

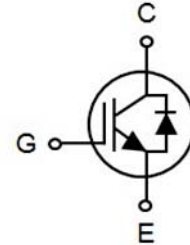
This IGBT is produced using advanced MagnaChip's Field Stop Trench IGBT Technology, which provides high performance, excellent quality and high ruggedness.

Features

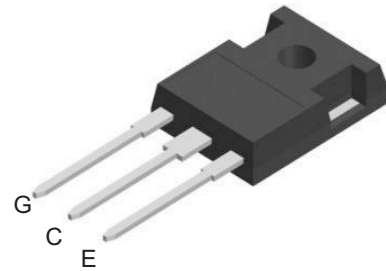
- High ruggedness for motor control
- $V_{CE(sat)}$ positive temperature coefficient
- Very soft, fast recovery anti-parallel diode
- Low EMI
- Maximum junction temperature 175°C

Applications

- PV Inverter
- UPS Power
- Welder
- Halogen-free



C : Collector
G : Gate
E : Emitter



TO-247 top view

Ordering Information

Part Number	Marking	Package	Packing
RG100N650T7	100N650	TO-247	-

Absolute Maximum Ratings(Ta=25°C)

Parameter	Symbol	Rating	Unit	
Collector-emitter voltage	V_{CE}	650	V	
DC collector current, limited by T_{vjmax}	I_C	$T_C=25^\circ\text{C}$	100	A
		$T_C=100^\circ\text{C}$	75	A
Pulsed collector current, t_p limited by T_{vjmax}	I_{Cpuls}	225	A	
Diode forward current, limited by T_{vjmax}	I_F	$T_C=25^\circ\text{C}$	80	A
		$T_C=100^\circ\text{C}$	50	A
Diode pulsed current, t_p limited by T_{vjmax}	I_{Fpuls}	150	A	
Gate-emitter voltage	V_{GE}	± 20	V	
Power dissipation	P_D	$T_C=25^\circ\text{C}$	428	W
		$T_C=100^\circ\text{C}$	214	W
Short circuit withstand time $V_{CC} \leq 360\text{V}$, $V_{GE} = 15\text{V}$, $T_{vj} = 150^\circ\text{C}$	t_{sc}	5	μs	
Operating Junction temperature range	T_{vj}	-40~175	$^\circ\text{C}$	
Storage temperature range	T_{stg}	-55~150	$^\circ\text{C}$	

Thermal Characteristics

Parameter	Symbol	Rating	Unit
Thermal resistance junction-to-ambient	$R_{th(j-a)}$	40	$^\circ\text{C/W}$
Thermal resistance junction-to-case for IGBT	$R_{th(j-c)}$	0.35	
Thermal resistance junction-to-case for Diode	$R_{th(j-c)}$	0.70	

