Lonten N-channel 650V, 47A, 0.07Ω LonFET™ Power MOSFET

Description

LonFET™ Power MOSFET is fabricated using advanced super junction technology. The resulting device has extremely low on resistance, making it especially suitable for applications which require superior power density and outstanding efficiency.

Features

- Ultra low $R_{DS(on)}$
- Ultra low gate charge (typ. Q_g = 87nC)
- 100% UIS tested
- RoHS compliant

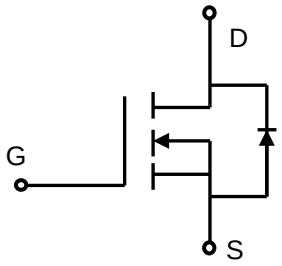
Applications

- Power faction correction (PFC).
- Switched mode power supplies (SMPS).
- Uninterruptible power supply (UPS).

Product Summary

V_{DS} @ $T_{j,max}$	700V
$R_{DS(on),max}$	0.070Ω
I_{DM}	141A
$Q_{g,typ}$	87nC

TO-247



N-Channel MOSFET

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	650	V
Continuous drain current (T_C = 25°C)	I_D	47	A
(T_C = 100°C)		30	A
Pulsed drain current [1]	I_{DM}	141	A
Gate-Source voltage	V_{GSS}	±30	V
Avalanche energy, single pulse [2]	E_{AS}	1200	mJ
Power Dissipation TO-247 (T_C = 25°C)	P_D	290	W
- Derate above 25°C		2.32	W/°C
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C
Continuous diode forward current	I_S	47	A
Diode pulse current	$I_{S,pulse}$	141	A

Thermal Characteristics TO-247

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.43	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	60	°C/W
Soldering temperature, wavesoldering only allowed at leads. (1.6mm from case for 10s)	T_{sold}	260	°C

Package Marking and Ordering Information

Device	Device Package	Marking	Units/Tube	Units/Real
LSB65R070GF	TO-247	LSB65R070GF	30	

Electrical Characteristics

T_c = 25°C unless otherwise noted

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static characteristics						
Drain-source breakdown voltage	BV_{DSS}	V_{GS}=0 V, I_D=0.25 mA	650	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=0.25mA	2	3	4	V
Drain cut-off current	I_{DSS}	V_{DS}=650 V, V_{GS}=0 V,				μA
		T_j = 25°C	-	-	1	
		T_j = 125°C	-	10	-	
Gate leakage current, Forward	I_{GSSF}	V_{GS}=30 V, V_{DS}=0 V	-	-	50	nA
Gate leakage current, Reverse	I_{GSSR}	V_{GS}=-30 V, V_{DS}=0 V	-	-	-50	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=10 V, I_D=23.5 A	-			
		T_j = 25°C	-	0.062	0.070	Ω
		T_j = 150°C	-	0.16	-	
Dynamic characteristics						
Input capacitance	C_{iss}	V_{DS} = 25 V, V_{GS} = 0 V,	-	4677	-	
Output capacitance	C_{oss}	f = 1 MHz	-	2556	-	pF
Reverse transfer capacitance	C_{rss}		-	30	-	
Turn-on delay time	$t_{d(on)}$	V_{DD} = 400V, I_D = 23.5A	-	28.3	-	
Rise time	t_r	R_G = 10Ω, V_{GS}=10V	-	12.9	-	ns
Turn-off delay time	$t_{d(off)}$		-	186.5	-	
Fall time	t_f		-	13.5	-	
Gate charge characteristics						
Gate to source charge	Q_{gs}	V_{DD}=480 V, I_D=23.5A,	-	24	-	
Gate to drain charge	Q_{gd}	V_{GS}=0 to 10 V	-	31.24	-	nC
Gate charge total	Q_g		-	87	-	
Gate plateau voltage	$V_{plateau}$		-	5.5	-	V
Reverse diode characteristics						
Diode forward voltage	V_{SD}	V_{GS}=0 V, I_F=23.5A	-	1.0	-	V
Reverse recovery time	t_{rr}	V_R=50 V, I_F=47A,	-	243.5	-	ns
Reverse recovery charge	Q_{rr}	dI_F/dt=100 A/μs	-	1.9	-	μC
Peak reverse recovery current	I_{rrm}		-	14.0	-	A

Notes:

1. Limited by maximum junction temperature, maximum duty cycle is 0.75.

2. I_{AS} = 8A, V_{DD} =60V, Starting T_j= 25°C.

Electrical Characteristics Diagrams

Figure 1. On-Region Characteristics

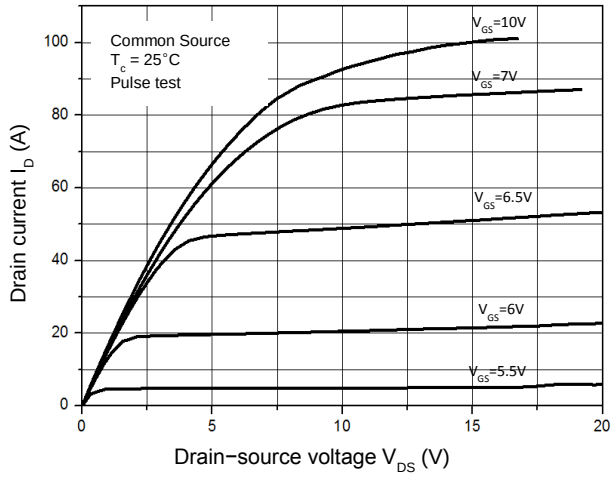


Figure 2. Transfer Characteristics

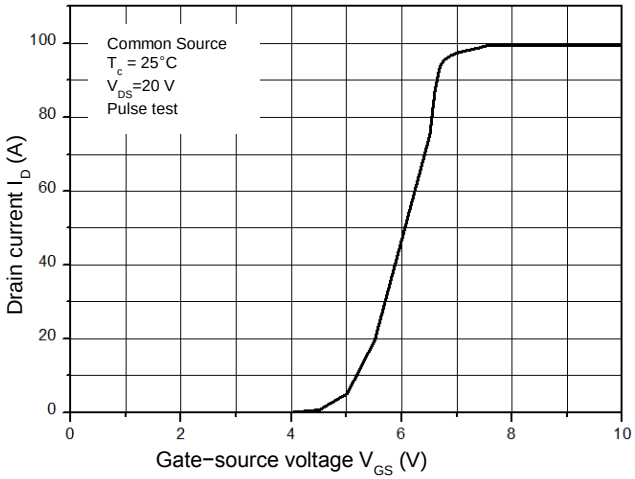


Figure 3. On-Resistance Variation vs. Drain Current

