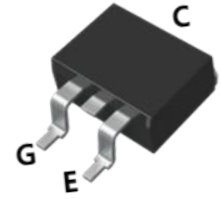
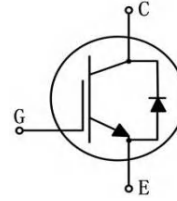


Trench Field-stop IGBT Discrete

Parameter	Value	Unit
V_{CE}	650	V
I_C	20	A
$V_{CE(sat)}$	1.6	V



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Features

- Trench FS Technology
- Low gate charge
- High ruggedness performance
- High efficiency for motor control
- Positive $V_{CE(sat)}$ temperature coefficient

Applications

- Home appliances
- Motor drives
- General inverter
- Uninterruptible Power Supply

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-emitter voltage	V_{CES}	650	V
Gate-emitter voltage	V_{GES}	± 20	V
Continuous collector current($T_C=25^\circ\text{C}$)	I_C	40	A
Continuous collector current($T_C=100^\circ\text{C}$)		20	A
Pulsed collector current, t_p limited by T_{vjmax}	I_{CM}	80	A
Diode continuous forward current($T_C=100^\circ\text{C}$)	I_F	20	A
Surge non repetitive forward current $t_p=10\text{ms}$ sinusoidal	I_{FSM}	80	A
Power dissipation($T_C=25^\circ\text{C}$)	P_{tot}	162	W
Operating and Storage Temperature Range	$T_j; T_{stg}$	-55 to +150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal resistance, junction to case for IGBT	$R_{th(j-c)}$	0.77	K/W
Thermal resistance, junction to case for Diode	$R_{th(j-c)}$	2.05	
Thermal resistance, junction-ambient	$R_{th(j-a)}$	33.8	

Electrical Characteristics of IGBT (T_{vj}=25°C unless otherwise specified)
Static characteristics

Parameter	Symbol	Test condition	Value			Unit
			Min.	Typ.	Max.	
Collector-emitter breakdown voltage	B _{VCEs}	V _{GE} =0V, I _C =500μA	650	-	-	V
Collector-emitter leakage current	I _{CES}	V _{CE} =650V, V _{GE} =0V	-	-	10	μA
Gate leakage current, forward	I _{GES}	V _{GE} =20V, V _{CE} =0V	-	-	200	nA
Gate leakage current, reverse		V _{GE} =-20V, V _{CE} =0V	-	-	-200	
Gate-emitter threshold voltage	V _{GE(th)}	V _{GE} =V _{CE} , I _C =250uA	4.5	-	6.5	V
Collector-emitter saturation voltage	V _{CE(sat)}	V _{GE} =15V, I _C =20A, T _{vj} =25°C	-	1.6	2.0	V
		V _{GE} =15V, I _C =20A, T _{vj} =125°C	-	1.75	2.15	
		V _{GE} =15V, I _C =20A, T _{vj} =175°C	-	1.9	2.3	

Dynamic Characteristics

Parameter	Symbol	Test condition	Value			Unit
			Min.	Typ.	Max.	
Input capacitance	C _{ies}	V _{CE} =25V	-	1500	-	pF
Output capacitance	C _{oes}	V _{GE} =0V	-	128	-	
Reverse transfer capacitance	C _{res}	f=1MHz	-	28.7	-	
Total gate	Q _g	V _{CC} =400V, I _C =20A V _{GE} =15V, R _G =10Ω	-	43.9	-	nC

