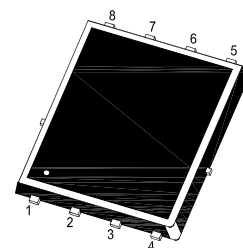
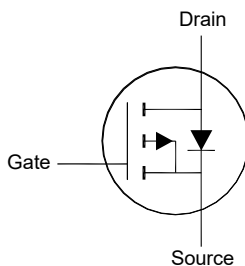


WTM506P700LS-HAF

P-Channel Enhancement Mode MOSFET

Features

- Halogen and Antimony Free(HAF),
RoHS compliant



1.Source 2.Source 3.Source 4.Gate
5.Drain 6.Drain 7.Drain 8.Drain
DFN5060 Plastic Package

Key Parameters

Parameter	Value	Unit
$-BV_{DSS}$	60	V
$R_{DS(ON)}$ Max	75 @ $-V_{GS} = 10$ V	m Ω
	110 @ $-V_{GS} = 4.5$ V	
$-V_{GS(th)}$ typ	1.8	V
Q_g typ	16 @ $-V_{GS} = 10$ V	nC

Absolute Maximum Ratings (at $T_a = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$-V_{DS}$	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current	$-I_D$	$T_c = 25^\circ\text{C}$	14
		$T_c = 100^\circ\text{C}$	9
Peak Drain Current, Pulsed ¹⁾	$-I_{DM}$	35	A
Avalanche Current	$-I_{AS}$	17	A
Single Pulse Avalanche Energy ²⁾	E_{AS}	14	mJ
Power Dissipation	P_D	25	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to + 150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Max.	Unit
Thermal Resistance - Junction to Case	$R_{\theta JC}$	5	$^\circ\text{C}/\text{W}$
Thermal Resistance - Junction to Ambient ³⁾ Steady State	$R_{\theta JA}$	45	$^\circ\text{C}/\text{W}$

¹⁾ Pulse Test: Pulse Width ≤ 100 μs , Duty Cycle $\leq 2\%$, Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)} = 150^\circ\text{C}$.

²⁾ Limited by $T_{J(MAX)}$, starting $T_J = 25^\circ\text{C}$, $L = 0.1$ mH, $R_g = 25$ Ω , $-I_D = 17$ A, $-V_{GS} = 10$ V.

³⁾ Device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch square copper plate in still air.

