

General Description

Using micro trench design and advanced.

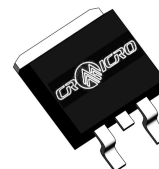
Field Stop (FS) technology, offering superior conduction and switching performances, RoHS Compliant.

V_{CE}	650	V
I_C	15	A
$P_{tot} (T_C = 25^{\circ}C)$	92	W
$V_{CE(sat)}$	1.7	V

Features

- FS Trench Technology, positive temperature coefficient
- Low saturation voltage:
 $V_{CE(sat)}$, TYP = 1.7V@ $I_C = 15A$, $V_{GE} = 15V$
- Low switching loss
- Qualified according to JEDEC criteria

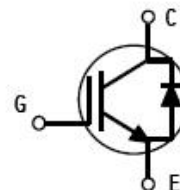
Outline: TO-263



Applications

- Motor Control

Inner circuit:



Package Parameters

Type	Marking	Package	Packing	Qty
CRG15T65A07SD	G15T65A07SD	TO-263	Reel	2500

Absolute Maximum Ratings ($T_c = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Rating	Unit
V_{CE}	Collector-Emitter Voltage	650	V
V_{GE}	Gate-Emitter Voltage	± 20	V
V_{GE}	Gate-Emitter Voltage ($t_p \leq 10\mu\text{s}, D < 0.01$)	± 30	V
I_C^{a1}	Collector Current @ $T_c = 25^\circ\text{C}$	30	A
	Collector Current @ $T_c = 100^\circ\text{C}$	15	
I_{CM}	Pulsed Collector Current, t_p limited by T_{jmax}	60	A
I_F^{a2}	Diode Continuous Forward Current @ $T_c = 25^\circ\text{C}$	30	A
	Diode Continuous Forward Current @ $T_c = 100^\circ\text{C}$	15	
I_{FM}	Diode Maximum Forward Current, t_p limited by T_{jmax}	60	A
T_{SC}	Short Circuit Withstand Time @ $V_{GE}=15V, V_{CE}=400V$	6	μs
P_D	Power Dissipation @ $T_c = 25^\circ\text{C}$	92	W
	Power Dissipation @ $T_c = 100^\circ\text{C}$	46	W
T_j^{a3}	Operating Junction temperature range	$-40 \sim 175$	$^\circ\text{C}$
T_{stg}	Storage Temperature Range	$-55 \sim 150$	$^\circ\text{C}$
T_L	Maximum Temperature for Soldering	270	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Typ	Max	Unit
$R_{th(j-c)}$	Thermal Resistance, Junction to case for IGBT	--	1.63	$^\circ\text{C}/\text{W}$
$R_{th(j-c)}$	Thermal Resistance, Junction to case for Diode	--	2.3	$^\circ\text{C}/\text{W}$
$R_{th(j-a)}$	Thermal Resistance, Junction to Ambient	--	62.5	$^\circ\text{C}/\text{W}$

Electrical Characteristics of the IGBT ($T_j = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Conditions	Value			Unit
			Min	Typ	Max	
OFF Characteristics						
V_{CE}	Collector-Emitter Breakdown Voltage	$V_{GE} = 0V, I_{CE} = 250\mu A$	650	--	--	V
I_{CES}	Collector Cut-off Current	$V_{GE} = 0V, V_{CE} = 650V$	--	--	1	mA
$I_{GES(F)}$	Gate-Emitter Forward Leakage Current	$V_{GE} = +20V$	--	--	+250	nA
$I_{GES(R)}$	Gate-Emitter Reverse Leakage Current	$V_{GE} = -20V$	--	--	-250	nA
ON Characteristics						
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 15A, V_{GE} = 15V$ $@T_j = 25^\circ C$	--	1.7	2.2	V
		$I_C = 15A, V_{GE} = 15V$ $@T_j = 175^\circ C$	--	2.0	--	V
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$I_C = 250\mu A, V_{CE} = V_{GE}$	4	5.2	7	V
Pulse width $t_p \leq 300\mu s, \delta \leq 2\%$						

