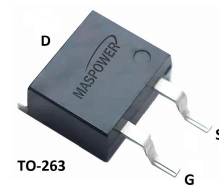


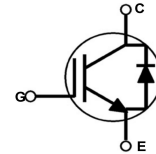
Features

- Low Gate charge
- FS Technology
- $V_{CE(sat)}$ (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	$T_C = 25^\circ C$	I_C	40	A
	$T_C = 100^\circ C$		20	
Pulsed collector current, pulse time limited by T_{jmax}		I_{CM}	60	
Diode forward current @ $T_C = 100^\circ C$		I_F	20	
Diode pulsed current, Pulse time limited by T_{jmax}		I_{FM}	120	
Power dissipation	$T_C = 25^\circ C$	P_D	227	W
	$T_C = 100^\circ C$		132	
Operating Junction and storage temperature rang		T_J	-55 to 150	$^\circ C$
		T_{stg}	-55 to 150	
Maximum Lead Temperature for Soldering Purposes		TL	300	$^\circ C$

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

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
Collector-emitter breakdown voltage	BV_{CES}	$I_C = 500\mu A, V_{GE} = 0V$	1200	-	-	V
Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}, I_C = 250\mu A$	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	$V_{CE(sat)}$	$I_C = 20A, V_{GE} = 15V, T_C = 25^{\circ}C$	-	1.9	2.5	V
		$I_C = 20A, V_{GE} = 15V, T_C = 150^{\circ}C$	-	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	t _f		-	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	t _f		-	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 (T _C =25°C unless otherwise specified)						
Forward voltage	V _F	I _F =20A,T _C =25°C	-	2.3	3.5	V
		I _F =20A,T _C =125°C	-	2.45	-	
Reverse recovery time	t _{rr}	I _F =20A,di/dt=100A/μs T _C =25°C	-	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°C	-	240	-	ns
Reverse recovery current	I _{rr}		-	4.5	-	A
Reverse recovery charge	Q _{rr}		-	1500	-	nC

Notes:

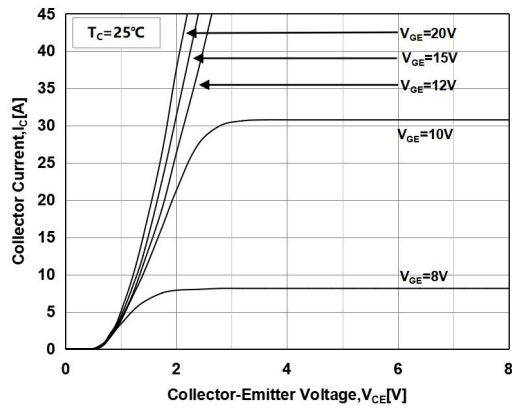
- 1: Pulse width limited by maximum junction temperature
- 2: Allowed number of short circuits: <1000; time between short circuits: >1s.
- 3: Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycles $\leq 2\%$
- 4: Essentially independent of operating temperature

Thermal Characteristics

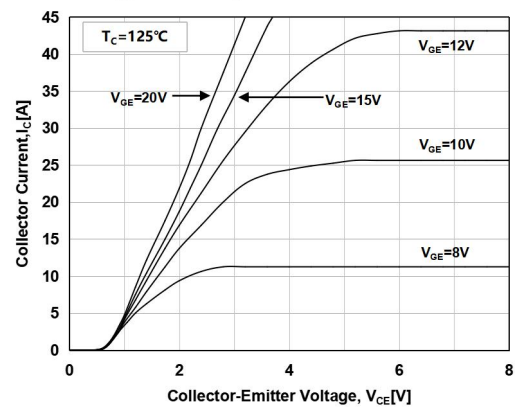
Parameter	Symbol	Value	Unit
Thermal resistance junction-to-ambient	$R_{\theta JA}$	62.5	$^\circ C/W$
Thermal resistance junction-to-case for IGBT	$R_{\theta JC}$	0.55	
Thermal resistance junction-to-case for Diode	$R_{\theta JC}$	0.65	

