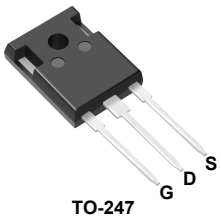
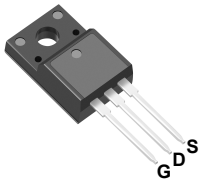
DESCRIPTION

The WTM25N65VF/VMP is a high voltage power MOSFET and is designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and have a high rugged avalanche characteristics. This power MOSFET is usually used at high speed switching applications in switching power supplies and adapters.



TO-247



TO-220F

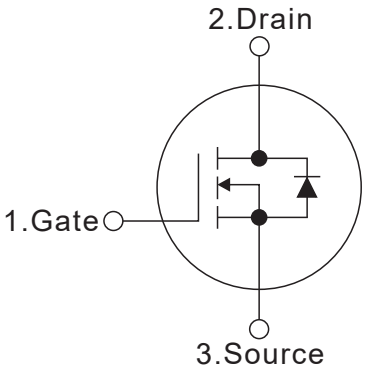
Features

- $R_{DS(ON)} \leq 0.40\Omega$ @ V_{GS}=10V, I_D=12,5A
- Fast switching capability
- Avalanche energy tested
- Improved dv/dt capability, high ruggedness

Mechanical data

- Case: TO-247-3L TO-220F
- RoHS compliant
- Case Material: “Green” molding compound, UL flammability classification 94V-0,“Halogen-free”.

SYMBOL



ABSOLUTE MAXIMUM RATINGS (T_A=25°C, unless otherwise specified)

PARAMETER		Symbols	RATINGS	Units
Drain-Source Voltage		V_{DS}	650	V
Gate-Source Voltage		V_{GS}	±30	V
Continuous Drain Current	Tc=25℃	I_D	25	A
	Tc=100℃		17.6	A
Pulsed Drain Current (Note 2)		I_{DM}	100	A
Avalanche Energy Single Pulsed (Note 3)		E_{AS}	780	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	50	V/ns
Power Dissipation TO-247		P_D	104	W
TO-220F		P_D	20	W
Operation Junction Temperature and Storage Temperature		T_j,T_{stg}	-55 ~ +150	°C

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. Repetitive Rating: Pulse width limited by maximum junction temperature.
3. L = 6.1mH,VDD = 50V, RG = 25 Ω, Starting TJ = 25°C
4. ISD ≤ 25A, di/dt ≤ 200A/μs, VDD ≤ BVDSS, Starting TJ = 25°C

THERMAL DATA

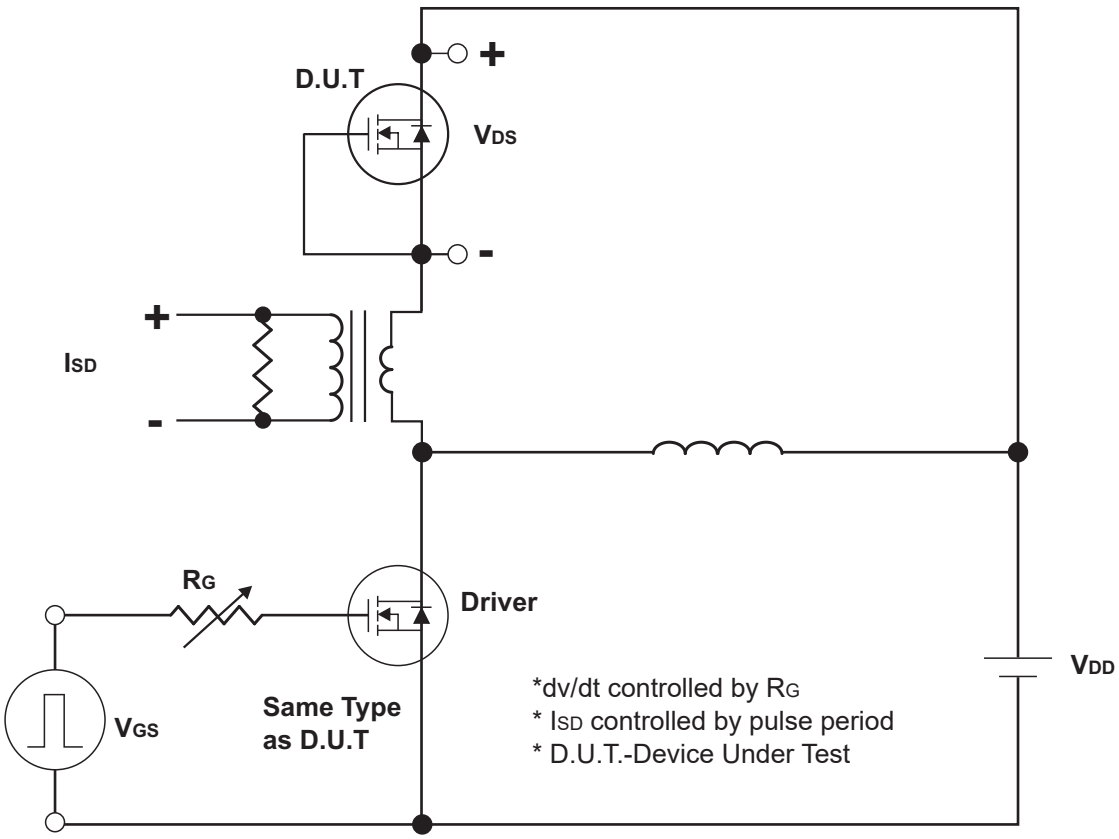
PARAMETER	Symbols	RATINGS	Units
Junction to Ambient	R_{thJA}	62.5	°C/W
Junction to Case	R_{thJC}	1.2	°C/W