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

Parameter	Symbol	Conditions	Min	Typ	Max	Unit	
Static Characteristics							
Collector-emitter breakdown voltage	BV _{CES}	I _C = 2mA, V _{GE} = 0V	650	-	-	V	
Collector-emitter saturation voltage	V _{CE(sat)}	I _C = 75A, V _{GE} = 15V	T _{vj} = 25°C	-	1.7	2	V
			T _{vj} = 175°C	-	2.2	-	
Diode forward voltage	V _F	V _{GE} = 0V, I _F = 50A	T _{vj} = 25°C	-	1.55	1.8	V
			T _{vj} = 175°C	-	1.6	-	
Gate-emitter threshold voltage	V _{GE(th)}	V _{CE} = V _{GE} , I _C = 1.2mA	4.5	5.5	6.5	V	
Zero gate voltage collector current	I _{CES}	V _{CE} = 650V, V _{GE} = 0V, T _{vj} = 25°C	-	-	20	μA	
Gate-emitter leakage current	I _{GES}	V _{GE} = 20V, V _{CE} = 0V	-	-	±100	nA	
Dynamic Characteristics							
Total gate charge	Q _G	V _{CE} = 520V, I _C = 75A, V _{GE} = 15V	-	280	-	nC	
Gate-emitter charge	Q _{GE}		-	42	-		
Gate-collector charge	Q _{GC}		-	114	-		
Input capacitance	C _{ies}	V _{CE} = 25V, V _{GE} = 0V, f = 1MHz	-	6900	-	pF	
Output capacitance	C _{oes}		-	230	-		
Reverse transfer capacitance	C _{res}		-	158	-		
Switching Characteristics							
Turn-on delay time	t _{d(on)}	V _{GE} = -5/15V, V _{CC} = 400V, I _C = 75A, R _G = 10Ω, Inductive Load, T _{vj} = 25°C	-	38	-	ns	
Rise time	t _r		-	192	-		
Turn-off delay time	t _{d(off)}		-	156	-		
Fall time	t _f		-	103	-		
Turn-on switching energy	E _{on}		V _{GE} = -5/15V, V _{CC} = 400V, I _C = 75A, R _G = 10Ω, Inductive Load, T _{vj} = 175°C	-	4.69	-	mJ
Turn-off switching energy	E _{off}			-	1.75	-	
Total switching energy	E _{ts}	-		6.44	-	ns	
Turn-on delay time	t _{d(on)}	-		37	-		
Rise time	t _r	-		194	-		
Turn-off delay time	t _{d(off)}	-		168	-		
Fall time	t _f	-	106	-			
Turn-on switching energy	E _{on}	I _F = 50A, di _F /dt = 200A/μs, T _{vj} = 25°C	-	5.62	-		μJ
Turn-off switching energy	E _{off}		-	2.04	-		
Total switching energy	E _{ts}		-	7.66	-	ns	
Reverse recovery time	t _{rr}		-	181	-		
Reverse recovery current	I _{rr}		-	10.4	-		
Reverse recovery charge	Q _{rr}		-	1.12	-		
Reverse recovery time	t _{rr}	I _F = 50A, di _F /dt = 200A/μs, T _{vj} = 175°C	-	384	-		ns
Reverse recovery current	I _{rr}		-	13.3	-		A
Reverse recovery charge	Q _{rr}		-	3.07	-	μC	

RATING AND CHARACTERISTICS CURVES (RG100N650T7)

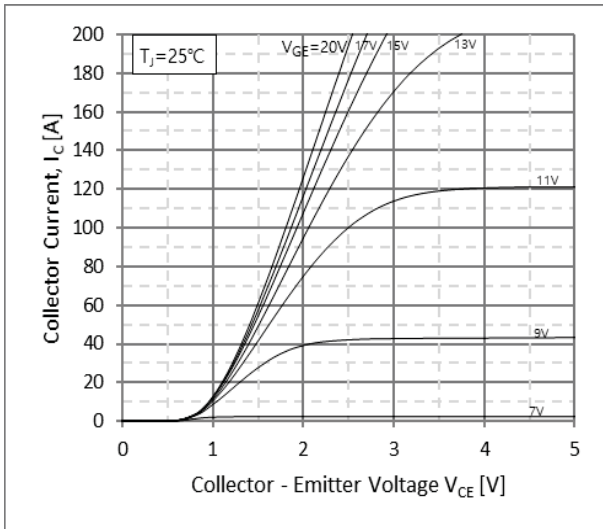


Fig.1 Typical Output Characteristics ($T_J = 25^\circ\text{C}$)

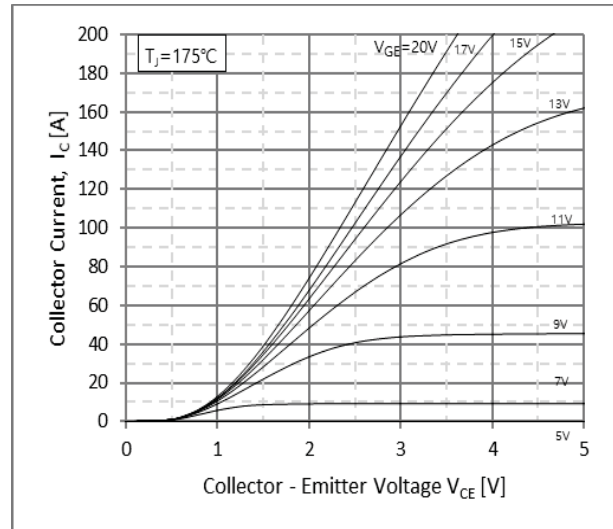


Fig.2 Typical Output Characteristics ($T_J = 175^\circ\text{C}$)

