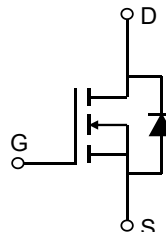


Description

Features

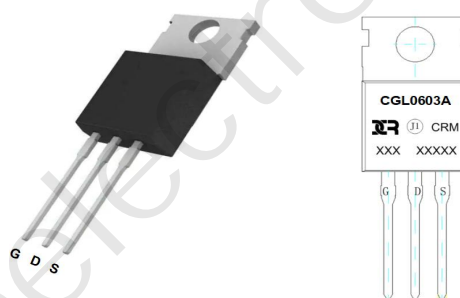
- 60V, 170A
- $R_{DS(ON)}$ Typ = 2.5mΩ @ $V_{GS} = 10V$
- $R_{DS(ON)}$ Typ = 3.2mΩ @ $V_{GS} = 4.5V$
- Advanced Split Gate Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- 100% UIS TESTED!
- 100% ΔV_d s TESTED!



Schematic Diagram

Application

- Load Switch
- PWM Application
- Power Management



Marking and Pin Assignment

Package Marking and Ordering Information

Device	Marking	Package	Outline	TUBE(pcs)	Inner Box (pcs)	Per Carton (pcs)
CRMCGL0603A	CRMCGL0603A	TO-220C-3L	TUBE	50	1000	5000

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

Symbol	Parameter	Value	Units	
V _{DS}	Drain-to-Source Voltage	60	V	
V _{GS}	Gate-to-Source Voltage	±20	V	
I _D	Continuous Drain Current	T _C = 25°C	170	A
		T _C = 100°C	100	A
I _{DM}	Pulsed Drain Current ⁽¹⁾	680	A	
E _{AS}	Single Pulsed Avalanche Energy ⁽²⁾	361	mJ	
P _D	Power Dissipation	T _C = 25°C	145	W
R _{θJC}	Thermal Resistance, Junction to Case	0.86	°C/W	
T _J , T _{STG}	Junction & Storage Temperature Range	-55 to 150	°C	

Electrical Characteristics ($T_J = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	I _D = 250μA, V _{GS} = 0V	60	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 60V, V _{GS} = 0V	-	-	1.0	μA
I _{GSS}	Gate-Body Leakage Current	V _{DS} = 0V, V _{GS} = ±20V	-	-	±100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	1	1.7	2.5	V
R _{DS(ON)}	Static Drain-Source ON-Resistance ⁽³⁾	V _{GS} = 10V, I _D = 30A	-	2.5	3.3	mΩ
		V _{GS} = 4.5V, I _D = 20A	-	3.2	4.2	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{GS} = 0V, V _{DS} = 30V, f = 1MHz	-	5321	-	pF
C _{oss}	Output Capacitance		-	1728	-	pF
C _{rss}	Reverse Transfer Capacitance		-	54	-	pF
Q _g	Total Gate Charge	V _{GS} = 0 to 10V V _{DS} = 30V, I _D = 30A	-	101	-	nC
Q _{gs}	Gate Source Charge		-	17	-	nC
Q _{gd}	Gate Drain("Miller") Charge		-	22	-	nC
Switching Characteristics						
t _{d(on)}	Turn-On DelayTime	V _{GS} = 10V, V _{DD} = 30V I _D = 30A, R _{GEN} = 3Ω	-	16	-	ns
t _r	Turn-On Rise Time		-	38	-	ns
t _{d(off)}	Turn-Off DelayTime		-	78	-	ns
t _f	Turn-Off Fall Time		-	95	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	170	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	680	A
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} = 0V, I _S = 30A	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	I _F = 30A, di/dt = 100A/us	-	54.7	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	60	-	nC

- Notes:
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
 2. E_{AS} condition: Starting $T_J = 25^\circ\text{C}$, $V_{DD} = 30\text{V}$, $V_G = 10\text{V}$, $R_G = 25\text{ohm}$, $L = 0.5\text{mH}$, $I_{AS} = 38\text{A}$
 3. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 0.5\%$.

