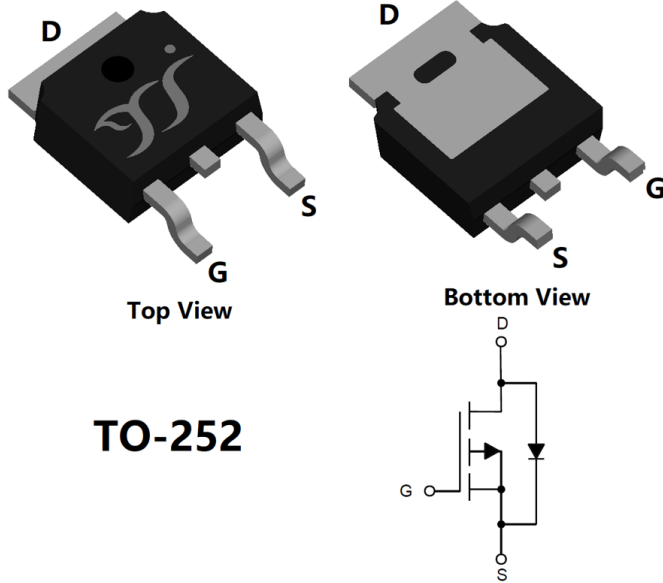


P-Channel Enhancement Mode Field Effect Transistor



TO-252

Product Summary

- V_{DS} -60 V
- I_D -50 A
- $R_{DS(ON)}$ (at $V_{GS}=-10V$) <12 m Ω
- $R_{DS(ON)}$ (at $V_{GS}=-4.5V$) <15 m Ω
- 100% EAS Tested
- 100% ∇V_{DS} Tested

General Description

- Split gate trench MOSFET technology
- Low $R_{DS(on)}$ & FOM
- Extremely low switching loss
- Excellent stability and uniformity
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

Applications

- Power management
- Portable equipment

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

Parameter		Symbol	Limit	Unit
Drain-source Voltage		V_{DS}	-60	V
Gate-source Voltage		V_{GS}	± 20	V
Drain Current	$T_A=25^\circ\text{C}$	I_D	-8	A
	$T_A=100^\circ\text{C}$		-5	
	$T_C=25^\circ\text{C}$		-50	
	$T_C=100^\circ\text{C}$		-31	
Pulsed Drain Current ^A		I_{DM}	-200	A
Avalanche energy ^B		EAS	169	mJ
Total Power Dissipation ^C	$T_A=25^\circ\text{C}$	P_D	2	W
	$T_A=100^\circ\text{C}$		0.8	
	$T_C=25^\circ\text{C}$		89	
	$T_C=100^\circ\text{C}$		35	
Junction and Storage Temperature Range		T_J, T_{STG}	-55~+150	$^\circ\text{C}$

■ Thermal resistance

Parameter		Symbol	Typ	Max	Units
Thermal Resistance Junction-to-Ambient ^D	Steady-State	$R_{\theta JA}$	50	60	$^\circ\text{C/W}$
Thermal Resistance Junction-to-Case	Steady-State	$R_{\theta JC}$	1.2	1.4	

■ Ordering Information (Example)

PREFERRED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
YJD50GP06A	F1/F2	YJD50GP06A	2500	/	25000	13" reel



