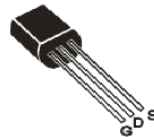


1.Features

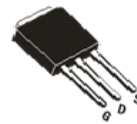
- $V_{DS(V)}=600V$
- $I_D=1A$
- $R_{DS(ON)}=11\Omega$

2.Pinning information

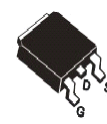
Pin	Symbol	Description
1	G	GATE
2	D	DRAIN
3	S	SOURCE



TO-92



TO-251S



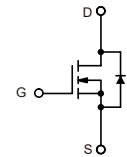
TO-252



TO-251



TO-223



N-Channel

3.Absolute Maximum Ratings $T_c=25^\circ C$

Parameter		Symbol	Rating	Units
Drain-source Voltage		V_{DS}	600	V
gate-source Voltage		V_{GS}	± 30	V
Continuous Drain Current	$T_c=25^\circ C$	I_D	1*	A
Continuous Drain Current	$T_c=100^\circ C$	I_D	0.6*	A
Drain Current - Pulsed ①		I_{DM}	4*	A
Power Dissipation ($T_A=25^\circ C$)	TO-92	P_D	12.5	W
	TO-223		8	W
	TO-251/251S/252		27	W
Junction Temperature		T_J	150	$^\circ C$
Storage Temperature		T_{STG}	-55 to 150	$^\circ C$
Single Pulse Avalanche Energy ②		E_{AS}	14	mJ

Notes: *Drain current limited by maximum junction temperature



4. Thermal resistance rating

Parameter	Symbol	MAX		Units
		TO-92	TO-251T/251S/252/223	
Thermal Resistance Junction-lead	R_{thJL}	41.67	4.46	°C/W
Thermal Resistance Junction-ambient	R_{thJA}	140	110	°C/W



5. Electrical Characteristic (T_c=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units	
Drain-source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	600			V	
Breakdown Voltage Temperature Coefficient	$\frac{\Delta BV_{DSS}}{\Delta T_J}$	I _D =250μA Referenced to 25°C		0.6		V/°C	
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	2		4	V	
Drain-source Leakage Current	I _{DSS}	V _{DS} =600V, V _{GS} =0V, T _J =25°C			25	μA	
		V _{DS} =480V, V _{GS} =0V, T _J =125°C			250	μA	
Forward Transconductance	g _{fs}	V _{GS} =40V, I _D =0.5A ③	0.5			S	
Gate-body Leakage Current (V _{DS} =0)	I _{GSS}	V _{GS} =±30V			±100	nA	
Static Drain-source On Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =0.5A ③		8.5	11	Ω	
Input capacitance	C _{iss}	V _{GS} =0V, V _{DS} =25V, f=1MHz		150		pF	
Output capacitance	C _{oss}				25		pF
Reverse transfer capacitance	C _{rss}				5.4		pF
Turn -Off Delay Time	t _{D(off)}	V _{DD} =300V, I _D =1A, R _G =25Ω ③		13		ns	
Total Gate Charge	Q _g	I _D =1A, V _{DS} =480V, V _{GS} =10V ③		4.8		nC	
Gate-to-Source Charge	Q _{gs}				0.7		nC
Gate-to-Drain Charge	Q _{gd}				2.7		nC
Continuous Diode Forward Current	I _S				1	A	
Diode Forward Voltage	V _{SD}	T _J =25°C, I _S =0.5A, V _{GS} =0V ③			1.4	V	
Reverse Recovery Time	t _{rr}	T _J =25°C, I _F =1A		190		ns	
Reverse Recovery Charge	Q _{rr}	di/dt=100A/μs ③		0.53		nC	

Notes:

- ① Repetitive rating: Pulse width limited by maximum junction temperature.
- ② T_J=25°C, V_{DD}=50V, L=30mH, R_G=25Ω, I_{AS}=1.0A, Starting T_J=25°C, V_{DD}=50V, L=30mH, R_G=25Ω, I_{AS}=1A.
- ③ Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%.