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Characteristics at $T_a = 25^\circ\text{C}$ unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit
STATIC PARAMETERS					
Drain-Source Breakdown Voltage at $-I_D = 250 \mu\text{A}$	$-V_{(BR)DSS}$	60	-	-	V
Drain-Source Leakage Current at $-V_{DS} = 48 \text{ V}$	$-I_{DSS}$	-	-	1	μA
Gate-Source Leakage Current at $V_{GS} = \pm 20 \text{ V}$	I_{GSS}	-	-	± 100	nA
Gate-Source Threshold Voltage at $-V_{DS} = V_{GS}$, $-I_D = 250 \mu\text{A}$	$-V_{GS(th)}$	1.2	-	2.5	V
Drain-Source On-State Resistance at $-V_{GS} = 10 \text{ V}$, $-I_D = 10 \text{ A}$ at $-V_{GS} = 4.5 \text{ V}$, $-I_D = 8 \text{ A}$	$R_{DS(ON)}$	-	68 97	75 110	m Ω
DYNAMIC PARAMETERS					
Forward Transconductance at $V_{GS} = 0 \text{ V}$, $V_{DS} = 0 \text{ V}$, $f = 1 \text{ MHz}$	R_g	-	7.2	-	Ω
Gate Resistance at $-V_{DS} = 5 \text{ V}$, $-I_D = 10 \text{ A}$	g_{fs}	-	16.4	-	S
Input Capacitance at $-V_{DS} = 30 \text{ V}$, $V_{GS} = 0 \text{ V}$, $f = 1 \text{ MHz}$	C_{iss}	-	954	-	pF
Output Capacitance at $-V_{DS} = 30 \text{ V}$, $V_{GS} = 0 \text{ V}$, $f = 1 \text{ MHz}$	C_{oss}	-	50	-	pF
Reverse Transfer Capacitance at $-V_{DS} = 30 \text{ V}$, $V_{GS} = 0 \text{ V}$, $f = 1 \text{ MHz}$	C_{rss}	-	45	-	pF
Total Gate Charge at $-V_{DS} = 30 \text{ V}$, $-V_{GS} = 10 \text{ V}$, $-I_D = 10 \text{ A}$ at $-V_{DS} = 30 \text{ V}$, $-V_{GS} = 4.5 \text{ V}$, $-I_D = 10 \text{ A}$	Q_g	-	16 7	-	nC
Gate-Source Charge at $-V_{DS} = 30 \text{ V}$, $-V_{GS} = 10 \text{ V}$, $-I_D = 10 \text{ A}$	Q_{gs}	-	4	-	nC
Gate-Drain Charge at $-V_{DS} = 30 \text{ V}$, $-V_{GS} = 10 \text{ V}$, $-I_D = 10 \text{ A}$	Q_{gd}	-	3	-	nC
Turn-On Delay Time at $-V_{DD} = 30 \text{ V}$, $-V_{GS} = 10 \text{ V}$, $-I_D = 10 \text{ A}$, $R_g = 3.3 \Omega$	$t_{d(on)}$	-	8	-	ns
Turn-On Rise Time at $-V_{DD} = 30 \text{ V}$, $-V_{GS} = 10 \text{ V}$, $-I_D = 10 \text{ A}$, $R_g = 3.3 \Omega$	t_r	-	17	-	ns
Turn-Off Delay Time at $-V_{DD} = 30 \text{ V}$, $-V_{GS} = 10 \text{ V}$, $-I_D = 10 \text{ A}$, $R_g = 3.3 \Omega$	$t_{d(off)}$	-	12	-	ns
Turn-Off Fall Time at $-V_{DD} = 30 \text{ V}$, $-V_{GS} = 10 \text{ V}$, $-I_D = 10 \text{ A}$, $R_g = 3.3 \Omega$	t_f	-	3	-	ns
Body-Diode PARAMETERS					
Drain-Source Diode Forward Voltage at $-I_S = 1 \text{ A}$, $V_{GS} = 0 \text{ V}$	$-V_{SD}$	-	-	1.2	V
Body-Diode Continuous Current	$-I_S$	-	-	14	A
Body-Diode Continuous Current, Pulsed	$-I_{SM}$	-	-	35	A
Body Diode Reverse Recovery Time at $-I_S = 10 \text{ A}$, $di/dt = 100 \text{ A} / \mu\text{s}$	t_{rr}	-	13	-	ns
Body Diode Reverse Recovery Charge at $-I_S = 10 \text{ A}$, $di/dt = 100 \text{ A} / \mu\text{s}$	Q_{rr}	-	9	-	nC

