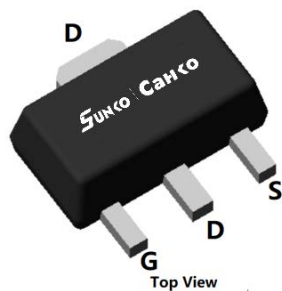
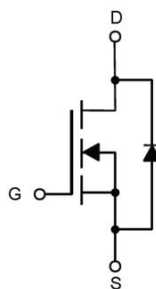
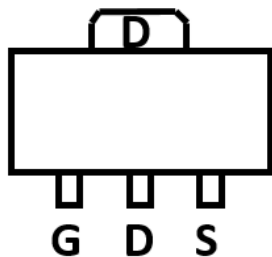


N-Channel Enhancement Mode Field Effect Transistor



SOT-89



Product Summary

• V_{DS}	20 V
• I_D	10 A
• $R_{DS(ON)}$ (at $V_{GS}=4.5V$)	<11 mohm
• $R_{DS(ON)}$ (at $V_{GS}=2.5V$)	<15 mohm
• $R_{DS(ON)}$ (at $V_{GS}=1.8V$)	<20 mohm

General Description

- Trench Power LV MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

Applications

- DC-DC Converters
- Power management functions

■ Absolute Maximum Ratings ($T_A=25^{\circ}C$ unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-source Voltage		V_{DS}	20	V
Gate-source Voltage		V_{GS}	± 10	V
Drain Current	$T_A=25^{\circ}C$	I_D	10	A
	$T_A=70^{\circ}C$		8	
Pulsed Drain Current ^A		I_{DM}	43	A
Total Power Dissipation	$T_A=25^{\circ}C$	P_D	1.5	W
	$T_C=25^{\circ}C$		4.0	
Thermal Resistance Junction-to-Ambient ^B		$R_{\theta JA}$	83	$^{\circ}C/W$
Thermal Resistance Junction-to-Case		$R_{\theta JC}$	31	$^{\circ}C/W$
Junction and Storage Temperature Range		T_J, T_{STG}	-55~+150	$^{\circ}C$

■ Ordering Information (Example)

PREFERRED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
SCH10N02A	F1	2010	1000	10000	40000	7" reel
	F2	2010	1000	8000	32000	7" reel

SCH10N02A

■ Electrical Characteristics (T_J=25℃ unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V, I _D =250μA	20			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =20V,V _{GS} =0V			1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} = ±10V, V _{DS} =0V			±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D =250μA	0.45	0.62	1.0	V
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} = 4.5V, I _D =5A		7	11	mΩ
		V _{GS} = 2.5V, I _D =3A		8.5	15	
		V _{GS} = 1.8V, I _D =2A		13	20	
Diode Forward Voltage	V _{SD}	I _S =10A,V _{GS} =0V		0.8	1.2	V
Maximum Body-Diode Continuous Current	I _S				10	A
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{DS} =10V,V _{GS} =0V,f=1MHZ		2250		pF
Output Capacitance	C _{oss}			334		
Reverse Transfer Capacitance	C _{rss}			271		
Switching Parameters						
Total Gate Charge	Q _g	V _{GS} =4.5V,V _{DS} =10V,I _D =15A		27.9		nC
Gate-Source Charge	Q _{gs}			4.1		
Gate-Drain Charge	Q _{gd}			7.4		
Body Diode Reverse Recovery Charge	Q _{rr}	I _F =15A,dI/dt=100A/μs		2.2		ns
Body Diode Reverse Recovery Time	T _{rr}			16.3		
Turn-on Delay Time	t _{D(on)}	V _{GS} =4.5V,V _{DD} =10V,I _D =10A,R _L =1Ω R _{GEN} =3Ω		13		
Turn-on Rise Time	t _r			53		
Turn-off Delay Time	t _{D(off)}			61		
Turn-off fall Time	t _f			76		

A. Pulse Test: Pulse Width ≤ 300μs, Duty cycle ≤ 2%.

B. R_{θJA} is the sum of the junction-to-Case and Case-to-ambient thermal resistance, where the Case thermal reference is defined as the solder mounting surface of the drain pins. R_{θJC} is guaranteed by design, while R_{θJA} is determined by the board design. The maximum rating presented here is based on mounting on a 1 in 2 pad of 2oz copper.