Dynamic Characteristics							
C _{ies}	Input Capacitance	V _{CE} = 30V, V _{GE} = 0V, f = 1MHz	--	1005	--	pF	
C _{oes}	Output Capacitance		--	51	--		
C _{res}	Reverse Transfer Capacitance		--	6	--		
Switching Characteristics							
t _{d(on)}	Turn-on Delay Time	V _{CE} = 400V, I _C = 15A, R _G = 10 Ω, V _{GE} = 15V, Inductive Load, T _j = 25°C	--	12.2	--	ns	
t _r	Rise Time		--	9.6	--		
t _{d(off)}	Turn-Off Delay Time		--	56.3	--		
t _f	Fall Time		--	39.7	--		
E _{on} ^{a4}	Turn-On Switching Loss	V _{CE} = 400V, I _C = 15A, R _G = 10 Ω, V _{GE} = 15V, Inductive Load, T _j = 175°C	--	160	--	uJ	
E _{off}	Turn-Off Switching Loss		--	192	--		
E _{ts}	Total Switching Loss		--	352	--		
t _{d(on)}	Turn-on Delay Time		V _{CE} = 400V, I _C = 15A, R _G = 10 Ω, V _{GE} = 15V, Inductive Load, T _j = 175°C	--	12.2	--	ns
t _r	Rise Time			--	9.6	--	
t _{d(off)}	Turn-Off Delay Time			--	62.1	--	
t _f	Fall Time			--	56.3	--	
E _{on} ^{a4}	Turn-On Switching Loss	--	294	--	uJ		
E _{off}	Turn-Off Switching Loss	--	234	--			
E _{ts}	Total Switching Loss	--	528	--			
Q _g	Total Gate Charge	V _{CE} = 520V, I _C = 15A, V _{GE} = 15V	--	35.3	--	nC	
Q _{ge}	Gate to Emitter Charge		--	8.7	--		
Q _{gc}	Gate to Collector Charge		--	14.8	--		
Electrical Characteristics of the DIODE							
V _F	Diode Forward Voltage	I _F = 15A	T _j = 25°C	--	1.85	2.3	V
			T _j = 175°C	--	1.5	--	V
t _{rr}	Reverse Recovery Time	I _F =15A di/dt=200A/uS T _C =25°C	--	225	--	ns	
Q _{rr}	Reverse Recovery Charge		--	380	--	nC	
I _{rrm}	Reverse Recovery Current		--	3.38	--	A	

Notes:

- a1: The collector DC current is limited by the maximum junction temperature, limited by the bond wire current capacity at $25^\circ C$
a2: FRD DC forward current is limited by the maximum junction temperature, limited by the bond wire current capacity at $25^\circ C$
a3: Repetitive rating; pulse width limited by maximum junction temperature; Under overloading conditions, it is allowed to operate under the maximum junction temperature $T_j = 175^\circ C$, and the maximum duty cycle is less than 20% (maximum lasting 60s)
a4: Turn-on losses include diode losses

