

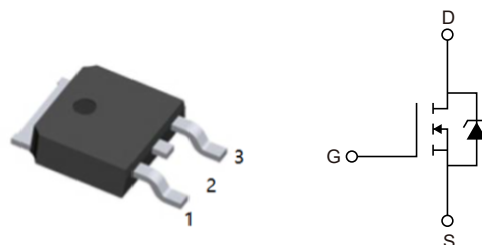
1.Features

- $V_{DS(V)}=100V$
- $I_D=10A$
- $R_{DS(ON)}<150m\Omega(V_{GS}=10V)$
- $R_{DS(ON)}<160m\Omega(V_{GS}=5V)$
- Ultra Low On-Resistance
- Simulation Models
- UIS Rating Curve
- Switching Time vs R_{GS} Curves
- Peak Current vs Pulse Width Curve
- Spice and SABER Thermal Impedance Models
- Electrical Models

2.Pinning information

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

TO-252(DPAK)
top view



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

Parameter	Symbol	Rating	Units
Drain to Source Voltage (Note 1)	V_{DSS}	100	V
Drain to Gate Voltage ($R_{GS}=20k\Omega$) (Note 1)	V_{DGR}	100	V
Gate to Source Voltage	V_{GS}	± 16	V
Drain Current Continuous ($T_c=25^{\circ}C$, $V_{GS}=5V$)	I_D	10	A
Continuous ($T_c=25^{\circ}C$, $V_{GS}=10V$)(Figure 2)		10	A
Continuous ($T_c=100^{\circ}C$, $V_{GS}=5V$)		7	A
Continuous ($T_c=100^{\circ}C$, $V_{GS}=4.5V$)(Figure 2)		7	A
Pulsed Drain Current	I_{DM}	Figure 4	
Pulsed Avalanche Rating	UIS	Figures 6, 17, 18 Power	
Dissipation	P_D	49	W
Derate Above $25^{\circ}C$		0.327	W/ $^{\circ}C$



Operating and StorageTemperature	T_J, T_{STG}	-55 to 175	°C
Maximum Temperature for Soldering			
Leads at 0.063in (1.6mm) from Case for 10s	T_L	300	°C
Package Body for 10s, See Techbrief TB334	T_{pkg}	260	°C

Note:

1. T_J =25°C to 150°C.



4. Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D=250\mu A, V_{GS}=0V$ (Figure 12)	100			V
		$I_D=250\mu A, V_{GS}=0V, T_C=-40^{\circ}C$	90			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=95V, V_{GS}=0V$			1	μA
		$V_{DS}=90V, V_{GS}=0V, T_C=150^{\circ}C$			250	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 16V$			± 100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage(Note 3)	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$ (Figure 11)	1		3	V
Drain to Source On Resistance	$R_{DS(on)}$	$I_D=10A, V_{GS}=10V$ (Figure 9,10)		130	150	m Ω
		$I_D=7A, V_{GS}=5V$ (Figure 9)		135	160	m Ω
		$I_D=7A, V_{GS}=4.5V$ (Figure 9)		140	161	m Ω
THERMAL SPECIFICATIONS						
Thermal Resistance Junction to Case	$R_{\theta JC}$	TO-252			3.06	$^{\circ}C/W$
Thermal Resistance Junction toAmbient	$R_{\theta JA}$				100	$^{\circ}C/W$
SWITCHING SPECIFICATIONS ($V_{GS} = 4.5V$)						
Turn-On Time	t_{on}	$V_{DD}=50V, I_D=7A$ $V_{GS}=4.5V, R_{GS}=20\Omega$ (Figures 15, 21, 22)			77	ns
Turn-On Delay Time	$t_{D(on)}$			10		ns
Rise Time	t_r			41		ns
Turn-Off Delay Time	$t_{D(off)}$			30		ns
Fall Time	t_f			28		ns
Turn-Off Time	t_{off}				87	ns



