



CRG15T120BK3SD

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	15	A
P _{tot} (T _C =25°C)	236	W
V _{CE(sat)}	2.0	V

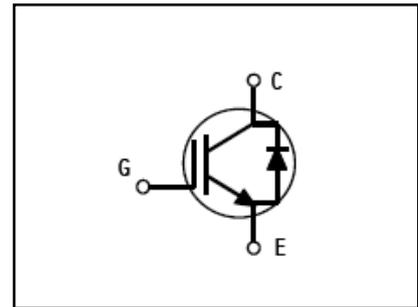
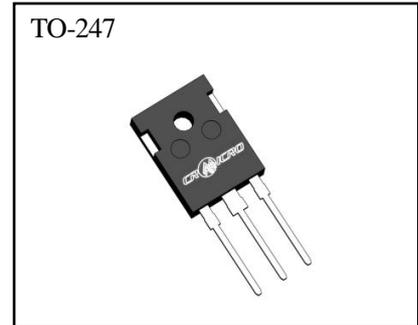
Features:

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

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

Applications

- Frequency Converter
- Solar Inverter
- UPS



Package Parameters

Type	Marking	Package	Packing
CRG15T120BK3SD	G15T120BK3SD	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 @ $T_C = 25^\circ\text{C}$	30	A
	Collector Current @ $T_C = 100^\circ\text{C}$	15	
I_{CM}^{al}	Pulsed Collector Current @ $T_C = 25^\circ\text{C}$	45	A
I_F	Diode Continuous Forward Current @ $T_C = 100^\circ\text{C}$	15	A
I_{FM}	Diode Maximum Forward Current	45	A
P_D	Power Dissipation @ $T_C = 25^\circ\text{C}$	236	W
T_J	Operating Junction	150	$^\circ\text{C}$
T_{stg}	Storage Temperature Range	$-55 \sim 150$	$^\circ\text{C}$
T_L	Maximum Temperature for Soldering	270	$^\circ\text{C}$

al: 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		0.53	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient for IGBT		27.1	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance, Junction to case for FRD		0.69	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient for FRD		35.5	

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	$V_{GE}=0V, I_{CE}=250\mu\text{A}$	1200	--	--	V
I_{CES}	Collector-Emitter Leakage Current	$V_{GE}=0V, V_{CE}=1200V$	--	--	1.0	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	$I_C=15A, V_{GE}=15V$	--	2.0	2.5	V
$V_{GE(th)}$	Gate Threshold Voltage	$I_C=250\mu\text{A}, V_{CE}=V_{GE}$	4.0	5.8	7.5	V
Pulse width $t_p \leq 300\mu\text{s}, \delta \leq 2\%$						
Dynamic Characteristics						
C_{ies}	Input Capacitance	$V_{CE}=25V, V_{GE}=0V$ $f=1\text{MHz}$	--	1207	--	pF
C_{oes}	Output Capacitance		--	58	--	
C_{res}	Reverse Transfer Capacitance		--	26	--	
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	$V_{CE}=600V, I_C=15A,$ $R_g=10\Omega, V_{GE}=15V,$	--	35	--	ns
t_r	Rise Time		--	30	--	

