



CRG25T120BK3S

General Description:

Using HUAJING's proprietary trench design and advanced Field Stop (FS) technology, offering superior conduction and switching performances. RoHS Compliant.

V _{CES}	1200	V
I _C	25	A
P _{tot} (T _C =25°C)	278	W
V _{CE(sat)}	2.0	V

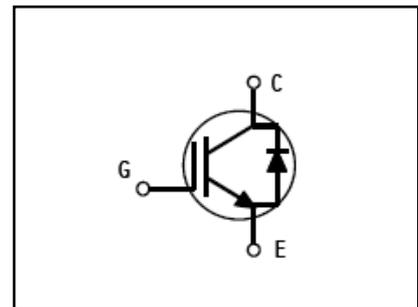
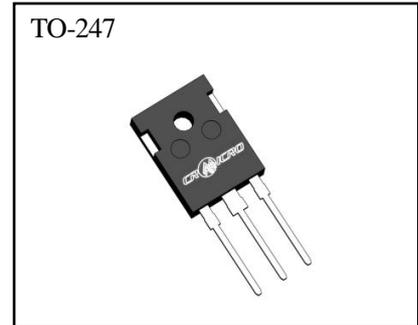
Features:

- FS Trench Technology, Positive temperature coefficient
- Low saturation voltage:

$V_{CE(sat),TYP}=2.0V @ I_C=25A, V_{GE}=15V;$

Applications

- Welding
- Solar Inverter
- UPS



Package Parameters

Type	Marking	Package	Packing
CRG25T120BK3S	G25T120BK3S	TO-247	Tube

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

Symbol	Parameter	Rating	Units
V_{CES}	Collector-Emitter Voltage	1200	V
V_{GES}	Gate- Emitter Voltage	± 20	V
I_C	Collector Current @ $T_C = 25^\circ\text{C}$	50	A
	Collector Current @ $T_C = 100^\circ\text{C}$	25	
I_{CM}^{a1}	Pulsed Collector Current @ $T_C = 25^\circ\text{C}$	75	A
I_F	Diode Continuous Forward Current @ $T_C = 100^\circ\text{C}$	20	A
I_{FM}	Diode Maximum Forward Current	60	A
P_D	Power Dissipation @ $T_C = 25^\circ\text{C}$	278	W
	Power Dissipation @ $T_C = 25^\circ\text{C}$	111	W
T_J	Operating Junction	$-40 \sim 150$	$^\circ\text{C}$
T_{stg}	Storage Temperature Range	$-55 \sim 150$	$^\circ\text{C}$
T_L	Wave Soldering Temperature for 10 sec	260 ± 5	$^\circ\text{C}$

a1: Repetitive rating; pulse width limited by maximum junction temperature

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Thermal Resistance, Junction to case for IGBT		0.45	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance, Junction to case for FRD		1.14	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient		51.5	$^\circ\text{C}/\text{W}$

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

Symbol	Parameter	Test Conditions	SPEC			Units
			Min.	Typ.	Max.	
OFF Characteristics						
$V_{(BR)CES}$	Collector-Emitter Breakdown Voltage	$V_{GE}=0V, I_{CE}=1mA$	1200	--	--	V
I_{CES}	Collector-Emitter Leakage Current	$V_{GE}=0V, V_{CE}=1200V$	--	--	3.0	mA
$I_{GES(F)}$	Gate to Emitter Forward Leakage	$V_{GE}=+20V$	--	--	+250	nA
$I_{GES(R)}$	Gate to Source Reverse Leakage	$V_{GE}=-20V$	--	--	-250	nA
ON Characteristics						
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=25A, V_{GE}=15V$	--	2.0	2.5	V
$V_{GE(th)}$	Gate Threshold Voltage	$I_C=250\mu A, V_{CE}=V_{GE}$	4.5	5.8	7	V
Pulse width $t_p \leq 300\mu s, \delta \leq 2\%$						
Dynamic Characteristics						
C_{ies}	Input Capacitance	$V_{CE}=30V, V_{GE}=0V$ $f=1MHz$	--	1914	--	pF
C_{oes}	Output Capacitance		--	77	--	
C_{tes}	Reverse Transfer Capacitance		--	40	--	

Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	$V_{CE}=600V, I_C=25A,$ $R_g=10\Omega, V_{GE}=15V,$ Inductive Load, $T_J=25^\circ C,$	--	48	--	ns
t_r	Rise Time		--	50	--	
$t_{d(off)}$	Turn-Off Delay Time		--	200	--	
t_f	Fall Time		--	35	--	
E_{on}	Turn-On Switching Loss		--	2.7	--	mJ
E_{off}	Turn-Off Switching Loss		--	0.8	--	
E_{ts}	Total Switching Loss		--	3.5	--	
$t_{d(on)}$	Turn-on Delay Time	$V_{CE}=600V, I_C=25A,$ $R_g=10\Omega, V_{GE}=15V,$ Inductive Load, $T_J=150^\circ C$	--	46	--	ns
t_r	Rise Time		--	53	--	
$t_{d(off)}$	Turn-Off Delay Time		--	233	--	
t_f	Fall Time		--	74	--	
E_{on}	Turn-On Switching Loss		--	2.72	--	mJ
E_{off}	Turn-Off Switching Loss		--	1.05	--	
E_{ts}	Total Switching Loss		--	3.77	--	
Q_g	Total Gate Charge	$V_{CE}=600V, I_C=25A,$ $V_{GE}=15V,$	--	141.2	--	nC
Q_{ge}	Gate to Emitter Charge		--	22.2	--	
Q_{gc}	Gate to Collector Charge		--	77.6	--	
Electrical Characteristics of the DIODE ($T_C=25^\circ C$ unless otherwise specified):						
V_F	Diode Forward Voltage	$I_F=20A$	--	1.8	--	V
t_{rr}	Reverse Recovery Time	$I_F=20A$ $di/dt=100A/\mu S$	--	80	--	ns
I_{rrm}	Reverse Recovery Current		--	5.4	--	A
Q_{rr}	Reverse Recovery Charge		--	150	--	nC