Typical Performance Characteristics

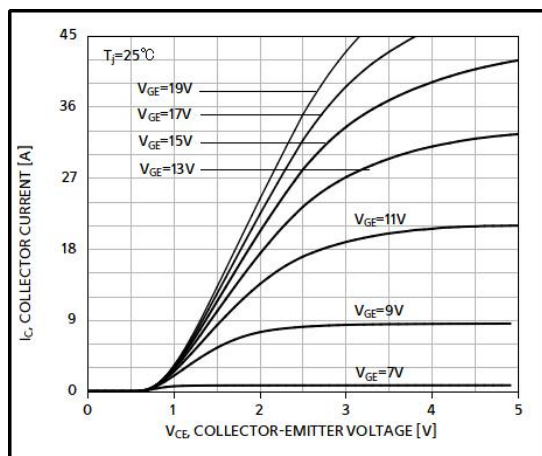


Figure 1. Output Characteristics

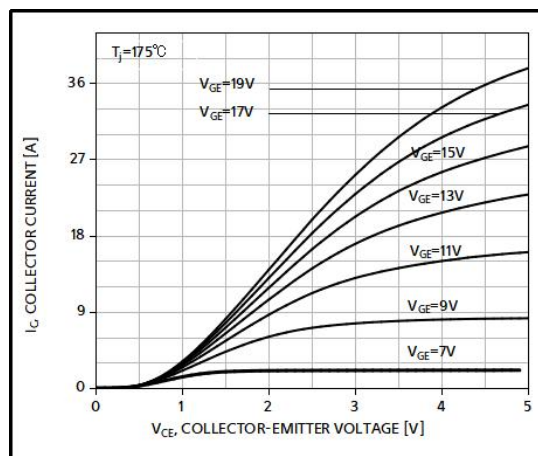


Figure 2. Output Characteristics

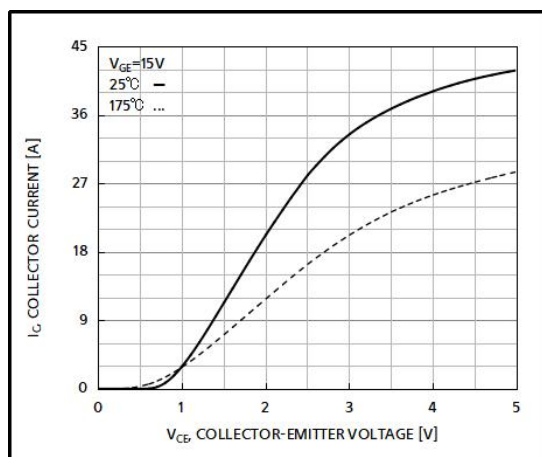