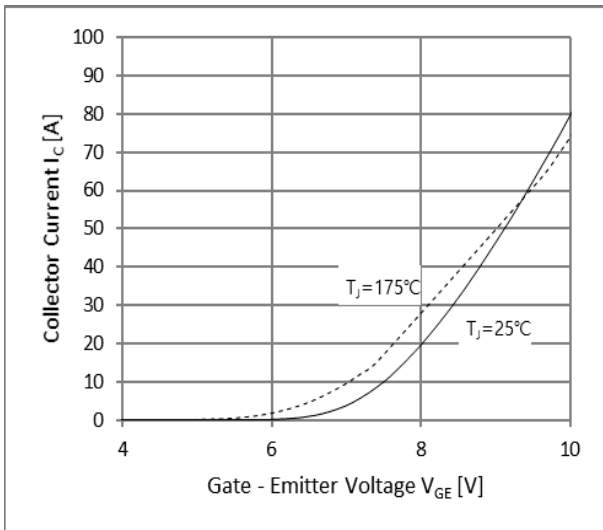


Fig.3 Typical Transfer Characteristics

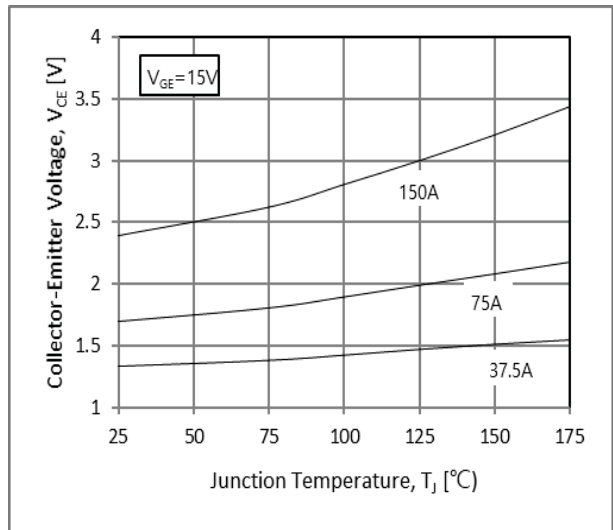


Fig.4 Typical Collector-Emitter Saturation Voltage - Junction Temperature

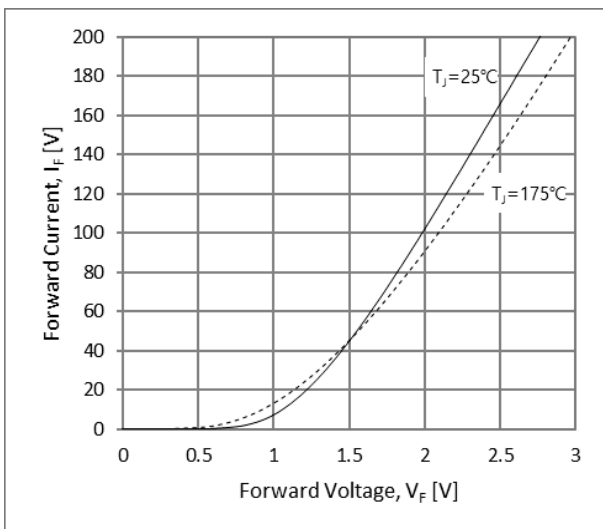


Fig.5 Diode Forward Characteristics

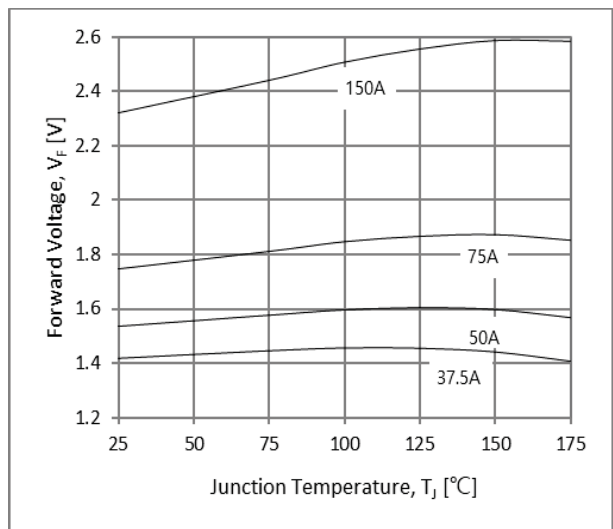


Fig.6 Diode Forward-Junction Temperature

RATING AND CHARACTERISTICS CURVES (RG100N650T7)