Typical Performance Characteristics

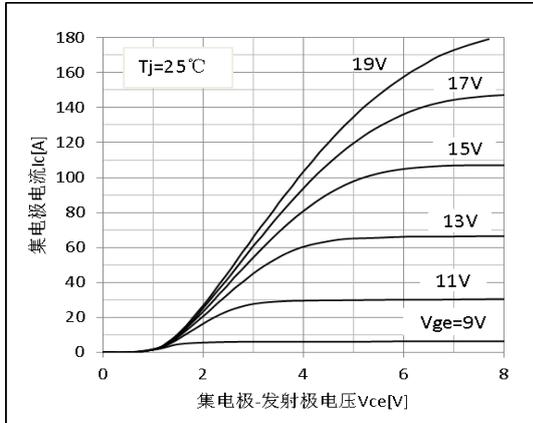


Figure 1. Output Characteristics

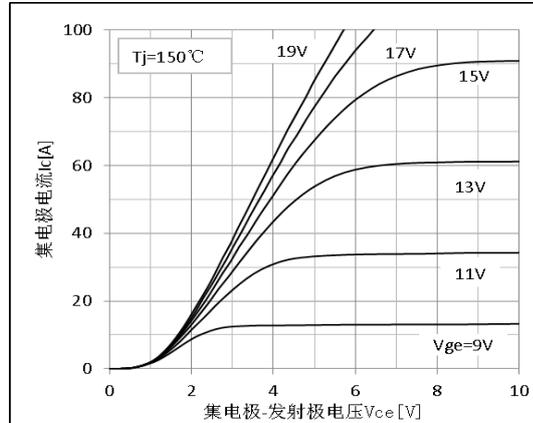


Figure 2. Output Characteristics

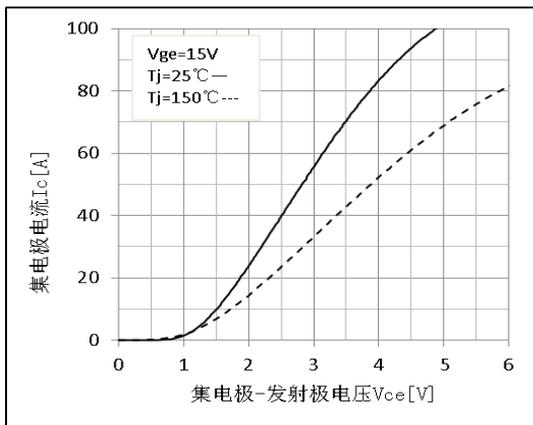


Figure 3. Saturation Voltage Characteristics

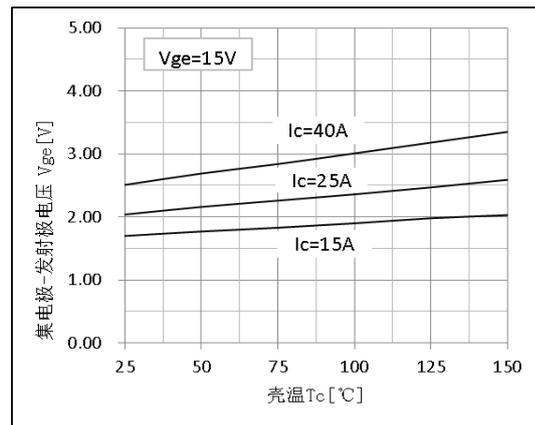


Figure 4. Saturation Voltage - T_c Characteristics

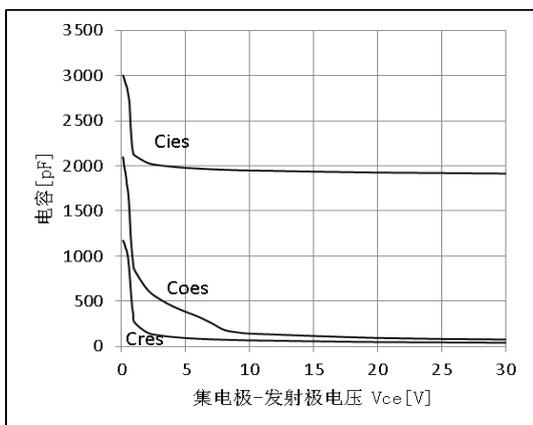


Figure 5. Capacitance Characteristics

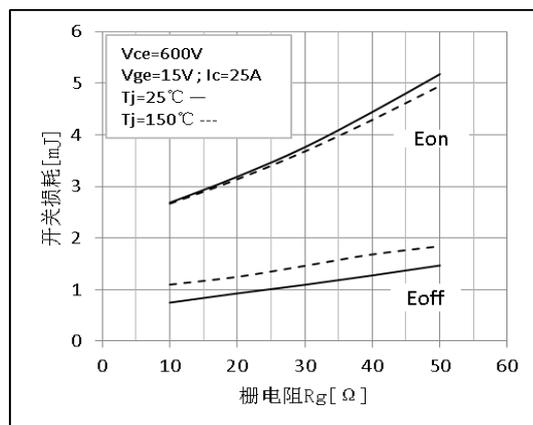


