

1.Description

The Power MOSFET is fabricated using the advanced planar VDMOS technology. The resulting device has low conduction resistance, superior switching performance and high avalanche energy.

2.2Features

- Low $R_{DS(ON)}$
- Low gate charge (typ. $Q_g=12.8nC$)

2.1Features

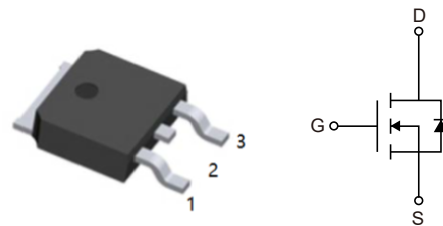
- $V_{DSS}=500V$
- $I_D=5A$
- $R_{DS(ON)}=1.6\Omega$

- 100% UIS tested
- RoHS compliant

3.Pinning information

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

TO-252(DPAK)
top view



4.Absolute Maximum Ratings $T_A=25^{\circ}C$

Parameter		Symbol	Rating	Units
Drain-Source Voltage		V_{DSS}	500	V
Continuous drain current	$T_C=25^{\circ}C$	I_D	5	A
	$T_C=100^{\circ}C$		3.1	
Pulsed drain current ¹⁾		I_{DM}	20	
Gate-Source voltage		V_{GSS}	± 30	V
Avalanche energy, single pulse ²⁾		E_{AS}	210	mJ
Peak diode recovery dv/dt ³⁾		dv/dt	5	V/ns



Power Dissipation TO-220F (T _c =25°C)	P _D	30	W
Derate above 25°C		0.24	W/°C
Power Dissipation TO-220\TO-251\TO-252(T _c =25°C)		75	W
Derate above 25°C		0.6	W/°C
storage temperature range	T _J , T _{STG}	-55 to 150	°C
Continuous diode forward current	I _S	5	A
Diode pulse current	I _{S,pulse}	20	A

5.Thermal resistance rating

Parameter	Symbol	Value	Units
Thermal Resistance,Junction-to-Case	R _{θJC}	1.67	°C/W
Thermal Resistance, Junction-to-Ambient	R _{θJA}	110	°C/W



6.SPECIFICATIONS (T_c= 25°C, unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=0.25mA$	500			V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=0.25mA$	2		4	V
Drain cut-off current	I_{DSS}	$V_{GS}=500V, V_{GS}=0V, T_J=25^{\circ}C$			1	μA
		$T_J=125^{\circ}C$			100	μA
Gate leakage current, Forward	I_{GSSF}	$V_{GS}=30V, V_{DS}=0V$			100	nA
Gate leakage current, Reverse	I_{GSSR}	$V_{GS}=-30V, V_{DS}=0V$			-100	nA
Drain-source on-state resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=2.5A$		1.35	1.6	Ω
Dynamic characteristics						
Input Capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V, f=1MHz$		537.5		pF
Output Capacitance	C_{oss}			80.3		pF
Reverse Transfer Capacitance	C_{rss}			4		pF
Turn-On Delay Time	$t_{D(on)}$	$V_{DD}=250V, I_D=5A$ $R_G=10V\Omega, V_{GS}=15V$		10.3		ns
Rise Time	t_r			33.1		ns
Turn-Off Delay Time	$t_{D(off)}$			29.4		ns
Fall Time	t_f			13.2		ns
Gate charge characteristics						
Gate to source charge	Q_{gs}	$V_{DD}=400V, I_D=5A, V_{GS}=0 \text{ to } 0V$		3.9		nC
Gate to drain charge	Q_{gd}			4.6		nC
Gate charge total	Q_g			12.8		nC
Gate plateau voltage	$V_{plateau}$			5		V
Reverse diode characteristics						
Diode forward voltage	V_{SD}	$V_{GS}=0V, I_F=5A$			1.5	V
Reverse recovery time	t_{rr}	$V_R=250V, I_F=5A$ $dI_F/dt=100A/\mu s$		319.2		ns
Reverse recovery charge	Q_{rr}			1.6		μC
Peak reverse recovery current	I_{rrm}			10.2		A

