

1.Description

This advanced MOSFET technology has been especially tailored to reduce on-state resistance, and to provide superior switching performance and high avalanche energy strength. These devices are suitable for switched mode power supplies, audio amplifier, DC motor control, and variable switching power applications.

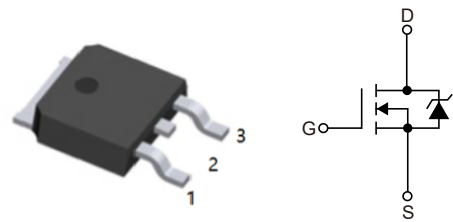
2.Features

- $V_{DS(V)}=100V$
- $I_D=10A$
- $R_{DS(ON)}<180m\Omega(V_{GS}=10V)$

3.Pinning information

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

TO-252(DPAK)
top view



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

Parameter	Symbol	Rating	Units
Drain - Source Voltage	V_{DSS}	100	V
Drain Current - Continuous $T_C=25^{\circ}C$	I_D	10	A
- Continuous $T_C=100^{\circ}C$		6.3	A
- Pulsed (Note 1)	I_{DM}	40	A
Gate-Source Voltage	V_{GSS}	± 20	V
Single Pulse Avalanche Energy (Note 2)	E_{AS}	95	mJ
Avalanche Current (Note 1)	I_{AR}	10	A
Repetitive Avalanche Energy (Note 1)	E_{AR}	4	mJ
Peak Diode Recovery dv/dt (Note 3)	dv/dt	6	V/ns



Power Dissipation ($T_A=25^{\circ}\text{C}$)	P_D	2.5	W
Power Dissipation ($T_C=25^{\circ}\text{C}$)		40	W
- Derate above 25°C		0.32	W/ $^{\circ}\text{C}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^{\circ}\text{C}$
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	T_L	300	$^{\circ}\text{C}$

5. Thermal Characteristics

Parameter	Symbol	Rating	Units
Thermal Resistance, Junction to Case, Max	$R_{\theta JC}$	3.13	$^{\circ}\text{C/W}$
Thermal Resistance, Junction to Ambient (Minimum Pad of 2-oz Copper), Max	$R_{\theta JA}$	110	$^{\circ}\text{C/W}$
Thermal Resistance, Junction to Ambient (*1 in ² Pad of 2-oz Copper), Max	$R_{\theta JA}$	50	$^{\circ}\text{C/W}$



6. Electrical Characteristic ($T_c=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D=250\mu A$, $V_{GS}=0V$	100			V
Breakdown Voltage Temperature Coefficient	$\frac{\Delta BV_{DSS}}{\Delta T_J}$	$I_D=250\mu A$ Referenced to 25°C		0.09		V/°C
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=100V$, $V_{GS}=0V$			1	μA
		$V_{GS}=80V$, $T_C=125^\circ C$			10	μA
Gate-Body Leakage Current, Forward	I_{GSSF}	$V_{GS}=20V$, $V_{DS}=0V$			100	nA
Gate-Body Leakage Current, Reverse	I_{GSSR}	$V_{GS}=-20V$, $V_{DS}=0V$			-100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$, $I_D=250\mu A$	1		2	V
Static Drain-Source	$R_{DS(ON)}$	$V_{GS}=10V$, $I_D=5A$		142	180	mΩ
On-Resistance		$V_{GS}=5V$, $I_D=5A$		158	200	mΩ
Forward Transconductance	g_{FS}	$V_{DS}=30V$, $I_D=5A$		8.7		S
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS}=25V$, $V_{GS}=0V$, $f=1MHz$		400	520	pF
Output Capacitance	C_{oss}			95	125	pF
Reverse Transfer Capacitance	C_{rss}			20	25	pF
Switching Characteristics						
Turn-On DelayTime	$t_{D(on)}$	$V_{DD}=50V$, $I_D=12.8A$ $R_G=25\Omega$ (Note 4)		7.5	25	ns
Turn-On Rise Time	t_r			220	450	ns
Turn-Off DelayTime	$t_{D(off)}$			22	55	ns
Turn-Off Fall Time	t_f			72	150	ns
Total Gate Charge	Q_g	$V_{DS}=80V$, $I_D=12.8A$ $V_{GS}=5V$ (Note 4)		8.7	12	nC
Gate to Source Charge	Q_{gs}			2		nC
Gate to Drain Charge	Q_{gd}			5.3		nC



