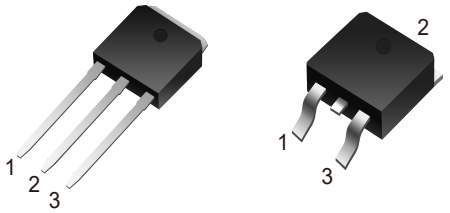
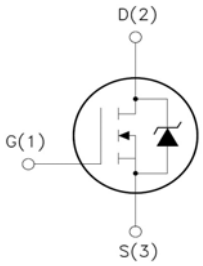
TKU7N70SE/
CTKD7N70SE

TO-251 TO-252



Features:

- ☐ Low Intrinsic Capacitances
- ☐ Excellent Switching Characteristics
- ☐ Extended Safe Operating Area
- ☐ Ultra Low Gate Charge:Qg=30nC (Typ.)
- ☐ VDSS=700V, ID=7A
- ☐ Rds(on):1.19 Ω(Typ.) @VG=10V
- ☐ 100% Avalanche Tested



1.Gate (G)
2.Drain (D)
3.Source (S)

Absolute Maximum Ratings (Ta=25℃ unless otherwise noted)

Symbol	Parameter		Value	Unit
V_{DSS}	Drain-Source Voltage		700	V
I_D	Drain Current	T_j=25℃	7	A
		T_j=100℃	3.9	
$V_{GS(TH)}$	Gate Threshold Voltage		±30	V
E_{AS}	Single Pulse Avalanche Energy (note1)		300	mJ
I_{AR}	Avalanche Current (note2)		7	A
P_D	Power Dissipation (Tj=25℃)		40	W
T_j	Junction Temperature(Max)		150	℃
T_{stg}	Storage Temperature		-55~+150	℃
TL	Maximum lead temperature for soldering purpose,1/8” from case for 5 seconds		300	℃

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JC}$	Thermal Resistance,Junction to Case	-	3.2	℃/W
$R_{\theta JA}$	Thermal Resistance,Junction to Ambient	-	62.5	℃/W

Electrical Characteristics (Ta=25℃ unless otherwise noted)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	I_D=250μA，V_{GS}=0	700	-	-	V
△BVDSS/△TJ	Breakdown Voltage Temperature Coefficient	I_D=250μA ,Reference to 25℃	-	0.6	-	V/℃
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=700V, V_{GS}=0V	-	-	1	μA
		V_{DS}=560V, Tj=125℃			10	
I_{GSSF}	Gate-body leakage Current, Forward	V_{GS}=+30V, V_{DS}=0V	-	-	100	nA
I_{GSSR}	Gate-body leakage Current, Reverse	V_{GS}=-30V, V_{DS}=0V	-	-	-100	
On Characteristics						
$V_{GS(TH)}$	Date Threshold Voltage	I_D=250μA,V_{DS}=V_{GS}	2.0	-	4.0	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	I_D= 3.5 A,V_{GS}=10V	-	1.19	1.5	Ω
Dynamic Characteristics						
Ciss	Input Capacitance	V_{DS}=25V，V_{GS}=0，f=1.0MHz	-	1100	-	pF
Coss	Output Capacitance		-	125	-	
Crss	Reverse Transfer Capacitance		-	15	-	
Switching Characteristics						
Td(on)	Turn-On Delay Time	V_{DD}=350V，I_D=6A R_G=25Ω (Note 3,4)	-	13	35	ns
Tr	Turn-On Rise Time		-	45	100	
Td(off)	Turn-Off Delay Time		-	25	60	
Tf	Turn-Off Rise Time		-	35	80	
Qg	Total Gate Charge	V_{DS}=560V,V_{GS}=10V，I_D=6A (Note 3,4)	-	30	40	nC
Qgs	Gate-Source Charge		-	3.5	-	
Qgd	Gate-Drain Charge		-	6.5	-	
Drain-Source Diode Characteristics and Maximum Ratings						
Is	Max. Diode Forward Current	-	-	-	7	A
I_{SM}	Max. Pulsed Forward Current	-	-	-	24	
V_{SD}	Diode Forward Voltage	I_D=7A	-	-	1.25	V
Trr	Reverse Recovery Time	I_S=7A,V_{GS} =0V diF/dt=100A/μs (Note3)	-	310	-	nS
Qrr	Reverse Recovery Charge		-	2.1	-	μC

