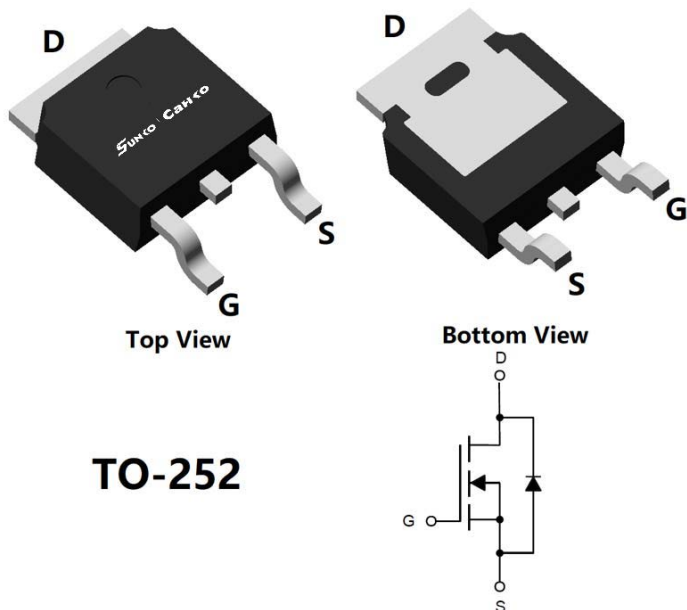


N-Channel Enhancement Mode Field Effect Transistor



Product Summary

- V_{DS} 20V
- I_D 60A
- $R_{DS(ON)}$ (at $V_{GS}=4.5V$) $<6.0m\Omega$
- $R_{DS(ON)}$ (at $V_{GS}=2.5V$) $<8.8m\Omega$
- $R_{DS(ON)}$ (at $V_{GS}=1.8V$) $<14m\Omega$
- 100% EAS Tested
- 100% ∇V_{DS} Tested

General Description

- Trench Power LV MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

Applications

- High current load applications
- Load switching
- Hard switched and high frequency circuits
- Uninterruptible power supply

■ 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	$T_C=25^\circ C$	I_D	60	A
	$T_C=100^\circ C$		38	
Pulsed Drain Current ^A		I_{DM}	210	A
Total Power Dissipation	$T_C=25^\circ C$	P_D	29	W
	$T_C=100^\circ C$		11	W
Single Pulse Avalanche Energy ^B		E_{AS}	68	mJ
Thermal Resistance Junction-to-Case ^C		$R_{\theta JC}$	4.3	$^\circ C/W$
Junction and Storage Temperature Range		T_J, T_{STG}	$-55 \sim +150$	$^\circ C$

■ Ordering Information (Example)

PREFERRED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
SCD60N02A	F1/F2 SC	D60N02A	2500	/	25000	13" reel

■ Electrical Characteristics (T_J=25°C 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 =20A		4.5	6.0	mΩ
		V _{GS} = 2.5V, I _D =15A		5.5	8.8	
		V _{GS} = 1.8V, I _D =10A		8.0	14	
Diode Forward Voltage	V _{SD}	I _S =20A, V _{GS} =0V			1.2	V
Maximum Body-Diode Continuous Current	I _S				60	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		
Reverse Recovery Charge	Q _{rr}	I _F = 15A, di/dt= 100A/us		2.2		
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		ns
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≤300us, Duty cycle ≤2%.