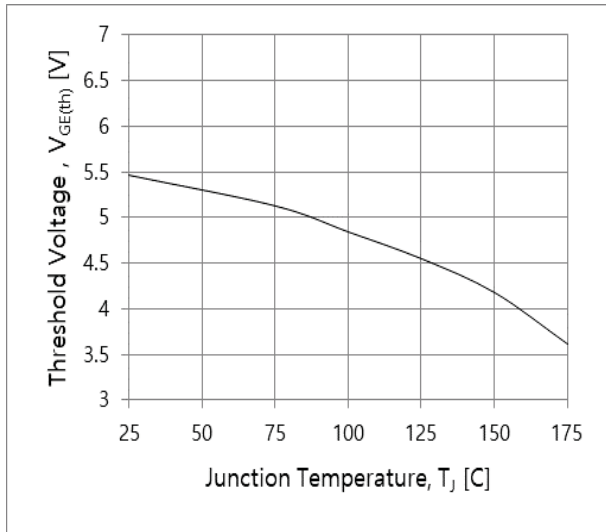


Fig.7 Threshold Voltage-Junction Temperature

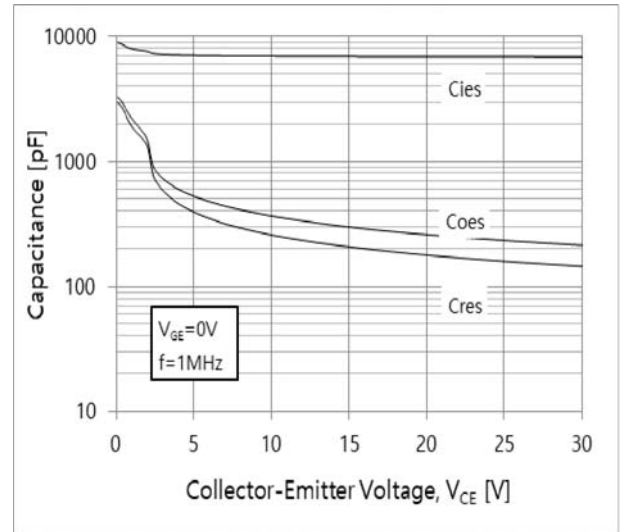


Fig.8 Typical Capacitance

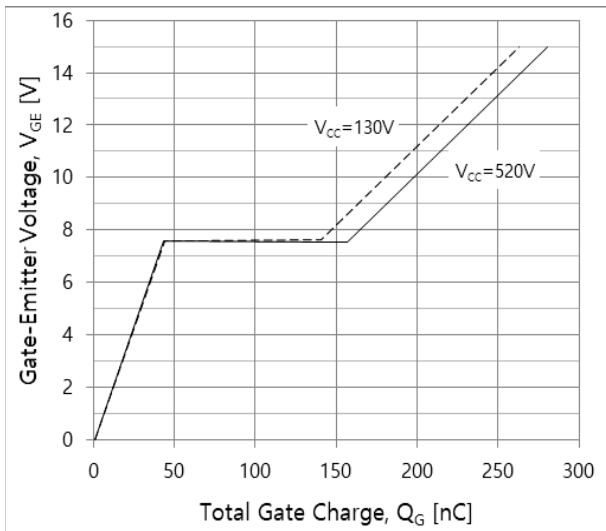


Fig.9 Typical Gate Charge

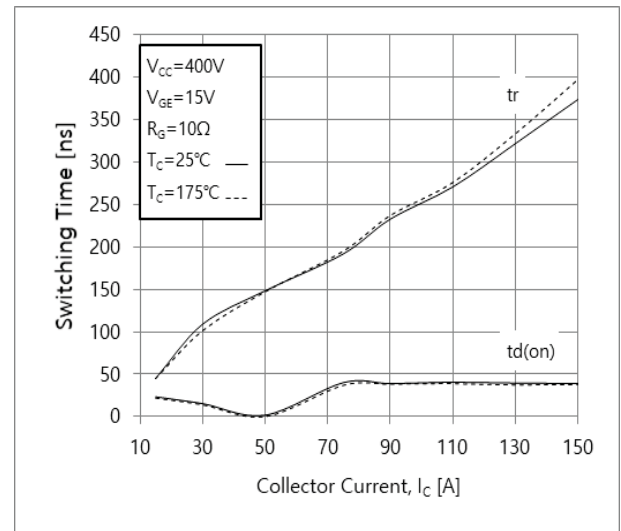


Fig.10 Typical Turn on-Collector Current

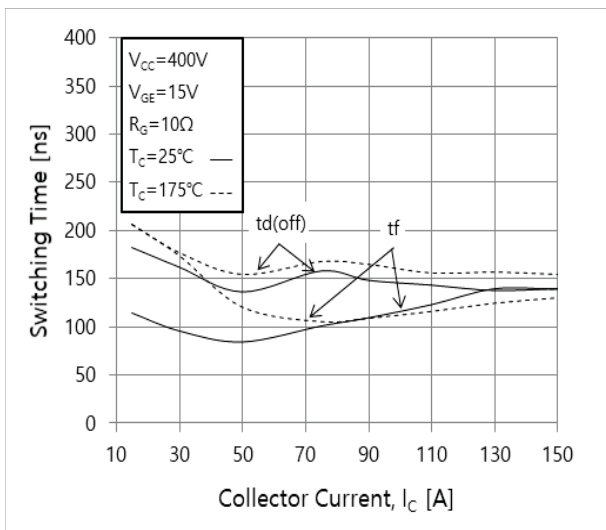


Fig.11 Typical Turn off-Collector Current

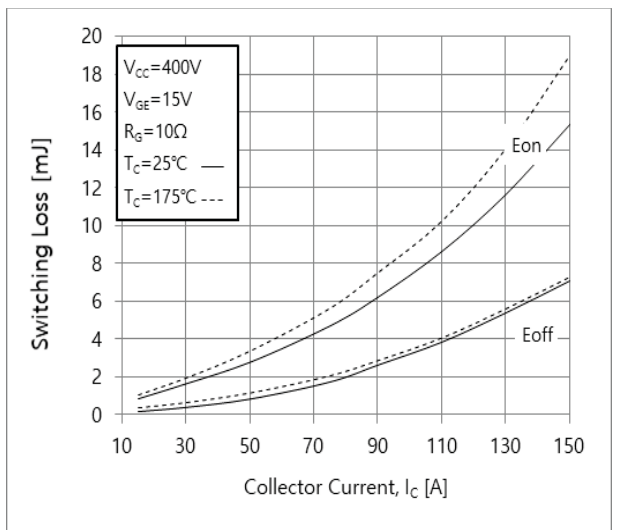


Fig.12 Switching Loss-Collector Current

RATING AND CHARACTERISTICS CURVES (RG100N650T7)