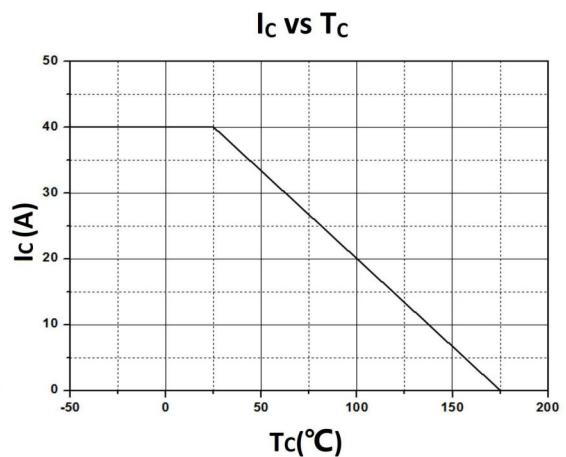
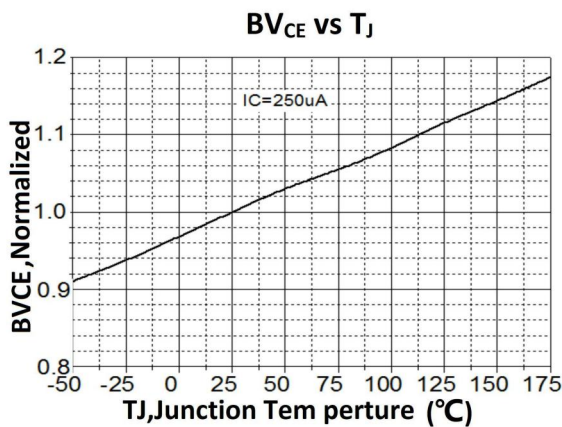
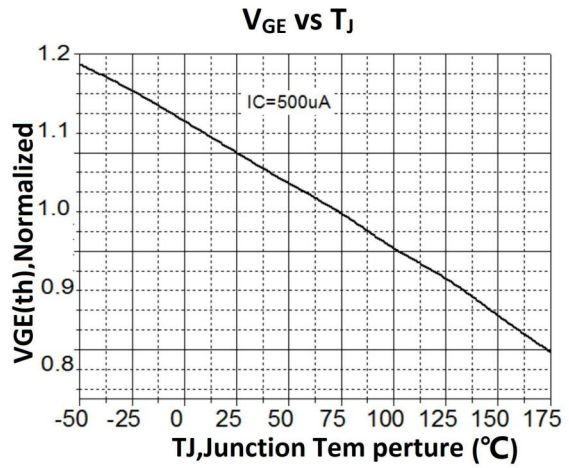
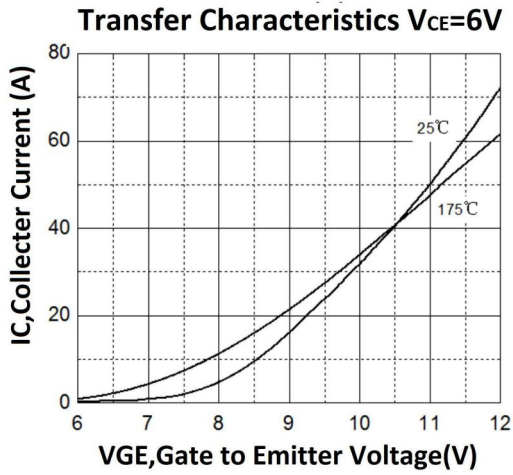
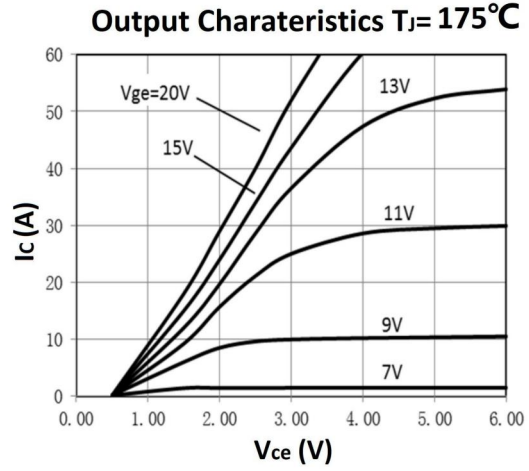
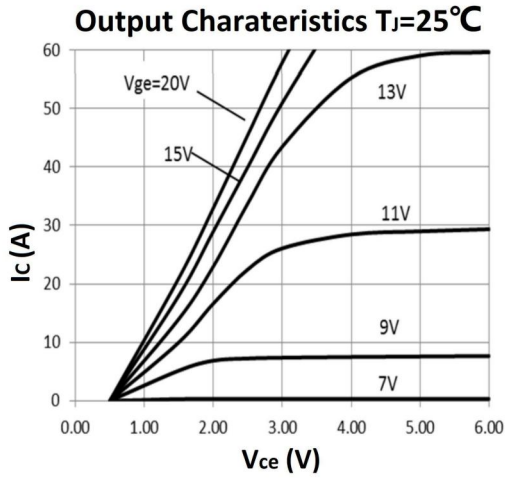
Switching Characteristics