B. T_J=25°C, V_{DD}=18V, V_G=5V, L=0.5mH, R_G=25Ω, I_{AS}=16.5A

C. 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 soldermounting 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

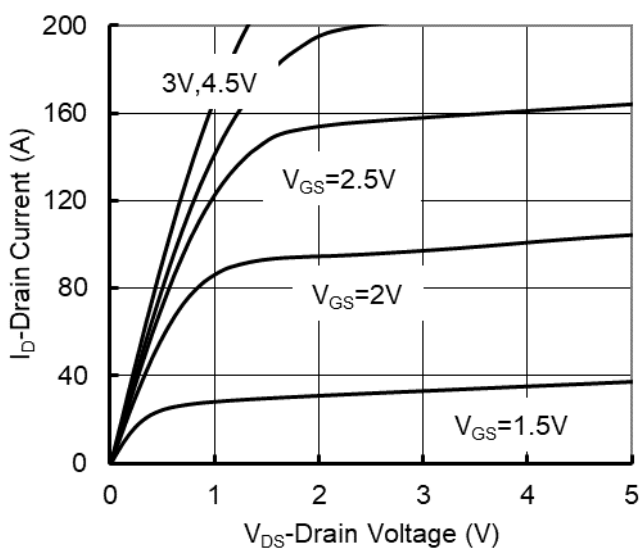


Figure1. Output Characteristics

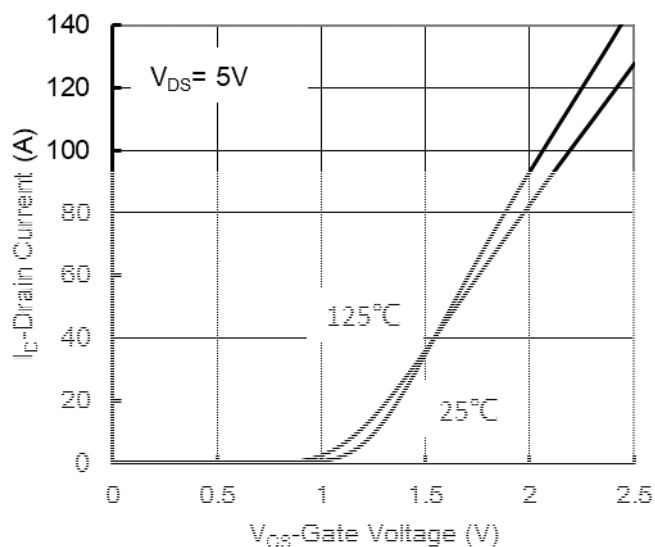


Figure2. Transfer Characteristics