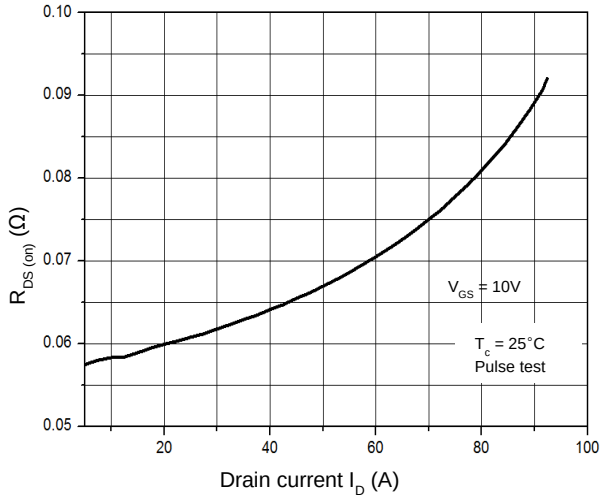


Figure 4. Threshold Voltage vs. Temperature

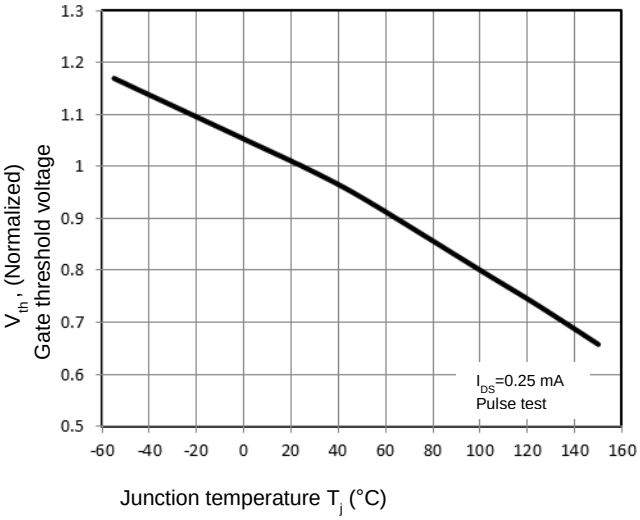


Figure 5. Breakdown Voltage vs. Temperature

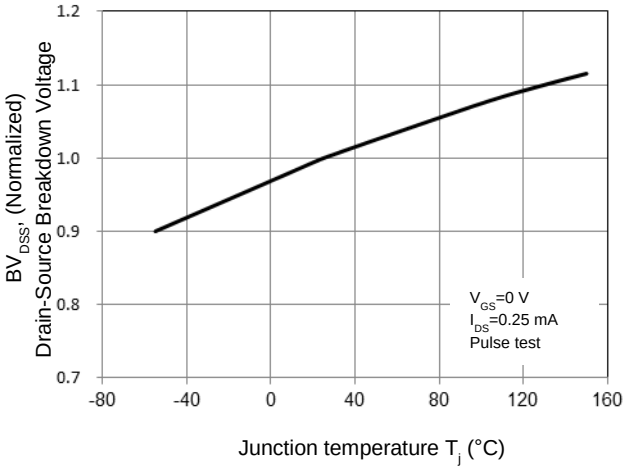


Figure 6. On-Resistance vs. Temperature

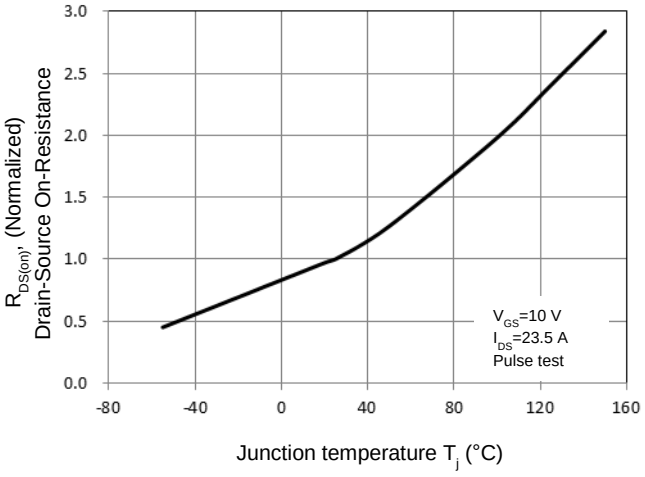


Figure 7. Capacitance Characteristics

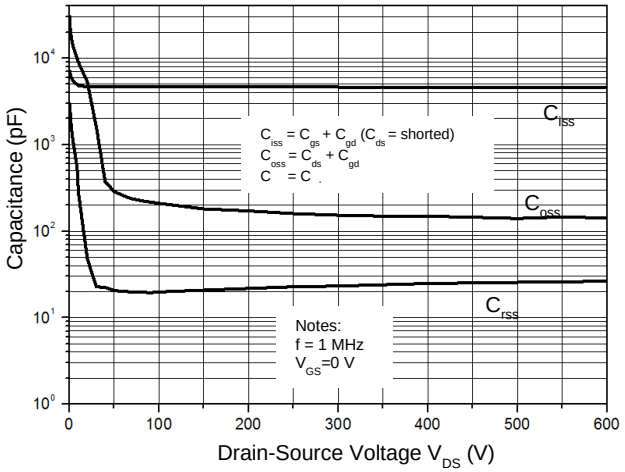