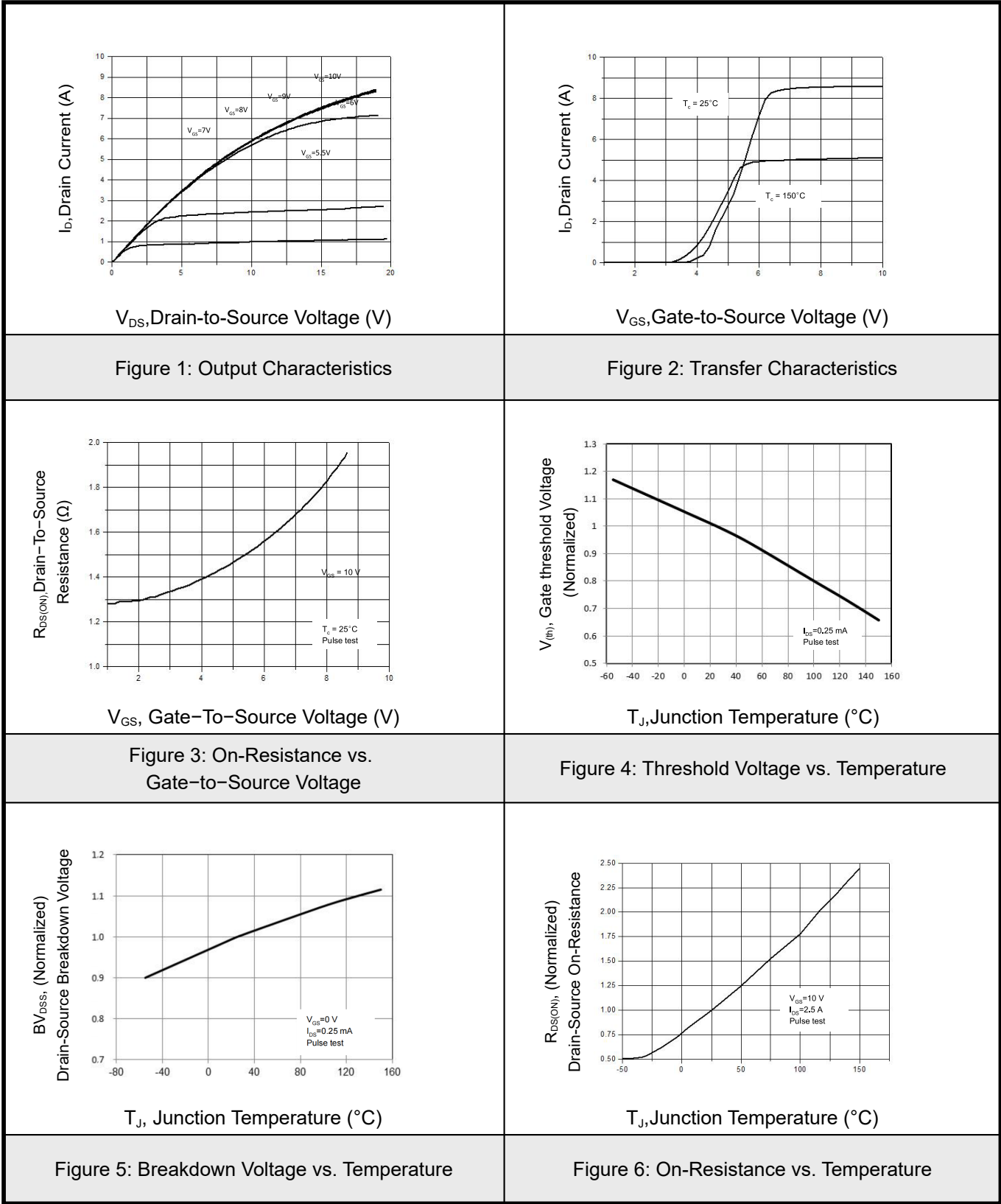


Notes:

1. Pulse width limited by maximum junction temperature.
2. $L=10\text{mH}$, $I_{AS}=6.5\text{A}$, Starting $T_J=25^\circ\text{C}$.
3. $I_{SD}=5\text{A}$, $di/dt \leq 100\text{A/us}$, $V_{DD} \leq BV_{DS}$, Starting $T_J=25^\circ\text{C}$.