Electrical Characteristics Curves

Fig. 1 Typical Output Characteristic

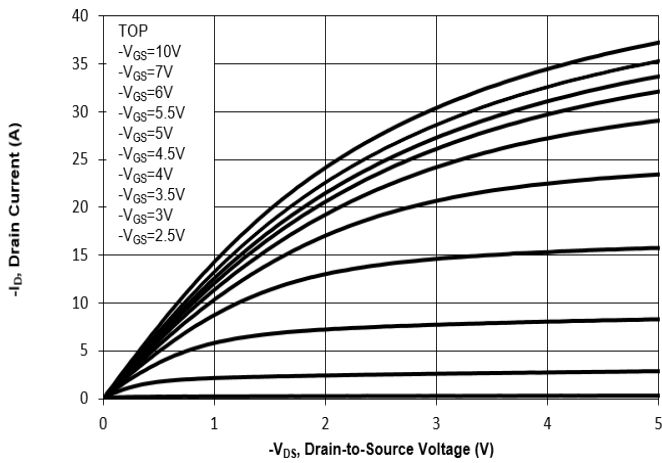


Fig. 2 Typical Transfer Characteristic

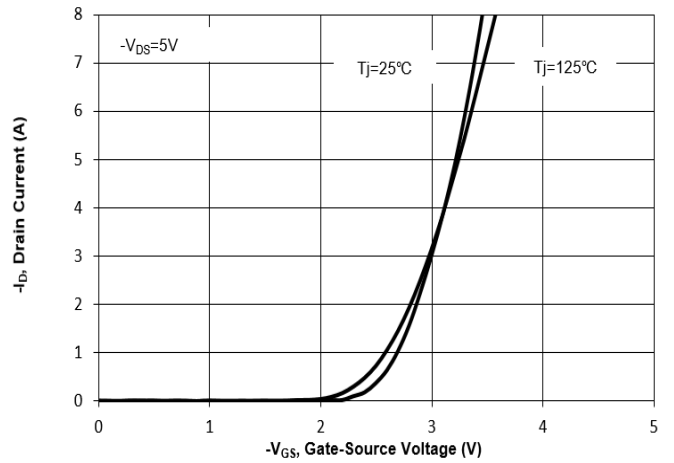


Fig. 3 On-Resistance vs. Drain Current

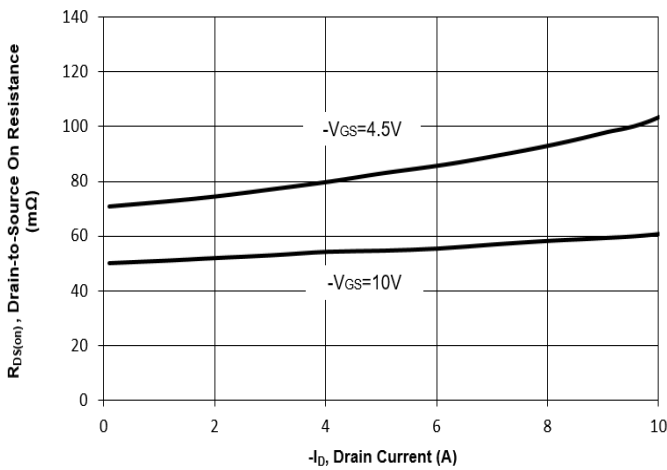


Fig. 4 On-Resistance vs. Gate Voltage

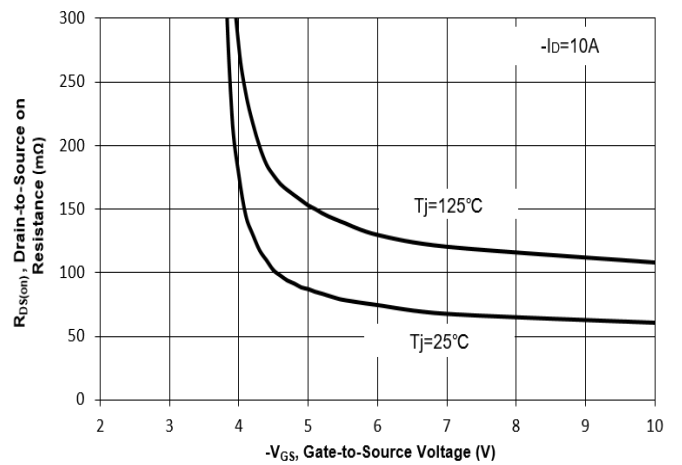


Fig. 5 On-Resistance vs. Tj

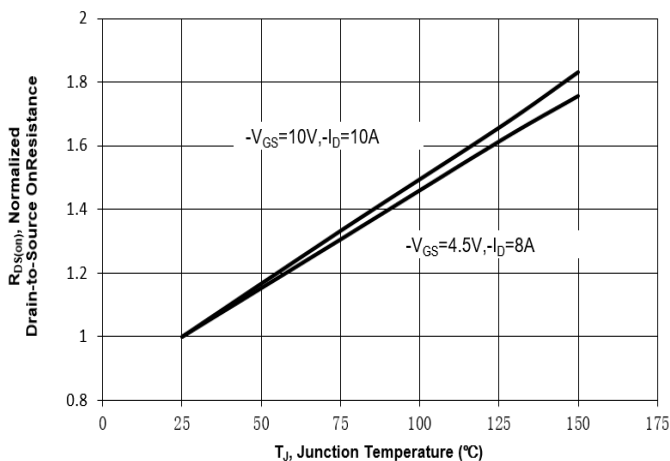
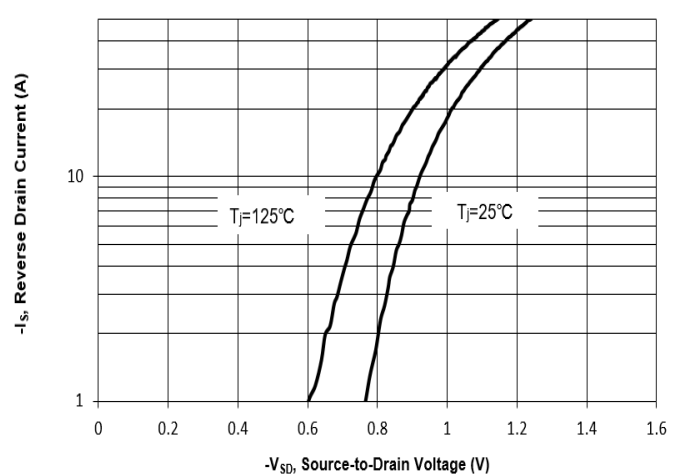