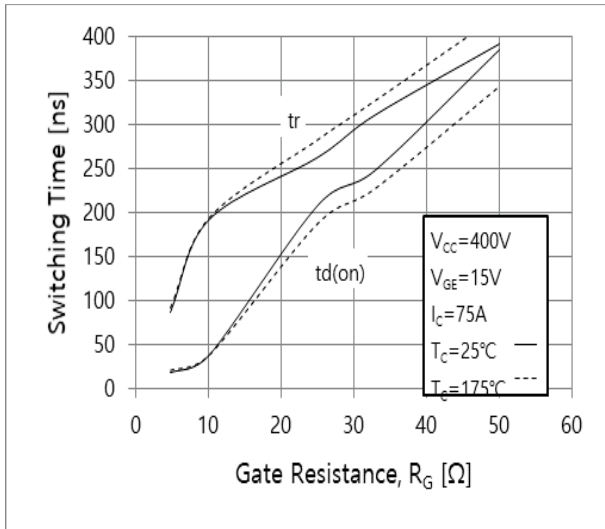


Fig.13 Turn on Characteristics-Gate Resistance

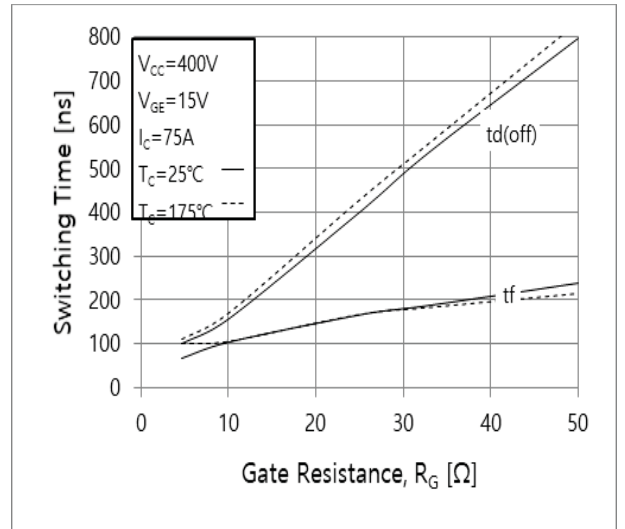


Fig.14 Turn off Characteristics-Gate Resistance

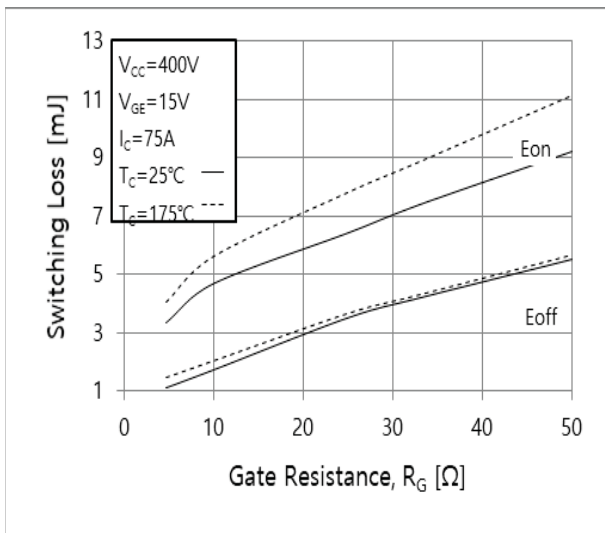


Fig.15 Switching Loss-Gate Resistance

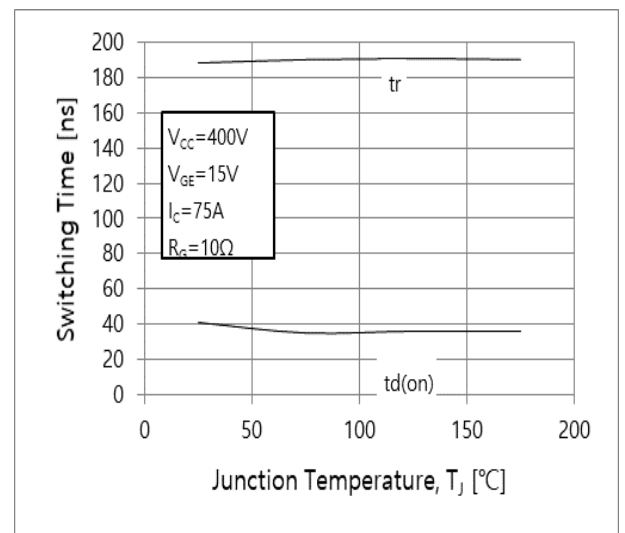