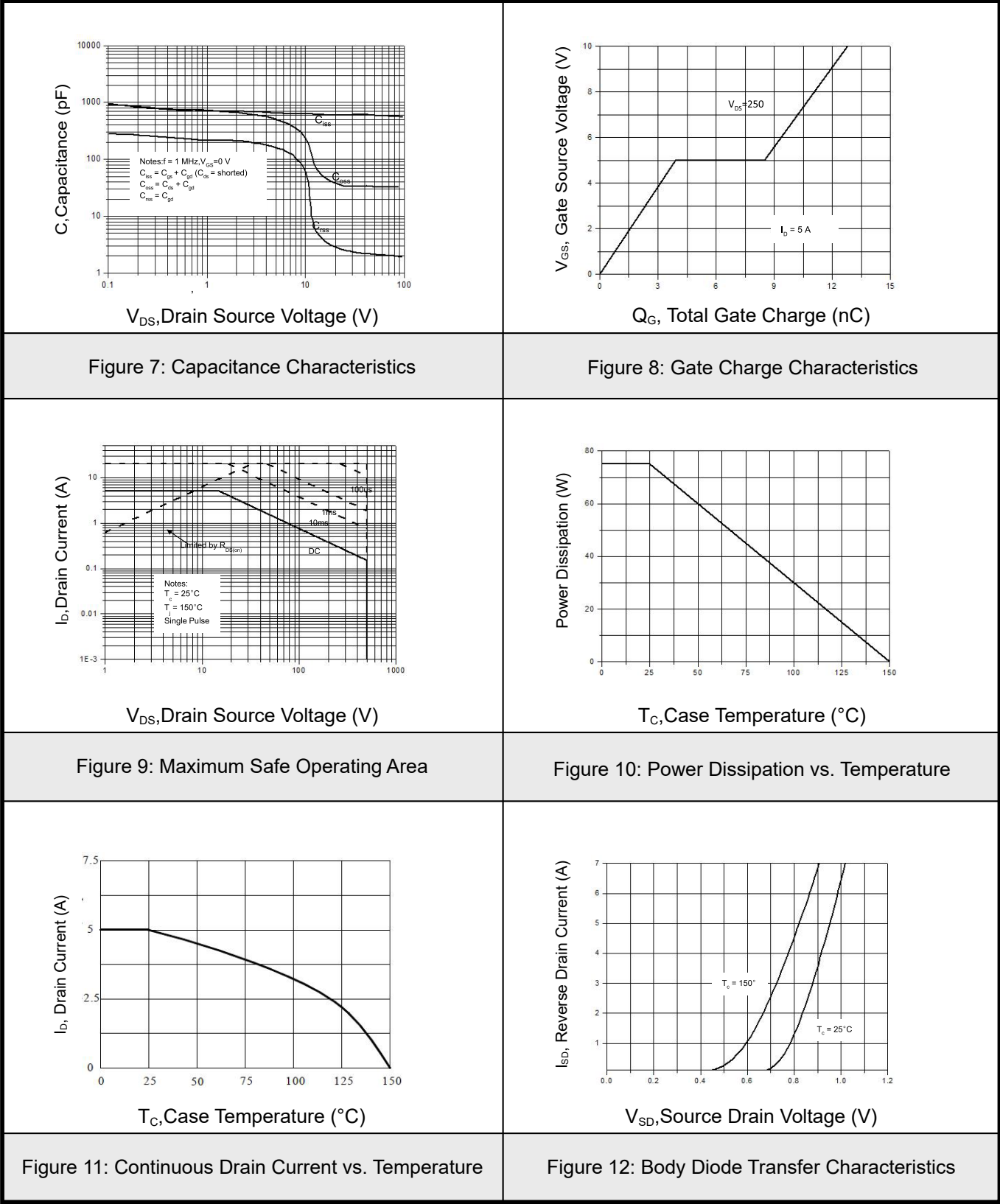


7.1 Typical Characteristics



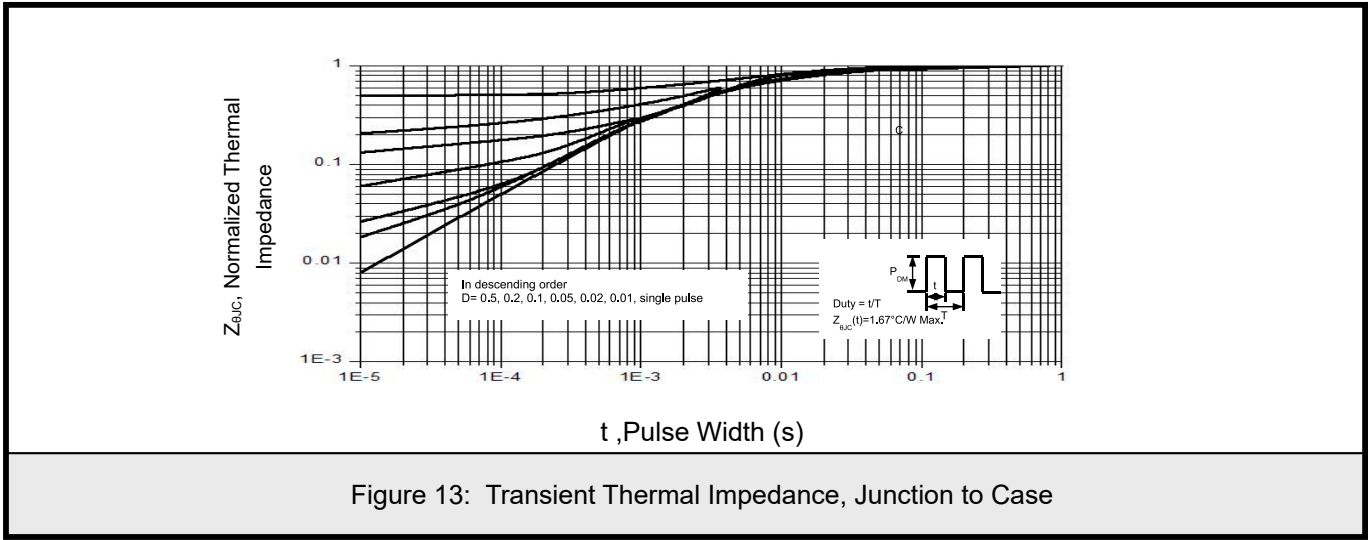


7.2Typical Characteristics



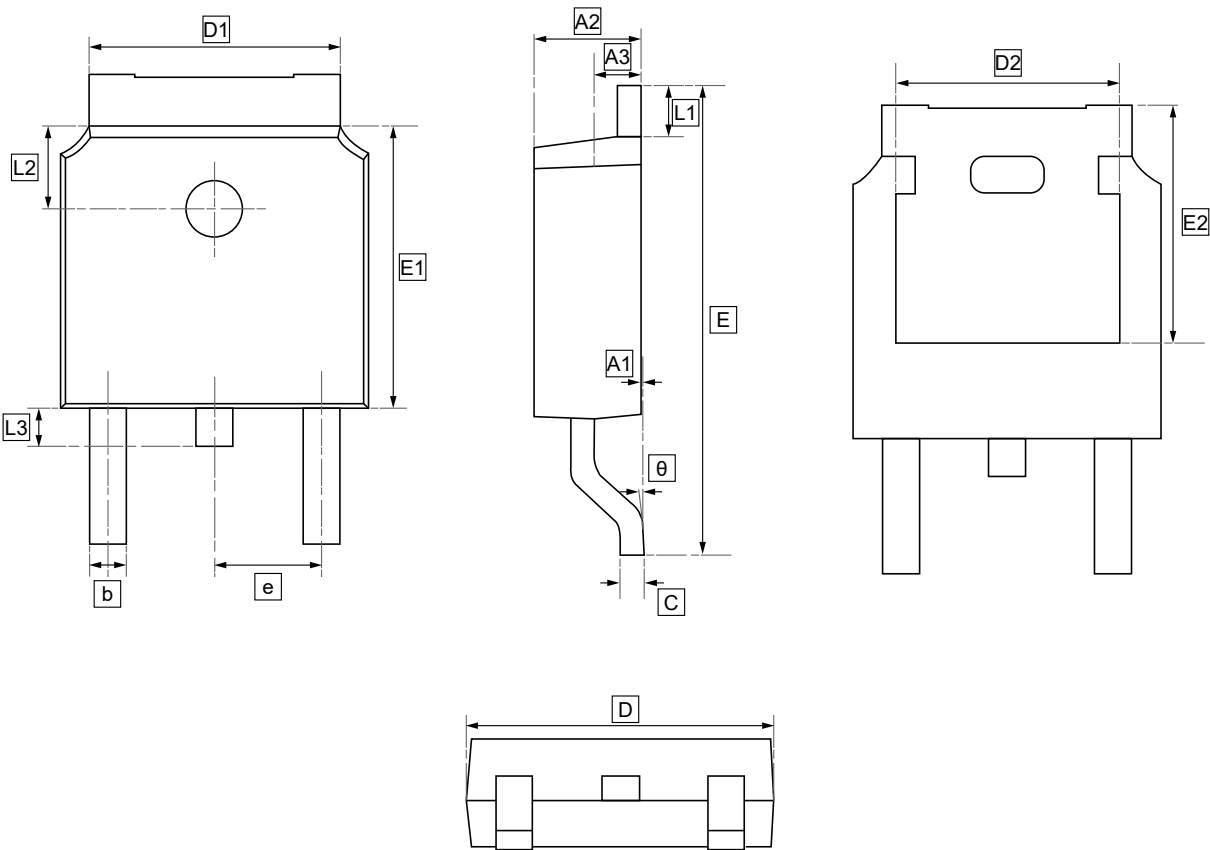


7.3Typical Characterisitics





8.TO-252 Package Outline Dimensions

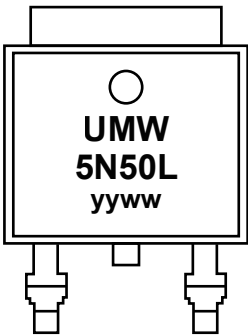


DIMENSIONS (mm are the original dimensions)

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		1.27	1.90	1.00	8.00



9.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW 5N50L	TO-252	2500	Tape and reel



10.Disclaimer

UMW reserves the right to make changes to all products, specifications. Customers should obtain the latest version of product documentation and verify the completeness and currency of the information before placing an order.

When applying our products, please do not exceed the maximum rated values, as this may affect the reliability of the entire system. Under certain conditions, any semiconductor product may experience faults or failures. Buyers are responsible for adhering to safety standards and implementing safety measures during system design, prototyping, and manufacturing when using our products to prevent potential failure risks that could lead to personal injury or property damage.

Unless explicitly stated in writing, UMW products are not intended for use in medical, life-saving, or life-sustaining applications, nor for any other applications where product failure could result in personal injury or death. If customers use or sell the product for such applications without explicit authorization, they assume all associated risks.

When reselling, applying, or exporting, please comply with export control laws and regulations of China, the United States, the United Kingdom, the European Union, and other relevant countries, regions, and international organizations.

This document and any actions by UMW do not grant any intellectual property rights, whether express or implied, by estoppel or otherwise. The product names and marks mentioned herein may be trademarks of their respective owners.