Figure 3. Saturation Voltage Characteristics

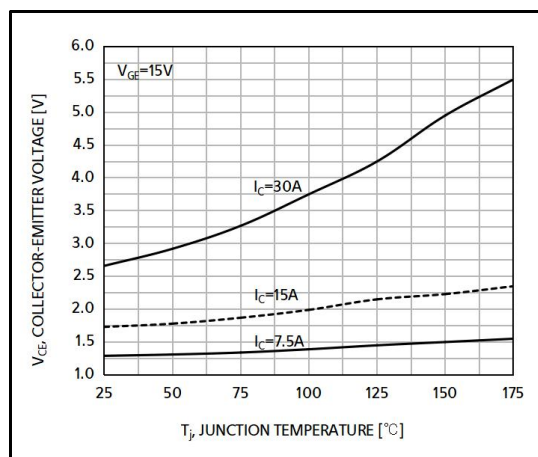


Figure 4. Saturation Voltage-T_j Characteristics

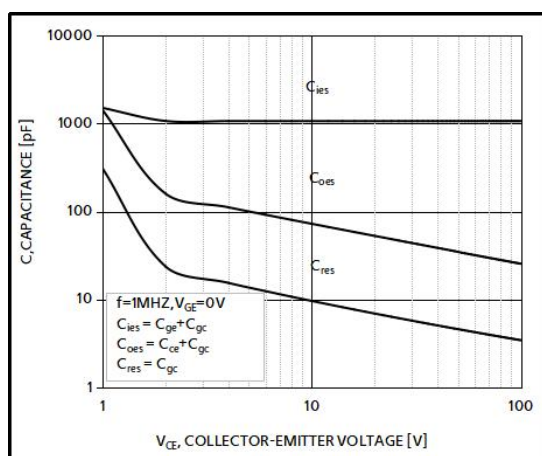


Figure 5. Capacitance Characteristics

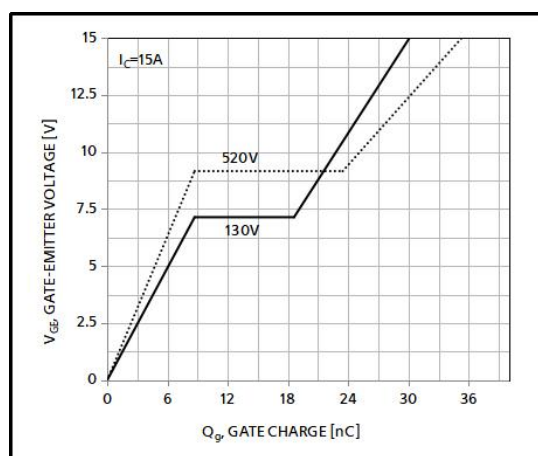