SWITCHING SPECIFICATIONS (V _{GS} = 10V)						
Turn-On Time	t _{on}	V _{DD} =50V, I _D =10A V _{GS} =10V, R _{GS} =24Ω (Figures 16, 21, 22)			36	ns
Turn-On Delay Time	t _{D(on)}			6		ns
Rise Time	t _r			18		ns
Turn-Off Delay Time	t _{D(off)}			55		ns
Fall Time	t _f			39		ns
Turn-Off Time	t _{off}				141	ns
GATE CHARGE SPECIFICATIONS						
Total Gate Charge	Q _{g(tot)}	V _{GS} =0 to 10V	V _{DD} =50V I _D =7A (Figures 14, 19, 20)	13	16	nC
Gate Charge at 5V	Q _{g(5)}	V _{GS} =0 to 5V		7.3	8.8	nC
Threshold Gate Charge	Q _{g(th)}	V _{GS} =0 to 1V		0.5	0.6	nC
Gate to Source Gate Charge	Q _{gs}			1.4		nC
Gate to Drain “Miller” Charge	Q _{gd}			3.4		nC
CAPACITANCE SPECIFICATIONS						
Input Capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V (Figure 13)		425		pF
Output Capacitance	C _{oss}			75		pF
Reverse Transfer Capacitance	C _{rss}			22		pF
Source to Drain Diode Specifications						
Source to Drain Diode Voltage	V _{SD}	I _{SD} =7A		1.25	V	
		I _{SD} =4A		1	V	
Reverse Recovery Time	t _{rr}	I _{SD} =7A, dI _{SD} /dt = 100A/μs		92	ns	
Reverse Recovered Charge	Q _{rr}	I _{SD} =7A, dI _{SD} /dt = 100A/μs		273	nC	