■ Typical Performance Characteristics

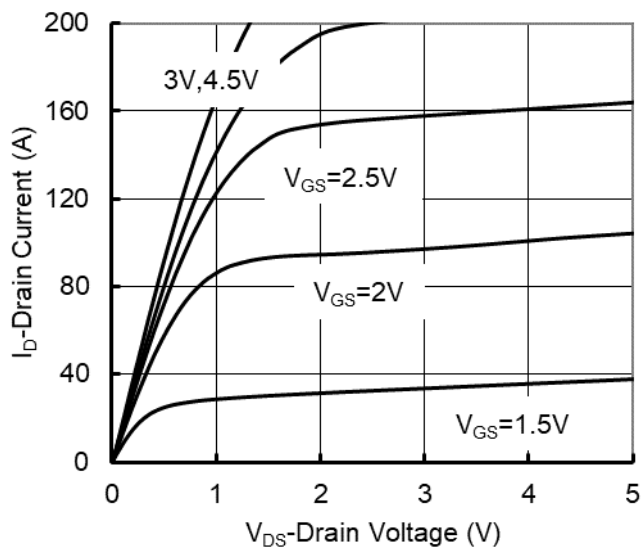


Figure1. Output Characteristics

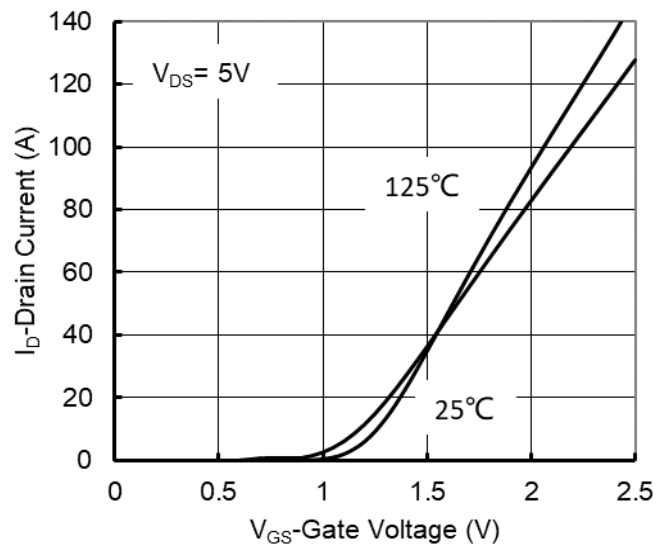


Figure2. Transfer Characteristics

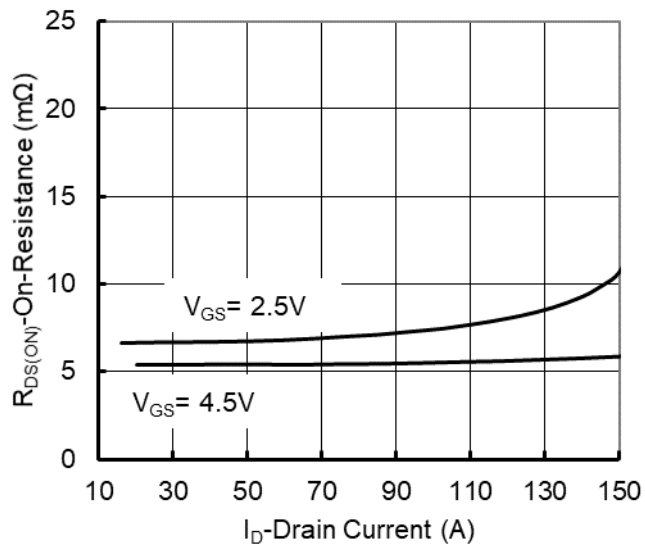


Figure3. On-Resistance vs. Drain Current

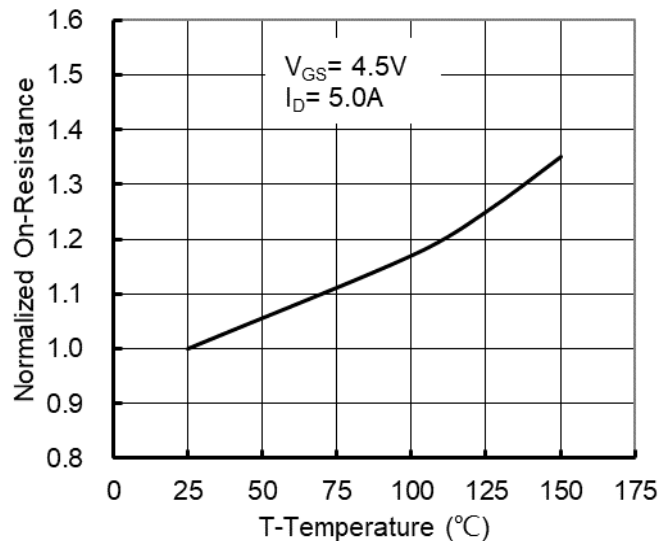