Figure 6. Switching Loss- R_g Characteristics

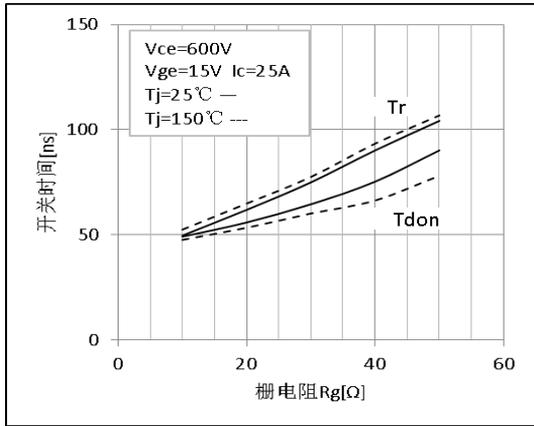


Figure 7.Switching Time-R_g Characteristics

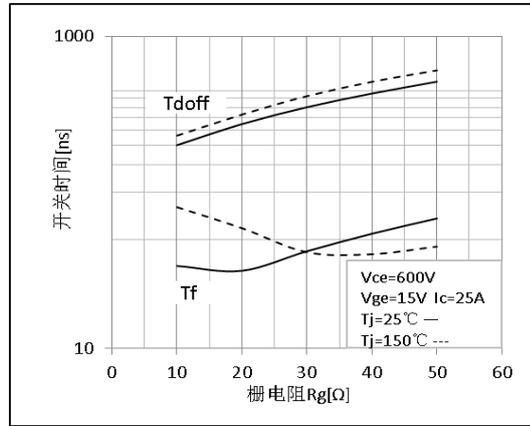


Figure 8.Switching Time-R_g Characteristics

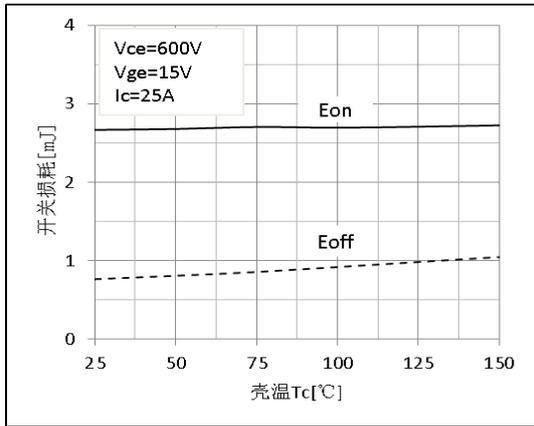


Figure 9.Switching Loss-T_c Characteristics

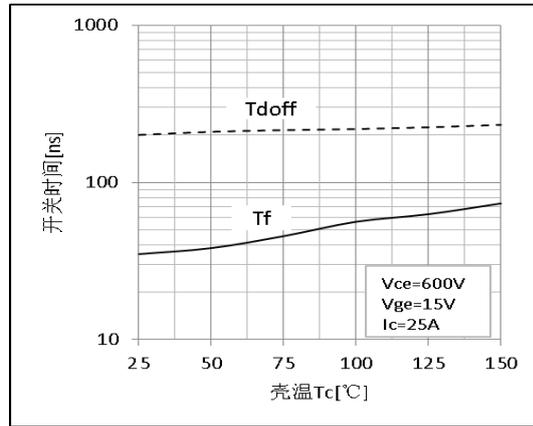


Figure 10. Turn-Off Time-T_c Characteristics

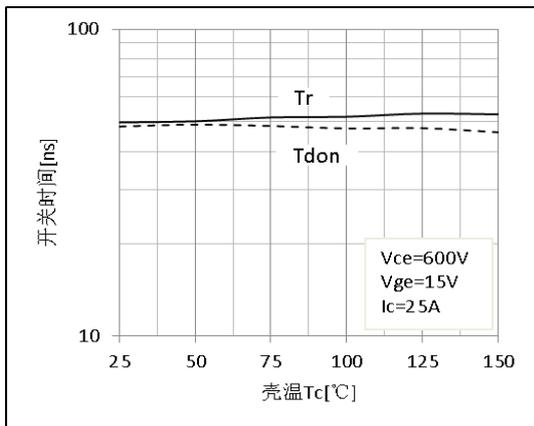


Figure 11. Turn-On Time-T_c Characteristics

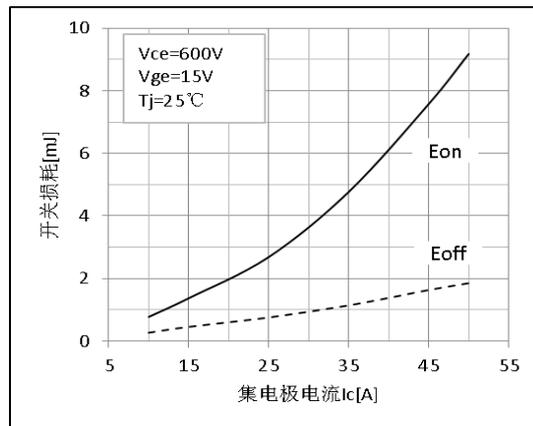