Typical Performance Characteristic

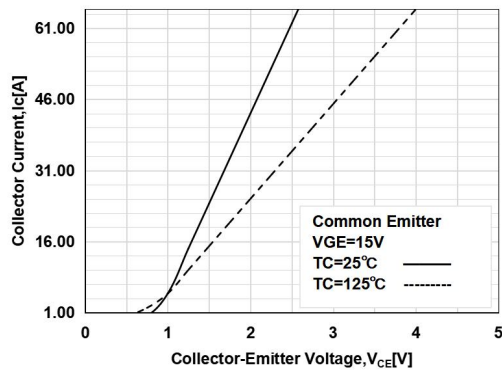
Typical Output Characteristics



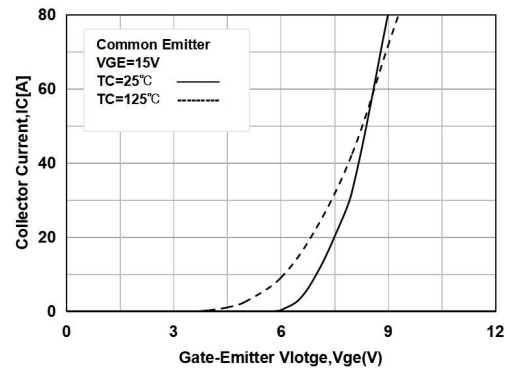
Typical Output Characteristics



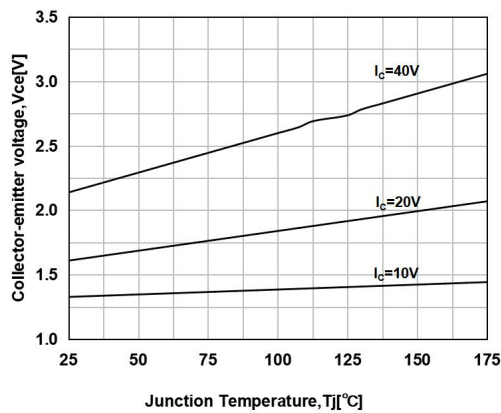
Typical Saturation Voltage Characteristics



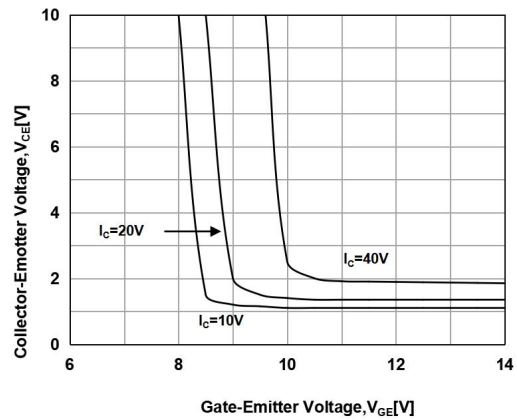
Transfer Characteristics



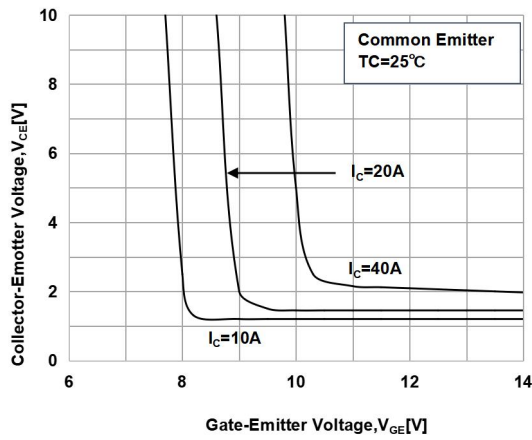
Saturation Voltage vs. Junction temperature at Variant Current Level