$t_{d(off)}$	Turn-Off Delay Time	Inductive Load, $T_J=25^{\circ}C$,	--	100	--	mJ
t_f	Fall Time		--	67	--	
E_{on}	Turn-On Switching Loss		--	1.03	--	
E_{off}	Turn-Off Switching Loss		--	0.30	--	
E_{ts}	Total Switching Loss		--	1.33	--	
$t_{d(on)}$	Turn-on Delay Time	$V_{CE}=600V, I_C=15A,$ $R_g=10\Omega, V_{GE}=15V,$ Inductive Load, $T_J=150^{\circ}C$	--	33	--	ns
t_r	Rise Time		--	33	--	
$t_{d(off)}$	Turn-Off Delay Time		--	108	--	
t_f	Fall Time		--	103	--	mJ
E_{on}	Turn-On Switching Loss		--	1.05	--	
E_{off}	Turn-Off Switching Loss		--	0.49	--	
E_{ts}	Total Switching Loss		--	1.54	--	
Q_g	Total Gate Charge	$V_{CE}=600V, I_C=15A,$ $V_{GE}=15V,$	--	75	--	nC
Q_{ge}	Gate to Emitter Charge		--	11	--	
Q_{gc}	Gate to Collector Charge		--	44	--	
Electrical Characteristics of the DIODE ($T_C=25^{\circ}C$ unless otherwise specified):						
V_F	Diode Forward Voltage	$I_F=15A$	--	2.1	3.2	V
t_{rr}	Reverse Recovery Time	$I_F=15A$ $di/dt=200A/uS$	--	50	--	ns
I_{rrm}	Reverse Recovery Current		--	5	--	A
Q_{rr}	Reverse Recovery Charge		--	139	--	nC