Notes : 1, L=27.5mH, IAS=7A, VDD=50V, RG=25Ω, Starting TJ =25°C
2, Repetitive Rating : Pulse width limited by maximum junction temperature
3, Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%
4, Essentially Independent of Operating Temperature

Typical Characteristics

Figure 1. On-Region Characteristics

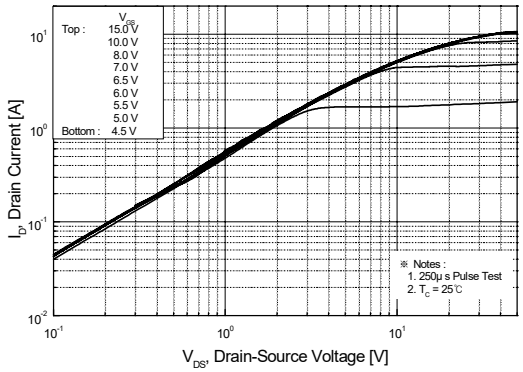


Figure 2. Transfer Characteristics

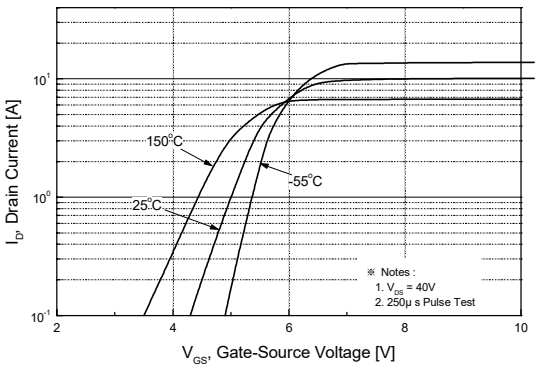


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

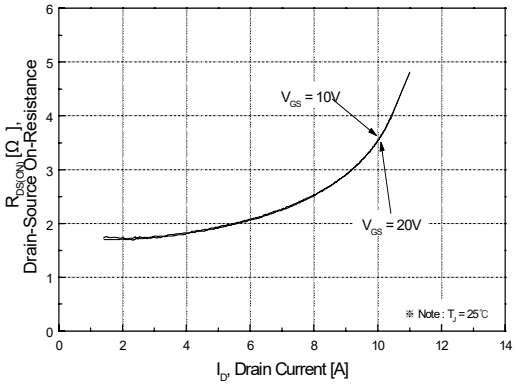


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperatue

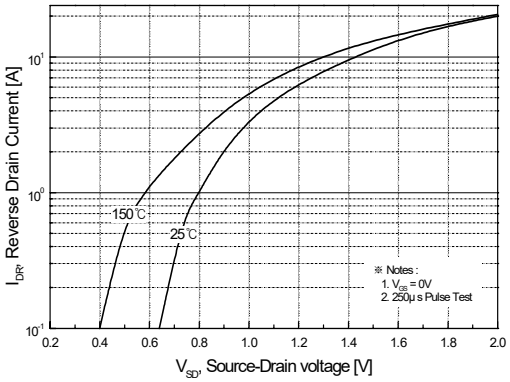


Figure 5. Capacitance Characteristics

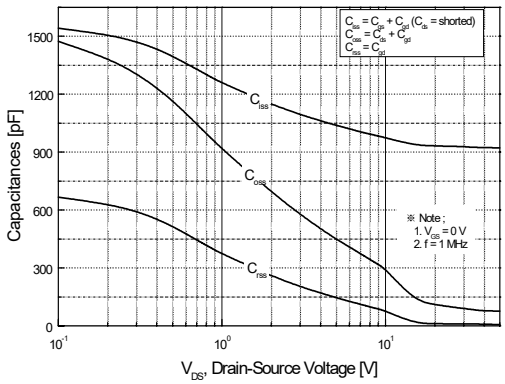
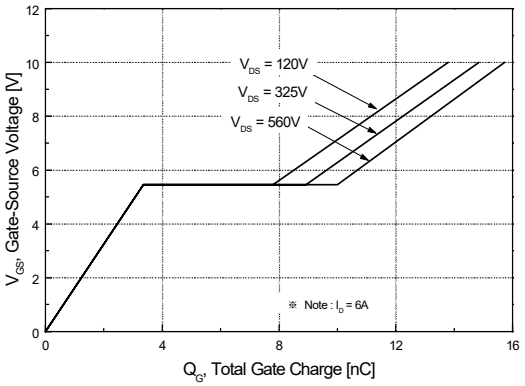


Figure 6. Gate Charge Characteristics



Typical Characteristics (Continued)