Fig.16 Turn on Characteristics-Junction Temperature

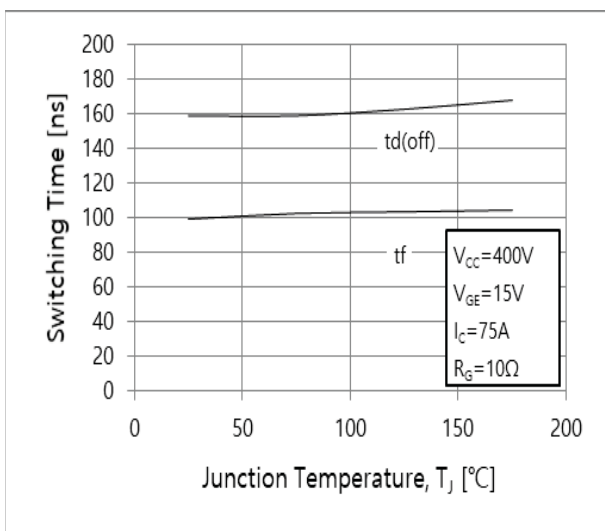


Fig.17 Turn off Characteristics-Junction Temperature

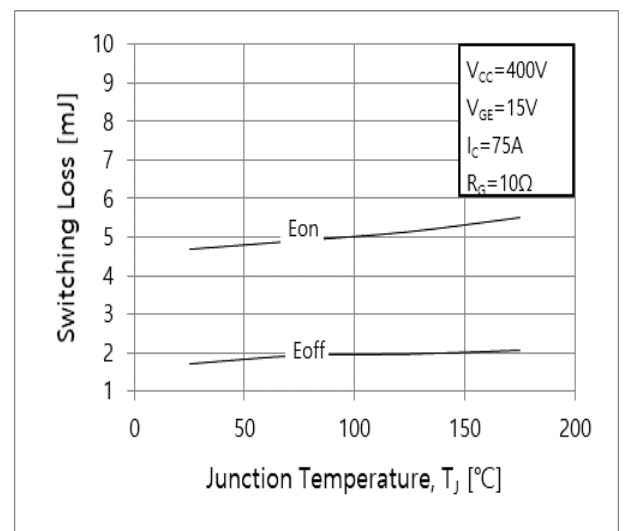


Fig.18 Switching Loss-Junction Temperature

RATING AND CHARACTERISTICS CURVES (RG100N650T7)