Typical Performance Characteristics

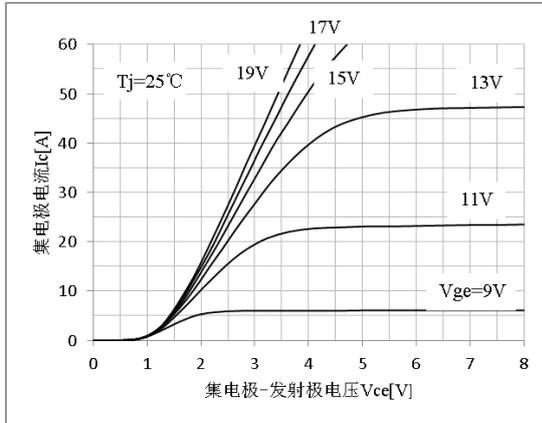


Figure 1. Output Characteristics

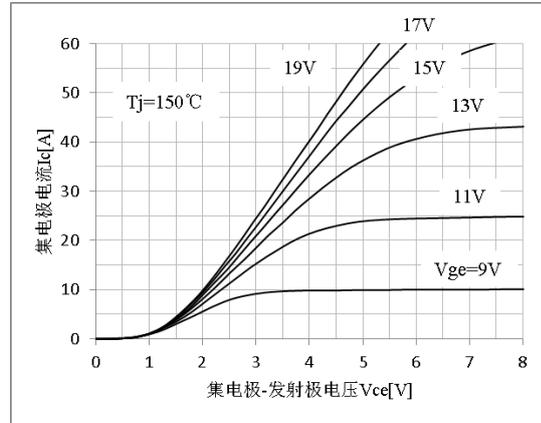


Figure 2. Output Characteristics

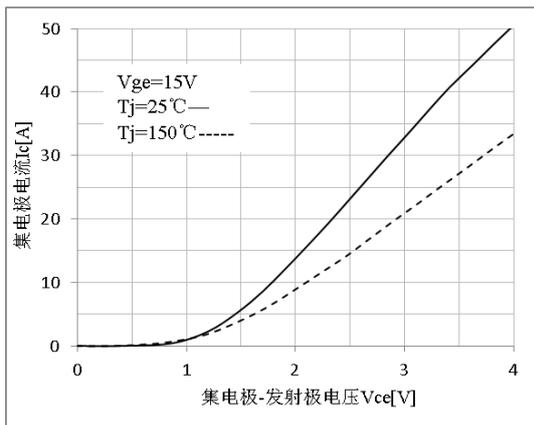


Figure 3. Saturation Voltage Characteristics

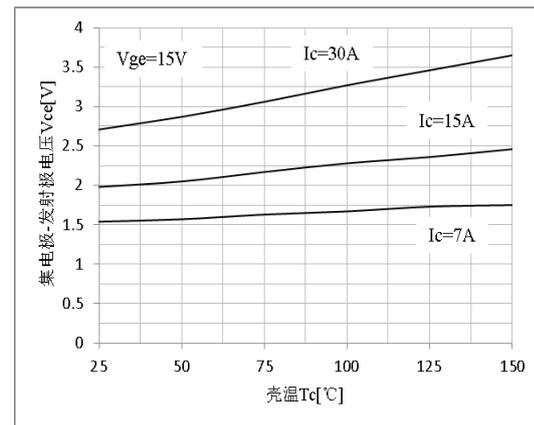


Figure 4. Saturation Voltage -T_c Characteristics

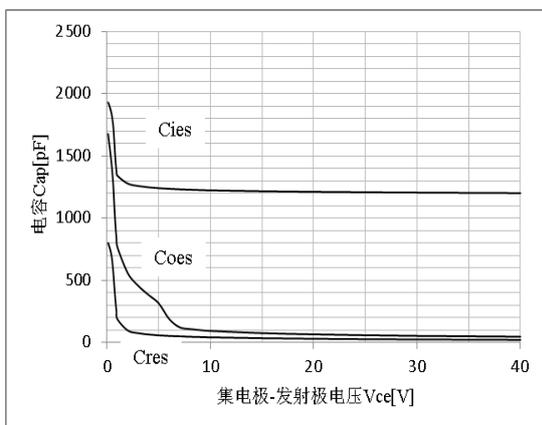


Figure 5. Capacitance Characteristics