Fig. 6 Typical Body-Diode Forward Characteristic



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Electrical Characteristics Curves

Fig. 7 Typical Junction Capacitance

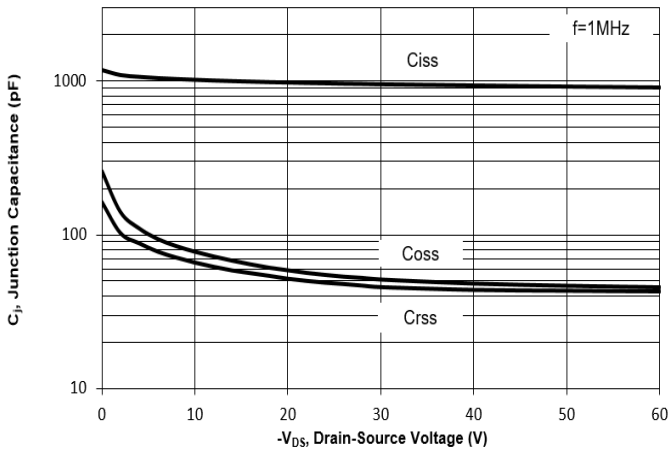


Fig. 8 Drain-Source Leakage Current vs. T_J

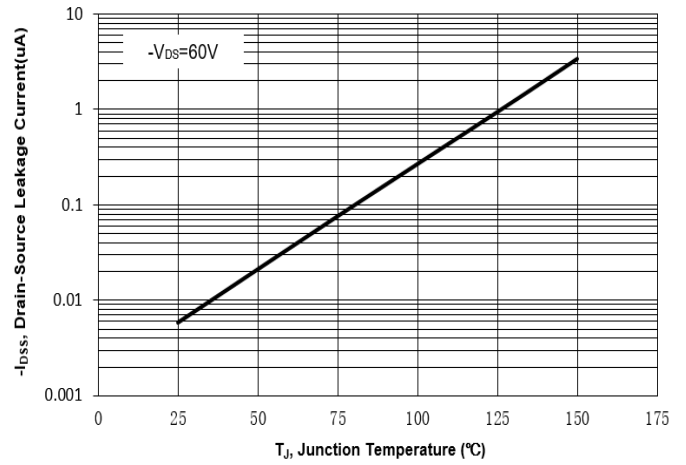


Fig. 9 V_{(BR)DSS} vs. Junction Temperature