Figure 12.Switching Loss-I_c Characteristics

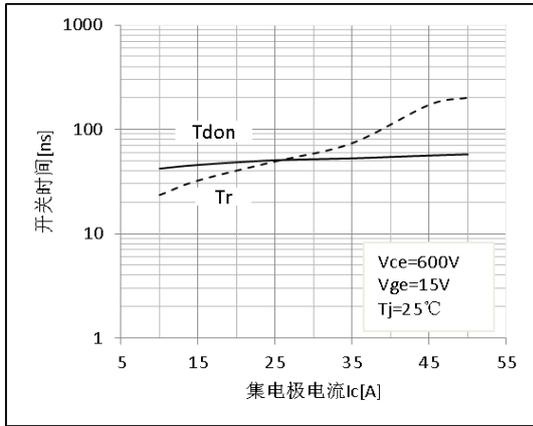


Figure 13. Turn-On Time-Ic Characteristics

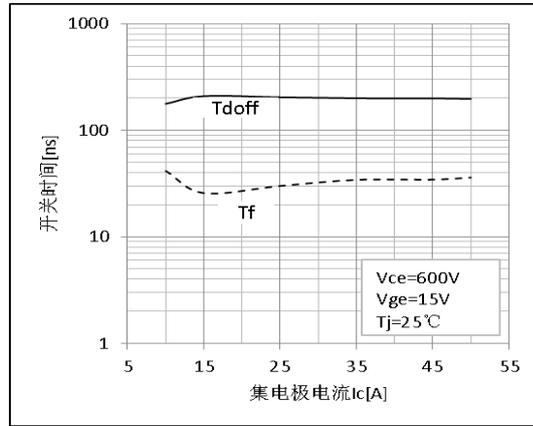


Figure 14. Turn-Off Time-Ic Characteristics

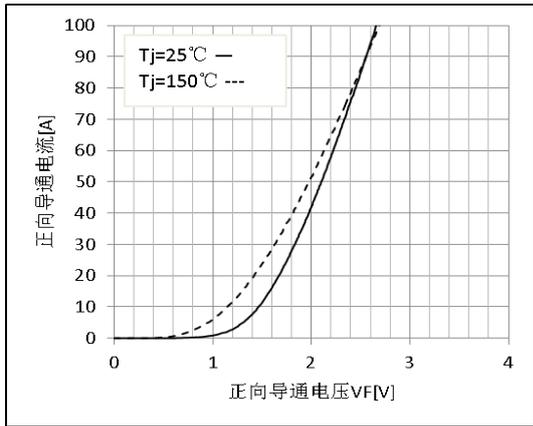


Figure 15. Diode Forward Characteristics

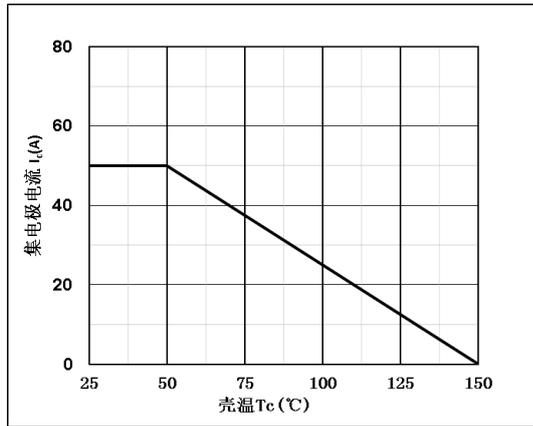


Figure 16. Collector Current-Tc Characteristics

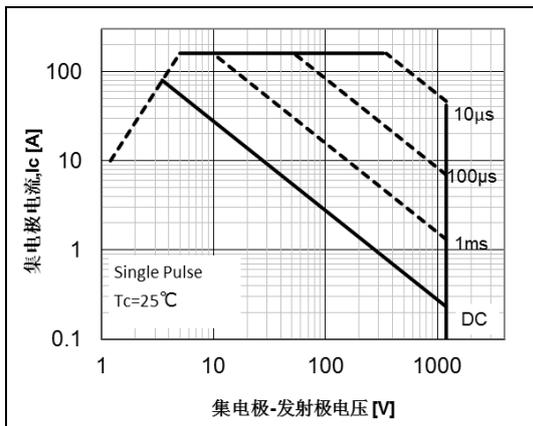


Figure 17. Forward Bias Safe Operating Area