Figure4. On-Resistance vs. Junction Temperature

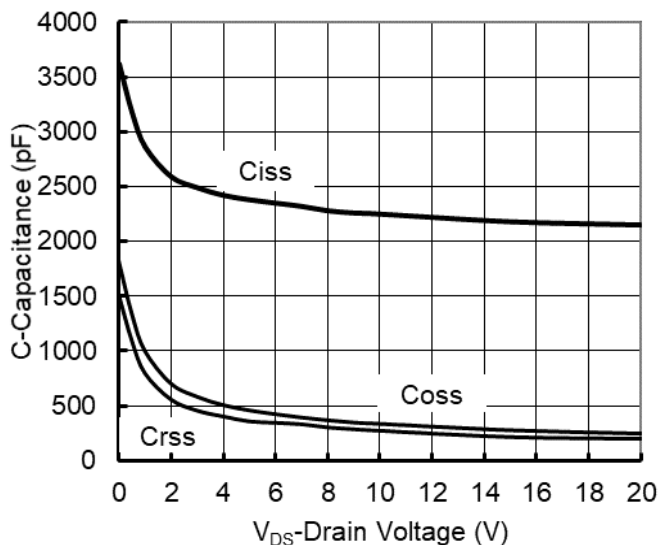


Figure5. Capacitance Characteristics

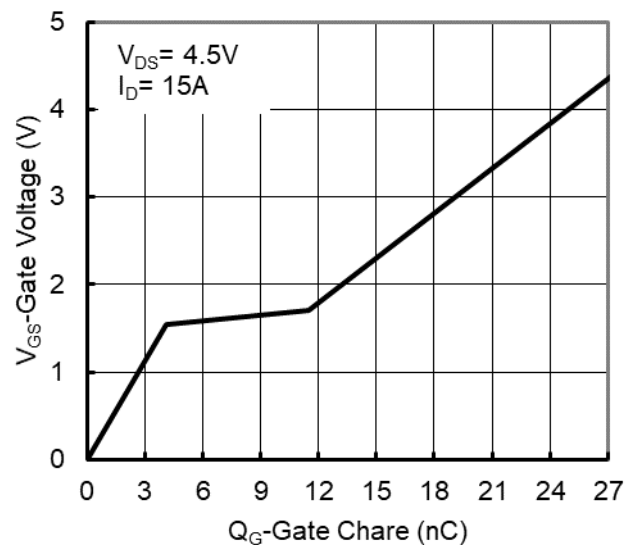


Figure6. Gate Charge

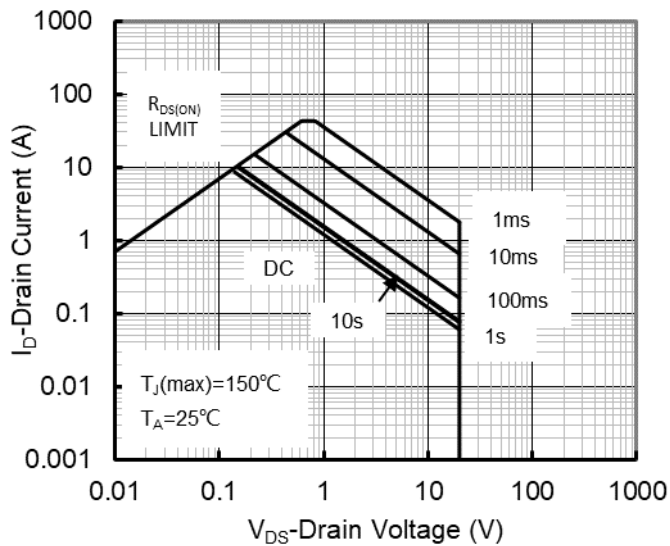


Figure7. Safe Operation Area