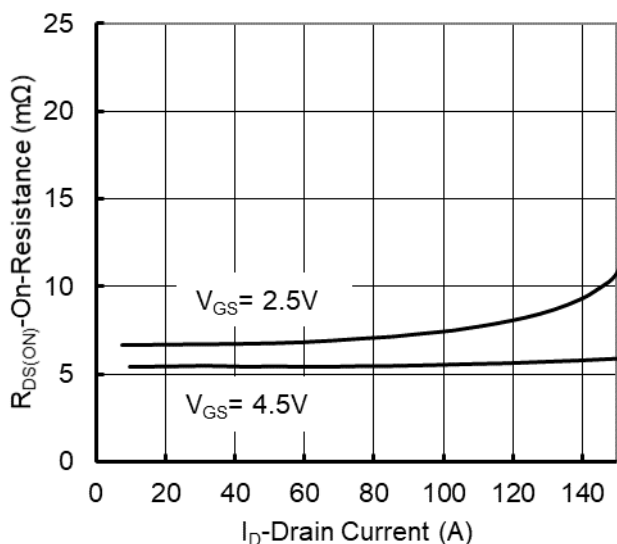


Figure3. On-Resistance vs. Drain Current

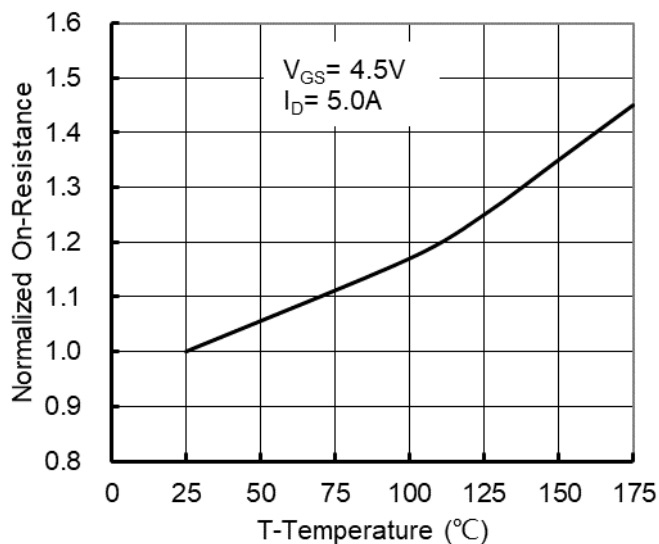


Figure4. Gate Charge

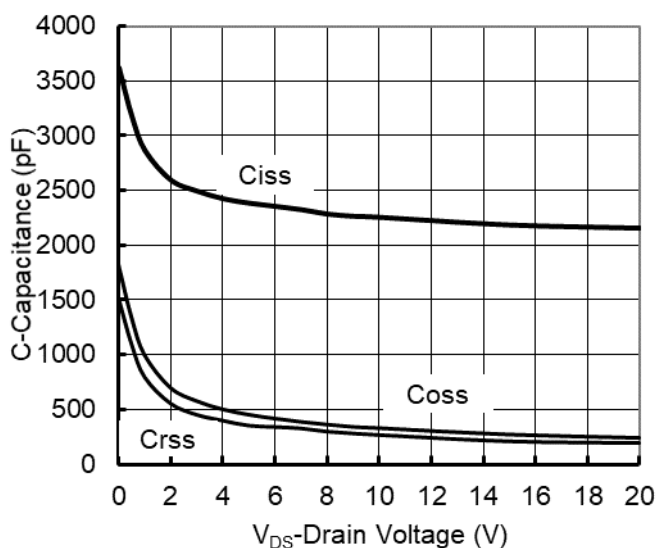


Figure5. Capacitance Characteristics

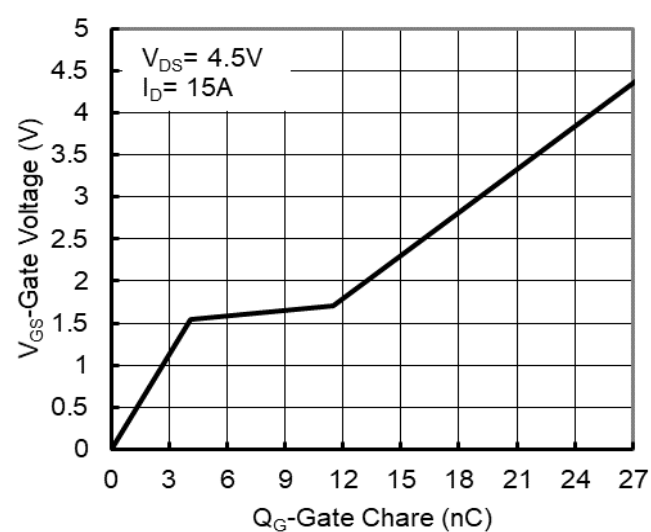


Figure6. Gate Charge

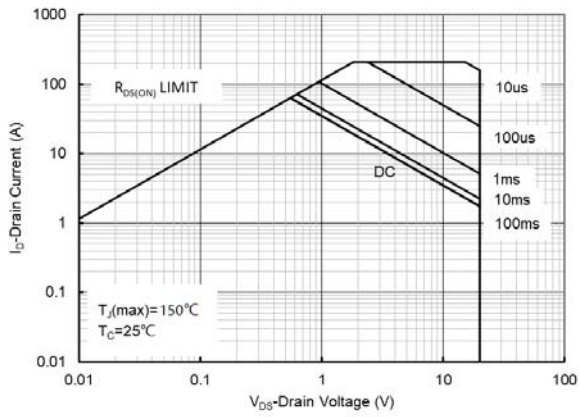