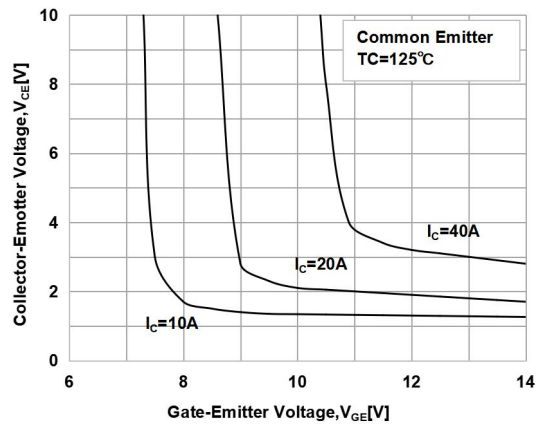
Saturation Voltage vs. V_{GE}



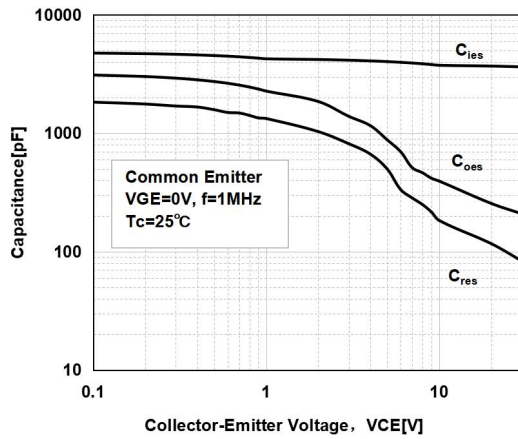
Saturation Voltage vs. V_{GE}



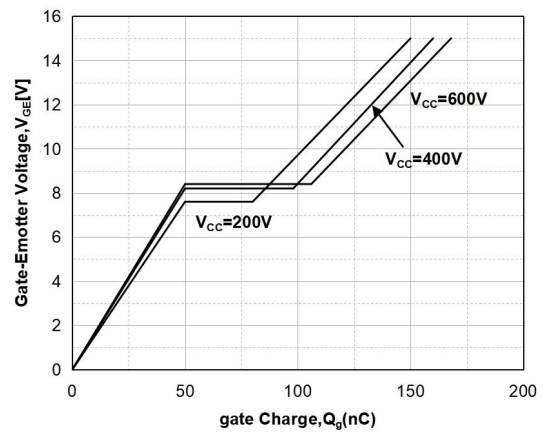
Saturation Voltage vs. V_{GE}



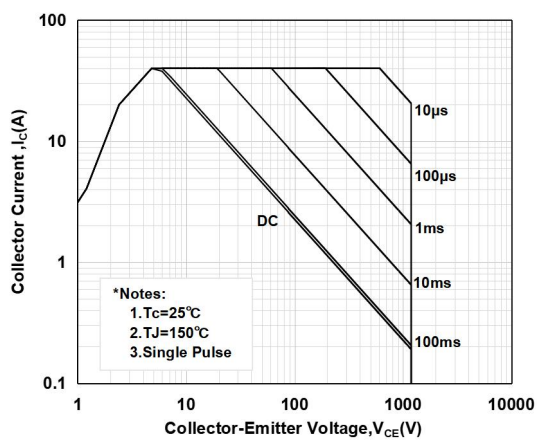
Capacitance Characteristics