5.1 Typical Characteristics

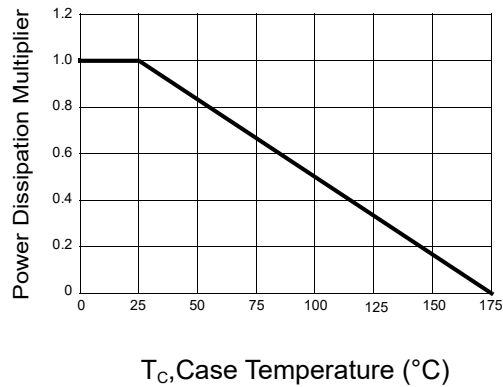


Figure 1: Normalized Power Dissipation Vs Case Temperature

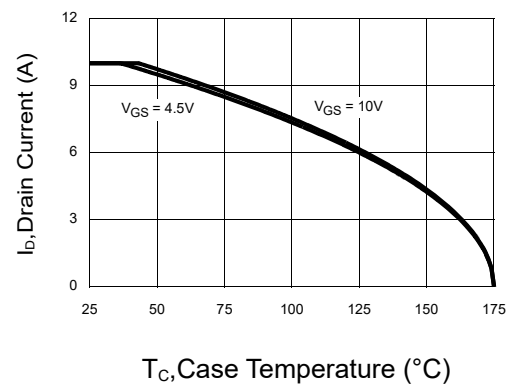


Figure 2: Maximum Continuous Drain Current Vs Case Temperature

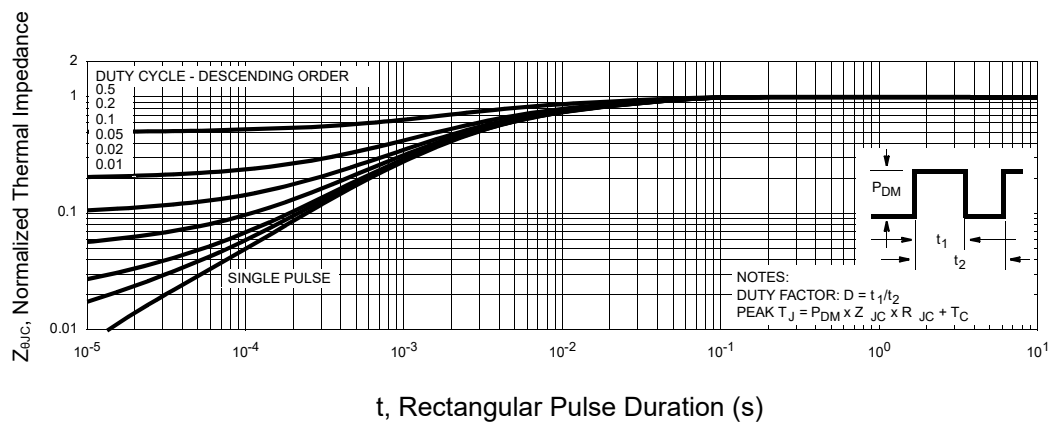


Figure 3: Normalized Maximum Transient Thermal Impedance

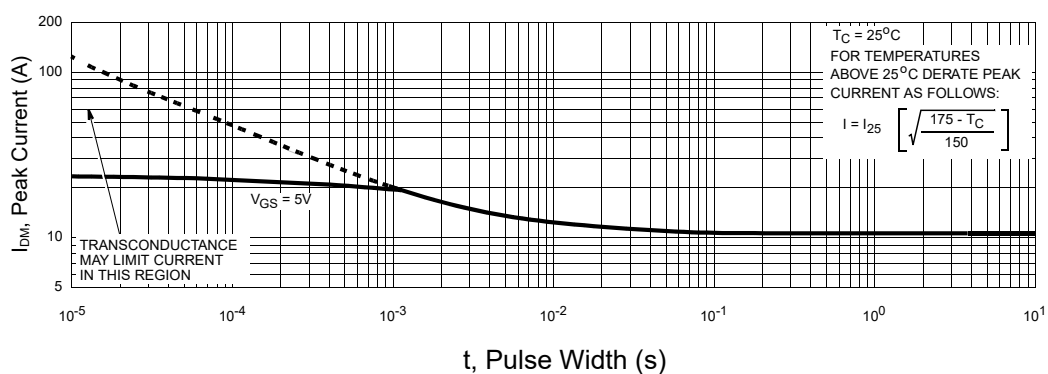


Figure 4: Peak Current Capability



5.2 Typical Characteristics

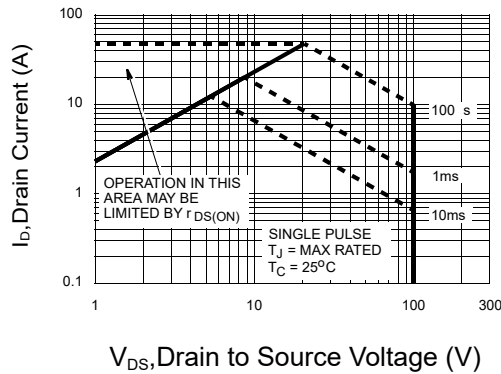


Figure 5: Forward Bias Safe Operating Area

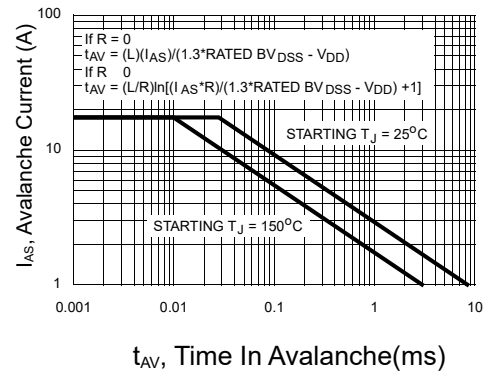


Figure 6: Unclamped Inductive Switching Capability

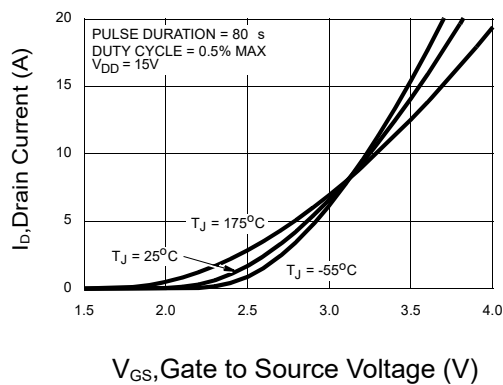


Figure 7: Transfer Characteristics