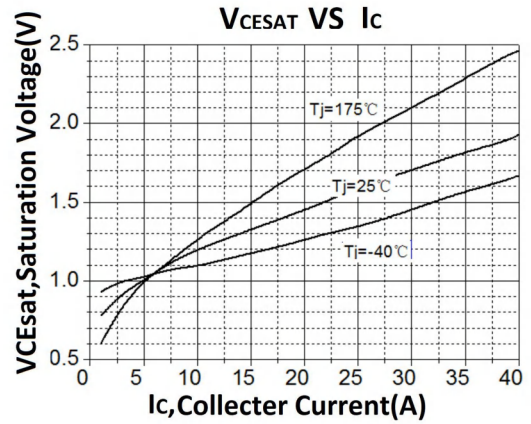
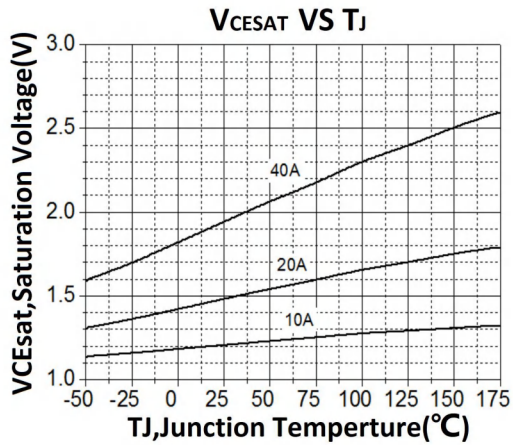
Parameter	Symbol	Test condition	Value			Unit
			Min.	Typ.	Max.	
Turn-on delay time	t _{d(on)}	V _{CC} =400V V _{GE} =15V I _C =20A R _G =10Ω	-	16	-	ns
Rise time	t _r		-	56	-	
Turn-off delay time	t _{d(off)}		-	52	-	
Turn-off fall time	t _f		-	82	-	
Turn-on energy	E _{on}	T _C =25°C Inductive load	-	0.79	-	mJ
Turn-off energy	E _{off}		-	0.3	-	
Total switching energy	E _{ts}		-	1.09	-	

Diode Characteristics

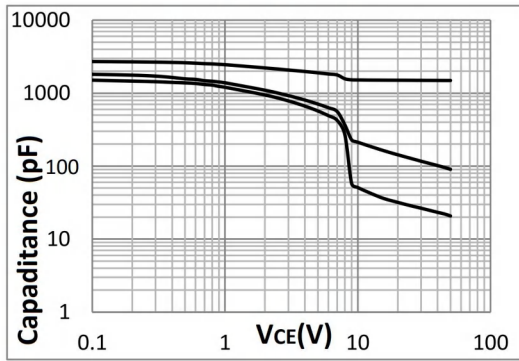
Parameter	Symbol	Test condition	Value			Unit
			Min.	Typ.	Max.	
Diode forward voltage	V _F	I _F =20A, T _{vj} =25°C	-	1.4	-	V
		I _F =20A, T _{vj} =175°C	-	1.0	-	V
Diode reverse recovery time	T _{rr}	V _{GE} =0V	-	254	-	ns
Diode peak reverse recovery current	I _{rrm}	I _F =20A	-	2.7	-	A
Diode reverse recovery charge	Q _{rr}	diF/dt=100A/μs	-	347	-	nC