Figure7. Safe Operation Area

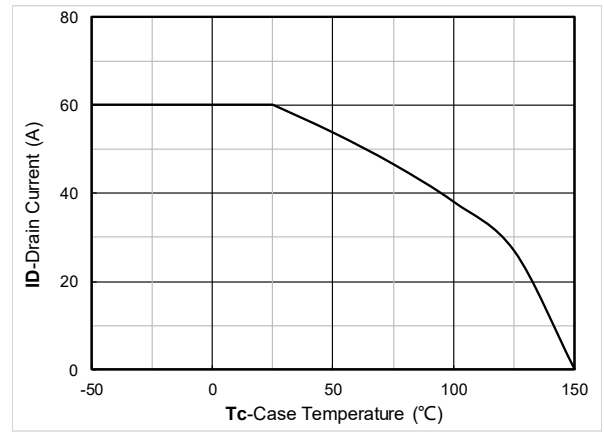


Figure8. Maximum Continuous Drain Current vs. Case Temperature

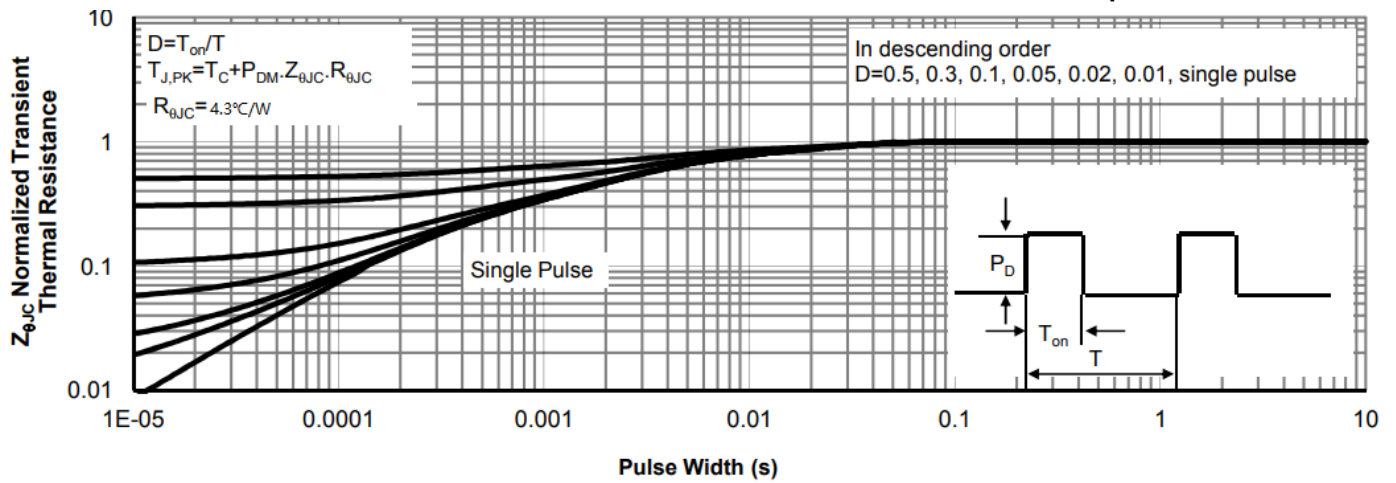
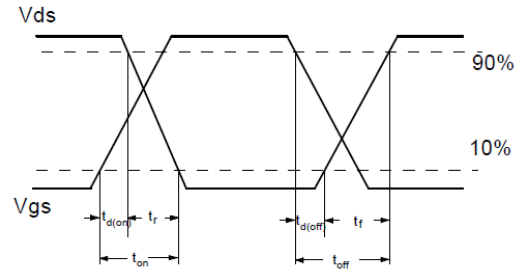
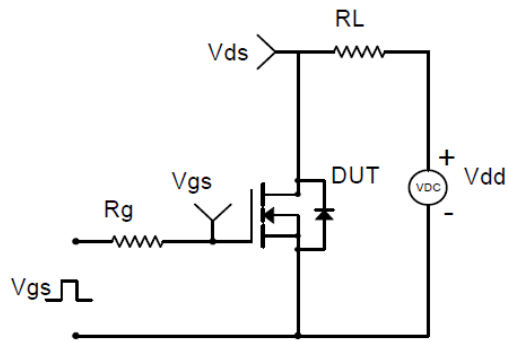
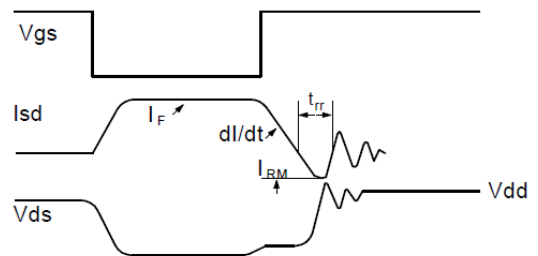
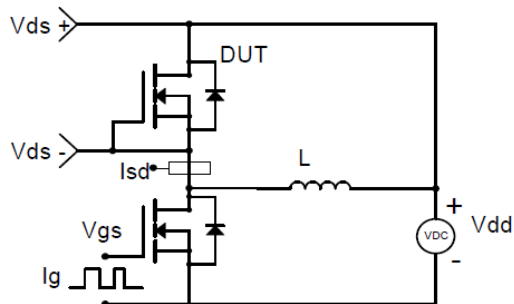