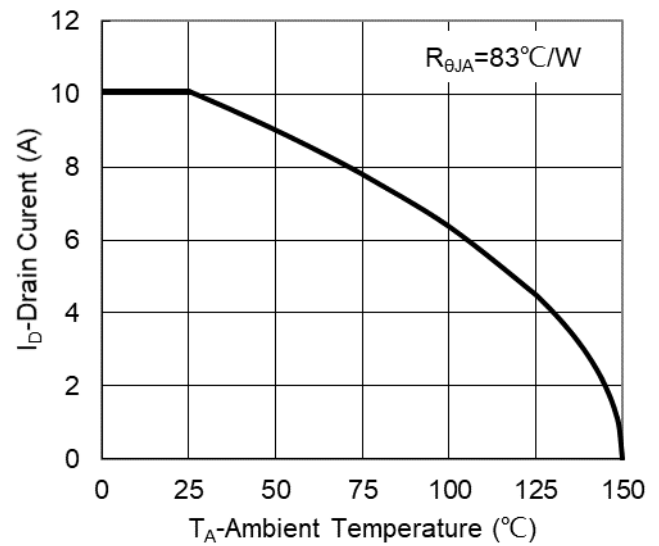


Figure8. Maximum Continuous Drain Current vs Ambient Temperature

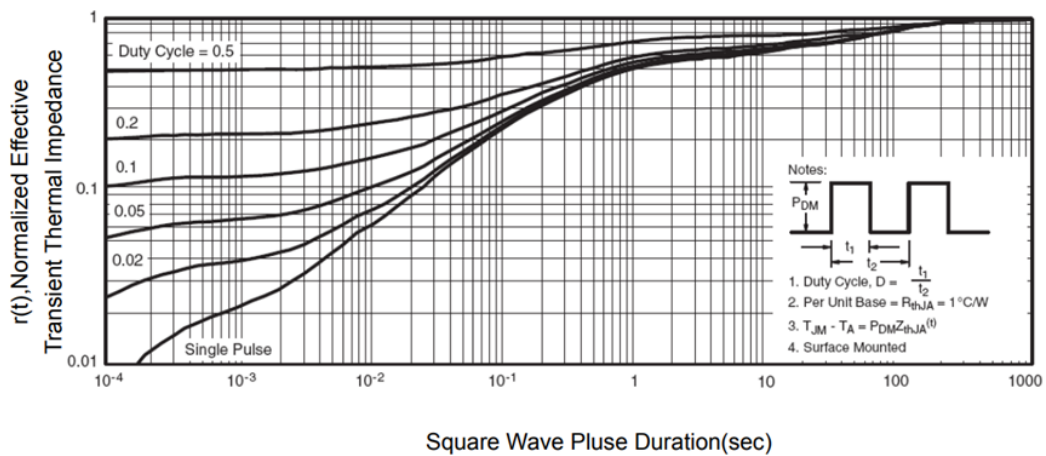
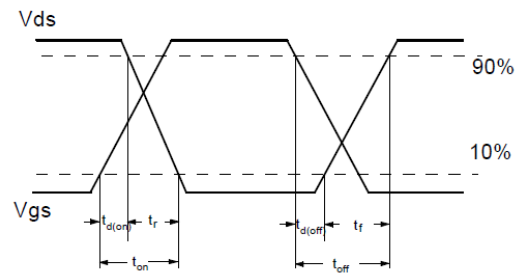
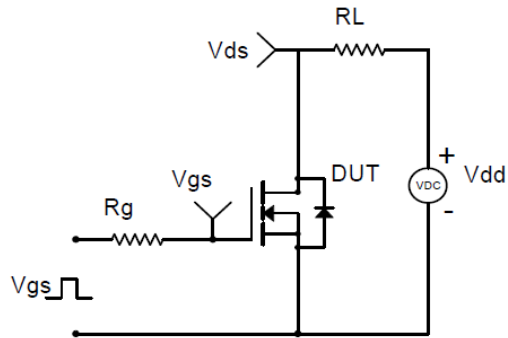
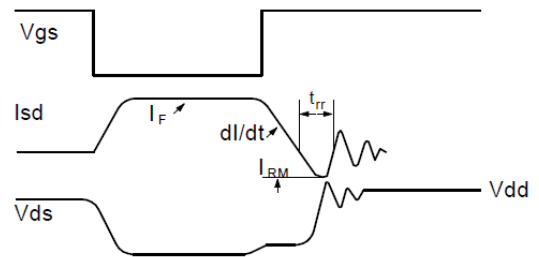
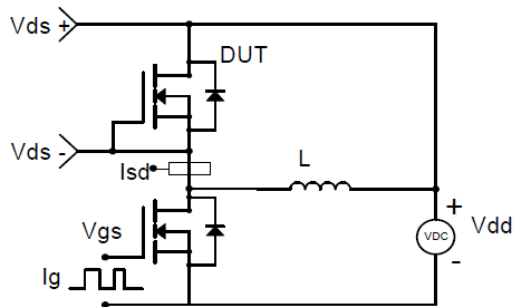


