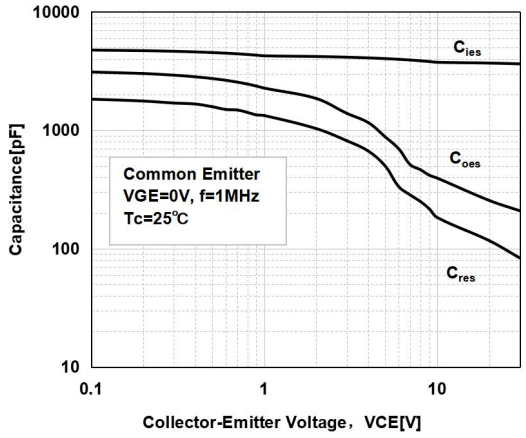
Saturation Voltage vs. V_{GE}



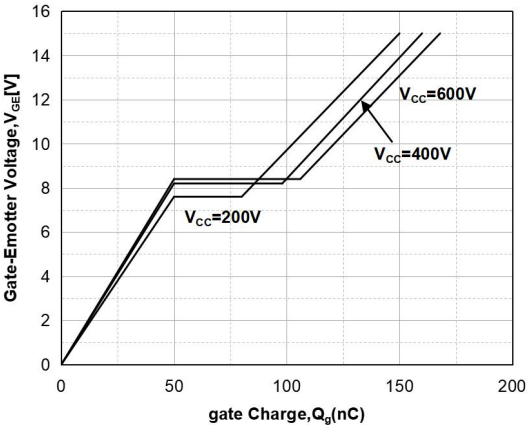
Saturation Voltage vs. V_{GE}



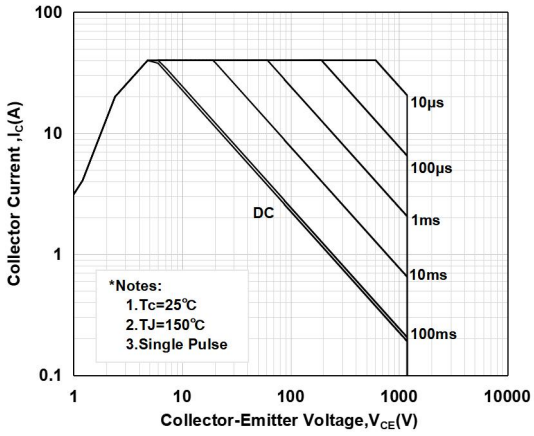
Capacitance Characteristics



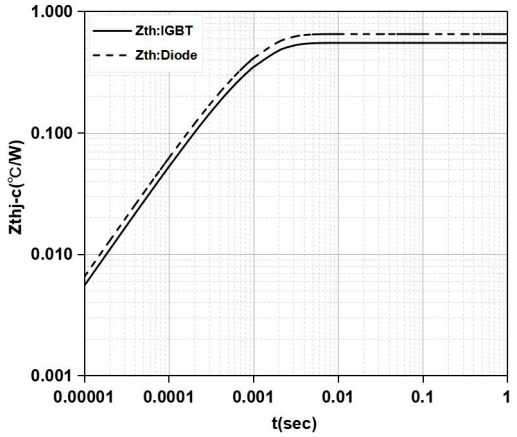
Gate Charge Characteristics



Foward Bias Safe Operating Area

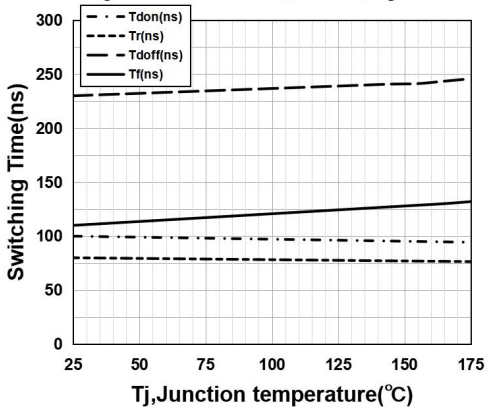


Transient Thermal Impedance



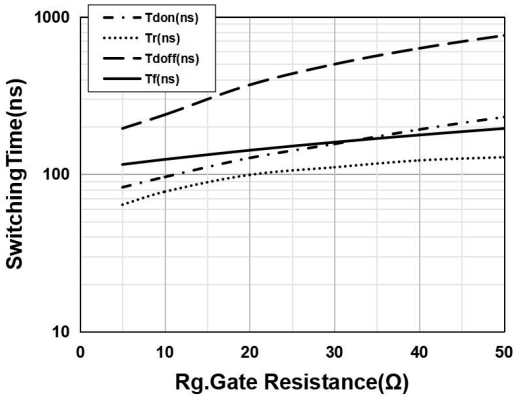