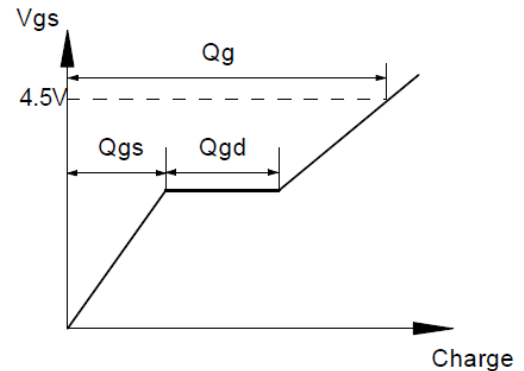
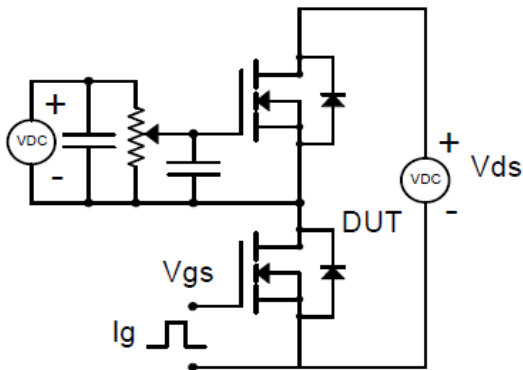
Figure9. Normalized Maximum Transient Thermal Impedance



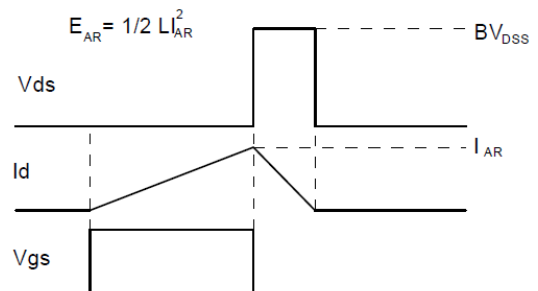
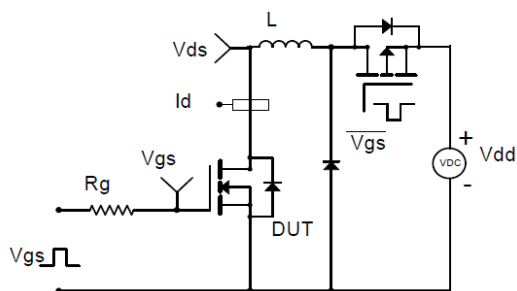
Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