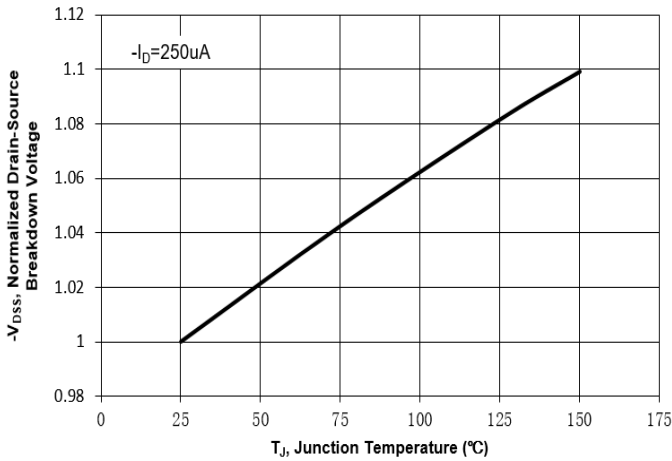


Fig. 10 Gate Threshold Variation vs. T_J

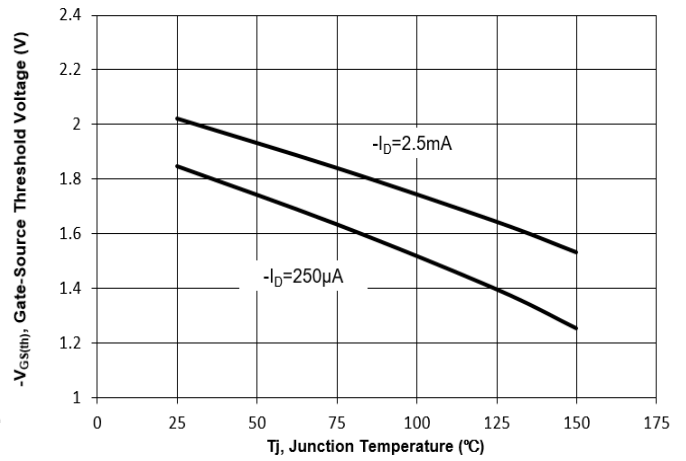


Fig. 11 Gate Charge

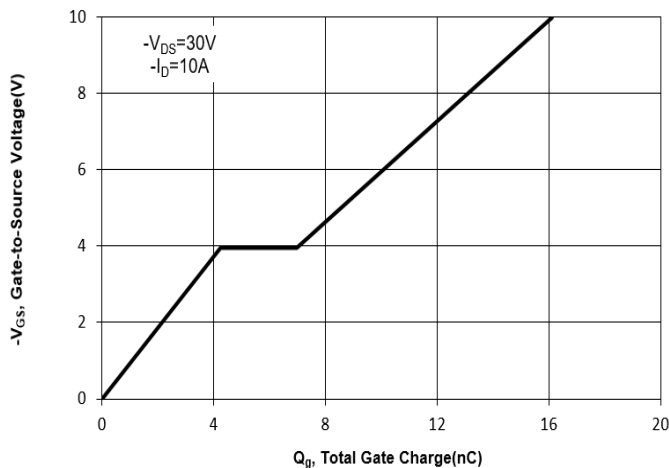
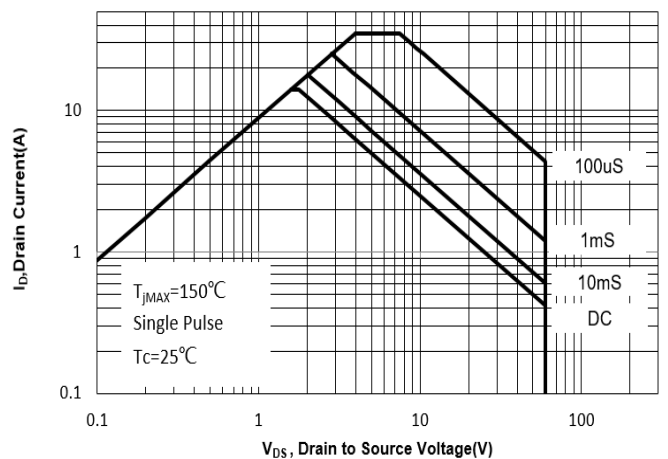


Fig. 12 Safe Operation Area



Electrical Characteristics Curves

Fig. 13 Normalized Maximum Transient Thermal Impedance($Z_{\theta JC}$)