Typical Characteristics

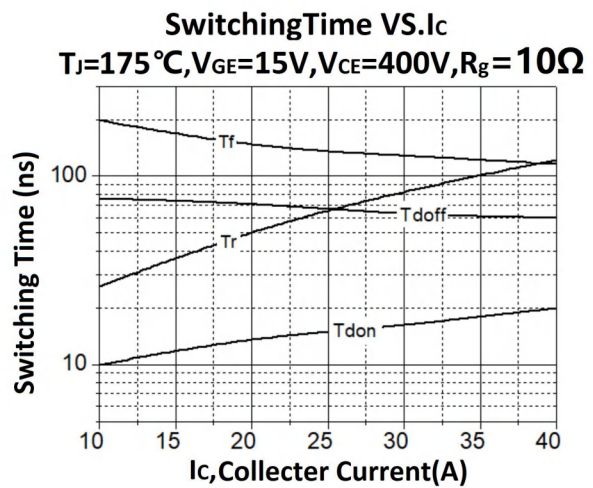
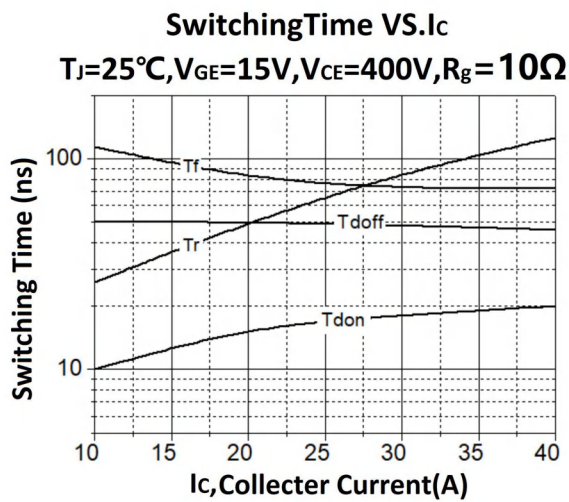
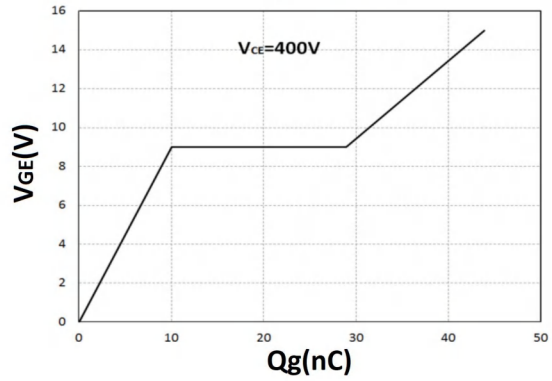