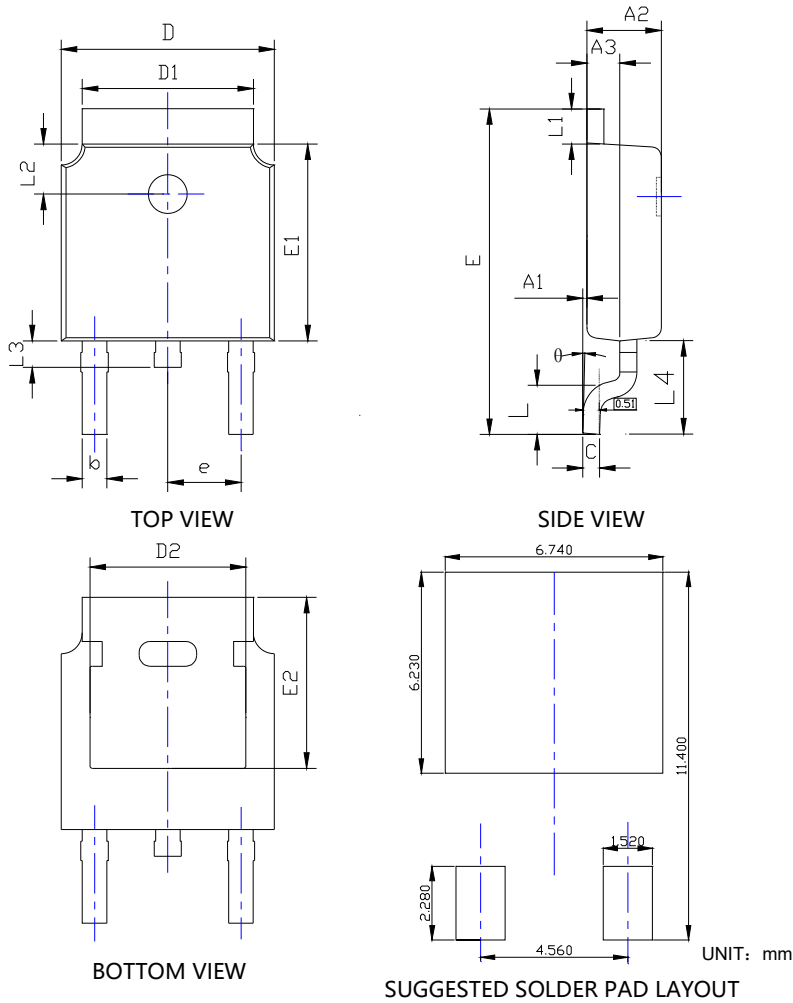


Gate Charge Test Circuit & Waveform



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

■ TO-252-B Package information



SYMBOL	DIMENSIONS					
	INCHES			Millimeter		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A1	0.000	---	0.008	0.000	---	0.200
A2	0.087	0.091	0.094	2.200	2.300	2.400
A3	0.035	0.039	0.043	0.900	1.000	1.100
b	0.026	0.030	0.034	0.660	0.760	0.860
c	0.018	0.020	0.023	0.460	0.520	0.580
D	0.256	0.260	0.264	6.500	6.600	6.700
D1	0.203	0.209	0.215	5.150	5.300	5.450
D2	0.181	0.189	0.195	4.600	4.800	4.950
E	0.390	0.398	0.406	9.900	10.100	10.300
E1	0.236	0.240	0.244	6.000	6.100	6.200
E2	0.203	0.209	0.215	5.150	5.300	5.450
e	0.090BSC			2.286BSC		
L	0.049	0.059	0.069	1.250	1.500	1.750
L1	0.035	---	0.050	0.900	---	1.270
L2	0.055	---	0.075	1.400	---	1.900
L3	0.240	0.310	0.039	0.600	0.800	1.000
L4	0.114REF			2.900REF		
θ	0°	---	10°	0°	---	10°

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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