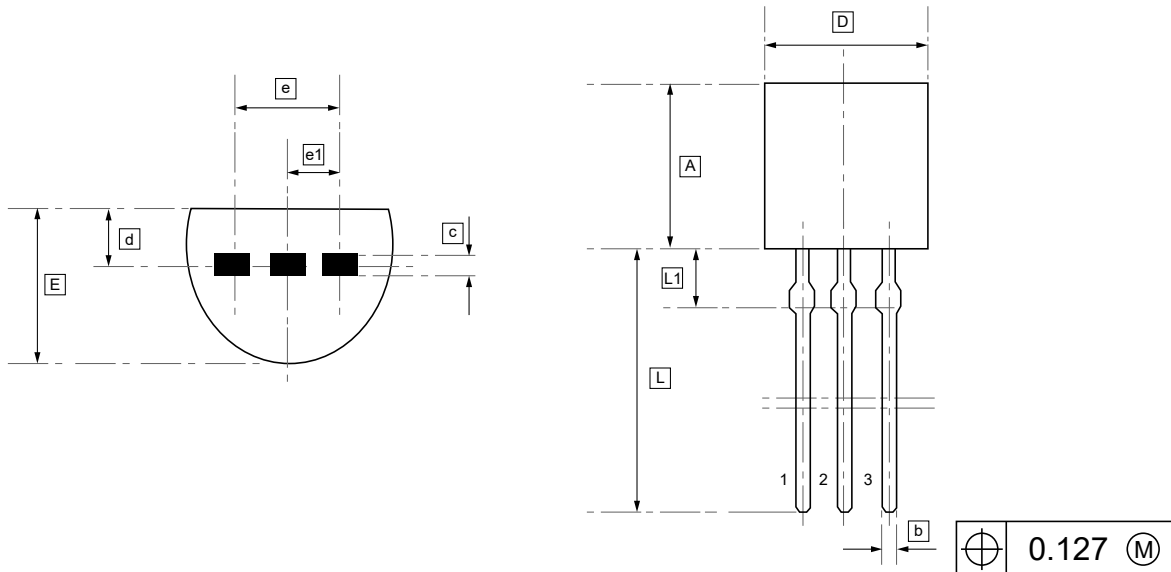


6. Typical characteristic

<p style="text-align: center;">$I_{D, Drain Current (A)}$</p> <p style="text-align: center;">$V_{DS, Drain to Source Voltage (V)}$</p>	<p style="text-align: center;">$I_{D, Drain Current (A)}$</p> <p style="text-align: center;">$V_{DS, Drain to Source Voltage (V)}$</p>
<p>Figure 1: Typical Output Characteristics, $T_c=25^\circ C$</p>	<p>Figure 2: Typical Output Characteristics, $T_c=150^\circ C$</p>
<p style="text-align: center;">$R_{DS(on), Drain to Source On Resistance (Normalized)}$</p> <p style="text-align: center;">$T_J, Junction Temperature (^\circ C)$</p>	<p style="text-align: center;">$I_{SD, Reverse Drain Current (A)}$</p> <p style="text-align: center;">$V_{SD, Source to Drain Voltage (V)}$</p>
<p>Figure 3: Normalized On-Resistance Vs. Temperature</p>	<p>Figure 4: Typical Source-Drain Diode Forward Voltage</p>
<p style="text-align: center;">$I_{D, Drain Current (A)}$</p> <p style="text-align: center;">$T_C, Case Temperature (^\circ C)$</p>	
<p>Figure 5: Maximum Drain Current Vs. Case Temperature</p>	