Figure 7. Breakdown Voltage Variation vs. Temperature

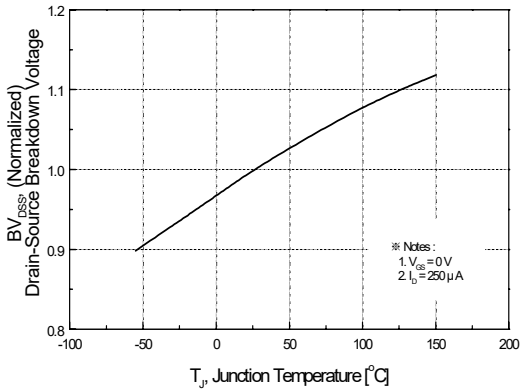


Figure 8. On-Resistance Variation vs. Temperature

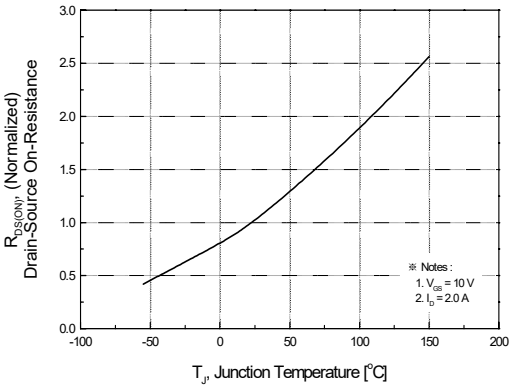


Figure 9. Maximum Safe Operating Area

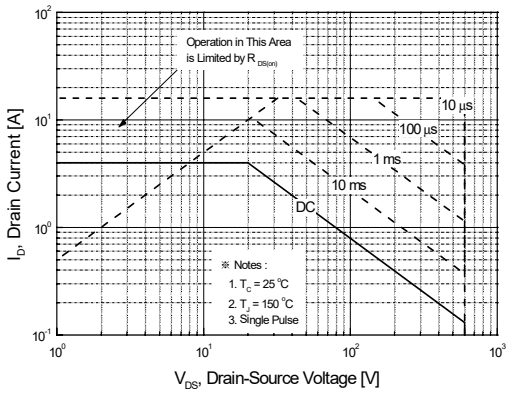


Figure 10. Maximum Drain Current vs. Case Temperature

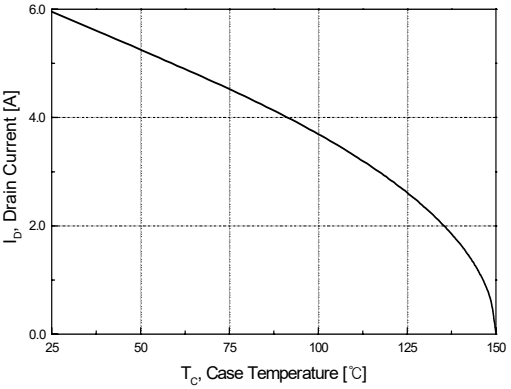
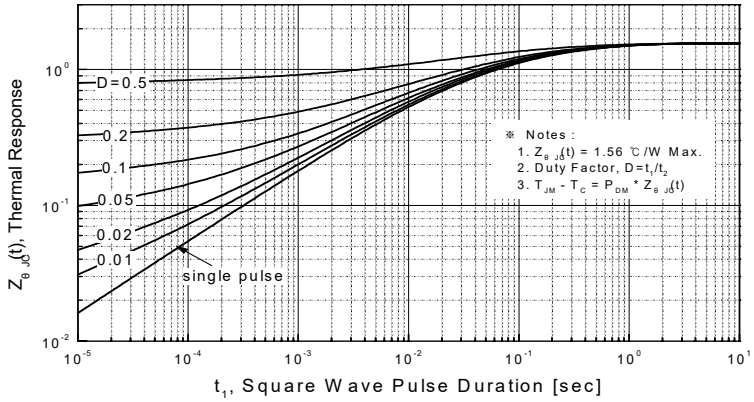
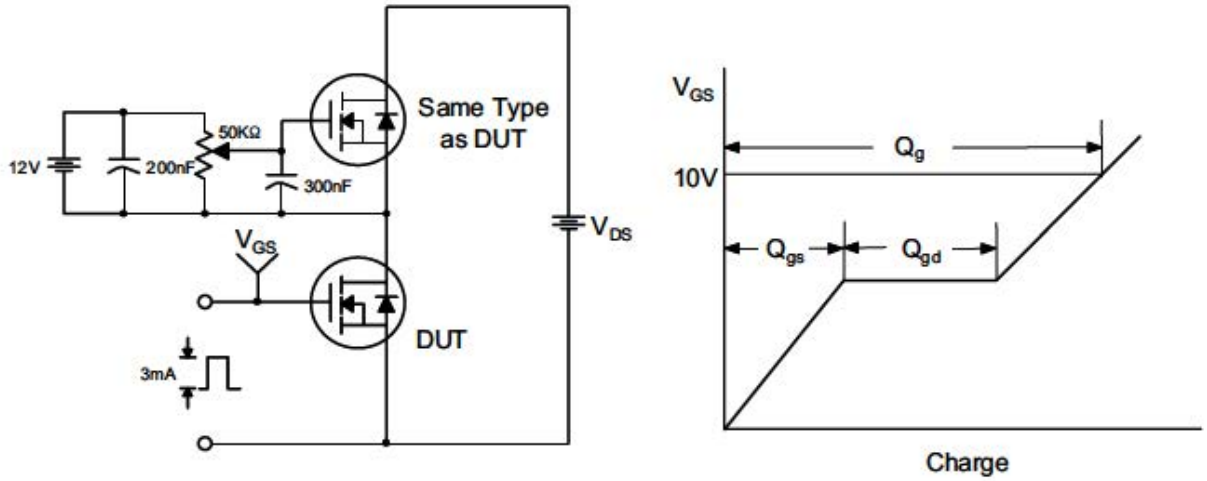