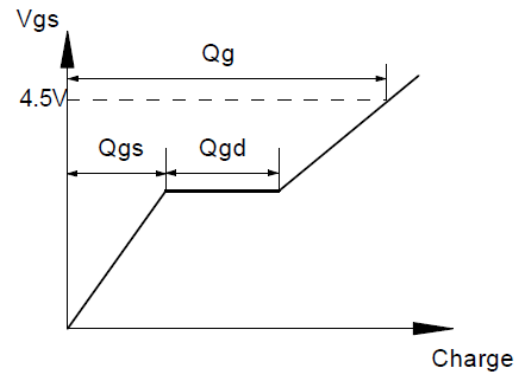
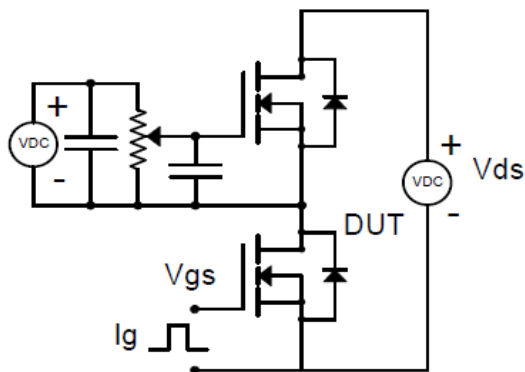
Figure9.Normalized Maximum Transient Thermal Impedance



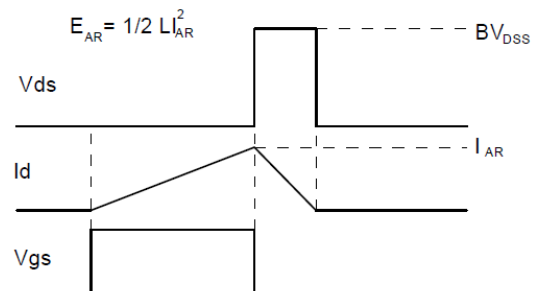
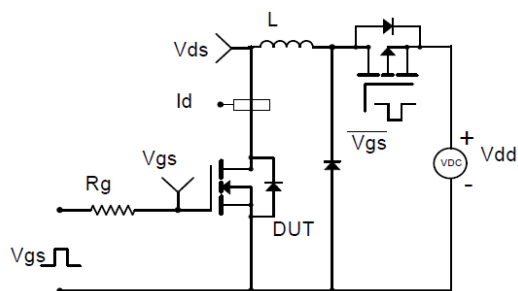
Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