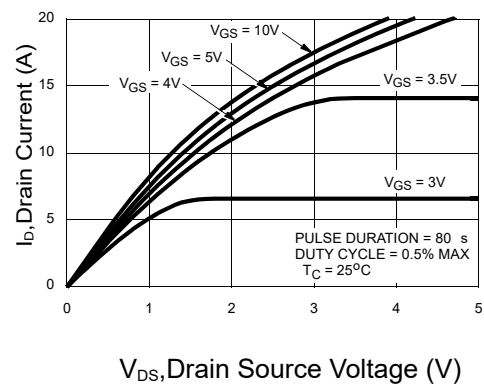


Figure 8: Saturation Characteristics

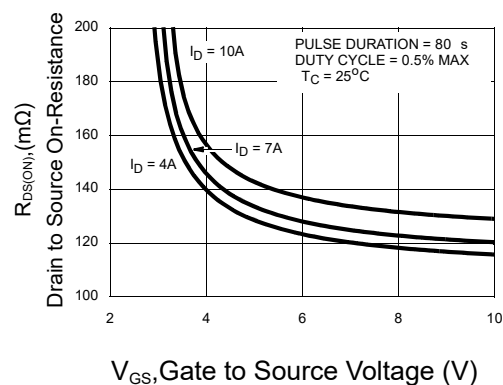


Figure 9: Drain To Source On Resistance Vs Gate Voltage And Drain Current

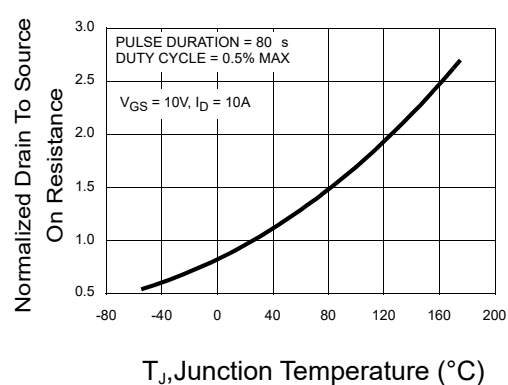


Figure 10: Normalized Drain To Source On Resistance Vs Junction Temperature



5.3 Typical Characteristics

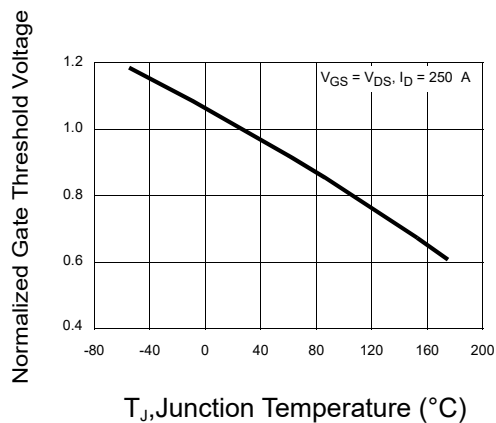


Figure 11: Normalized Gate Threshold Voltage Vs Junction Temperature

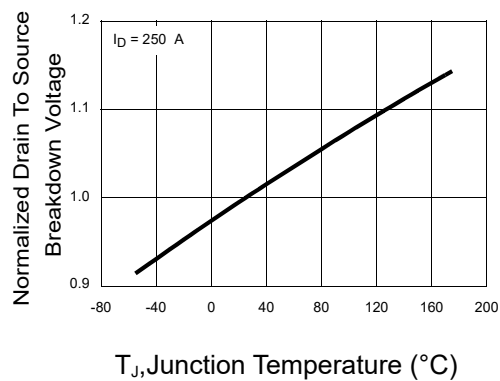


Figure 12: Normalized Drain To Source Breakdown Voltage Vs Junction Temperature

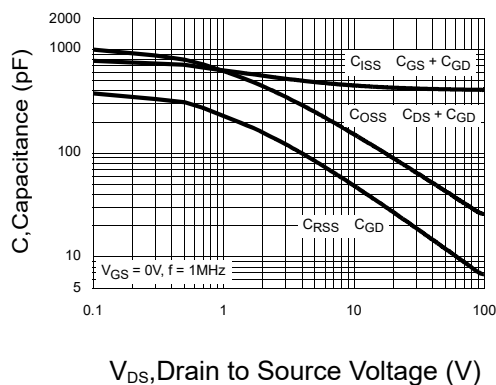


Figure 13: Capacitance Vs Drain To Source Voltage