Figure 11 Transient Thermal Response Curve

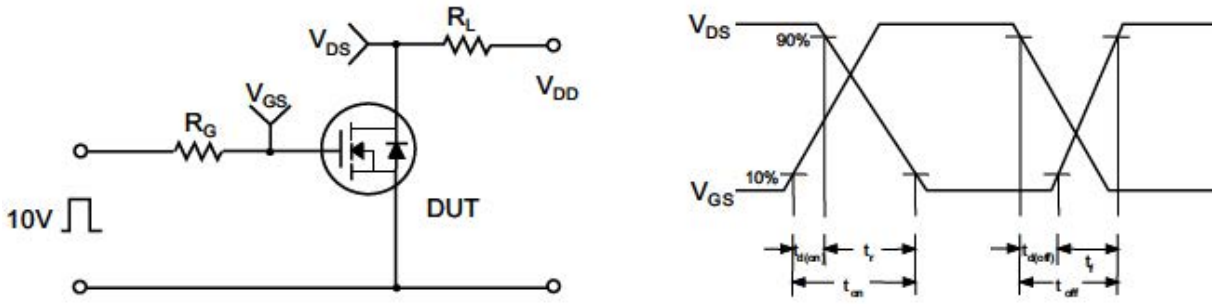


Test circuits

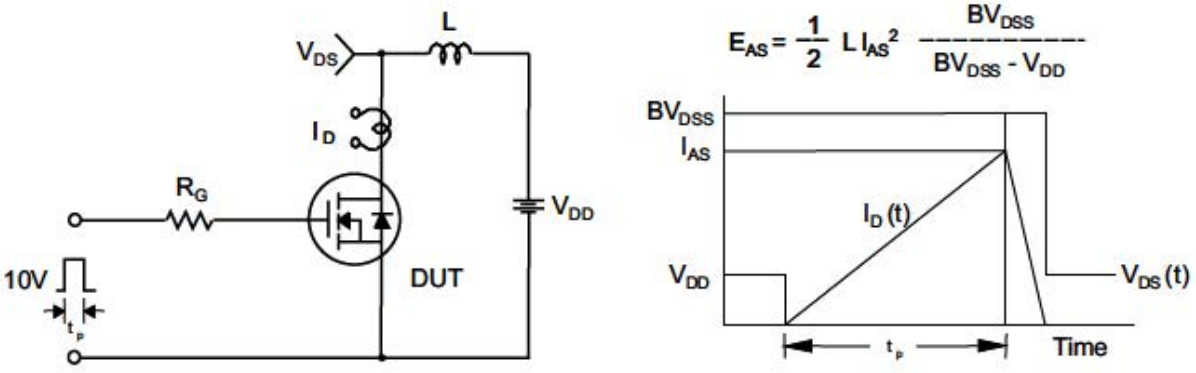
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