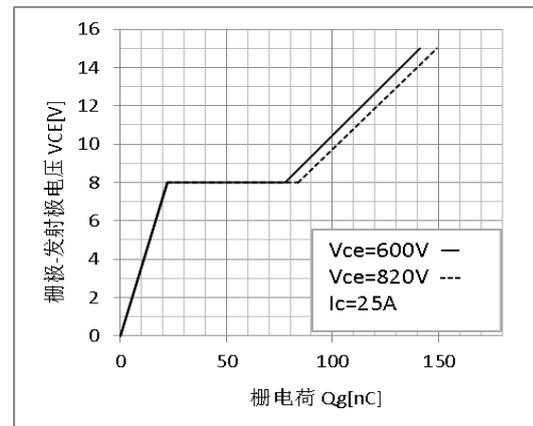


Figure 18. Gage Charge Characteristics

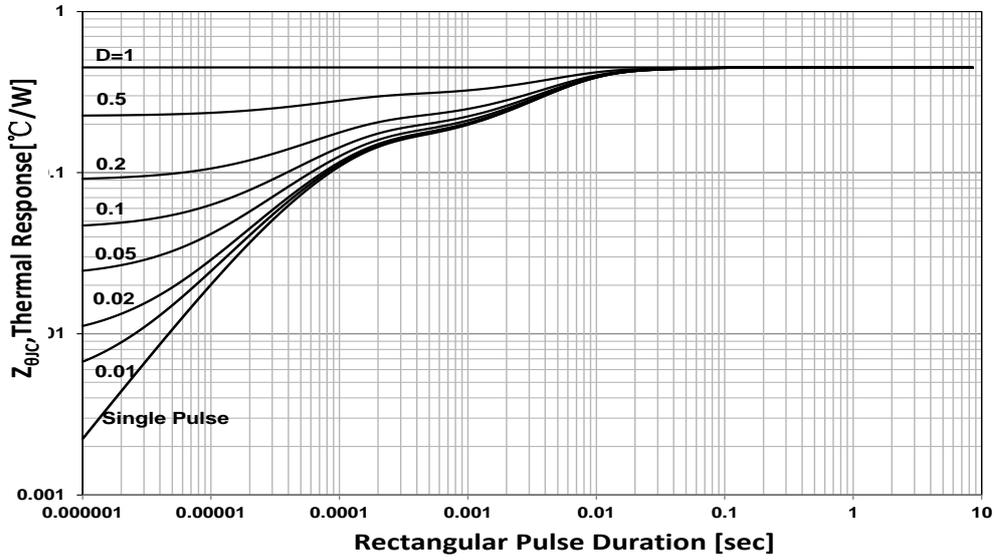
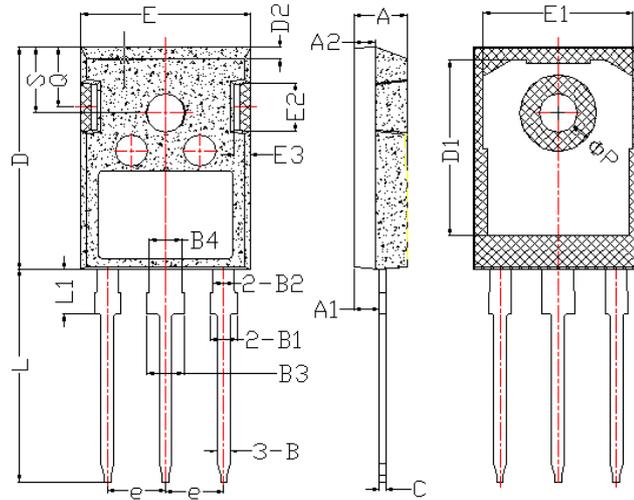


Figure 19.IGBT Transient Thermal Impedance

Package Information


Items	Values (mm)	
	MIN	MAX
A	4.6	5.2
A1	2,2	2.6
B	0.9	1.4
B1	1.75	2.35
B2	1.75	2.15
B3	2.8	3.35
B4	2.8	3.15
C	0.5	0.7
D	20.60	21.30
D1	16	18
E	15.5	16.10
E1	13	14.7
E2	3.80	5.3
E3	0.8	2.60
e	5.2	5.7
L	19	20.5
L1	3.9	4.6
ΦP	3.3	3.70
Q	5.2	6.00
S	5.8	6.6

TO-247 Package