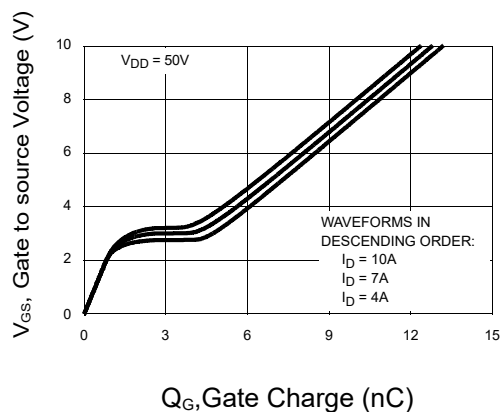


Figure 14: Gate Charge Waveforms For Constant Gate Current

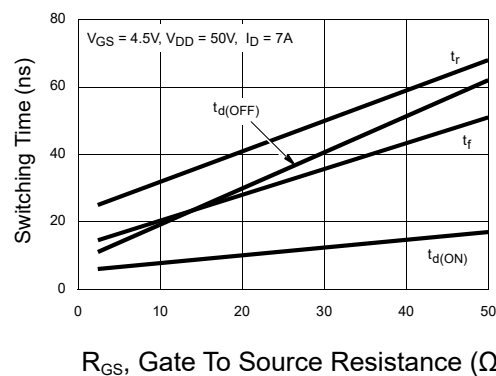


Figure 15: Switching Time Vs Gate Resistance

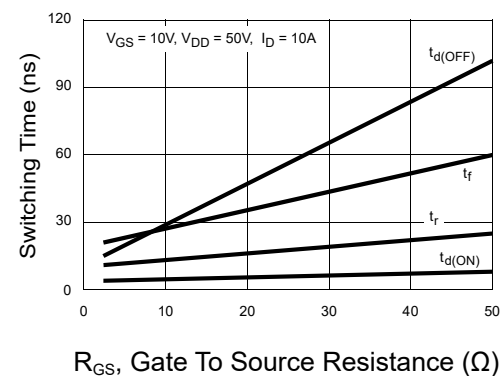


Figure 16: Switching Time Vs Gate Resistance



5.4 Typical Characteristics

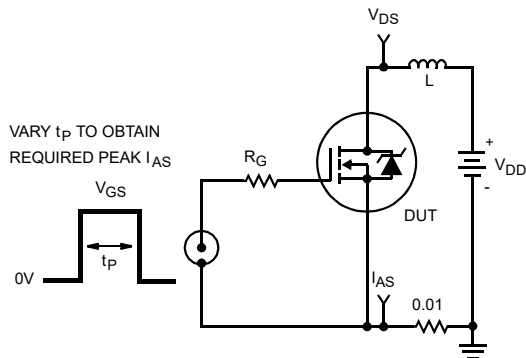


Figure 17. unclamped Energy Test Circuit

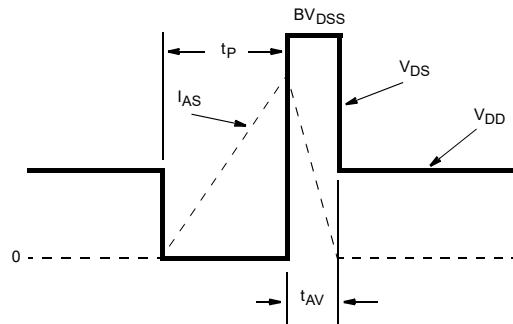


Figure 18. unclamped Energy Waveforms

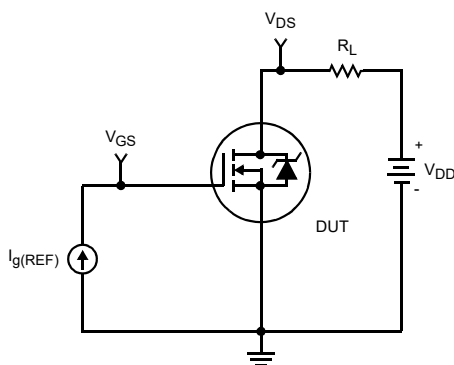


Figure 19. gate Charge Test Circuit

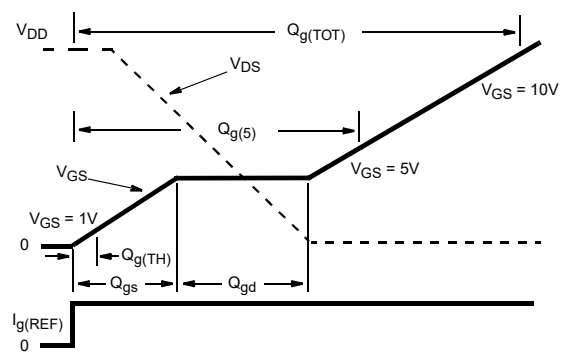


Figure 20. gate Charge Waveforms

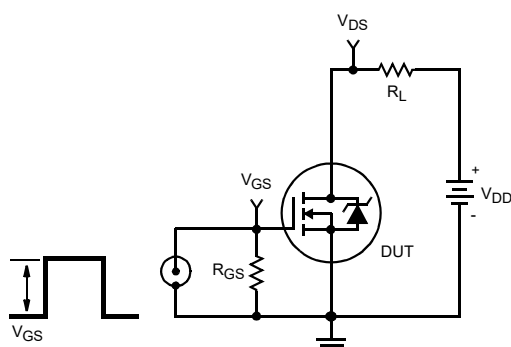


Figure 21. Switching Time Test Circuit