YJD50GP06A

■ 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	-60	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-60V, V _{GS} =0V	-	-	-1	μA
		V _{DS} =-60V, V _{GS} =0V, T _J =150°C	-	-	-100	
Gate-Body Leakage Current	I _{GSS}	V _{GS} = ±20V, V _{DS} =0V	-	-	±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D =-250μA	-1	-2	-3	V
Static Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =-10V, I _D =-25A	-	9	12	mΩ
		V _{GS} =-10V, I _D =-20A	-	9	12	
		V _{GS} =-4.5V, I _D =-20A	-	11	15	
Diode Forward Voltage	V _{SD}	I _S =-25A, V _{GS} =0V	-	-0.9	-1.2	V
Gate resistance	R _G	f=1MHz, Open drain	-	8.5	-	Ω
Maximum Body-Diode Continuous Current	I _S		-	-	-50	A
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{DS} =-30V, V _{GS} =0V, f=1MHz	-	4260	-	pF
Output Capacitance	C _{oss}		-	690	-	
Reverse Transfer Capacitance	C _{rss}		-	145	-	
Switching Parameters						
Total Gate Charge	Q _g	V _{GS} =-10V, V _{DS} =-30V, I _D =-25A	-	79	-	nC
Gate-Source Charge	Q _{gs}		-	18	-	
Gate-Drain Charge	Q _{gd}		-	18	-	
Reverse Recovery Charge	Q _{rr}	I _F =-25A, di/dt=100A/us	-	96	-	nC
Reverse Recovery Time	t _{rr}		-	52	-	ns
Turn-on Delay Time	t _{D(on)}	V _{GS} =-10V, V _{DD} =-30V, I _D =-25A R _{GEN} =3Ω	-	17	-	ns
Turn-on Rise Time	t _r		-	88	-	
Turn-off Delay Time	t _{D(off)}		-	120	-	
Turn-off fall Time	t _f		-	110	-	

A. Repetitive rating; pulse width limited by max. junction temperature.

B. T_J=25°C, V_{DD}=-50V, V_G=-10V, R_G=25Ω, L=0.5mH, I_{AS}=-26A.

C. P_d is based on max. junction temperature, using junction-case and junction-ambient thermal resistance.

D. The value of RθJA is measured with the device mounted on the minimum recommend pad size, in the still air environment with T_A =25°C. The maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.



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Typical Electrical and Thermal Characteristics Diagrams