Drain–Source Diode Characteristics						
Maximum Continuous Drain-Source Diode Forward Current	I_S				10	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				40	A
Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=10A$			1.5	V
Reverse Recovery Time	t_{rr}	$V_{GS}=0V, I_S=12.8A$		75		ns
Reverse Recovery Charge	Q_{rr}			0.17		μC

Notes:

- 1. Repetitive rating : pulse-width limited by maximum junction temperature.
- 2. $L=1.43mH, I_{AS}=10A, V_{DD}=25V, R_G=25\Omega$, starting $T_J=25^{\circ}C$.
- 3. $I_{SD} \leq 12.8A, di/dt \leq 300 A/\mu s, V_{DD} \leq BV_{DSS}$, starting $T_J=25^{\circ}C$.
- 4. Essentially independent of operating temperature.



7.1 Typical characteristic

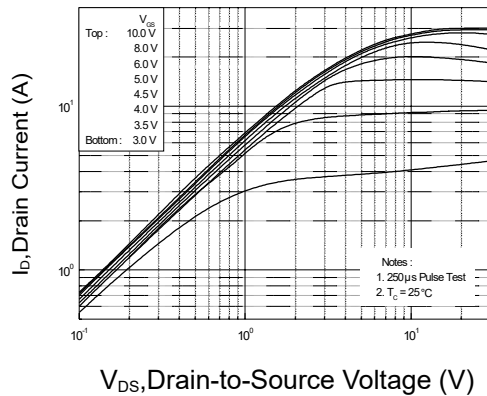


Figure 1: Output Characteristics

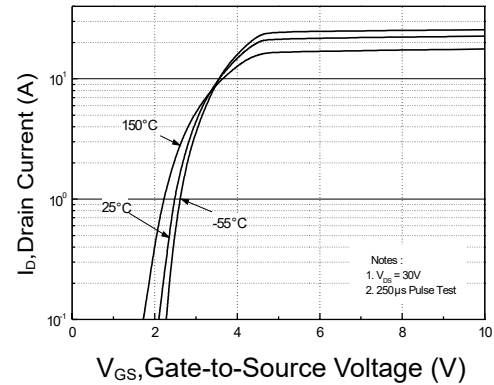


Figure 2: Transfer Characteristics

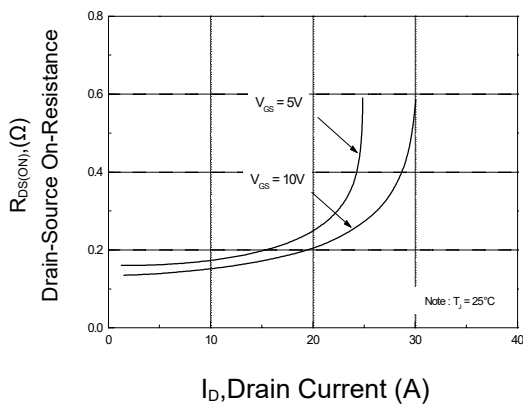


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

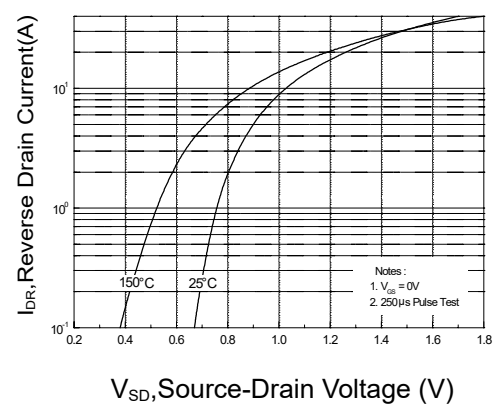


Figure 4: Body Diode Forward Voltage Variation vs. Source Current and Temperature