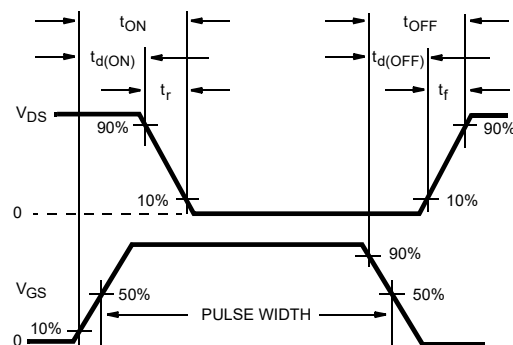
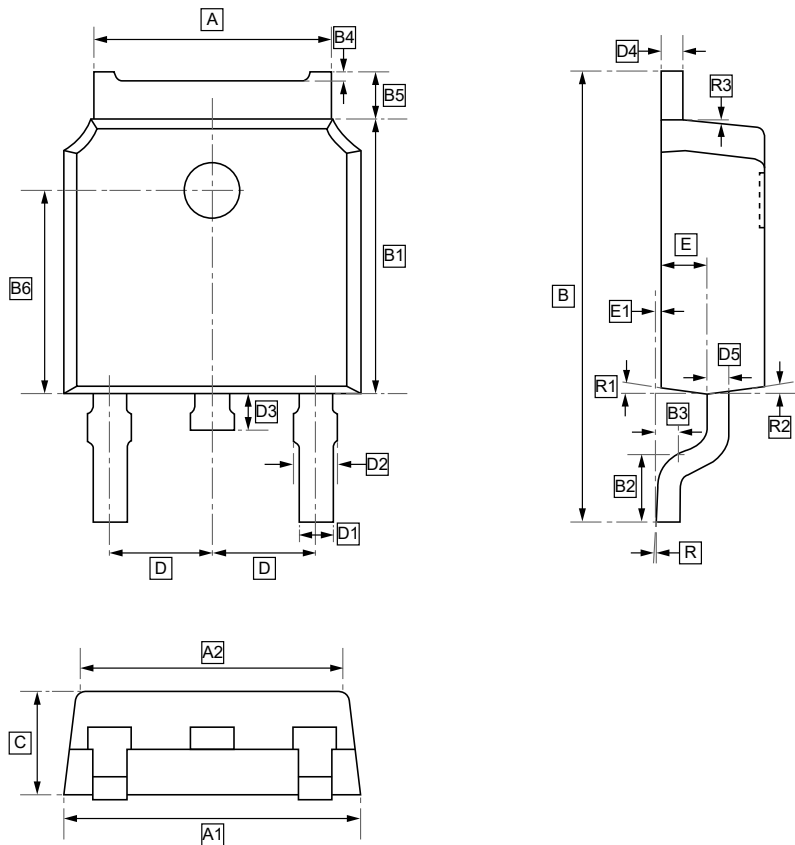


Figure 22. switching Time Waveform



6.TO-252 Package Outline Dimensions



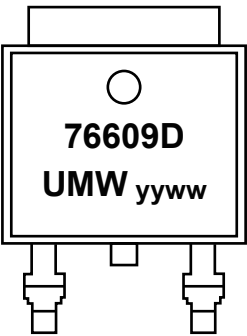
DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	B	B1	B2	B3	B4	B5	B6	C	D
Min	5.1	6.4	5.6	9.5	5.9	1.35	0.4	0.1	0.85	4.35	2.15	2.286
Max	5.5	6.8	6.0	10.3	6.3	1.65	0.6	(typ.)	1.05	4.65	2.45	(typ.)

Symbol	D1	D2	D3	D4	D5	E	E1	R	R1	R2	R3
Min	0.66	0.81	0.65	0.42	0.42	0.86	0.05	0°	7°	7°	7°
Max	0.86	1.01	0.95	0.58	0.58	1.16	0.05	6°	(typ.)	(typ.)	(typ.)



7.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW HUF76609D3	TO-252	2500	Tape and reel



8.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.