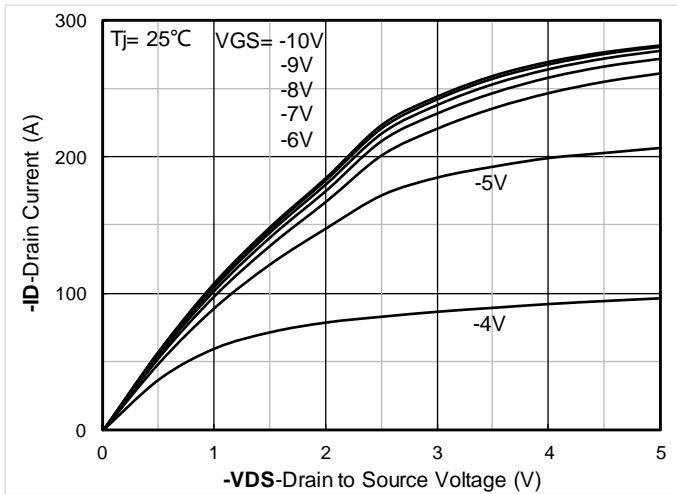


Figure 1. Output Characteristics

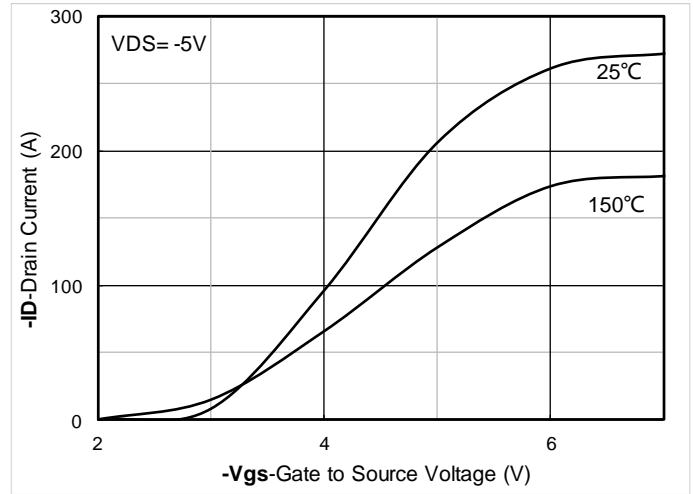


Figure 2. Transfer Characteristics

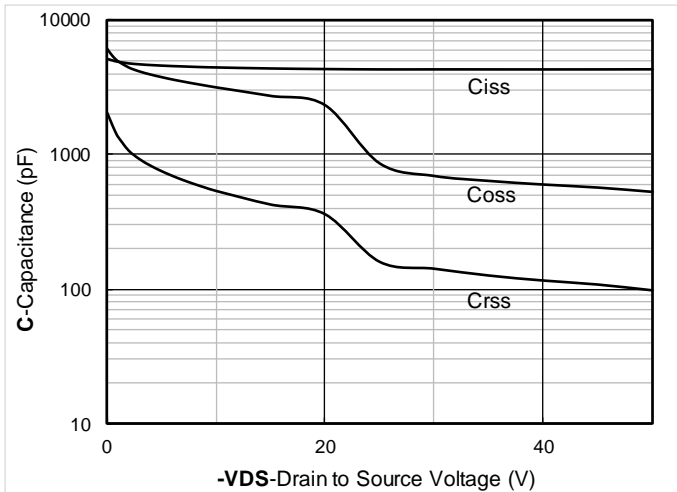


Figure 3. Capacitance Characteristics

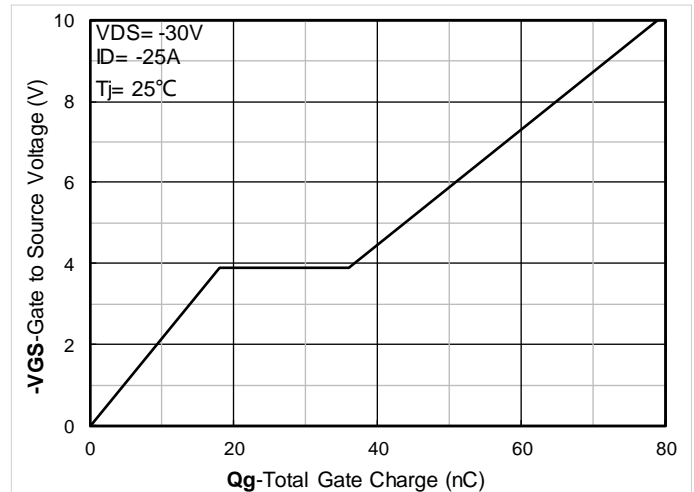