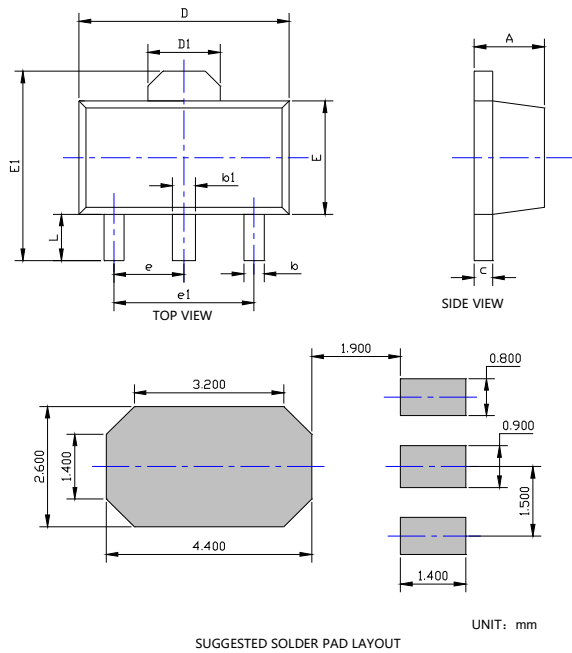
Gate Charge Test Circuit & Waveform



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

■ SOT-89 Package information

TYPE A(PACKING CODE:F1):

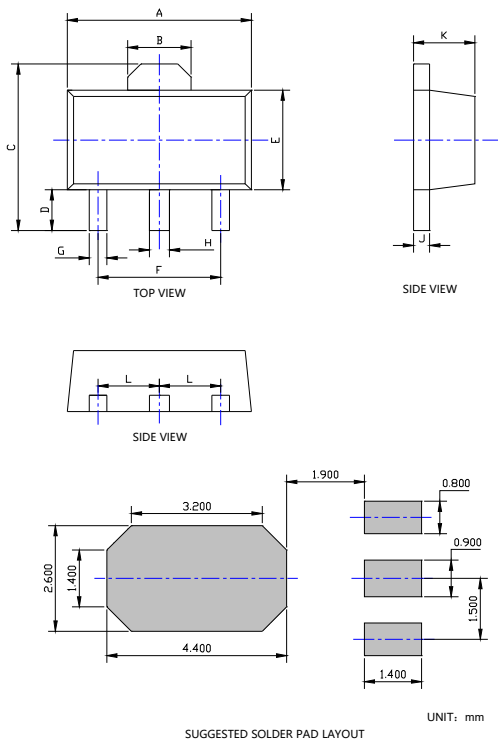


SYMBOL	DIMENSIONS			DIMENSIONS		
	INCHES			Millimeter		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.055	0.059	0.063	1.400	1.500	1.600
b	0.014	---	0.020	0.350	---	0.520
b1	0.016	---	0.023	0.400	---	0.580
c	0.014	---	0.017	0.350	---	0.440
D	0.173	0.177	0.181	4.400	4.500	4.600
D1	0.061REF			1.550REF		
E	0.093	0.096	0.100	2.350	2.450	2.550
E1	0.155	---	0.167	3.940	---	4.250
e	0.059TYP			1.500TYP		
e1	0.118TYP			3.000TYP		
L	0.035	0.039	0.043	0.900	1.000	1.100

NOTE:

- 1.PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
- 2.TOLERANCE 0.1mm UNLESS OTHERWISE SPECIFIED.
- 3.THE PAD LAYOUT IS FOR REFERENCE PURPOSES ONLY.

TYPE B(PACKING CODE:F2):



DIM	DIMENSIONS		DIMENSIONS	
	INCHES		Millimeter	
	MIN.	MAX.	MIN.	MAX.
A	0.169	0.185	4.300	4.700
B	0.061TYP		1.550TYP	
C	0.154	0.171	3.910	4.350
D	0.031	0.047	0.800	1.200
E	0.089	0.104	2.250	2.650
F	0.118TYP		3.000TYP	
G	0.013	0.020	0.330	0.520
H	0.016	0.023	0.400	0.580
J	0.014	0.017	0.350	0.440
K	0.055	0.063	1.400	1.600
L	0.059TYP		1.500TYP	

NOTE:

- 1.PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
- 2.TOLERANCE 0.1mm UNLESS OTHERWISE SPECIFIED.
- 3.THE PAD LAYOUT IS FOR REFERENCE PURPOSES ONLY.

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