Switching Time vs. Tj

Vge=15V,VCE=600V,IC=20A,Rg=10Ω



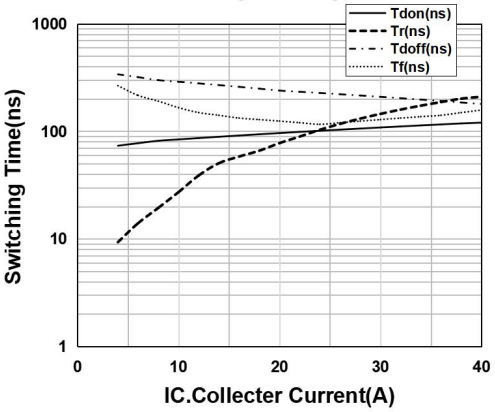
Switching Time Vs. Rg(125℃)

Vge=15V,VCE=600V,Ic=20A



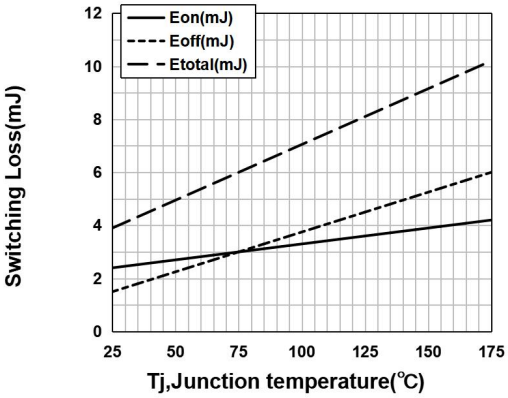
Switching Time vs. IC(125℃)

Vce=600V,Vge=15V,Rg=10Ω



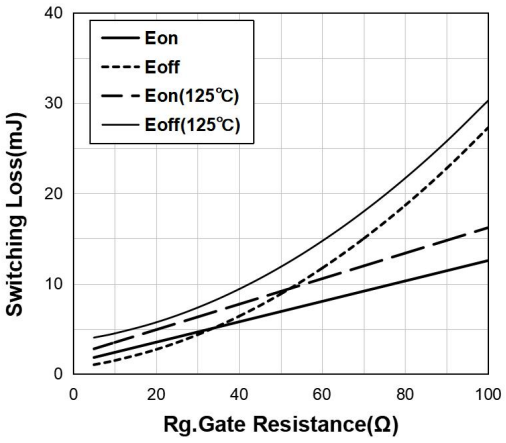
Switching Loss vs. Tj

Vge=15V,Vce=600V,IC=20A,Rg=10Ω



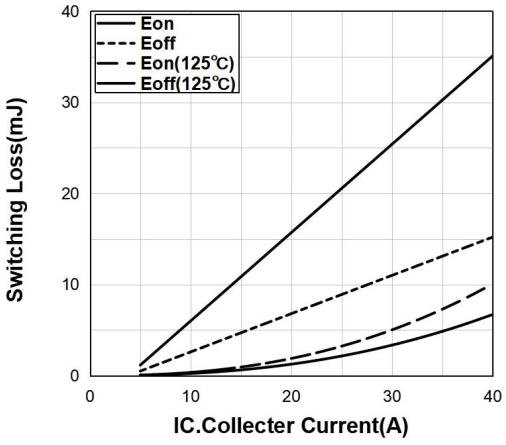
Switching Loss vs. Rg(125℃)