ELECTRICAL CHARACTERISTICS (T_A=25°C, unless otherwise specified)

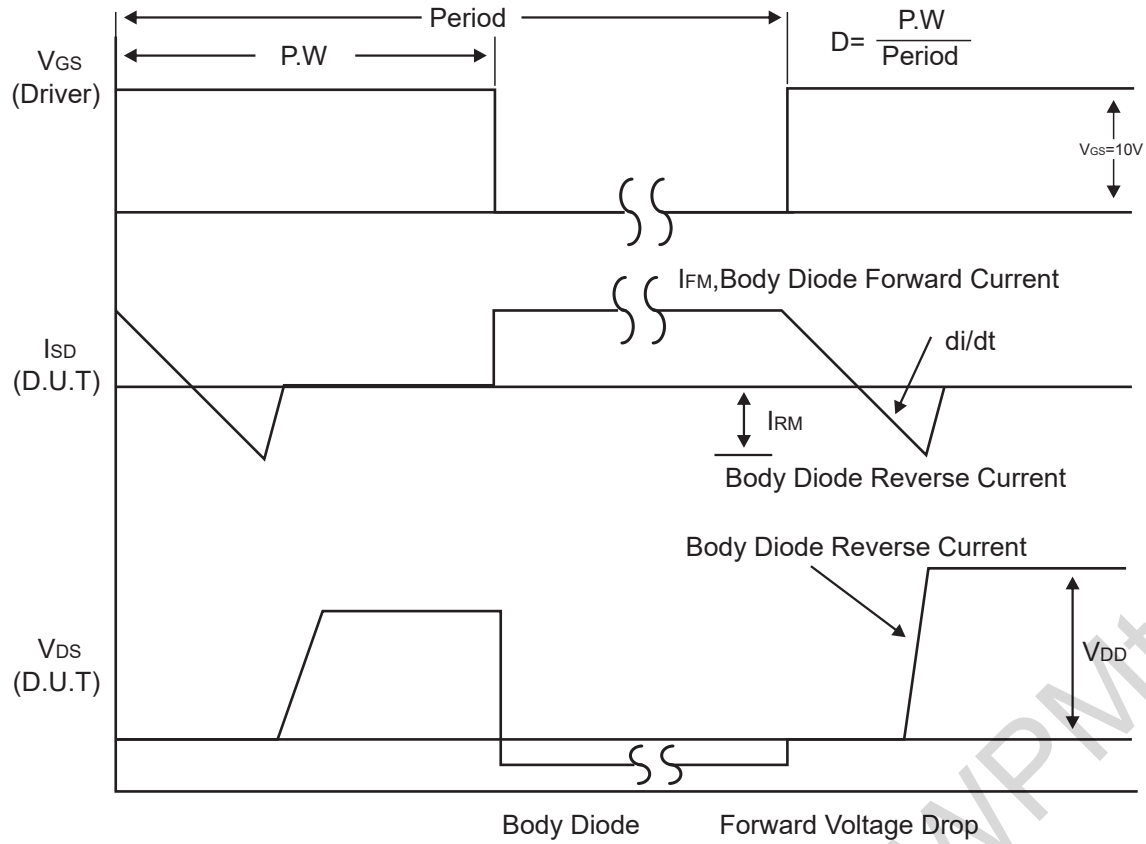
PARAMETER		Symbols	TEST CONDITIONS	Min	Typ	Max	Units
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V,I_D=250uA	650			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=650V,V_{GS}=0V			1	uA
Gate- Source Leakage Current	Forward	I_{GSS}	V_{GS}=30V,V_{DS}=0V			100	nA
	Reverse		V_{GS}=-30V,V_{DS}=0V			-100	
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS},I_D=250uA	2.0	3.2	4.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V,I_D=12.5A		0.33	0.40	Ω
DYNAMIC CHARACTERISTICS							
Input Capacitance		C_{ISS}	V_{DS}=25V,		3184		pF
Output Capacitance		C_{OSS}	V_{GS}=0V,		284		pF
Reverse Transfer Capacitance		C_{RSS}	f=1.0MHz		8.4		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge (Note 1)		Q_G	V_{DS}=520V,V_{GS}=10V,		30		nC
Gate-Source Charge		Q_{GS}	I_D=25A,I_G=1mA		8.0		nC
Gate-Drain Charge		Q_{GD}	(NOTE1,2)		12		nC
Turn-On Delay Time (Note 1)		$t_{D(ON)}$	V_{DS}=325V,V_{GS}=10V,		26		ns
Turn-On Rise Time		t_R	I_D=25A,R_G=25Ω		49		ns
Turn-Off Delay Time		$t_{D(OFF)}$	(NOTE1,2)		72		ns
Turn-Off Fall Time		t_F			40		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS							
Maximum Body-Diode Continuous Current		I_S				16	A
Maximum Body-Diode Pulsed Current		I_{SM}				64	A
Drain-Source Diode Forward Voltage (Note 1)		V_{SD}	I_S=25A,V_{GS}=0V			1.4	V
Reverse Recovery Time (Note 1)		trr	I_F=25A		470		ns
Reverse Recovery Charge		Qrr	di/dt=100A/us		5.0		uC