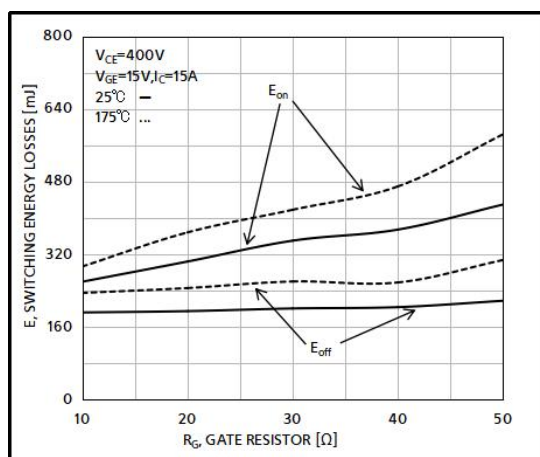
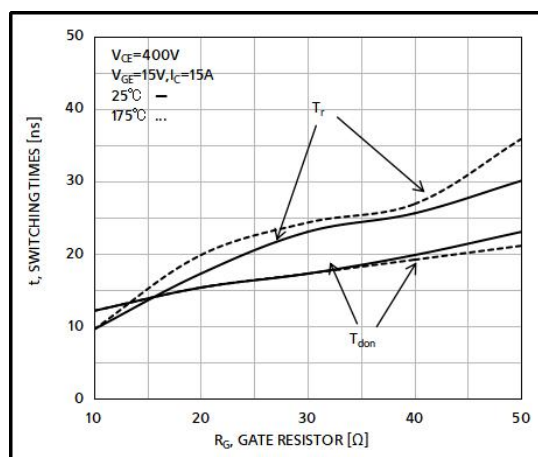
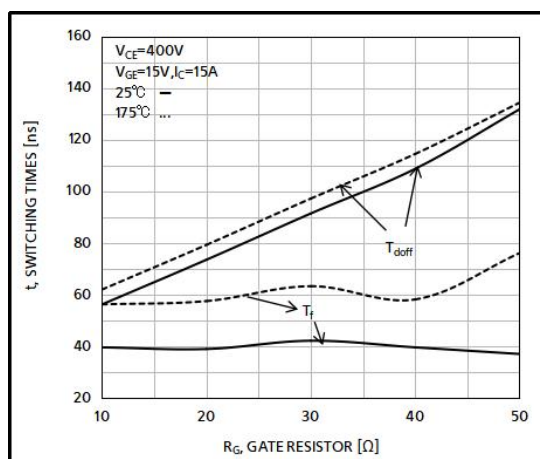
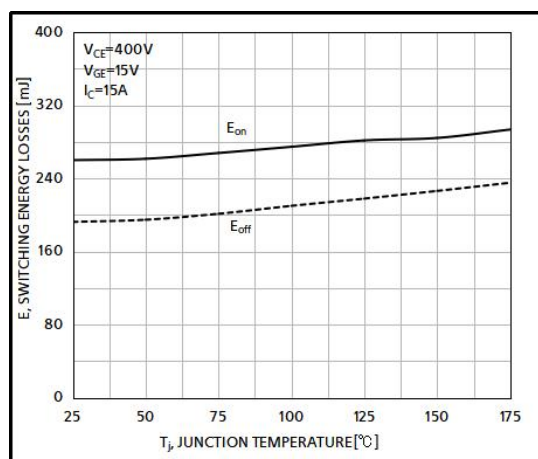
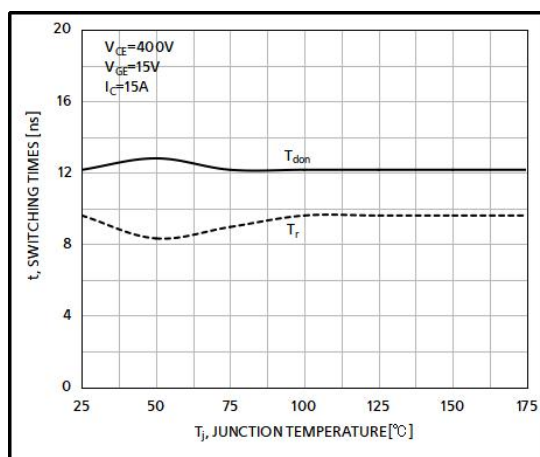
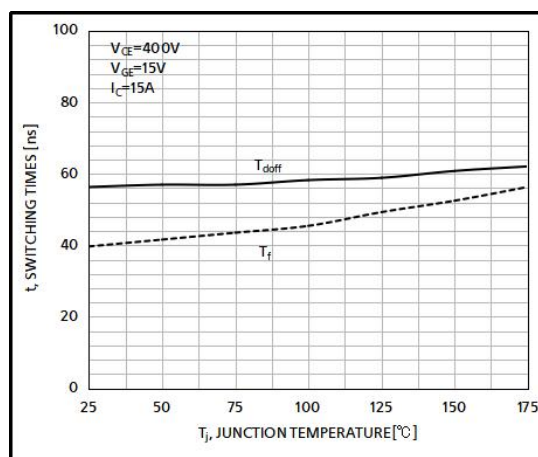