7.1 TO-92 Package Outline Dimensions

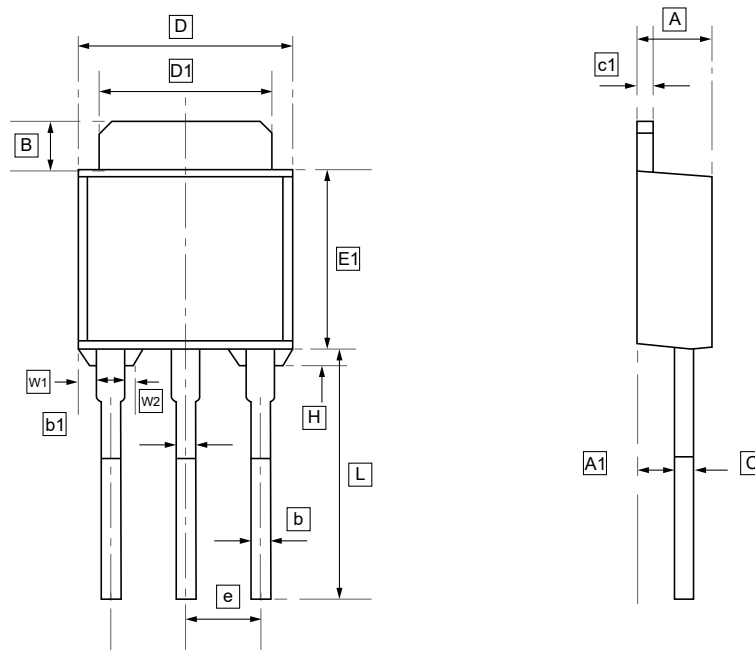


DIMENSIONS (mm are the original dimensions)

Symbol	A	b	c	D	d	E	e	e1	L	L1
Min	4.30	0.30	0.30	4.30	1.00	3.20	2.54	1.27	12.70	1.50
Max	5.30	0.55	0.50	5.20	1.70	4.20			15.00	2.00



7.2 TO-251T (IPAK) Package Outline Dimensions

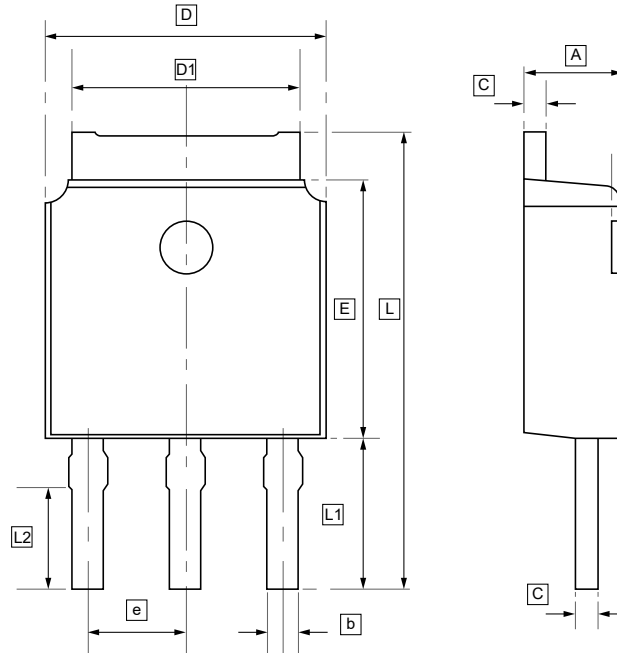


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	B	b	b1	c	c1	D	D1	E	e	L	H	W1	W2
Min	2.10	0.95	0.80	0.50	0.70	0.45	0.45	6.35	5.10	5.30	2.25	7.00	0.35	0.30	0.20
Max	2.50	1.30	1.25	0.80	0.80	0.70	0.70	6.80	5.50	6.30	2.35	9.20	0.45	0.50	0.40