Vge=15V,Vce=600V,IC=20A

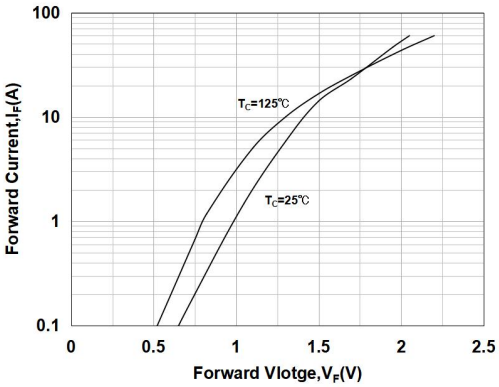


Switching Loss vs. I_C(125℃)

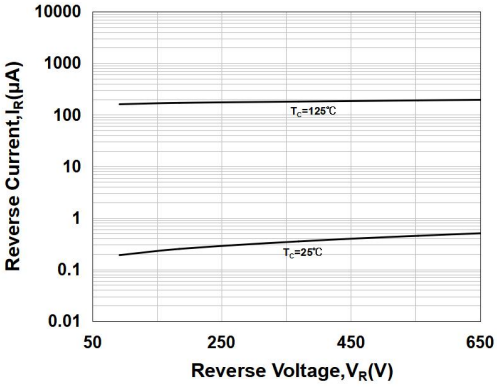
Vge=15V,Vce=600V,Rg=10Ω



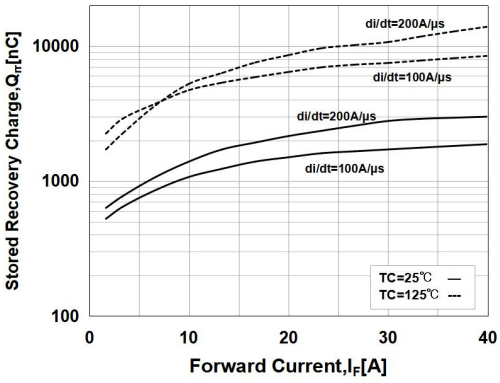
Forward Characteristics



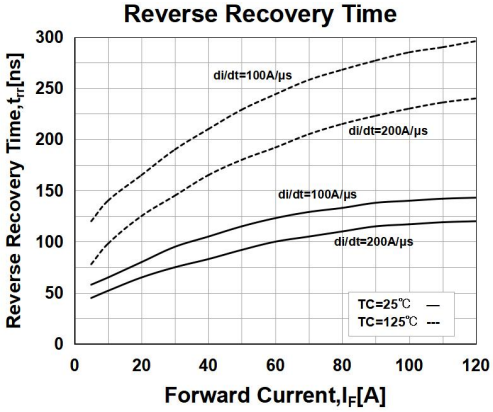
Reverse Current



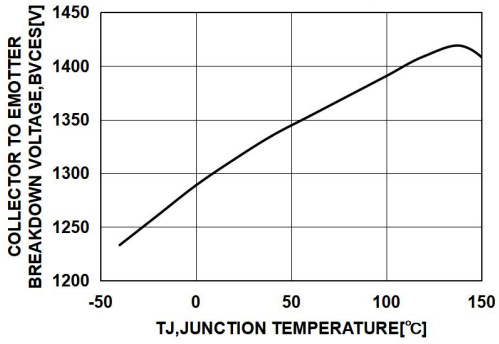