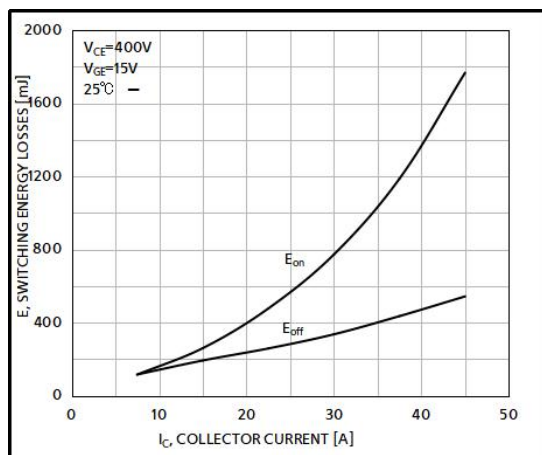
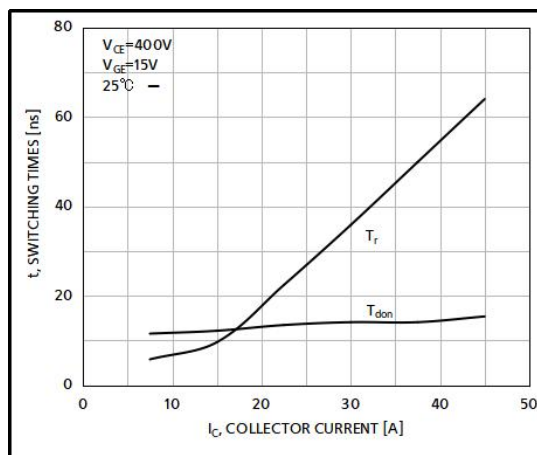
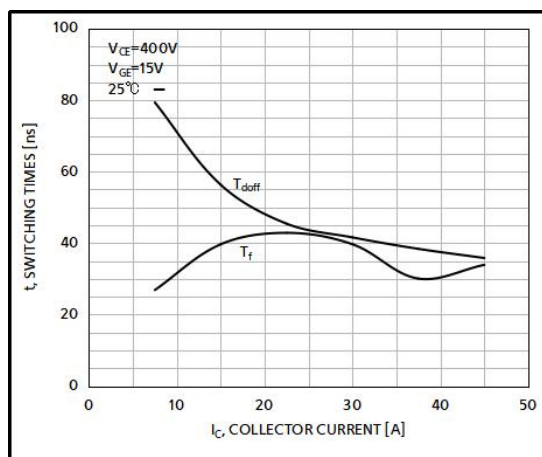
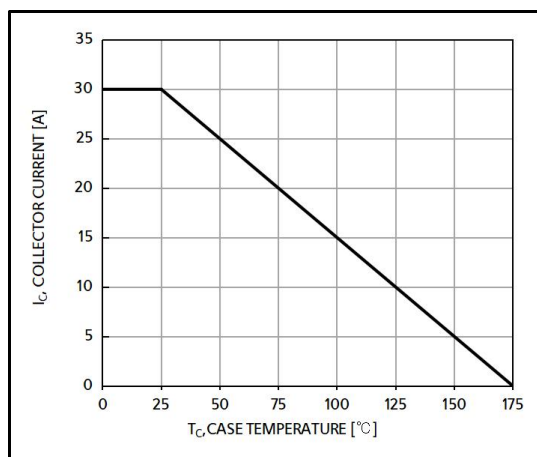
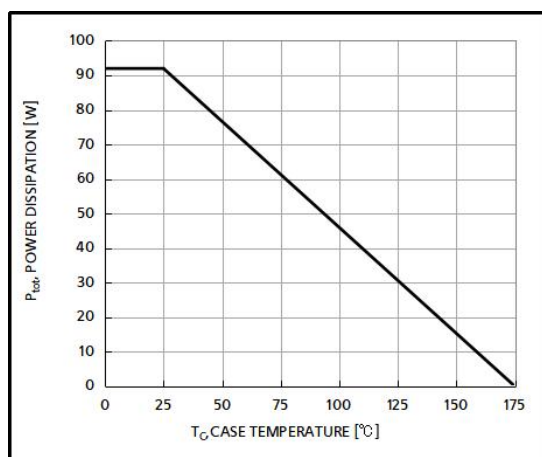
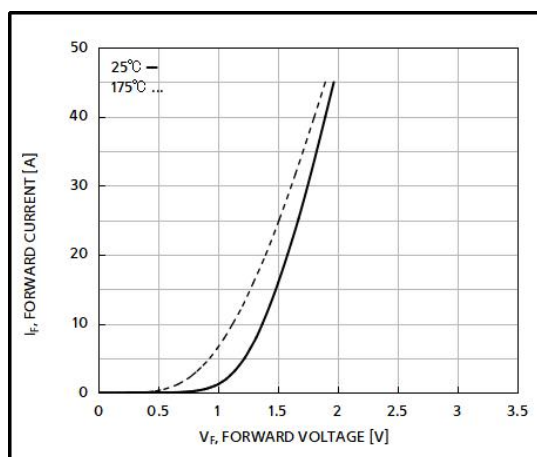