7.3 TO-251S Package Outline Dimensions

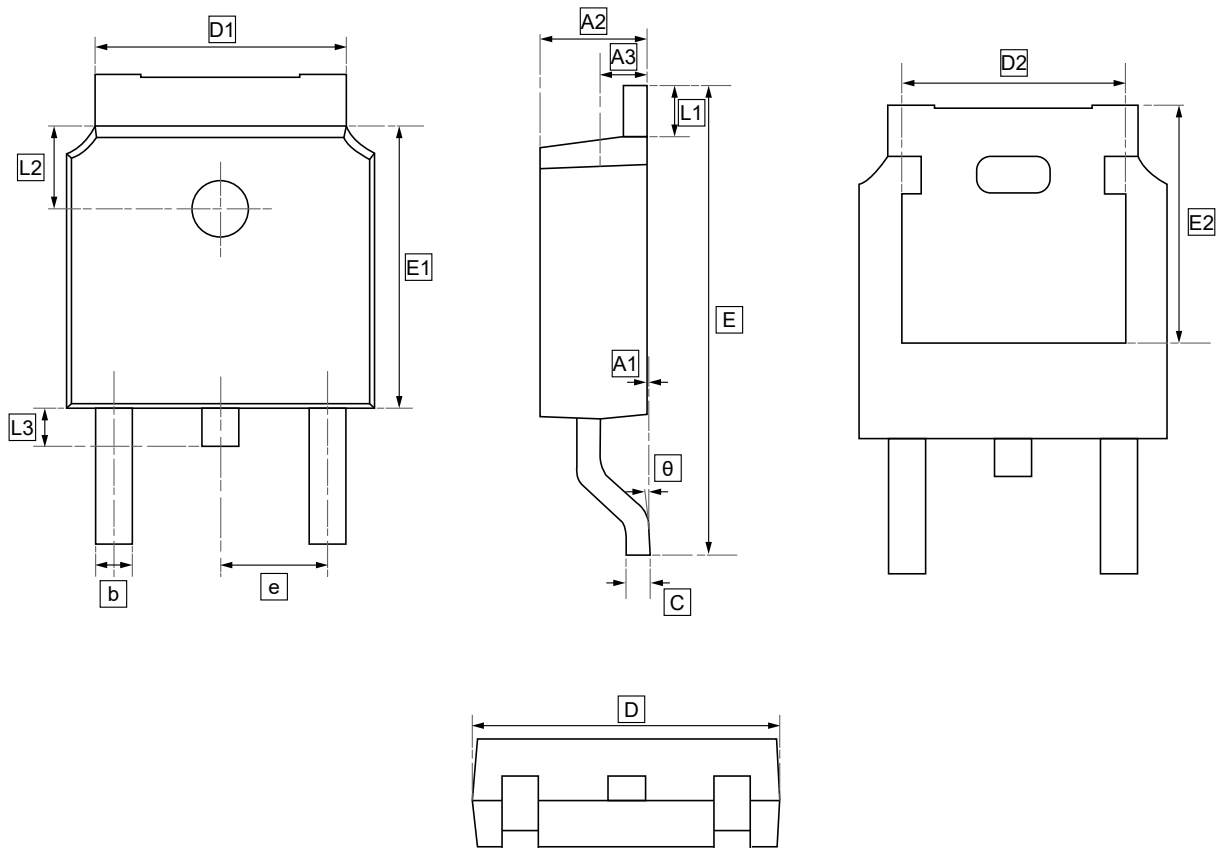


DIMENSIONS (mm are the original dimensions)

Symbol	A	b	C	D	D1	E	e	L	L1	L2
Min	2.20	0.60	0.45	6.50	5.10	5.9	2.18	11.00	4.8	3.5
Max	2.40	0.85	0.60	6.70	5.50	6.20	2.38	12.40	5.3	4.2