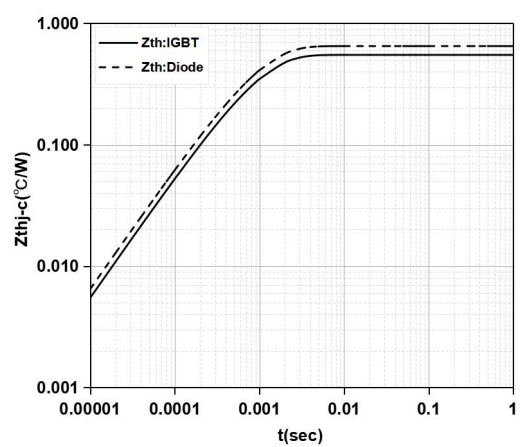
Gate Charge Characteristics

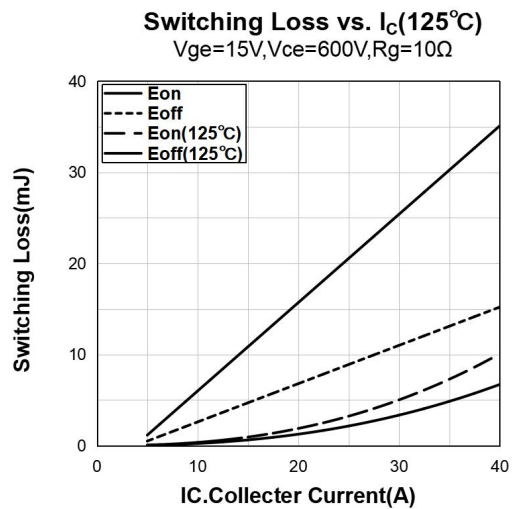
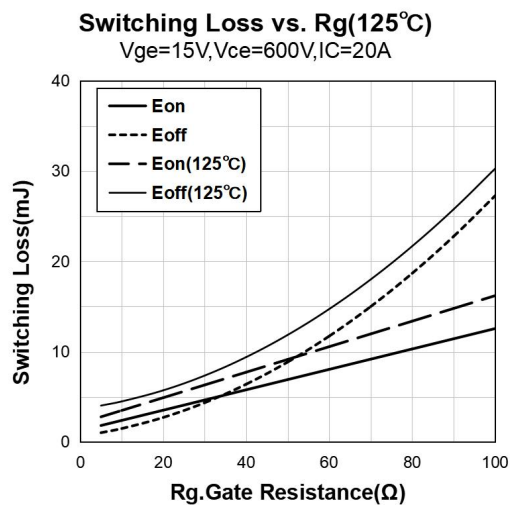
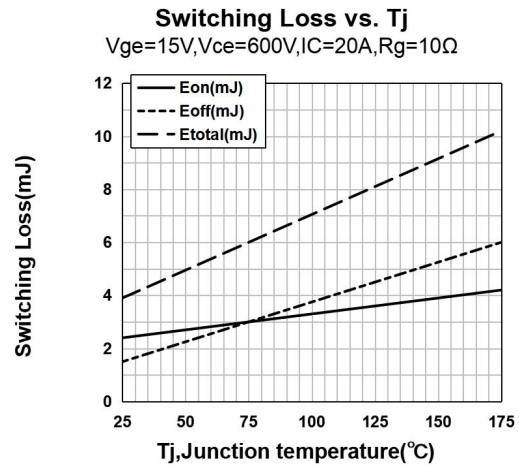
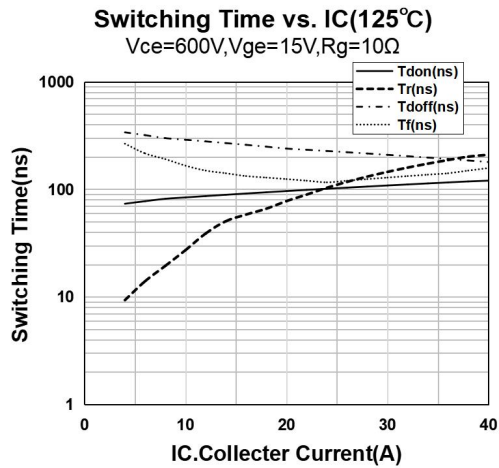
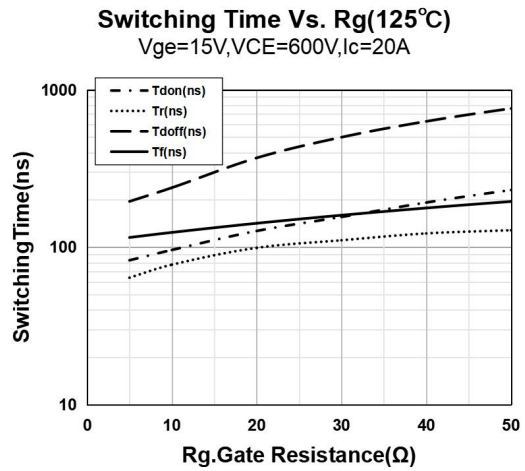
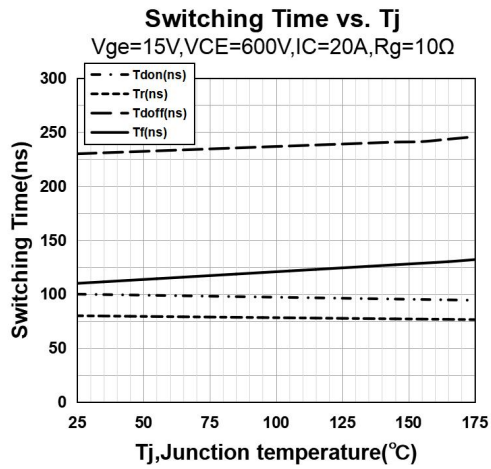