Figure 6. Gate Charge Characteristics


Figure 7. Switching Loss- R_G Characteristics

Figure 8. Switching Time- R_G Characteristics

Figure 9. Switching Time- R_G Characteristics

Figure 10. Switching Loss- T_J Characteristics

Figure 11. Switching Time- T_J Characteristics

Figure 12. Switching Time- T_J Characteristics


Figure 13. Switching Loss- I_c Characteristics

Figure 14. Switching Time- I_c Characteristics

Figure 15. Switching Time- I_c Characteristics

**Figure 16. Collector Current- T_c Characteristics
($T_j \leq 175^\circ C$)**

**Figure 17. Power Dissipation- T_c Characteristics
($T_j \leq 175^\circ C$)**

Figure 18. Diode Forward Characteristics

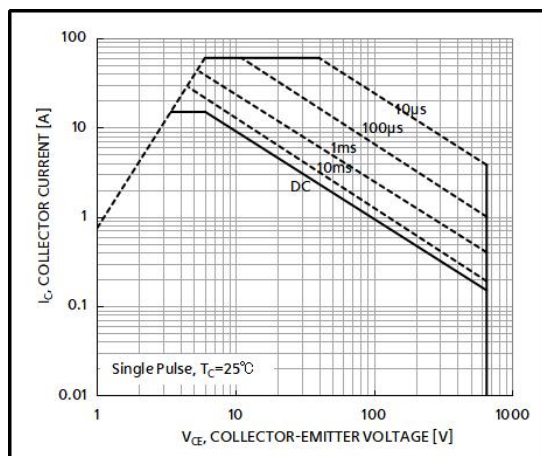


Figure 25. Forward Bias Safe Operating Area

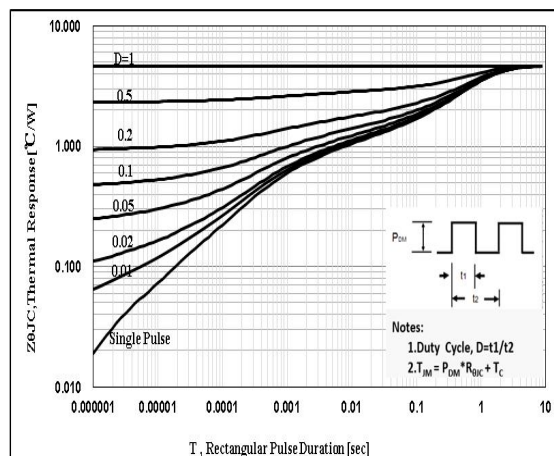
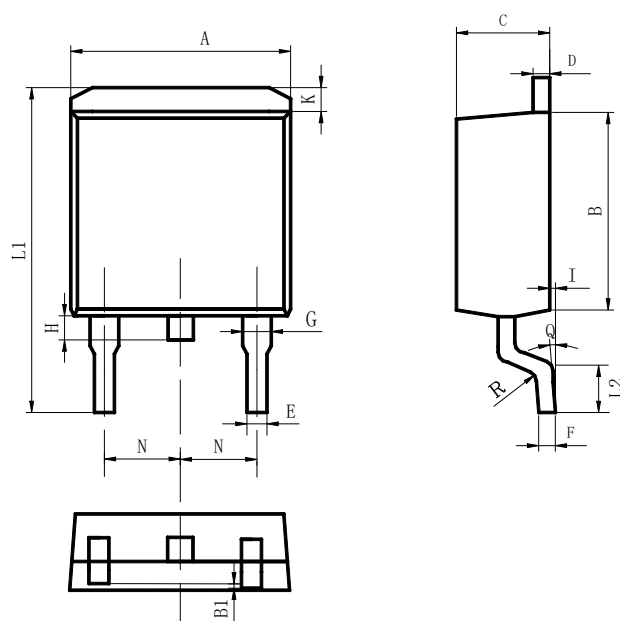


Figure 26 IGBT Transient Thermal Impedance

Package Information



Items	Values(mm)	
	MIN	MAX
A	9.80	10.40
B	8.90	9.50
B1	0	0.10
C	4.40	4.80
D	1.16	1.37
E	0.70	0.95
F	0.30	0.60
G	1.07	1.47
H	1.30	1.80
K	0.97	1.37
L1	14.50	16.50
L2	1.60	2.30
I	0	0.2
Q	0°	8°
R	0.4	
N	2.39	2.69

TO-263 Package

Warnings

1. Exceeding the maximum ratings of the device in performance may cause damage to the device, even the permanent failure, which may affect the dependability of the machine. It is suggested to be used under 80 percent of the maximum ratings of the device.
2. When installing the heat sink, please pay attention to the torsional moment and the smoothness of the heat sink.
3. IGBTs is the device which is sensitive to the static electricity, it is necessary to protect the device from being damaged by the static electricity when using it.
4. This publication is made by Huajing Microelectronics and subject to regular change without notice.

WUXI CHINA RESOURCES HUAJING MICROELECTRONICS CO., LTD.

Add: No.14 Liangxi RD. Wuxi, Jiangsu, China Mail: 214061 Tel: 0510-85807228
Fax: 0510-85800864

Marketing Part: Post: 214061 Tel / Fax: 0510-85807228-3663/5508
0510-85800360 (Fax)

Application and Service: Post: 214061 Tel / Fax: 0510-85807228-3399 / 2227

Revision History		
Revision	Date	Major changes
1.0	2026/5/19	Initial release