Stored Charge



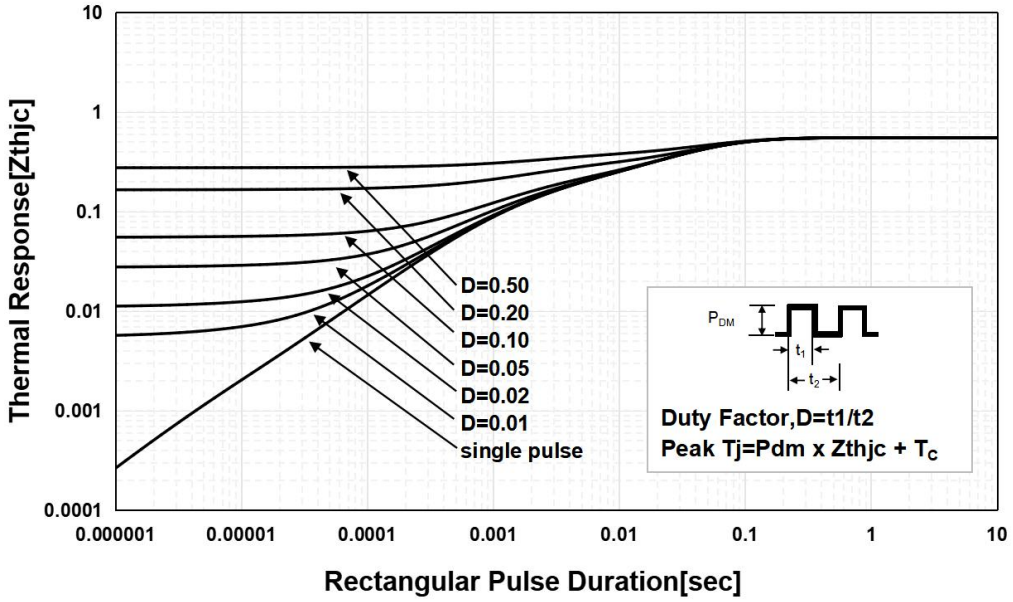
Reverse Recovery Time



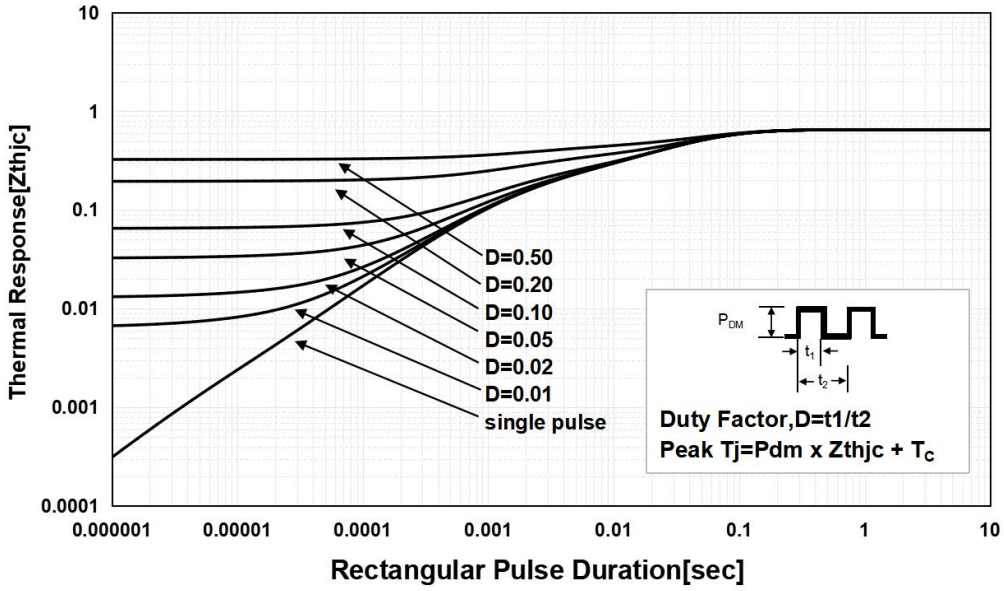
Collector to Emitter Breakdown Voltage vs. Junction Temperature



Transient Thermal Impedance of IGBT



Transient Thermal Impedance of Diode



Package outline dimension