Foward Bias Safe Operating Area

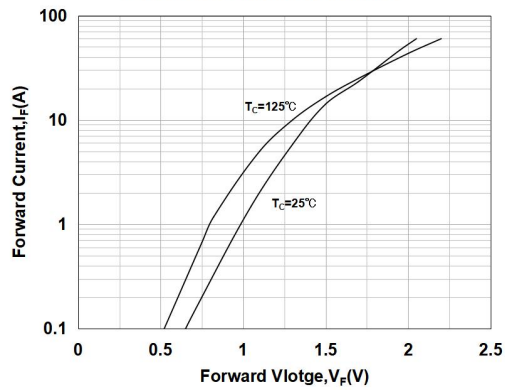


Transient Thermal Impedance

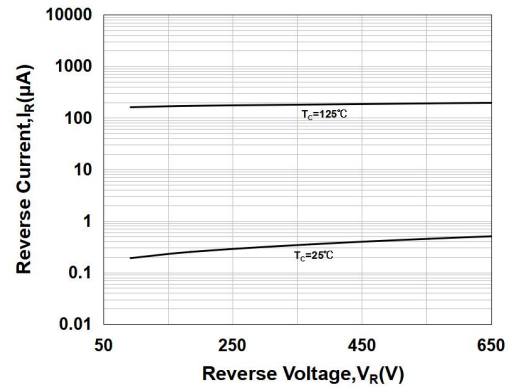




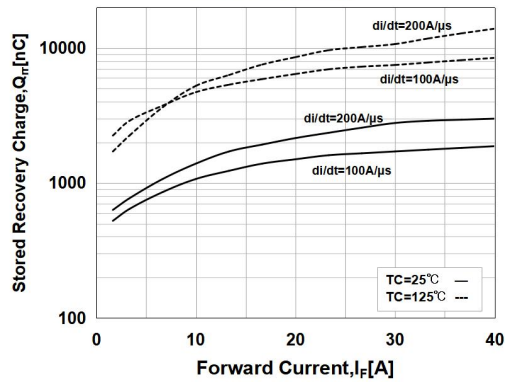
Forward Characteristics



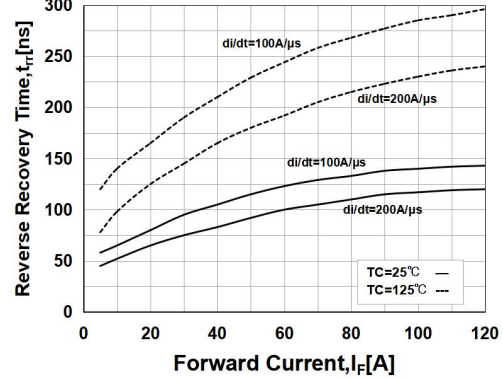