Typical Performance Characteristics

Figure 1: Output Characteristics

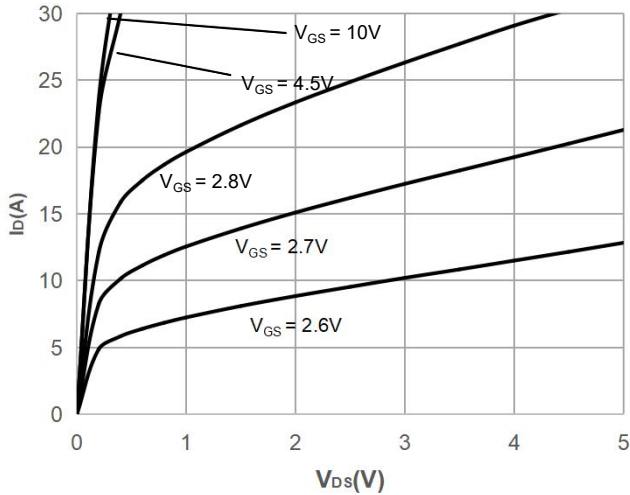


Figure 2: Typical Transfer Characteristics

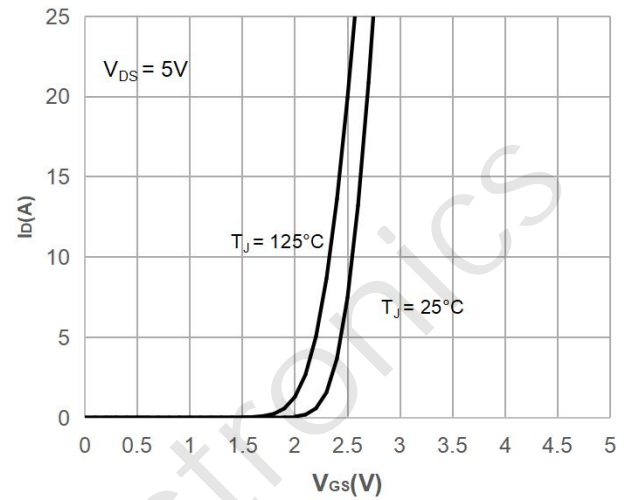


Figure 3: On-resistance vs. Drain Current