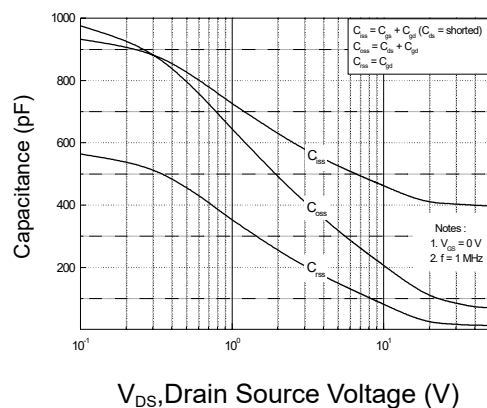


Figure 5: Capacitance Characteristics

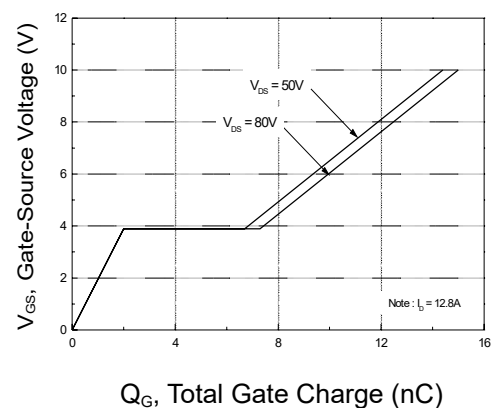


Figure 6: Gate Charge Characteristics



7.2 Typical characteristic

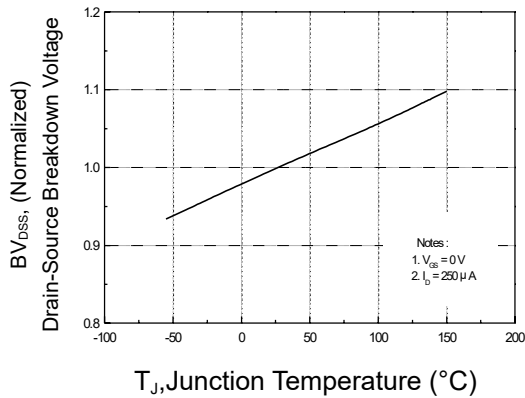


Figure 7: SBreakdown Voltage Variation vs. Temperature

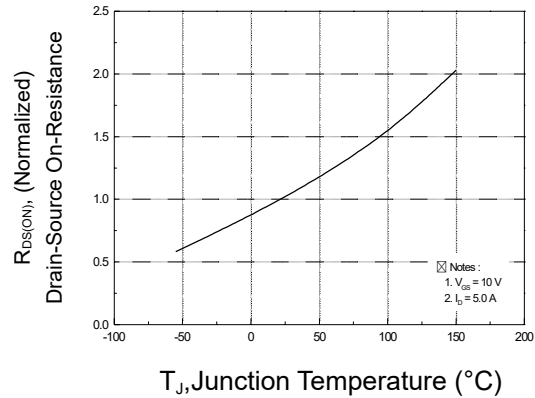


Figure 8: On-Resistance Variation vs. Temperature