Figure 4. Gate Charge

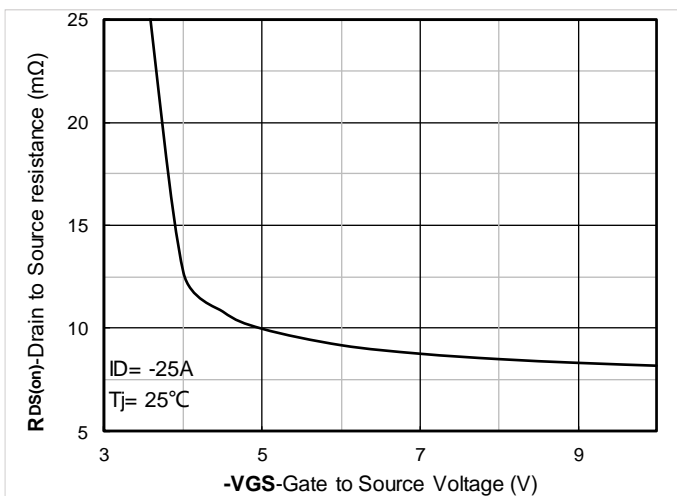


Figure 5. On-Resistance vs Gate to Source Voltage

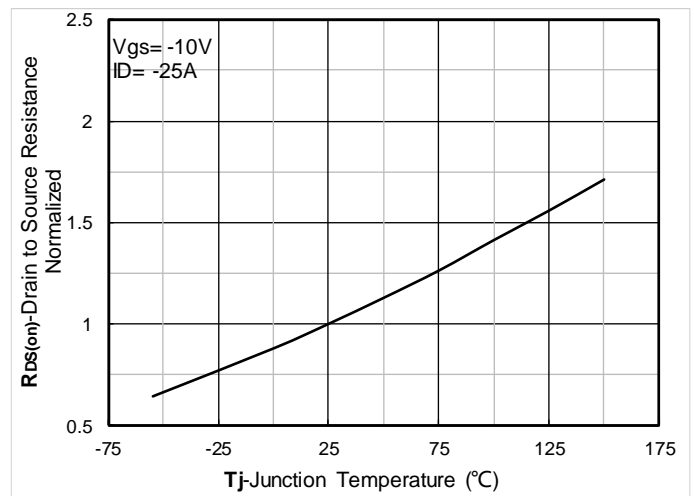


Figure 6. Normalized On-Resistance



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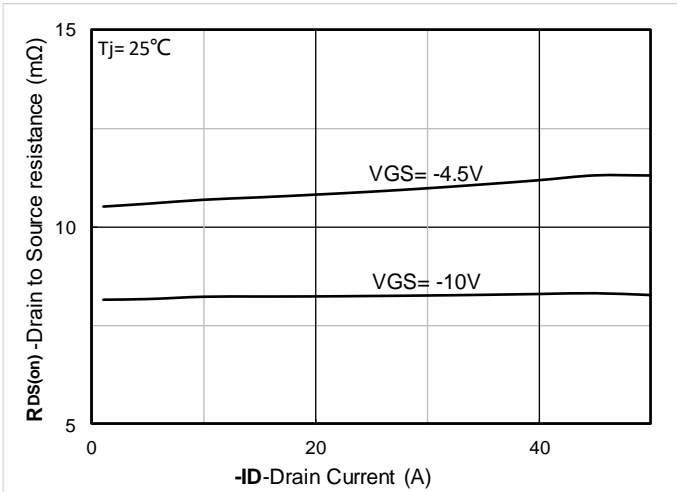