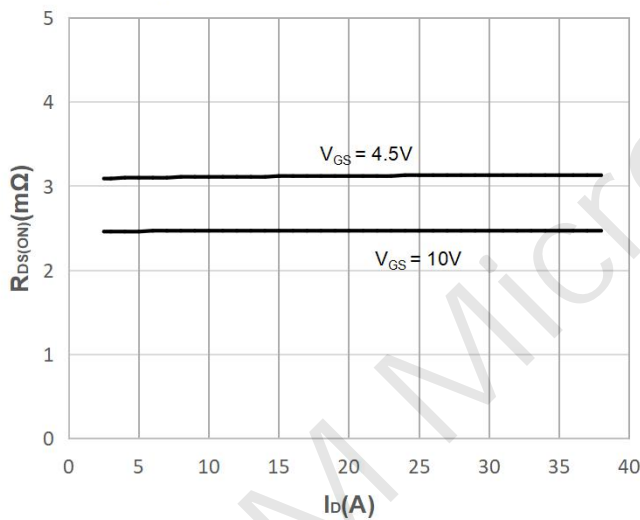


Figure 4: Body Diode Characteristics

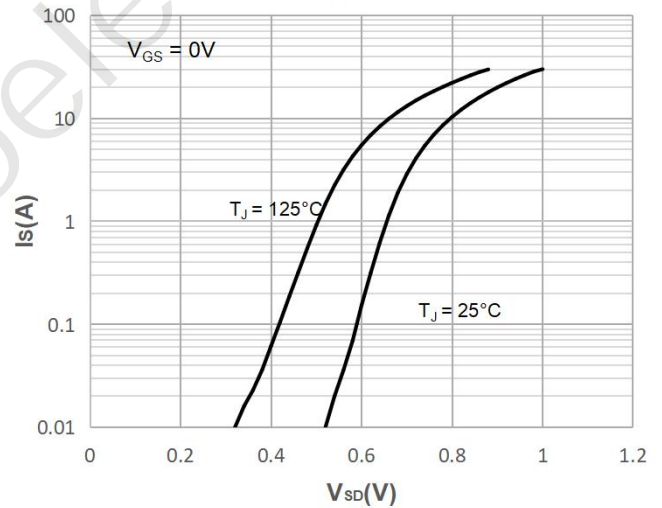


Figure 5: Gate Charge Characteristics

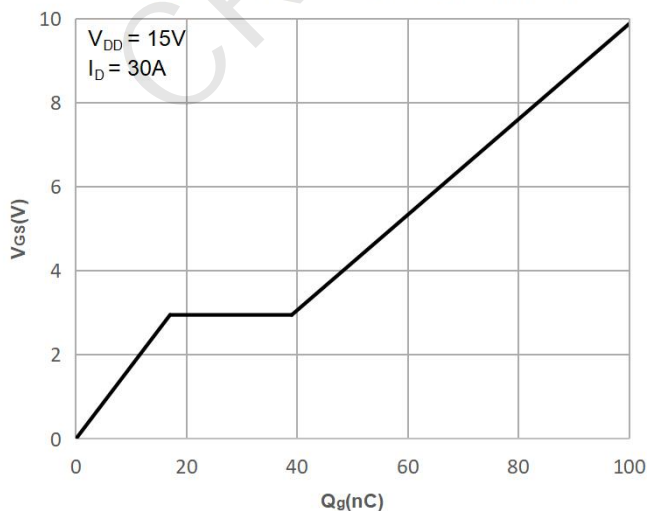
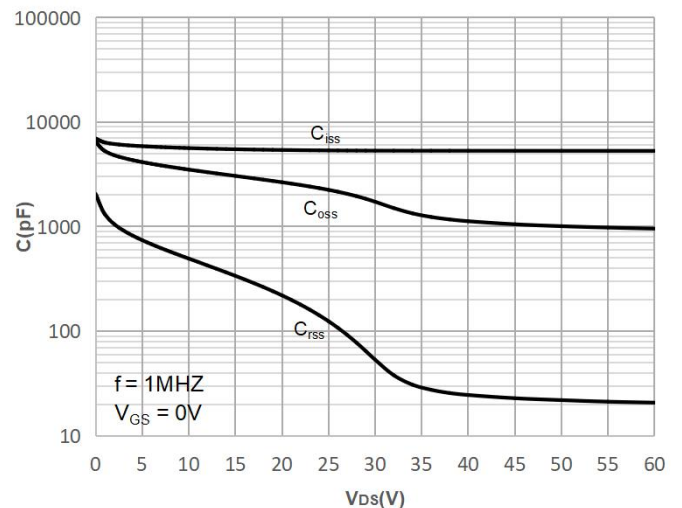