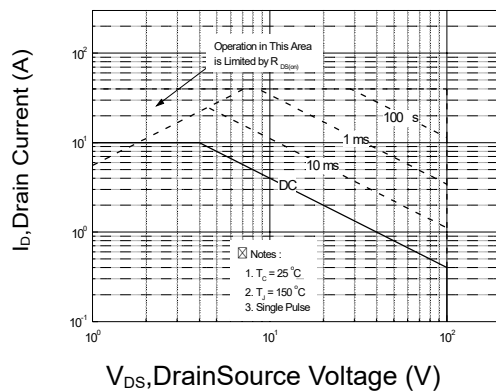


Figure 9: Maximum Safe Operating Area

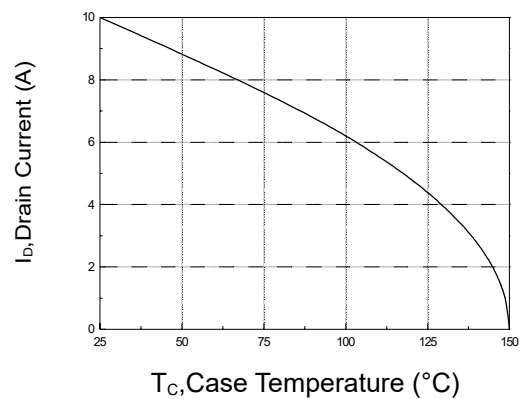


Figure 10: Maximum Drain Current vs. Case Temperature

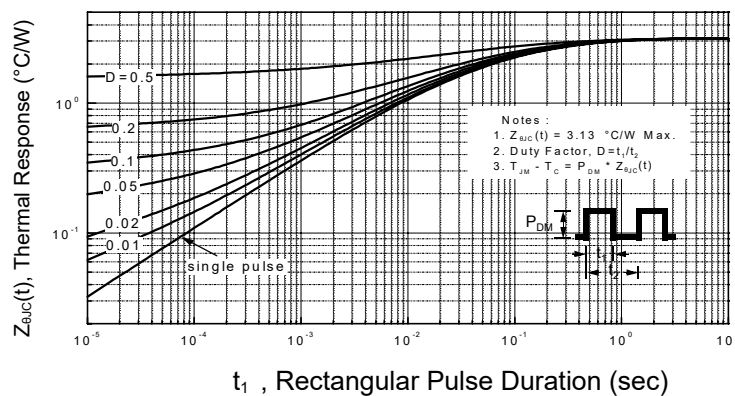


Figure 11: Transient Thermal Response Curve



7.3 Typical characteristic

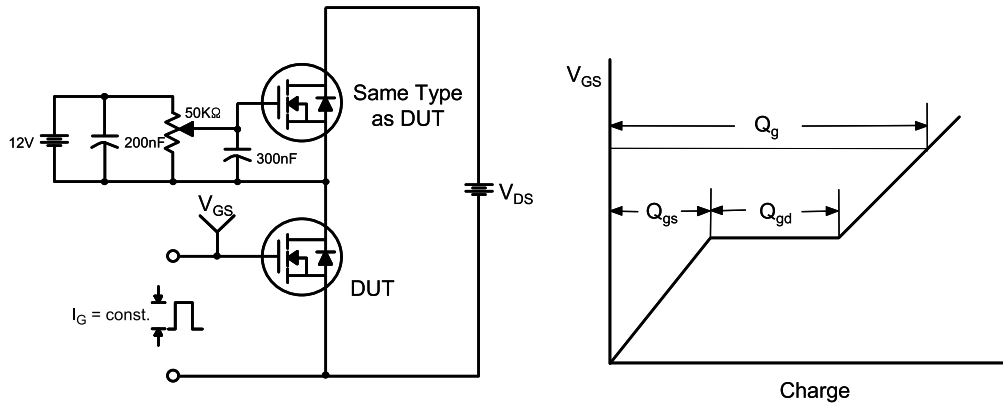


Figure 12. Gate Charge Test Circuit & Waveform