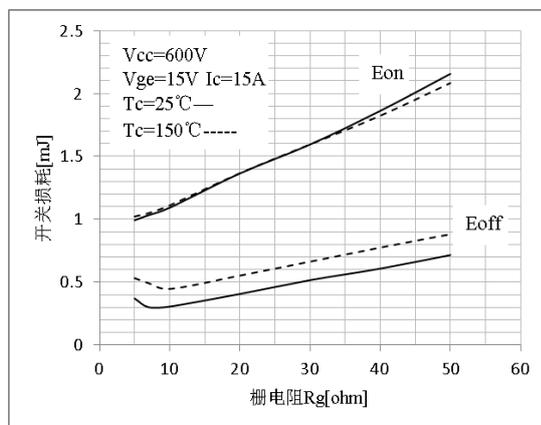


Figure 6. Switching Loss-R_g Characteristics

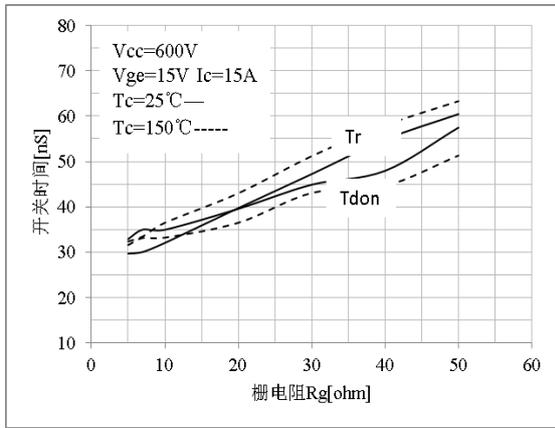


Figure 7.Switching Time- R_g Characteristics

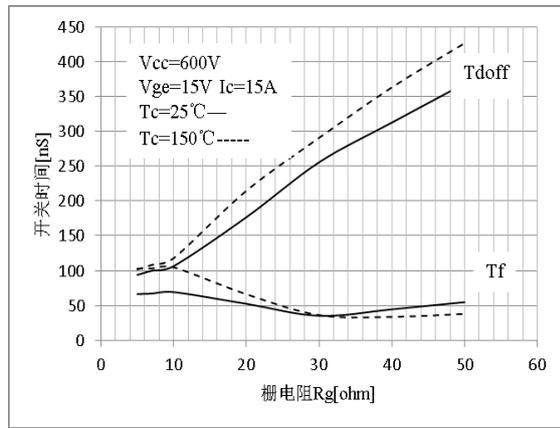


Figure 8.Switching Time- R_g Characteristics

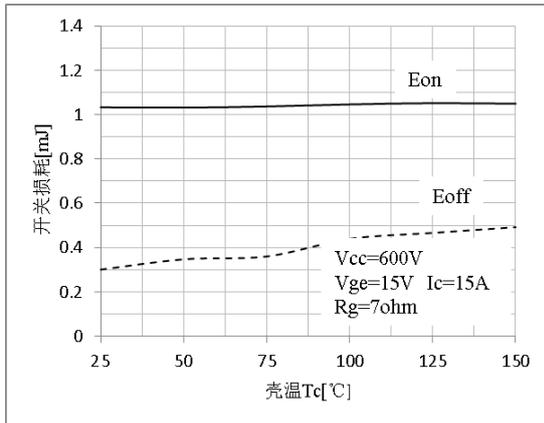


Figure 9.Switching Loss- T_c Characteristics

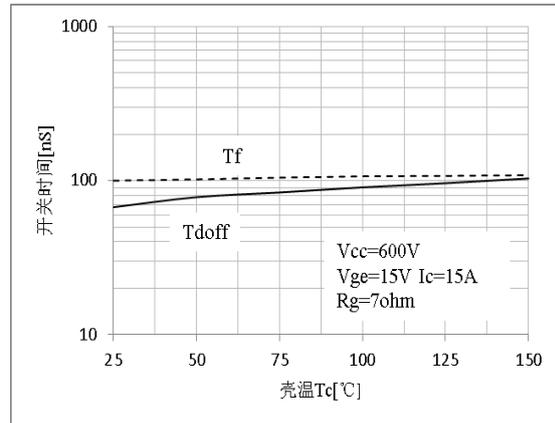


Figure 10. Turn-Off Time- T_c Characteristics