Figure 7. $R_{DS(on)}$ VS Drain Current

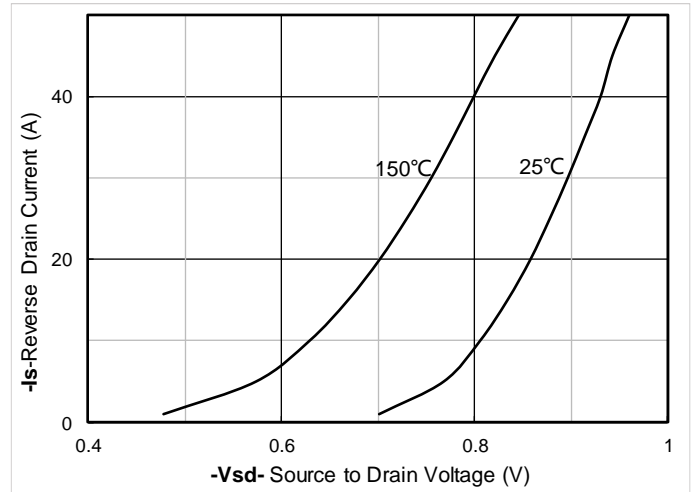


Figure 8. Forward characteristics of reverse diode

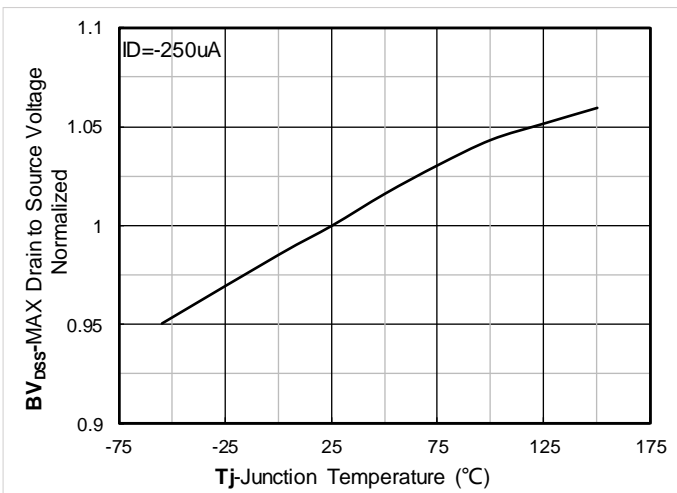


Figure 9. Normalized breakdown voltage

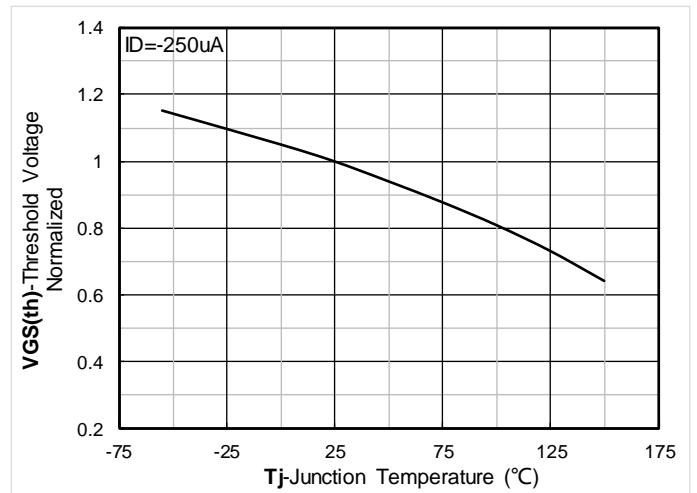


Figure 10. Normalized Threshold voltage

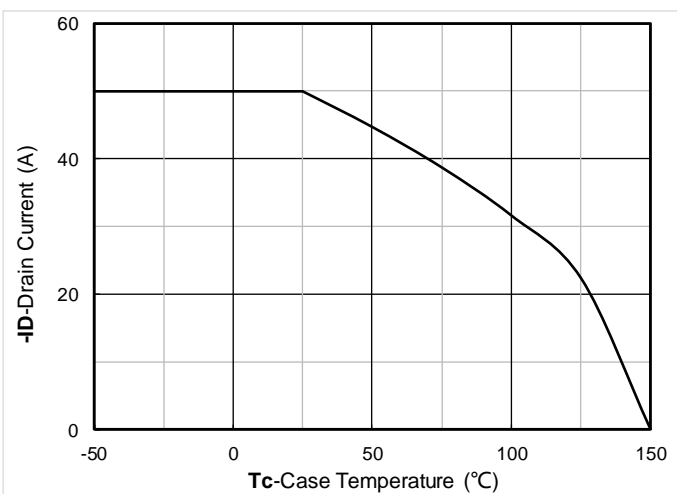


Figure 11. Current dissipation

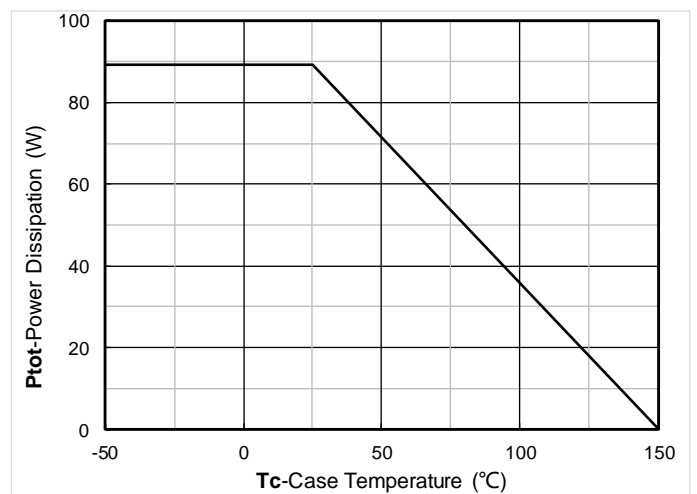


Figure 12. Power dissipation



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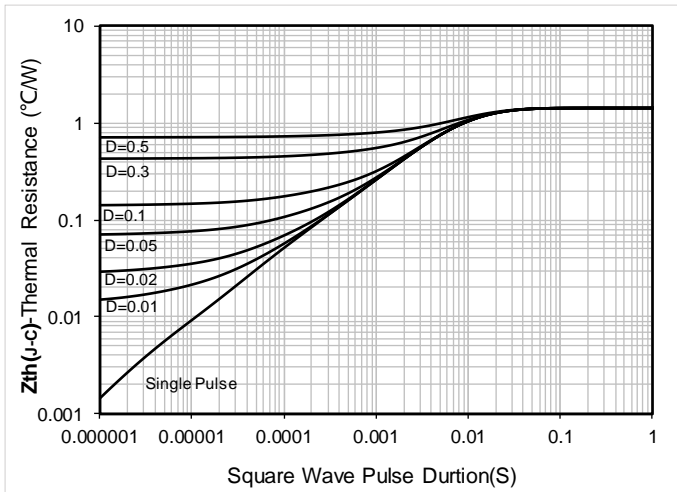