Reverse Current



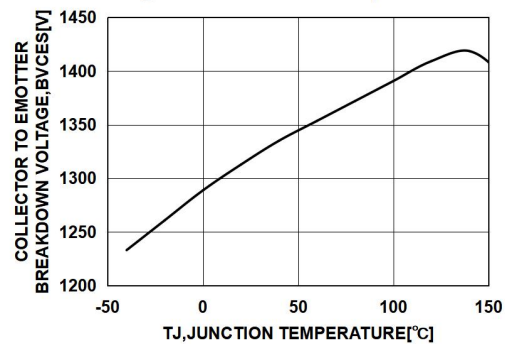
Stored Charge



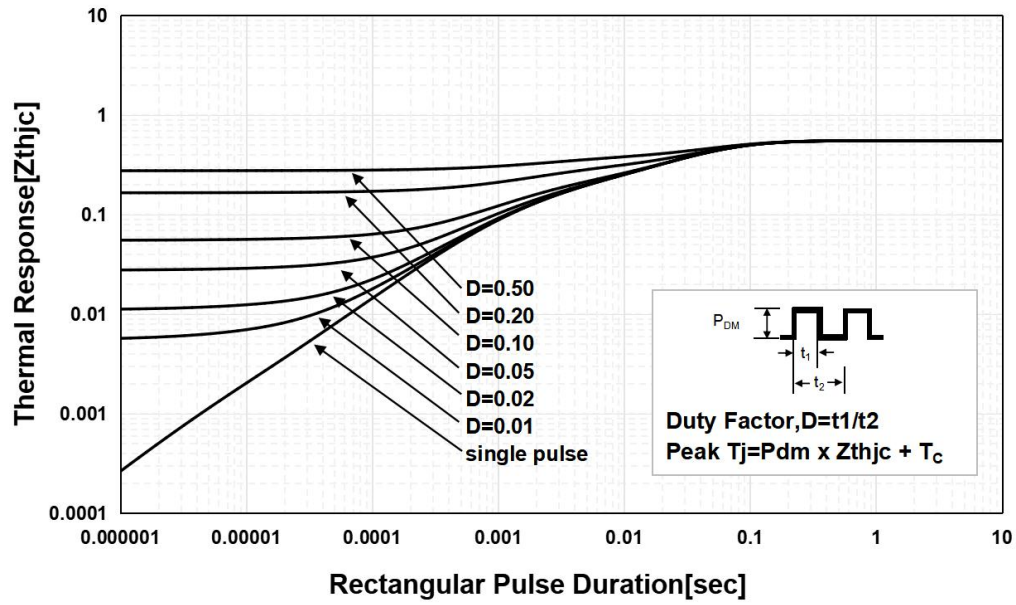
Reverse Recovery Time



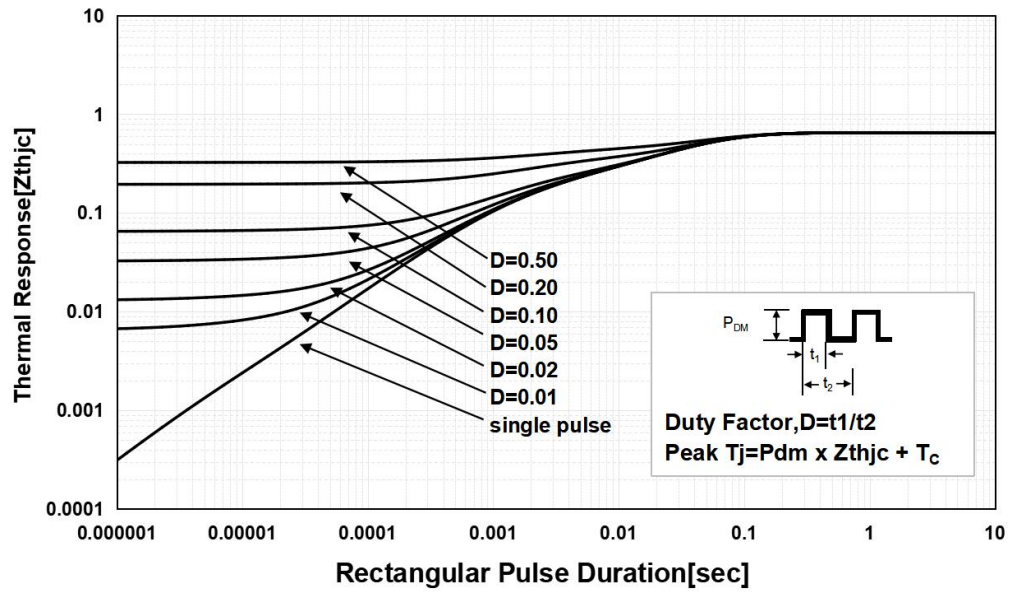
Collector to Emitter Breakdown Voltage vs. Junction Temperature