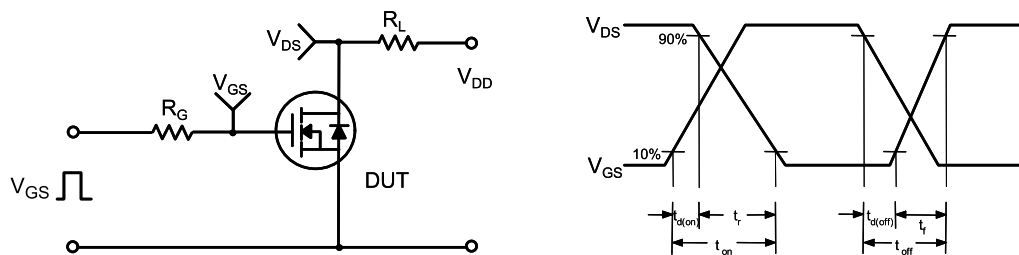


Figure 13. Resistive Switching Test Circuit & Waveforms

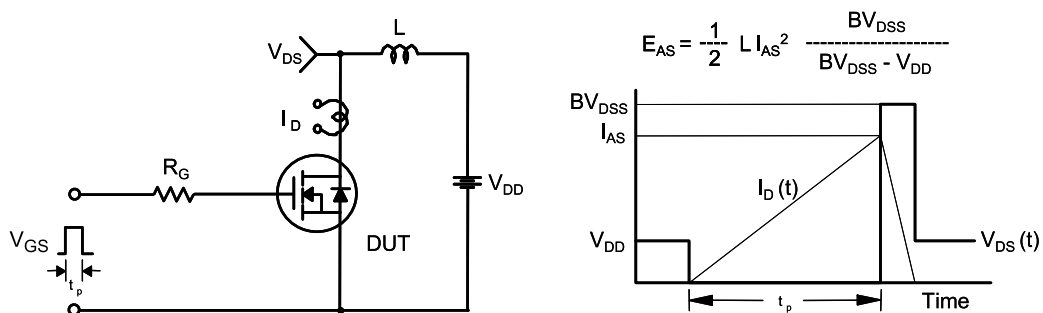


Figure 14. Unclamped Inductive Switching Test Circuit & Waveforms



7.4 Typical characteristic

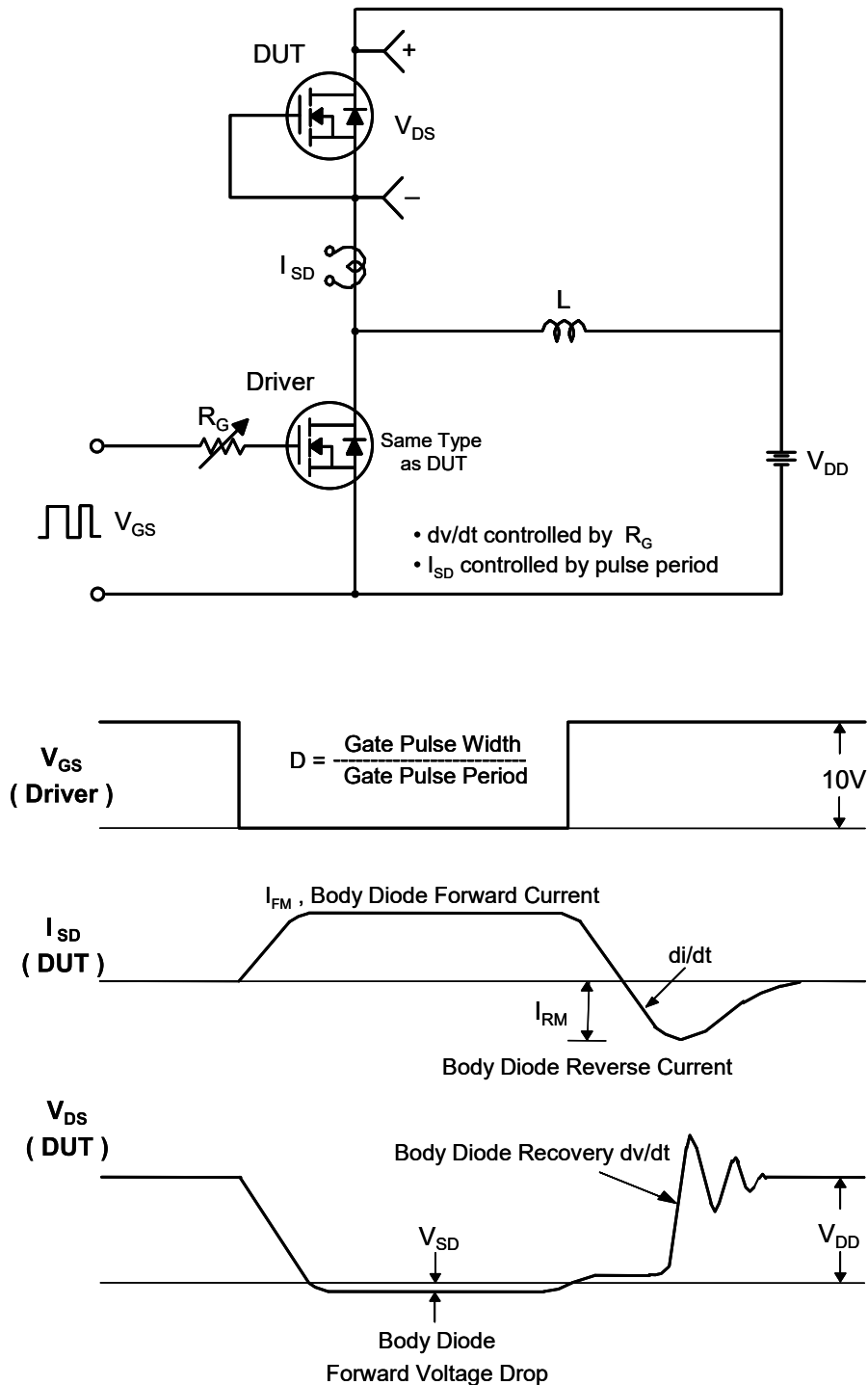
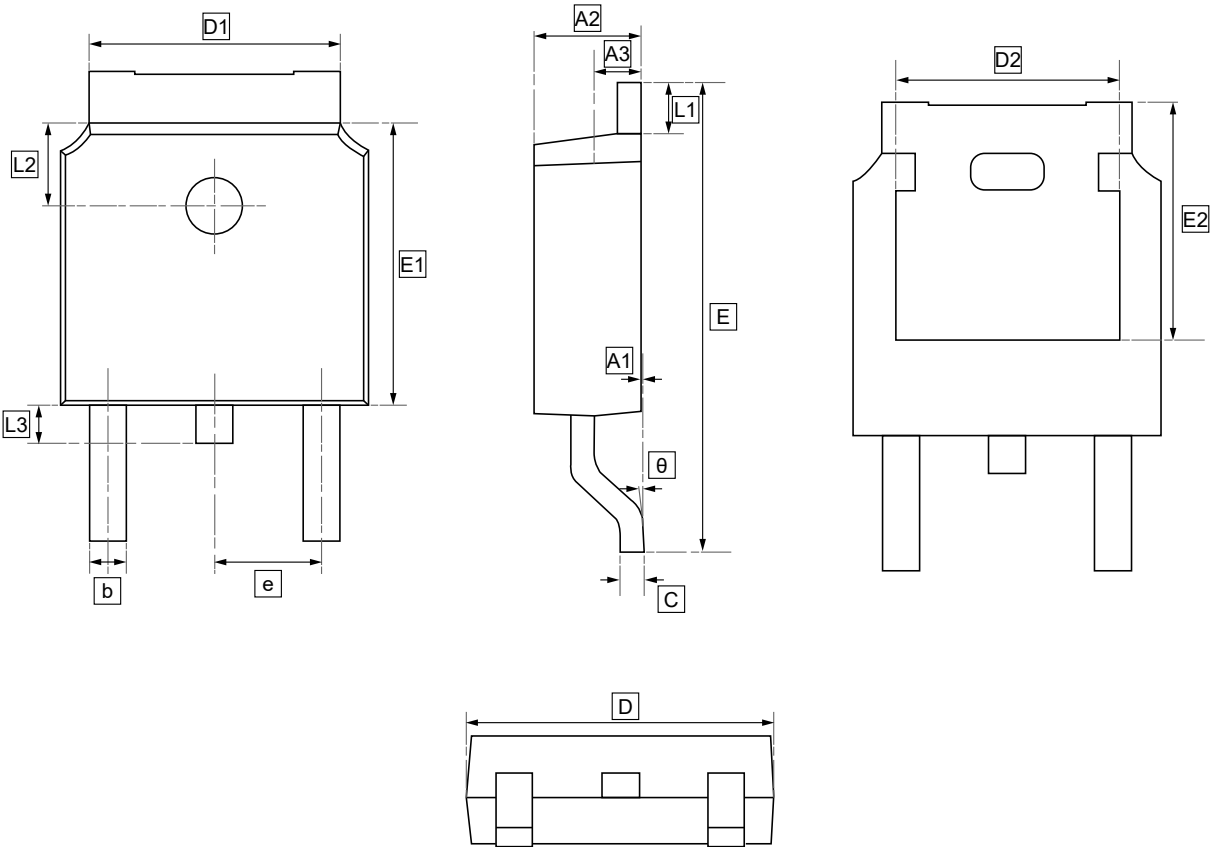


Figure 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms



8.TO-252 Package Outline Dimensions

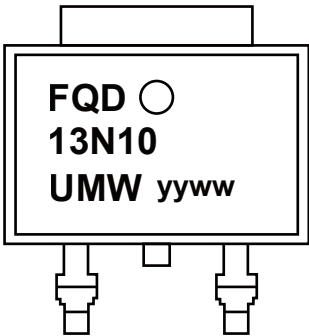


DIMENSIONS (mm are the original dimensions)

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 BSC	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 FQD13N10LTM	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.

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