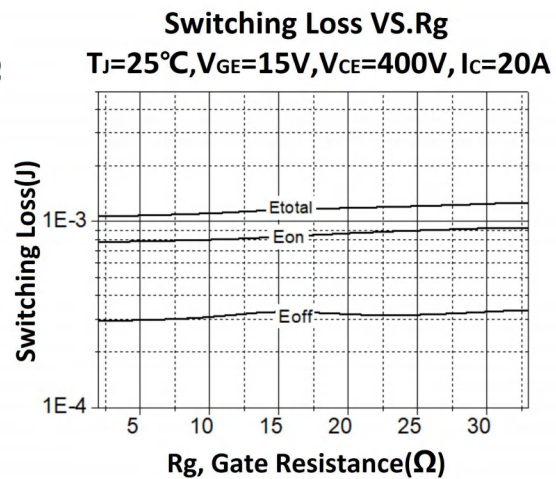
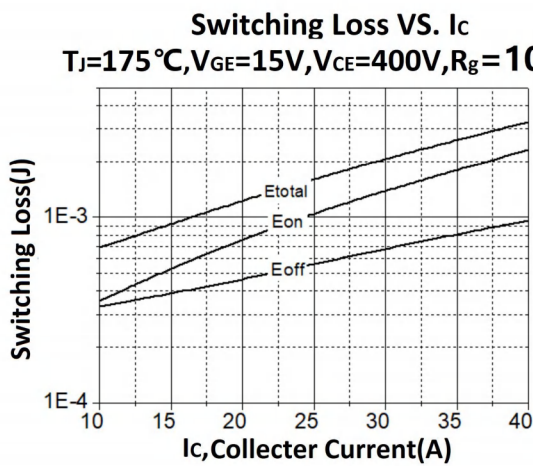
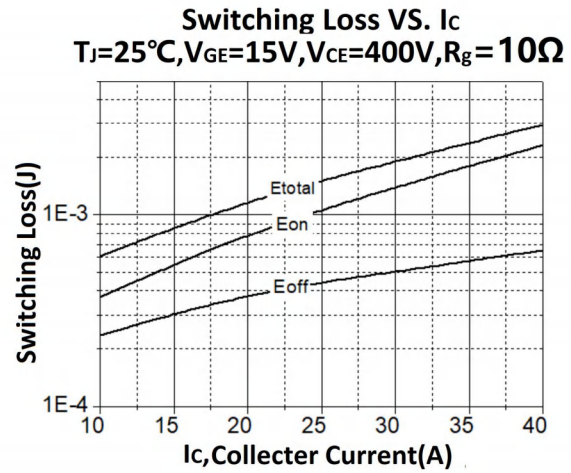
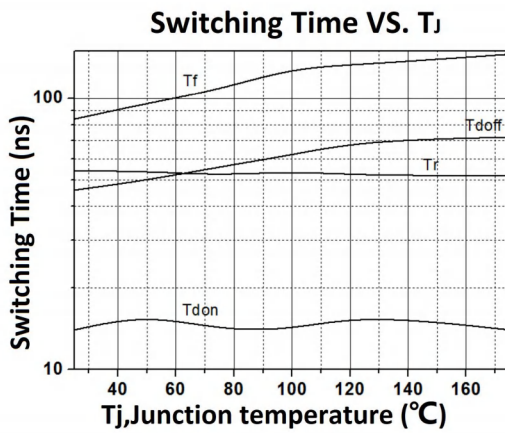
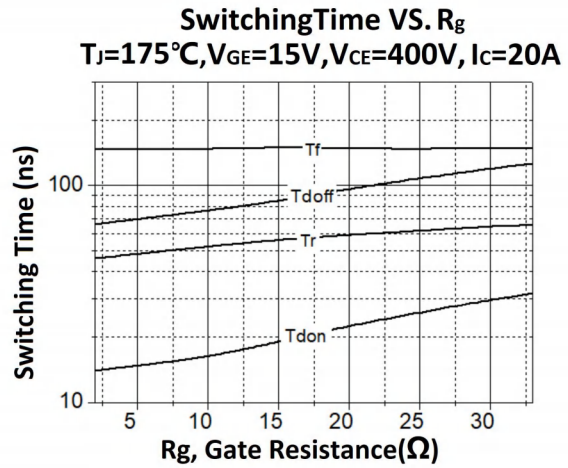
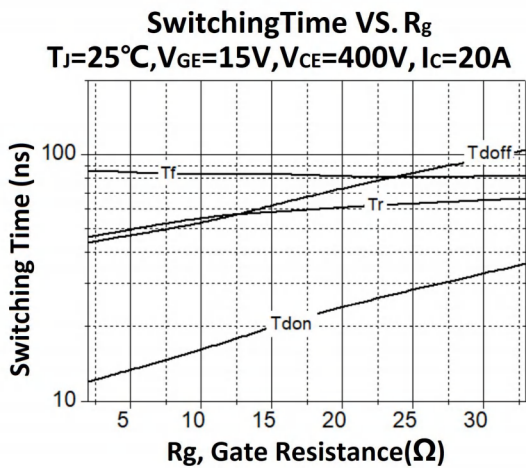