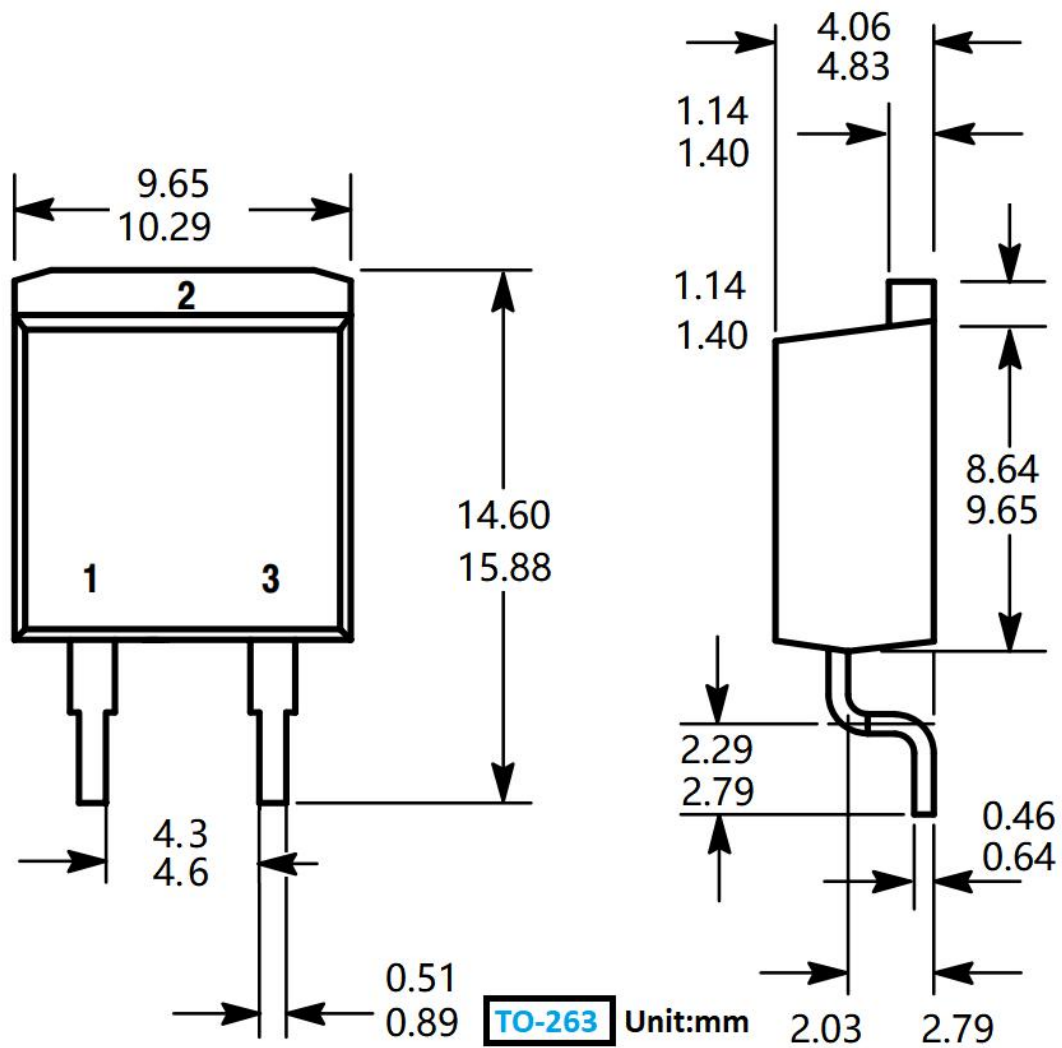
Transient Thermal Impedance of IGBT



Transient Thermal Impedance of Diode



Package outline dimension



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[MSG100T120FQC1](#) [MSG75T120FQC1](#) [MSG30T65FT](#) [MSG70T170HLB3](#) [MSG75D65HFC0](#) [MSG100T120FQW](#) [FGW40N120WD](#)
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