Figure 6: Capacitance Characteristics



Typical Performance Characteristics

Figure 7: Normalized Breakdown voltage vs. Junction Temperature

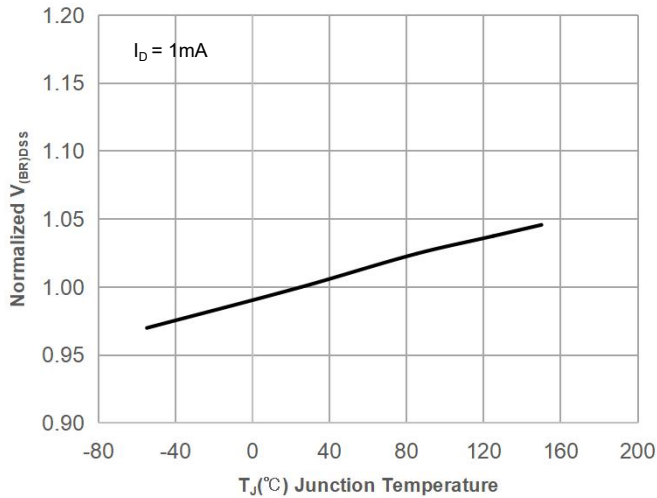


Figure 8: Normalized on Resistance vs. Junction Temperature

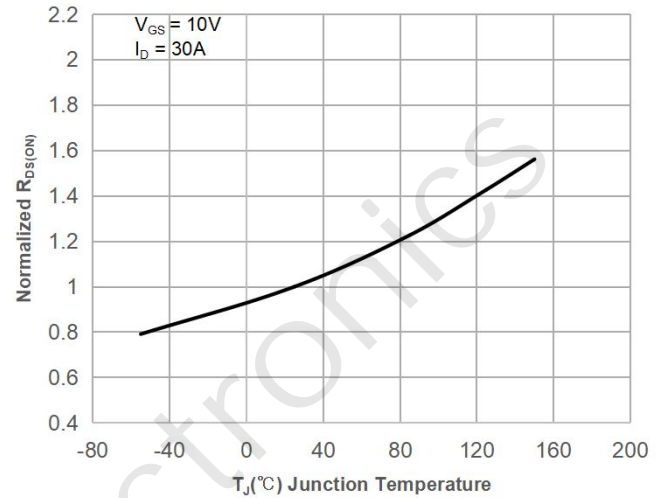


Figure 9: Maximum Safe Operating Area

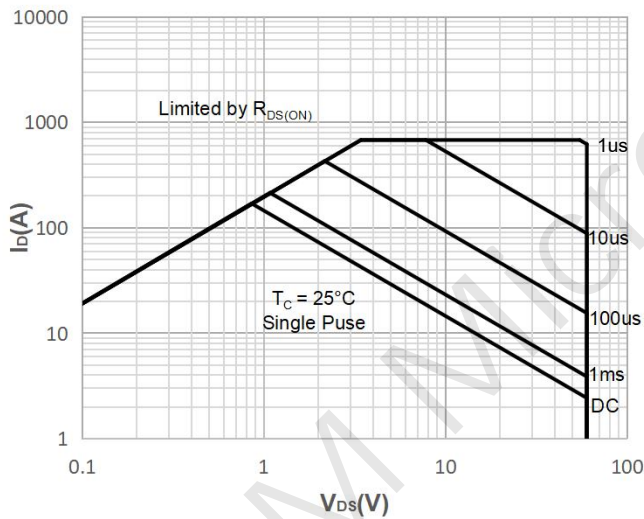


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

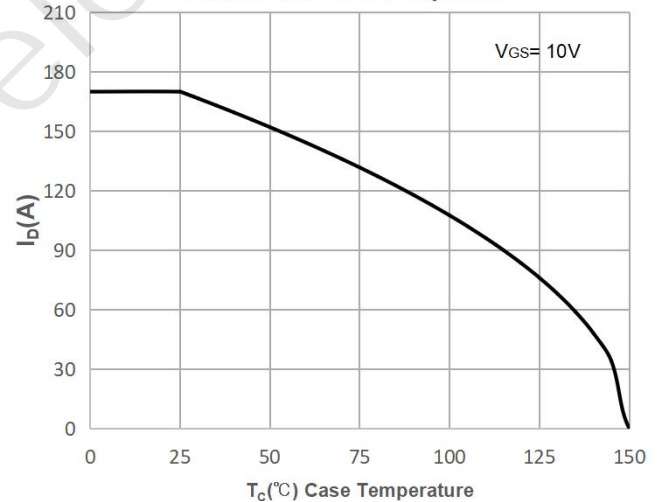