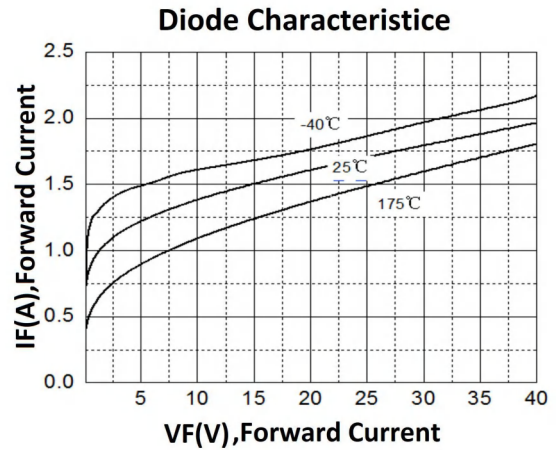
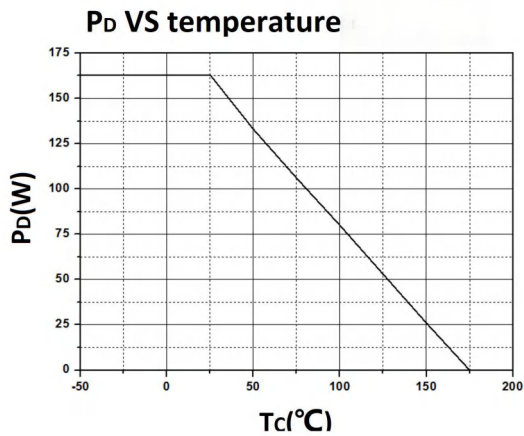
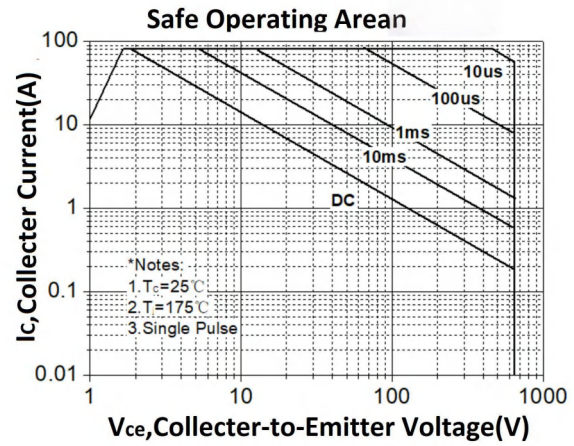
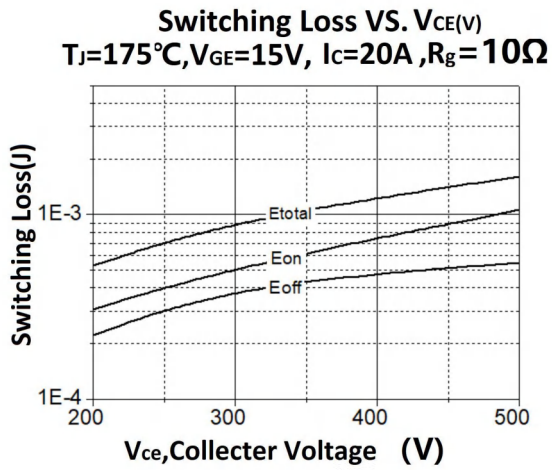
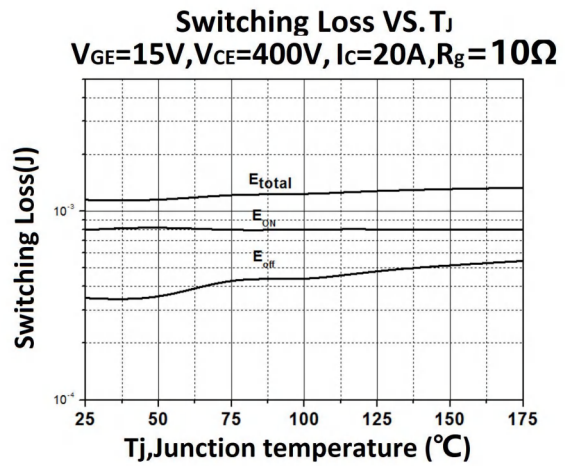
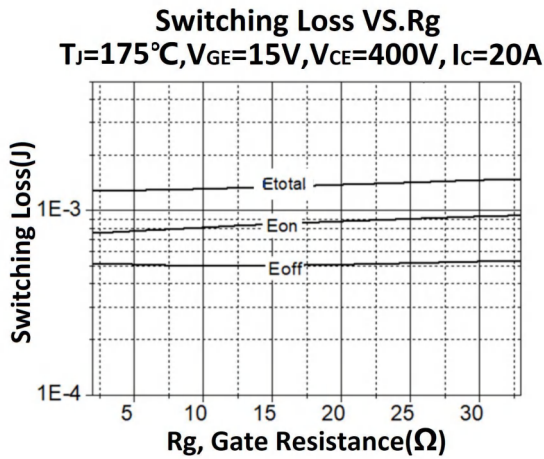
Capacitance Characteristic
V_{GE}=0V, f=1.0MHZ