Figure 8. Gate Charge Characterist

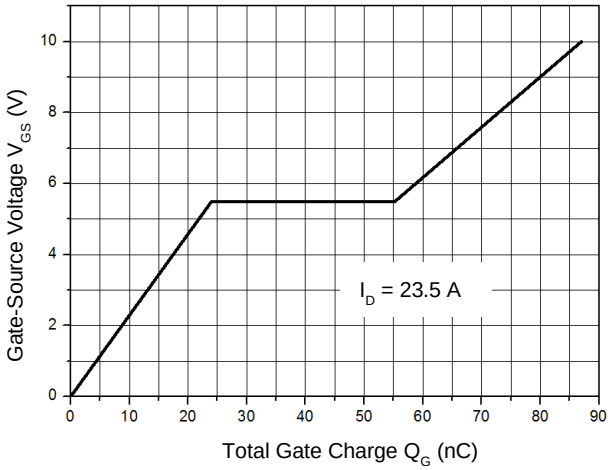


Figure 9. Maximum Safe Operating Area

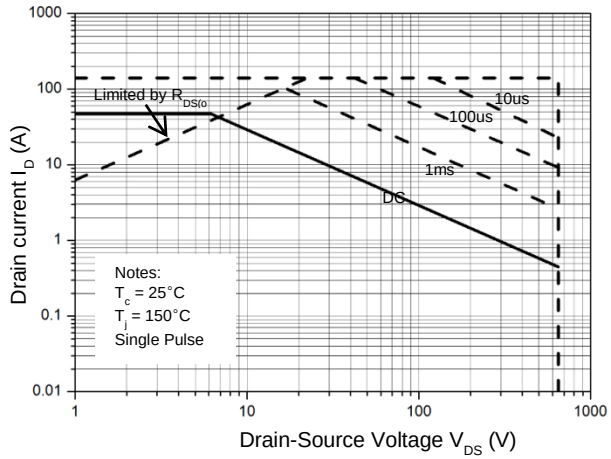


Figure 10. Power Dissipation vs. Temperature

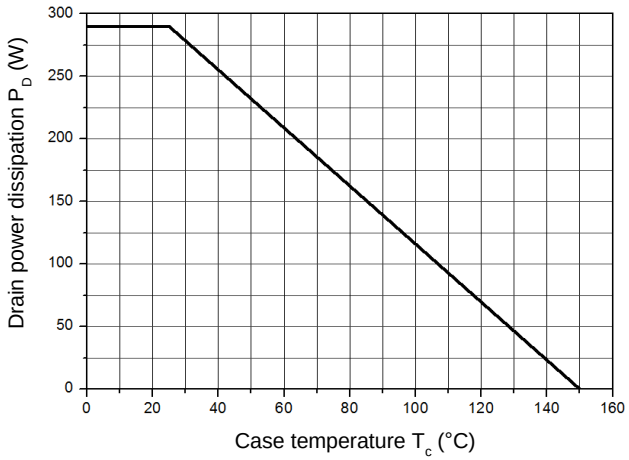
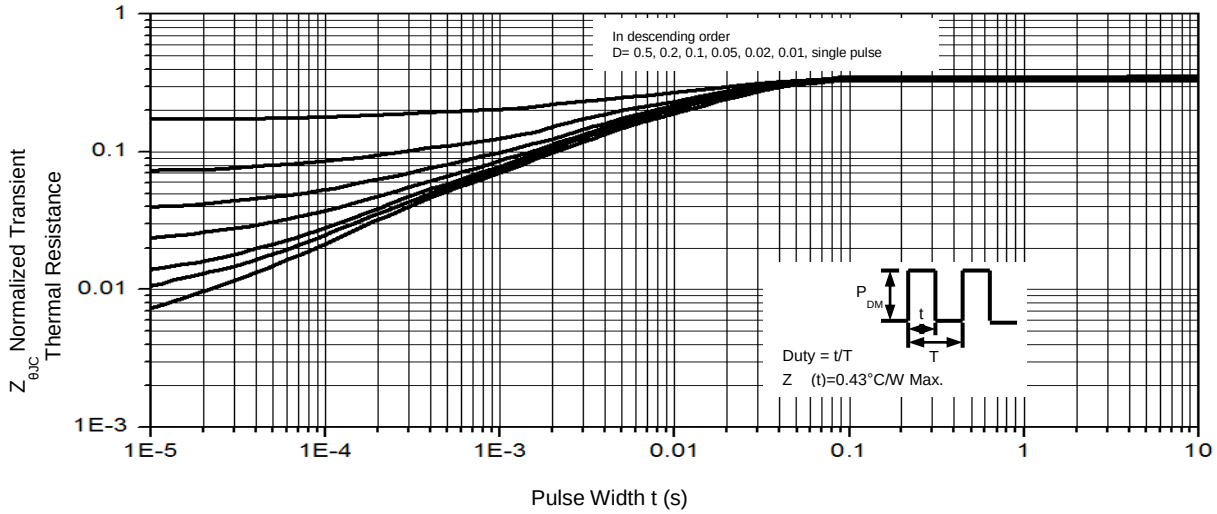
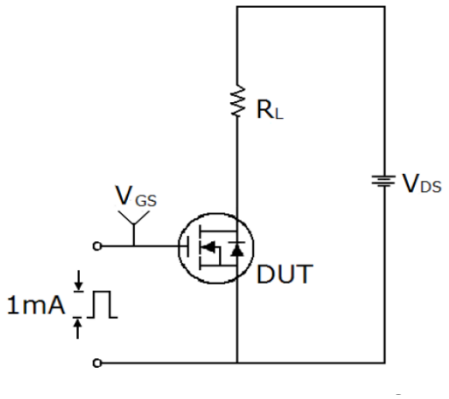
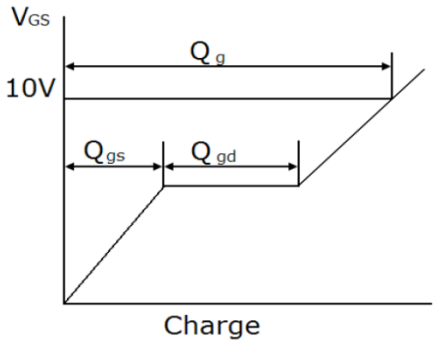