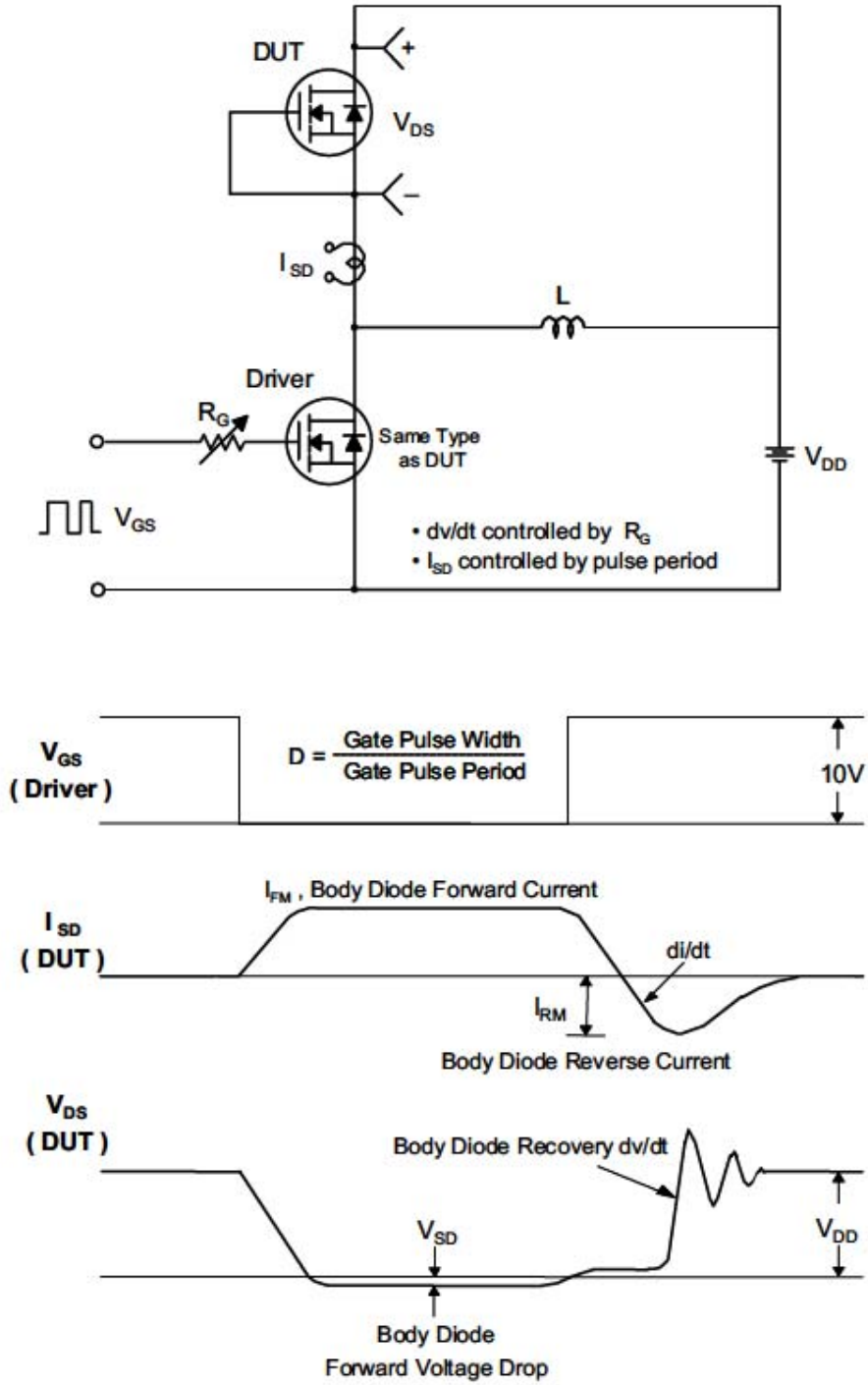


Unclamped Inductive Switching Test Circuit & Waveforms



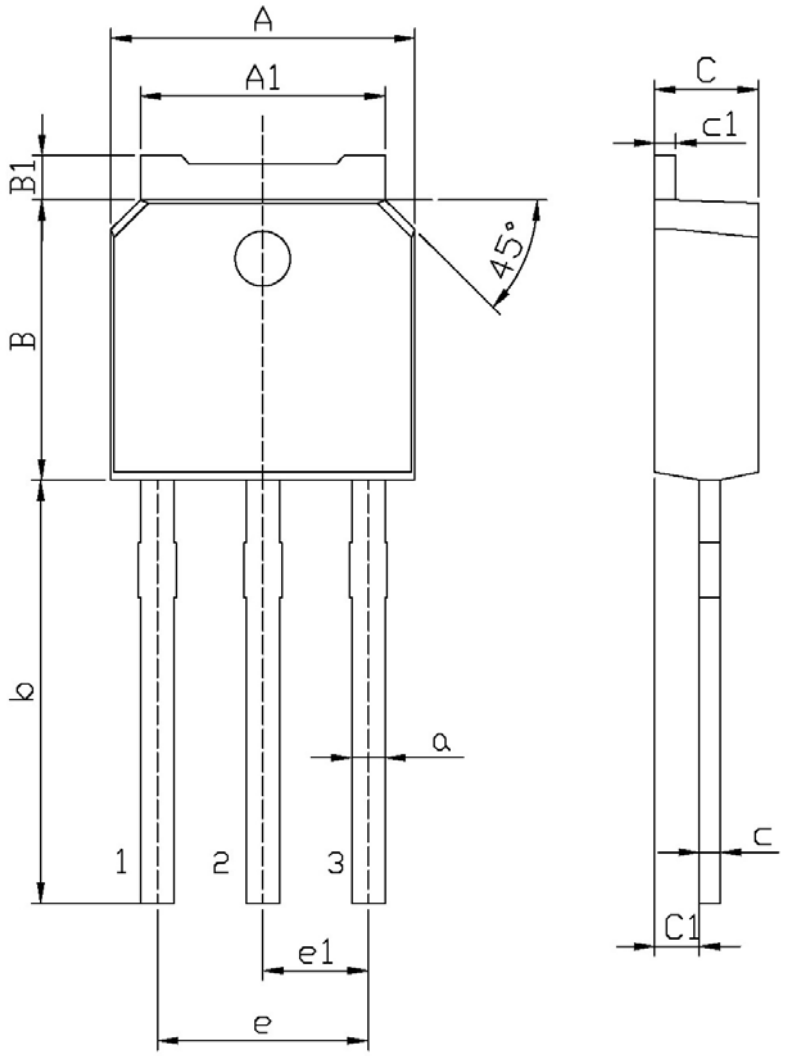
Test circuits (Continued)