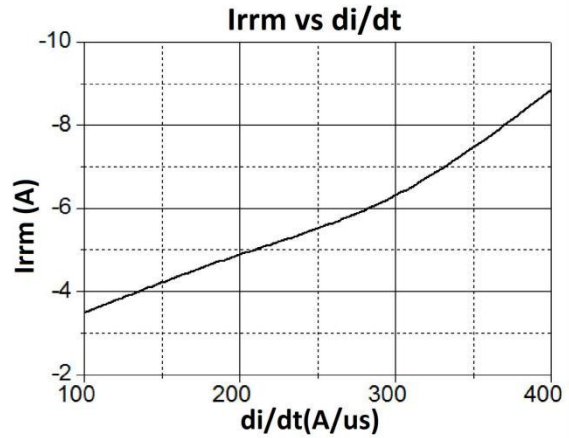
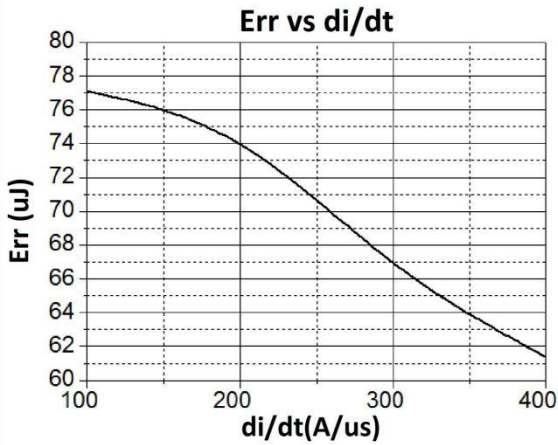
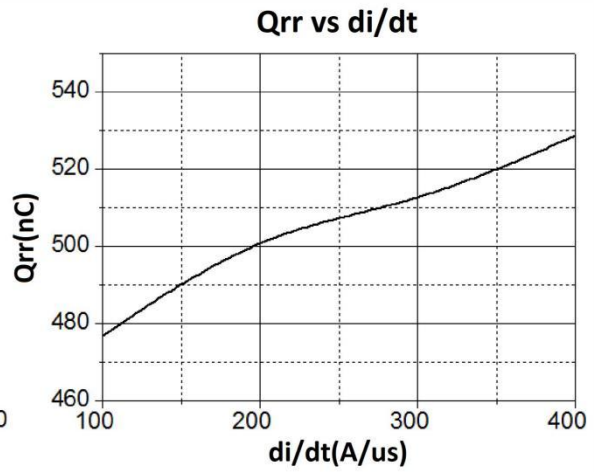
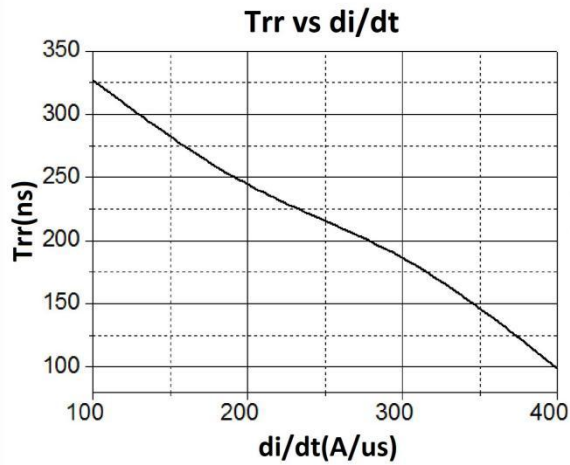