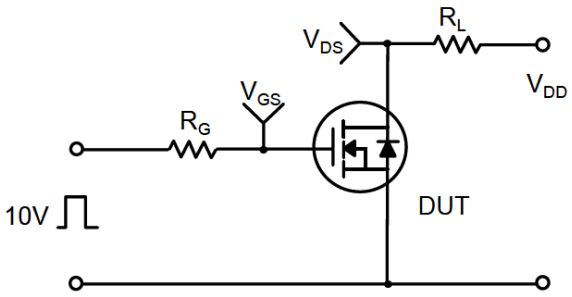
Figure 11. Transient Thermal Response Curve

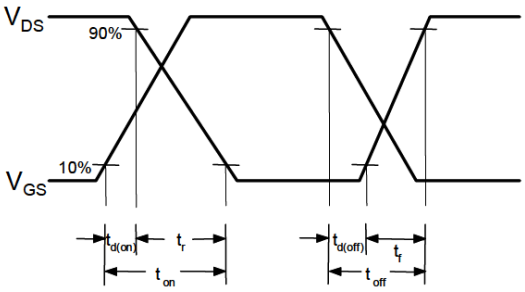


Gate Charge Test Circuit & Waveform

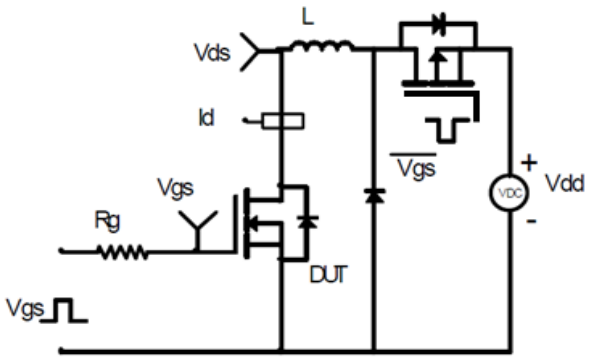


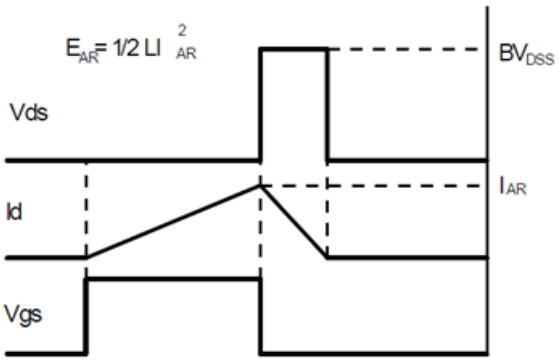




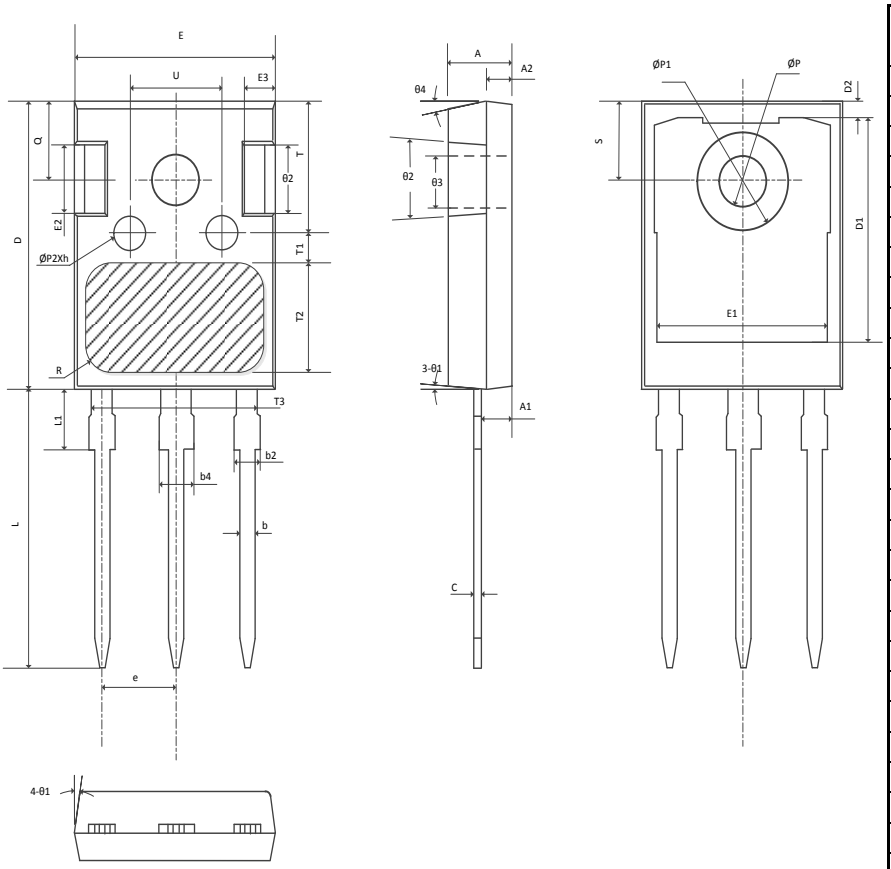


Unclamped Inductive Switching Test Circuit & Waveforms



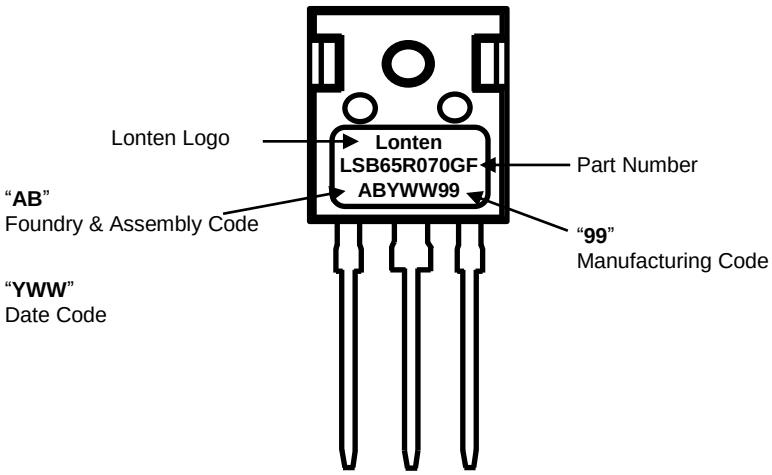


Mechanical Dimensions for TO-247



SYMBOL	mm		
	MIN	NOM	MAX
A	4.90	5.00	5.10
A1	2.31	2.41	2.51
A2	1.90	2.00	2.10
b	1.16	1.21	1.26
b2	1.96	2.01	2.06
b4	2.96	3.01	3.06
c	0.59	0.61	0.66
D	20.90	21.00	21.10
D1	16.25	16.55	16.85
D2	1.05	1.20	1.35
E	15.70	15.80	15.90
E1	13.10	13.30	13.50
E2	4.90	5.00	5.10
E3	2.40	2.50	2.60
e	5.44BSC		
h	0.05	0.10	0.15
L	19.80	19.92	20.10
L1	—	—	4.30
ØP	3.50	3.60	3.70
ØP1	—	—	7.30
ØP2	2.40	2.50	2.60
Q	5.60	5.80	6.00
S	6.15BSC		
R	0.50REF		
T	9.80	—	10.20
T1	1.65REF		
T2	8.00REF		
T3	12.80REF		
U	6.00	—	6.40
θ1	6°	7°	8°
θ2	4°	5°	6°
θ3	1°	—	1.5°
θ4	14°	15°	16°

TO-247 Part Marking Information



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