Peak Diode Recovery dv/dt Test Circuit & Waveforms



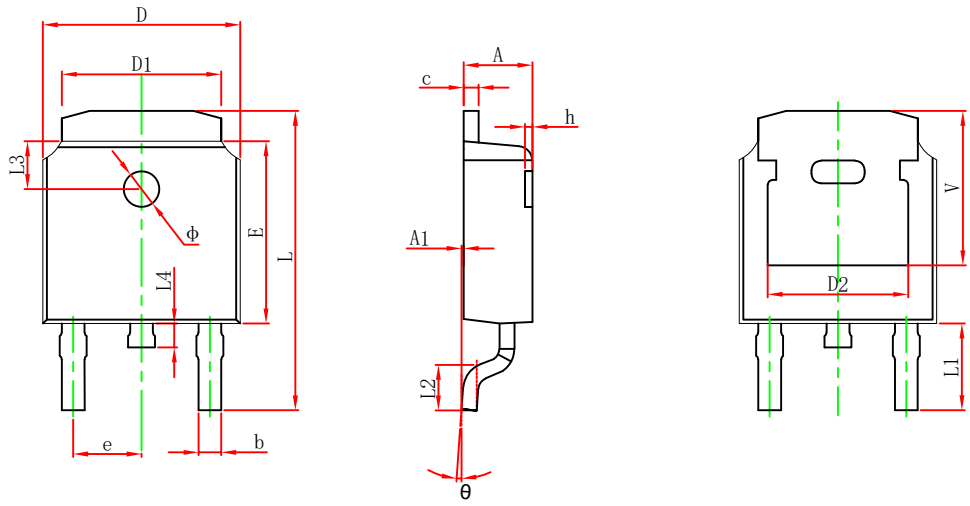
Package Dimension

Unit:mm



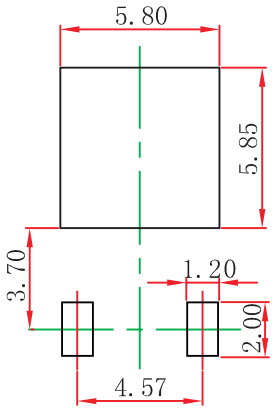
Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min	Max		Min	Max
A	6.45	6.75	a	0.70	0.90
A1	5.20	5.40	b	9.00	9.40
B	5.95	6.25	c	0.45	0.55
B1	0.95	1.25	c1	0.45	0.55
C	2.20	2.40	e1	2.24	2.34
C1	0.95	1.15	e	4.43	4.73

Package Dimension



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.700	0.860	0.025	0.030
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.300	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.712	10.312	0.382	0.406
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.250 REF.		0.207 REF.	

TO-252-2L Suggest Pad Layout



NOTE:

1. Controlling dimension: in millimeters.
2. General tolerance: ±0.05mm.
3. The pad layout is for reference purposes only.