Q_g VS V_{GE}

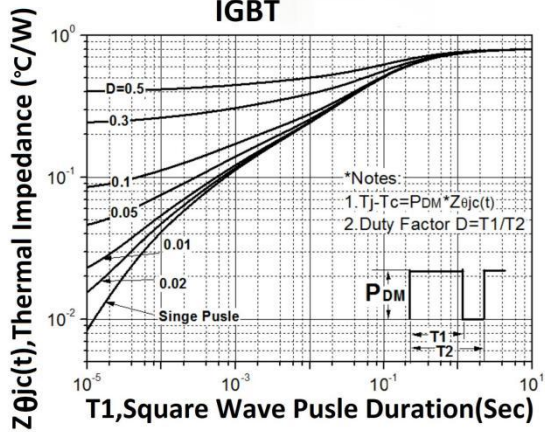






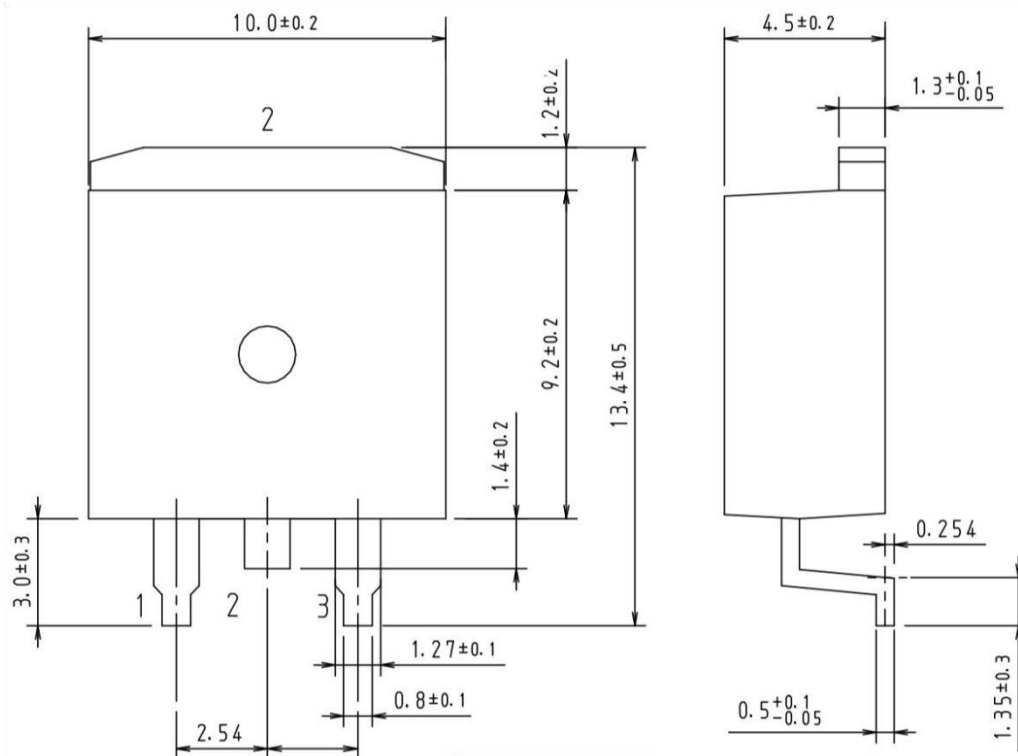


Normalized Maximum Transient Thermal Impedance for IGBT



Package Outlines (Unit: mm)

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