Figure 11: Normalized Maximum Transient Thermal Impedance

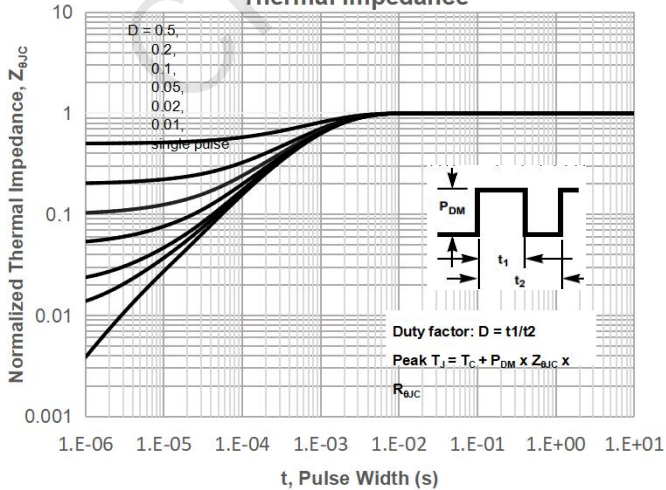
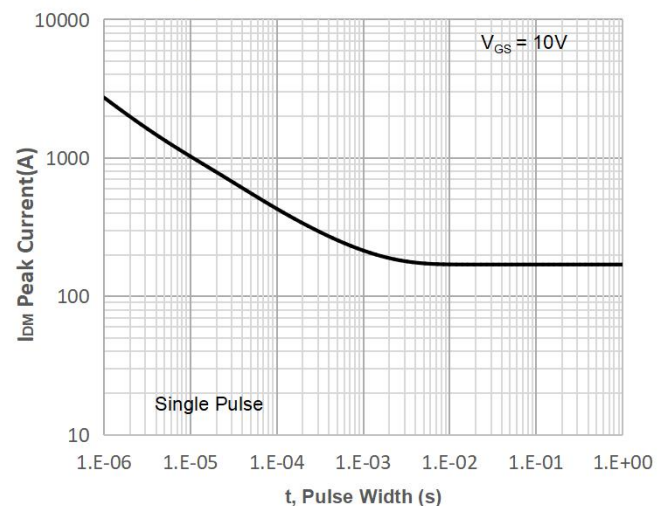


Figure 12: Peak Current Capacity



Test Circuit

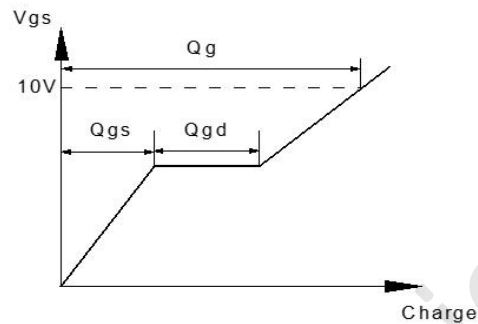


Figure 1: Gate Charge Test Circuit & Waveform

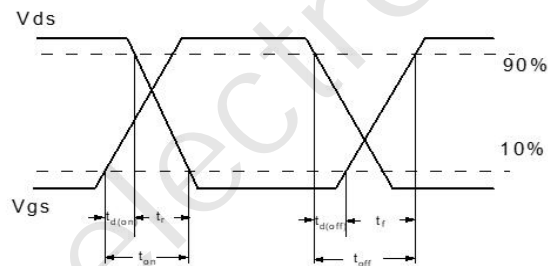
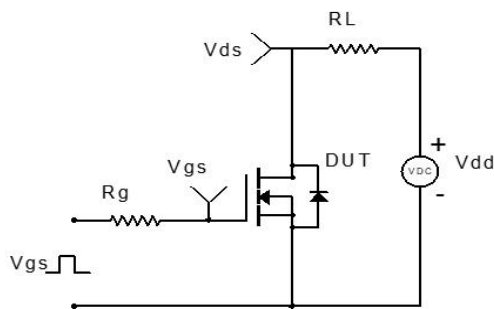


Figure 2: Resistive Switching Test Circuit & Waveform

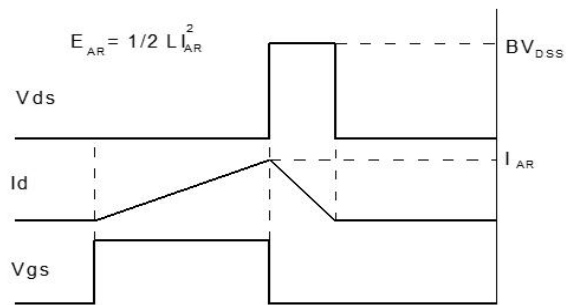
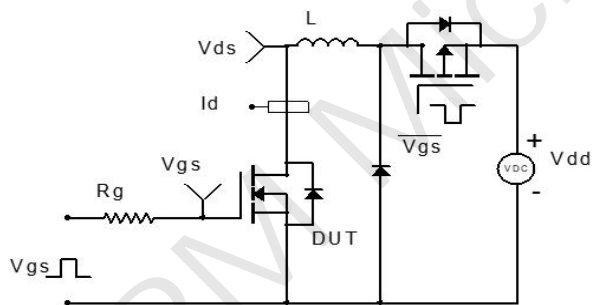