7.4 TO-252 Package Outline Dimensions

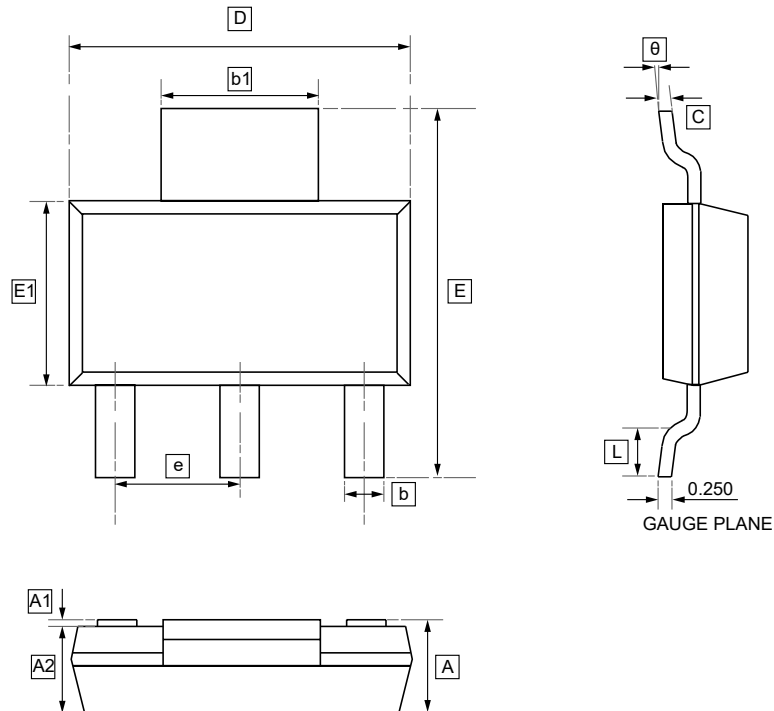


DIMENSIONS (mm are the original dimensions)

Symbol	A1	A2	A3	b	c	D	D1	D2	E	E1	E2	e	L1	L2	L3	θ
Min	0.00	2.18	0.90	0.65	0.46	6.35	4.95	4.32	9.40	5.97	5.21	2.286	0.89	1.70	0.60	0.00
Max	0.13	2.39	1.10	0.85	0.61	6.73	5.46	4.90	10.41	6.22	5.38		BSC	1.27	1.90	1.00



7.5 SOT-223 Package Outline Dimensions

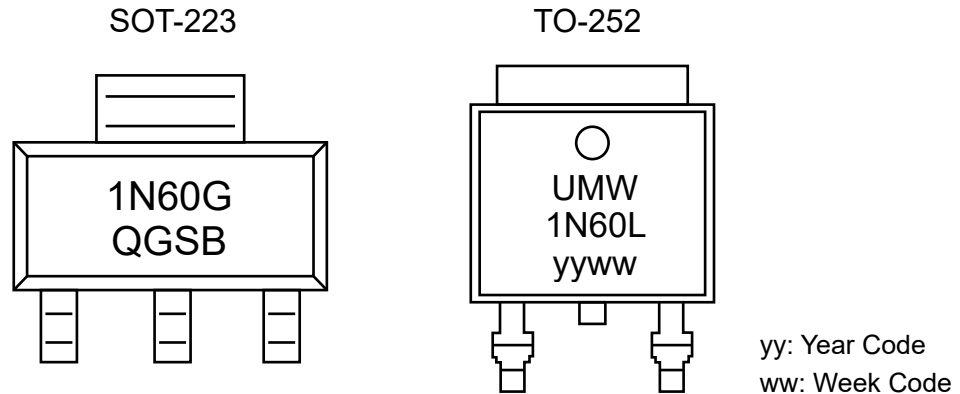


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	b1	c	D	E	E1	e	L	θ
Min	-	0.020	1.500	0.660	2.900	0.230	6.300	6.700	3.300	2.300	0.750	0°
Max	1.800	0.100	1.700	0.840	3.100	0.350	6.700	7.300	3.700	BSC	-	10°



8. Ordering information



Order Code	Marking code	Package	Base QTY	Delivery Mode
UMW 1N60G	1N60G	SOT-223	2500	Tape and reel
UMW 1N60L	1N60L	TO-252	2500	Tape and reel



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