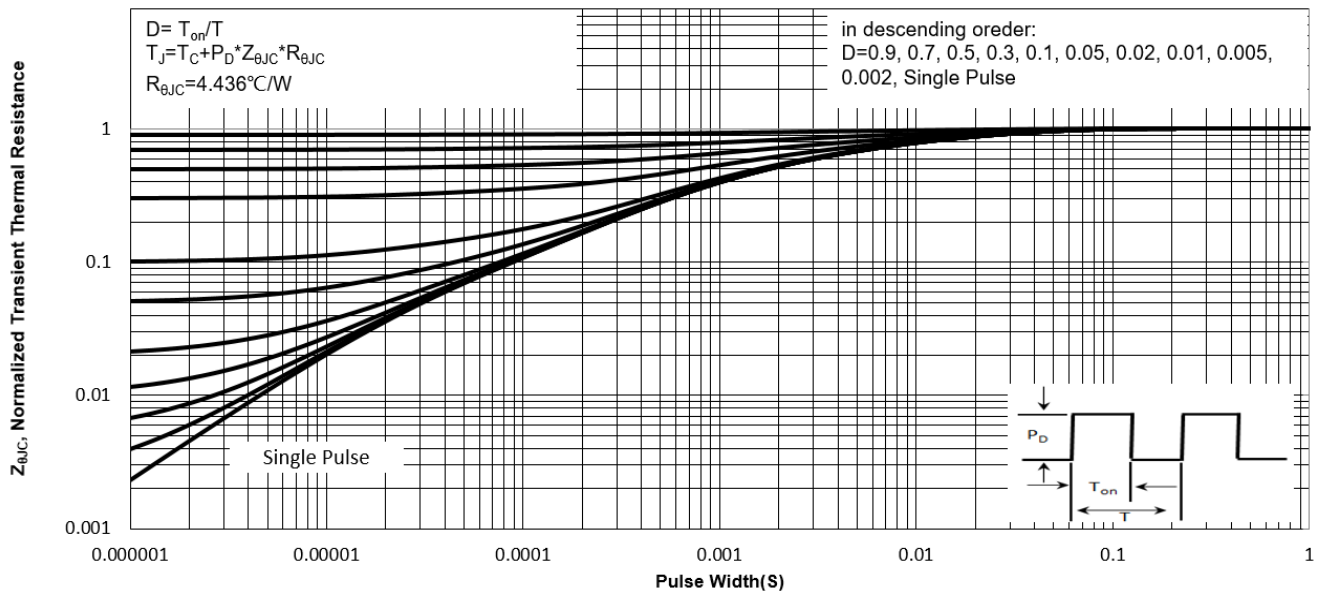
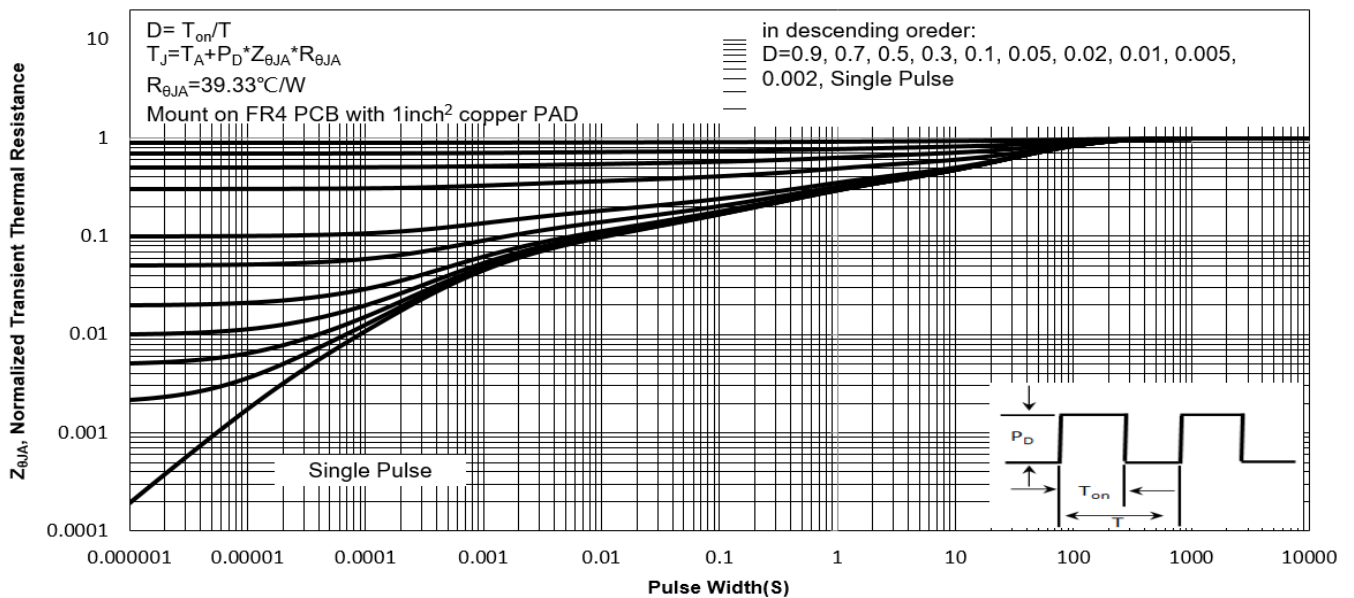