Figure 13. Maximum Transient Thermal Impedance

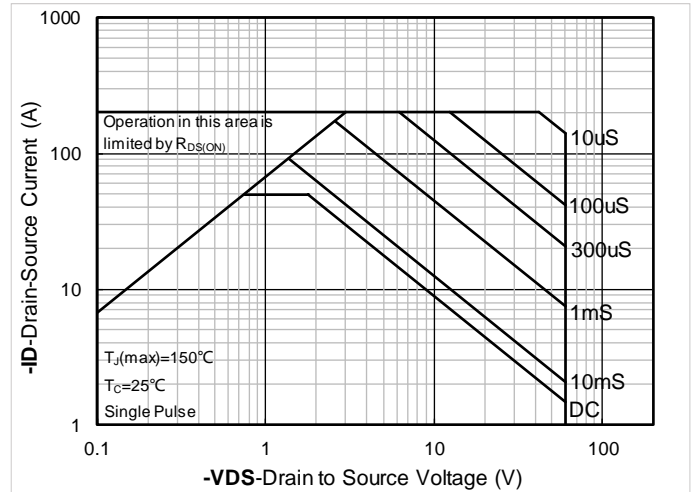
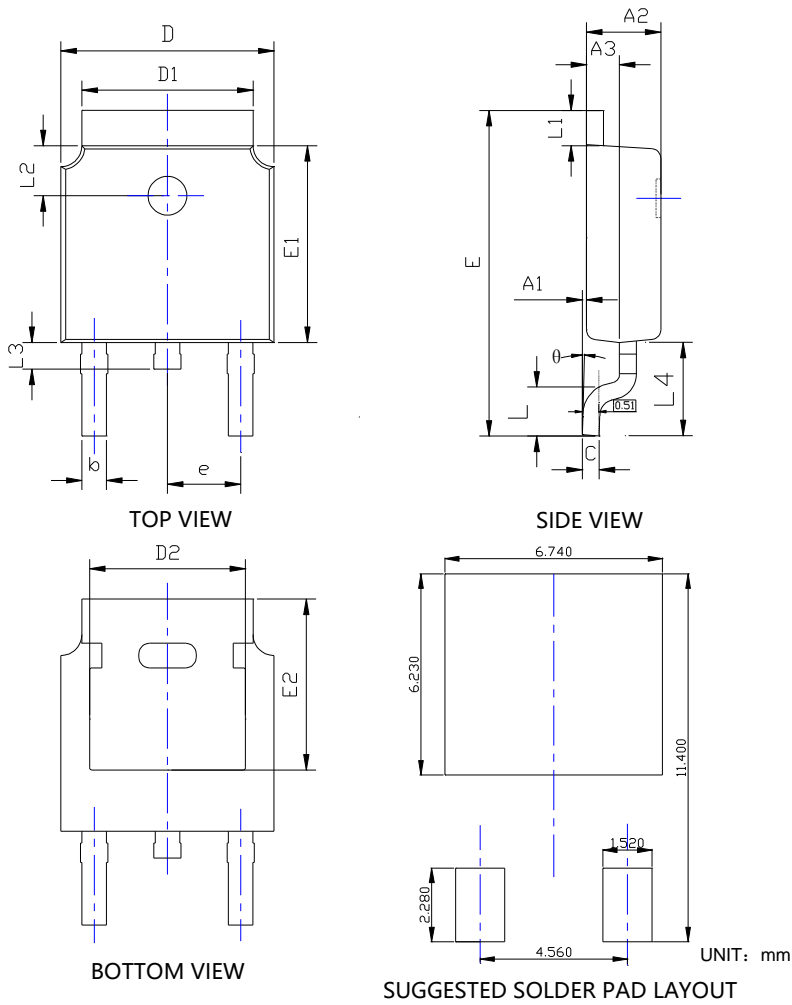


Figure 14. Safe Operation Area



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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.



YJD50GP06A

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