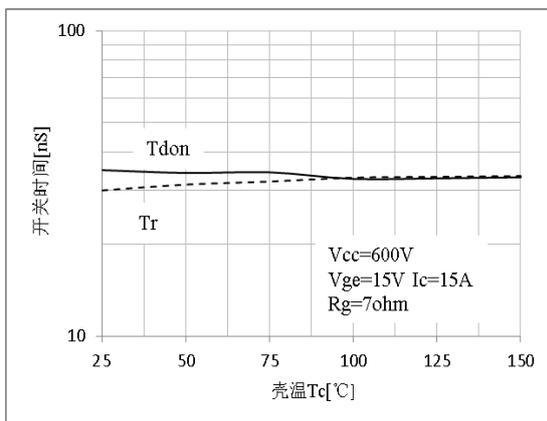


Figure 11. Turn-On Time- T_c Characteristics

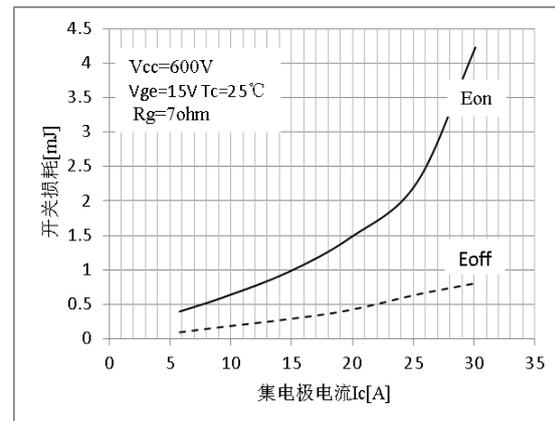


Figure 12.Switching Loss- I_c Characteristics

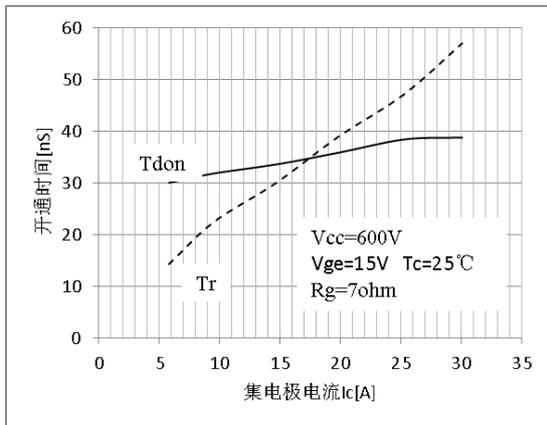


Figure 13. Turn-On Time-Ic Characteristics

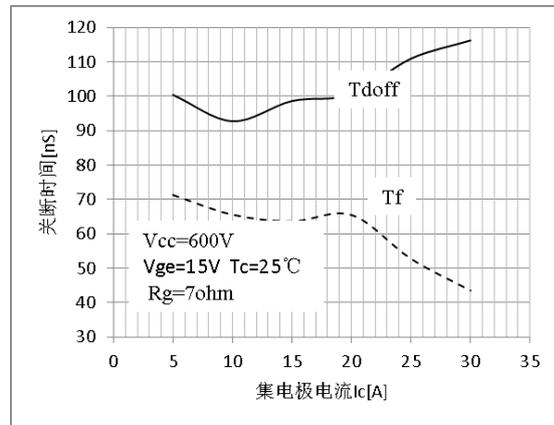


Figure 14. Turn-Off Time-Ic Characteristics

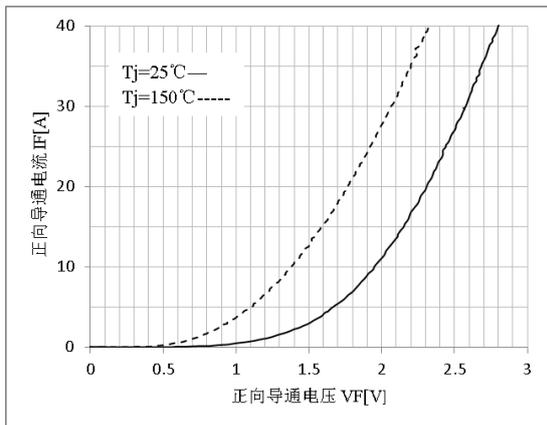


Figure 15. Diode Forward Characteristics