Fig. 14 Normalized Maximum Transient Thermal Impedance($Z_{\theta JA}$)



Test Circuits

Fig.1-1 Switching times test circuit

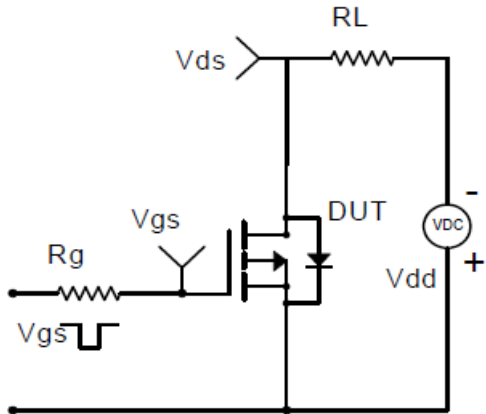


Fig.1-2 Switching Waveform

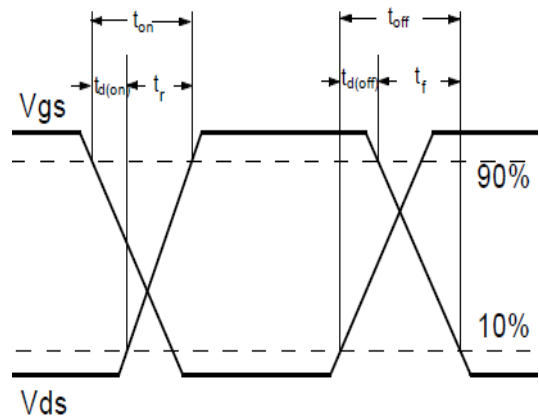


Fig.2-1 Gate charge test circuit

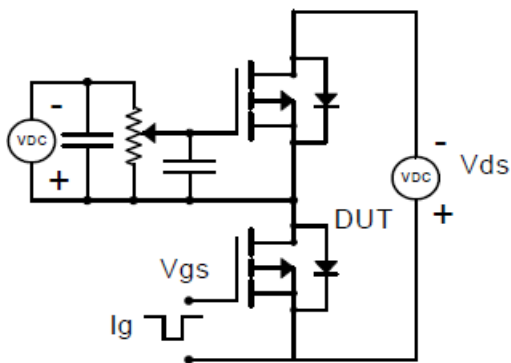


Fig.2-2 Gate charge waveform

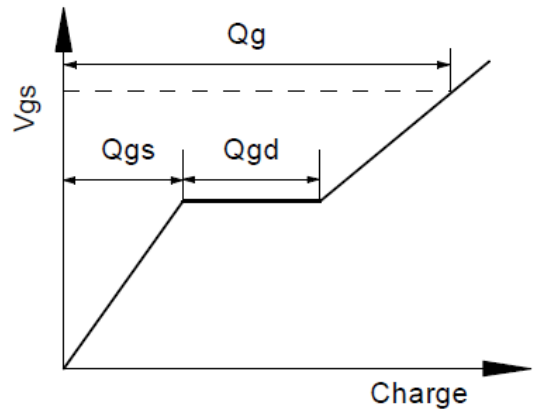


Fig.3-1 Avalanche test circuit

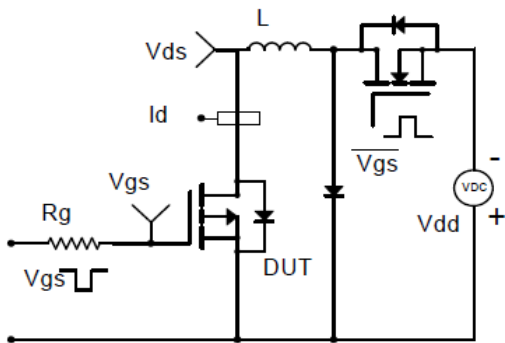
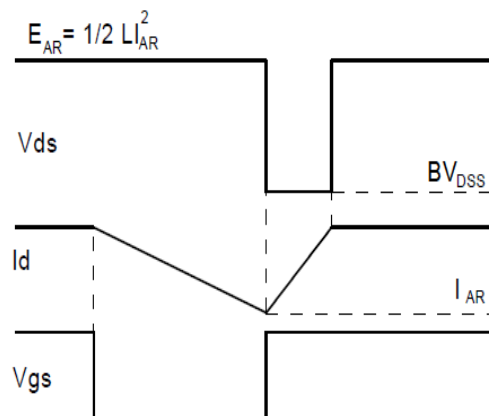


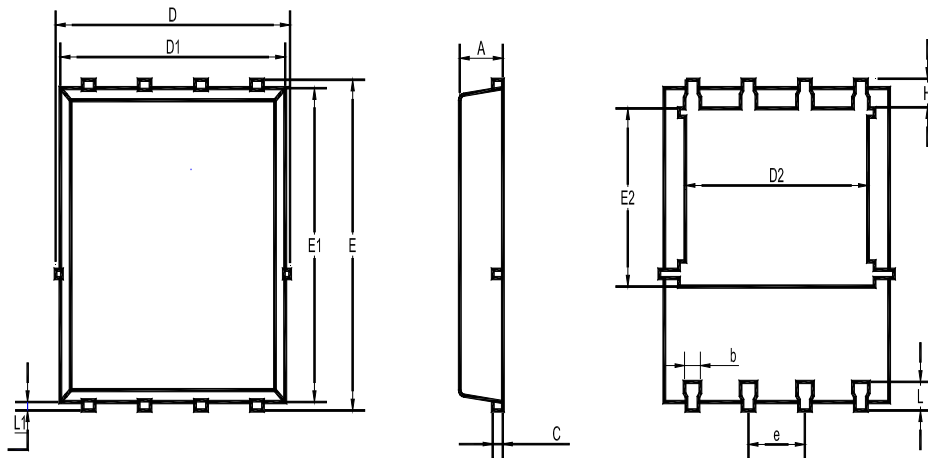
Fig.3-2 Avalanche waveform



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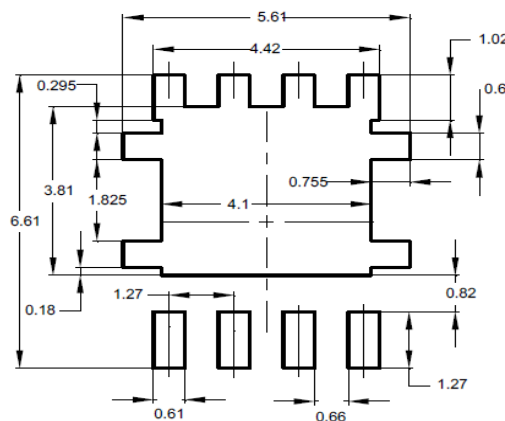
Package Outline Dimensions (Units: mm)

DFN5060



UNIT	A	b	C	D	D1	D2	E	E1	E2	e	L	L1	H
mm	1.12	0.51	0.34	5.26	5.1	4.5	6.25	6	3.66	1.37	0.71	0.2	0.71
	0.9	0.33	0.11	4.7	4.7	3.56	5.75	5.6	3.18	1.17	0.35	0.06	0.35

Recommended Soldering Footprint

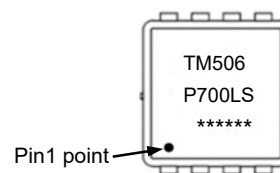


Packing information

Package	Tape Width (mm)	Pitch		Reel Size		Per Reel Packing Quantity
		mm	inch	mm	inch	
DFN5060	12	8 ± 0.1	0.315 ± 0.004	330	13	3,000

Marking information

- " TM506P700LS " = Part No.
- " ***** " = Date Code Marking
- Font type: Arial



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