Figure 3: Unclamped Inductive Switching Test Circuit & Waveform

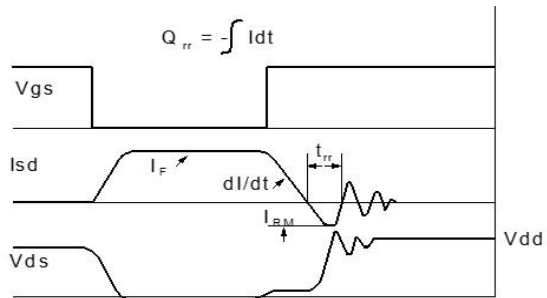
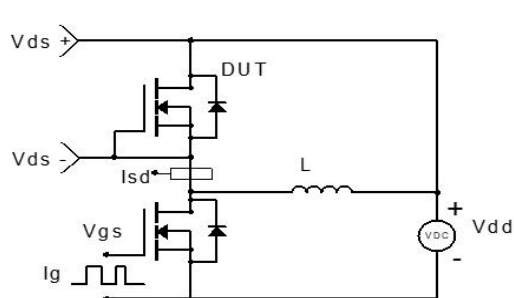
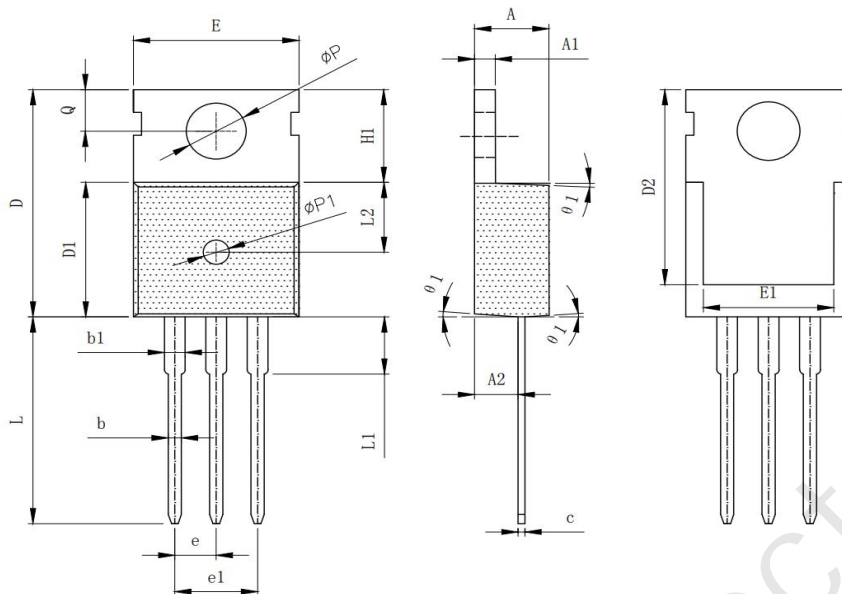


Figure 4: Diode Recovery Test Circuit & Waveform

Package Mechanical Data(TO-220C-3L)



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	4.40	4.50	4.60
A1	1.25	1.30	1.35
A2	2.30	2.40	2.50
b	0.70	0.80	0.90
b1	1.25	1.35	1.45
c	0.40	0.50	0.60
D	15.50	15.80	16.10
D1	9.10	9.20	9.30
D2	12.73	12.83	12.93
E	9.70	9.90	10.20
E1	7.60	8.00	8.40
e	2.54 (BSC)		
e1	5.08 (BSC)		
H1	6.30	6.50	6.80
L	12.75	13.08	13.50
L1	—	—	3.10
L2	4.30	4.60	4.90
φP	3.50	3.60	3.70
φP1	1.40	1.50	1.60
q	2.70	—	2.90
θ1	2°	4°	6°

NOTES: 1. PKG  SURFACE IS MATTE Ra1.2~1.4;
 OTHERS IS POLISHED Ra0.15;

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