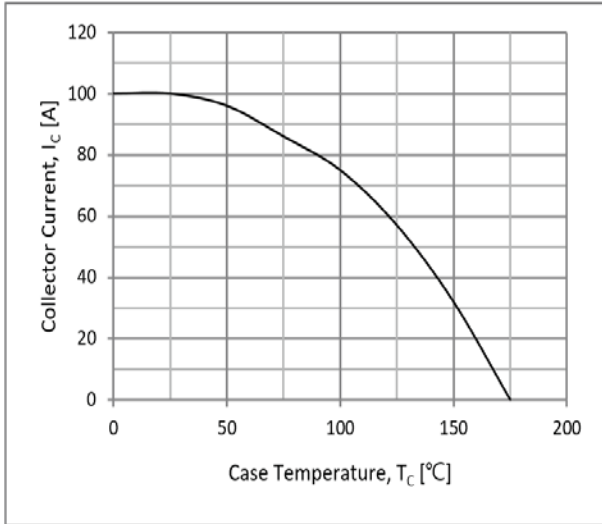


Fig.19 Case Temperature-Collector Current

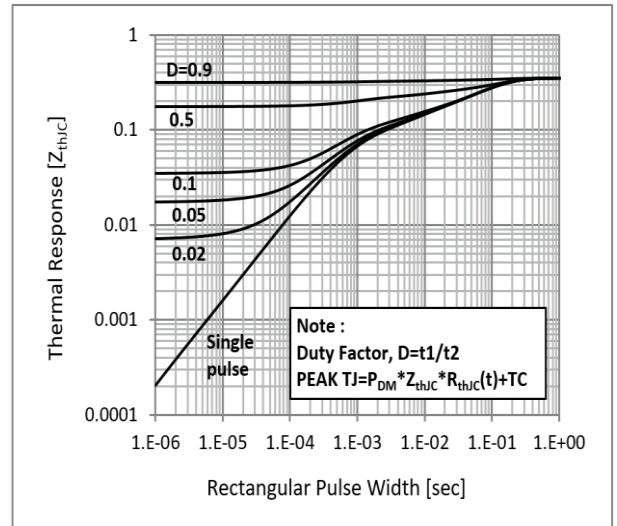


Fig.20 IGBT Transient Thermal Impedance

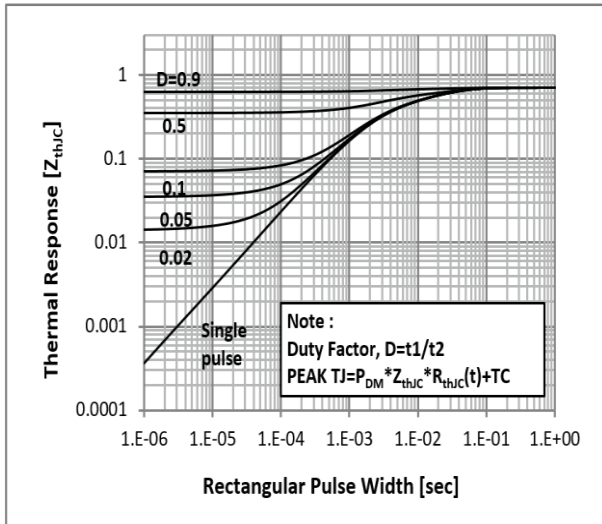
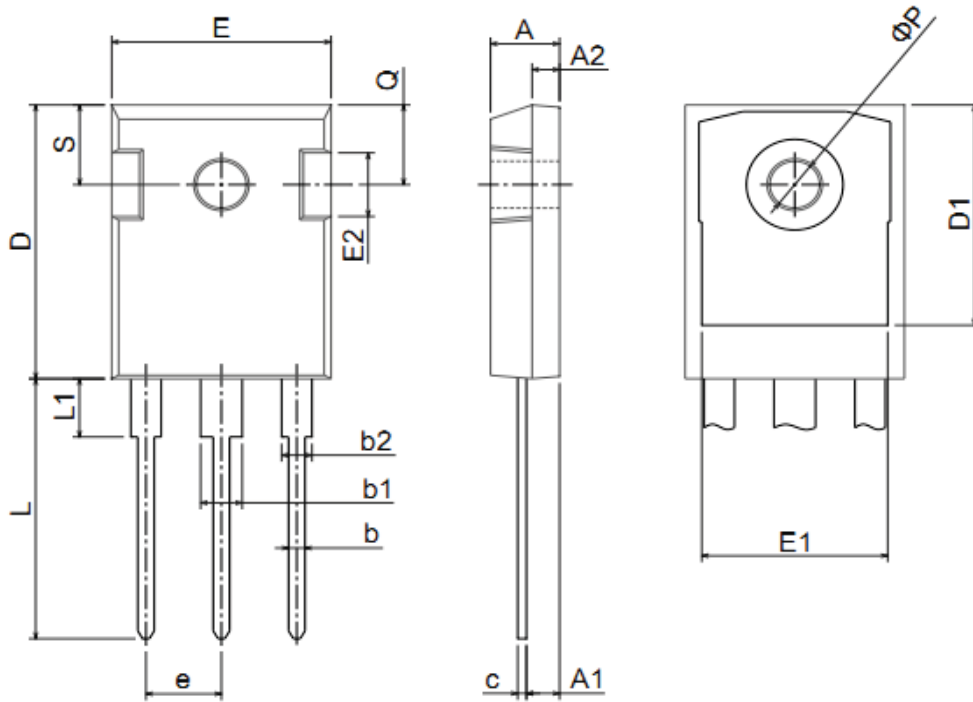


Fig.21 FRD Transient Thermal Impedance

TO-247

Dimensions are in millimeters, unless otherwise specified



Dimension	Min(mm)	Max(mm)
A	4.70	5.31
A1	2.20	2.60
A2	1.50	2.49
b	0.99	1.40
b1	2.59	3.43
b2	1.65	2.39
c	0.38	0.89
D	20.30	21.46
D1	13.08	-
E	15.45	16.26
E1	13.06	14.02
E2	4.32	5.49
e	5.45BSC	
L	19.81	20.57
L1	-	4.50
ΦP	3.50	3.70
Q	5.38	6.20
S	6.15BSC	

Note : Package body size, length and width do not include mold flash, protrusions and gate burrs.

DISCLAIMER NOTICE

Rectron Inc reserves the right to make changes without notice to any product specification herein, to make corrections, modifications, enhancements or other changes. Rectron Inc or anyone on its behalf assumes no responsibility or liability for any errors or inaccuracies. Data sheet specifications and its information contained are intended to provide a product description only. "Typical" parameters which may be included on RECTRON data sheets and/ or specifications can and do vary in different applications and actual performance may vary over time. Rectron Inc does not assume any liability arising out of the application or use of any product or circuit.

Rectron products are not designed, intended or authorized for use in medical, life-saving implant or other applications intended for life-sustaining or other related applications where a failure or malfunction of component or circuitry may directly or indirectly cause injury or threaten a life without expressed written approval of Rectron Inc. Customers using or selling Rectron components for use in such applications do so at their own risk and shall agree to fully indemnify Rectron Inc and its subsidiaries harmless against all claims, damages and expenditures.