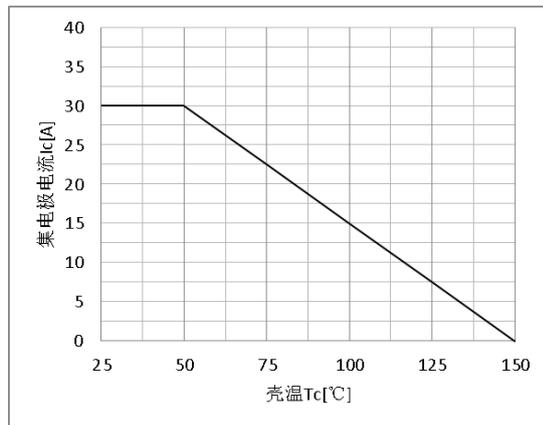


Figure 16. Collector Current-Tc Characteristics

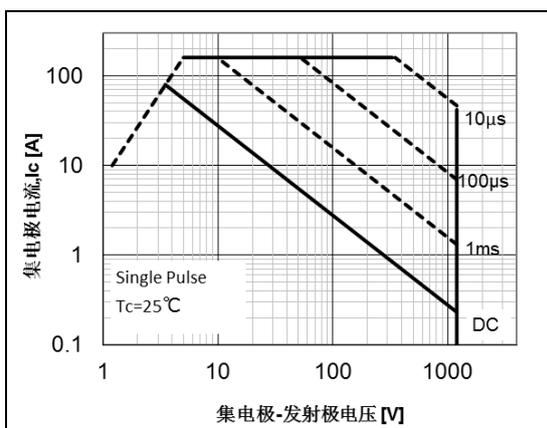


Figure 17. Forward Bias Safe Operating Area

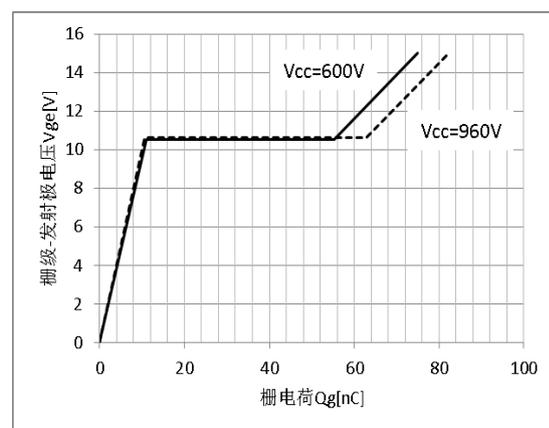


Figure 18. Gate Charge Characteristics

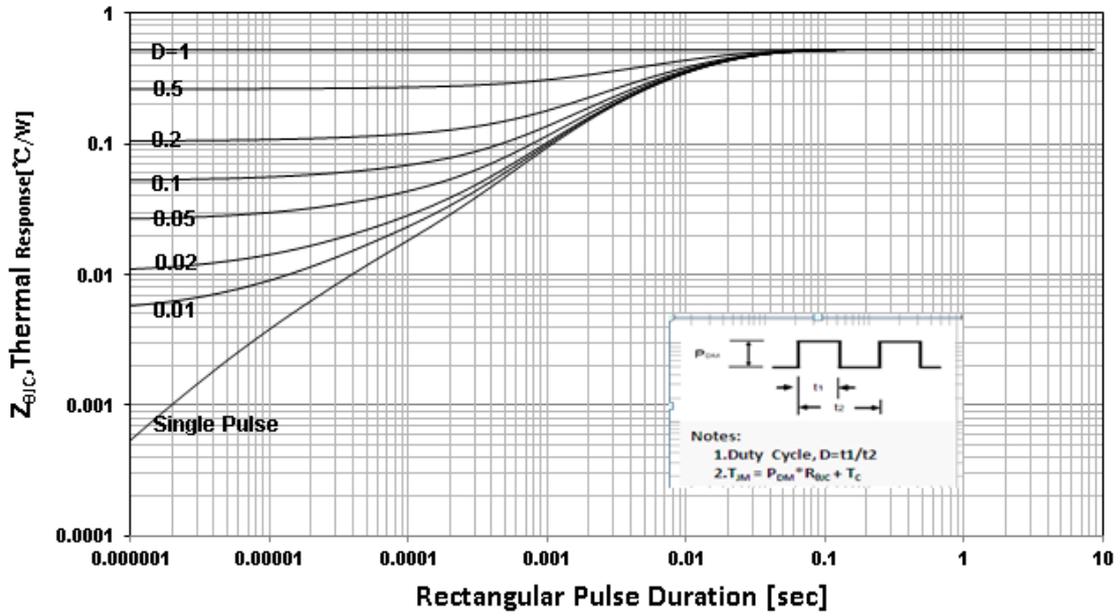
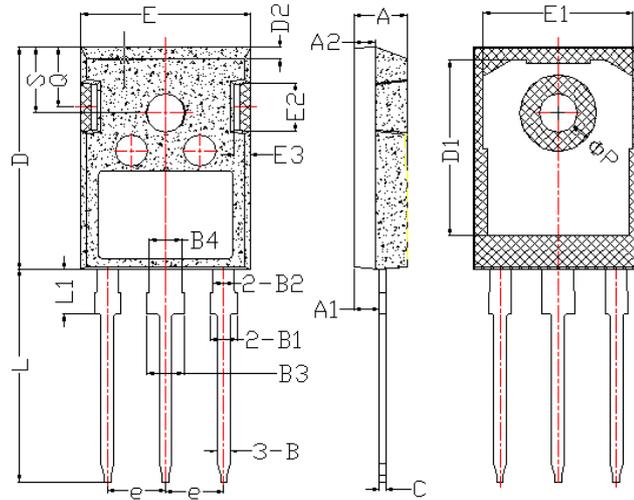


Figure 19.IGBT Transient Thermal Impedance

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