Notes:
1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating temperature.

Test Circuits and waveforms

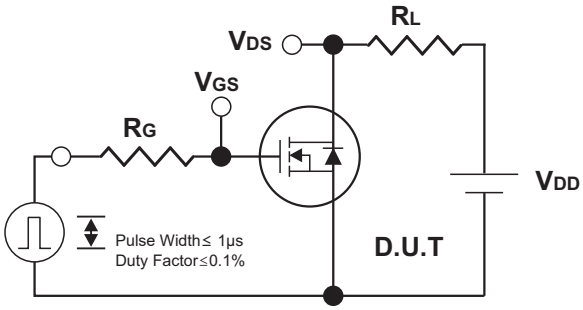


Peak Diode Recovery dv/dt Test Circuit

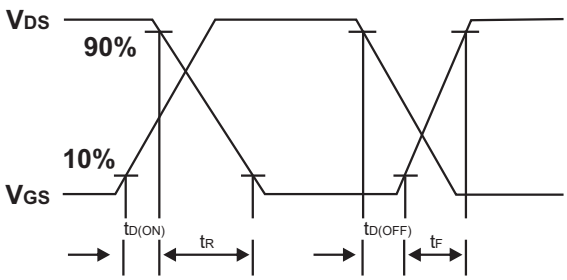


Peak Diode Recovery dv/dt Waveforms

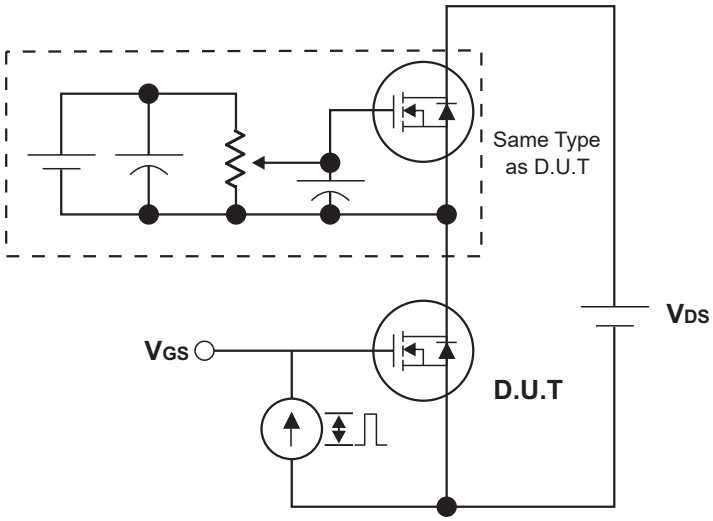
Test Circuits and waveforms



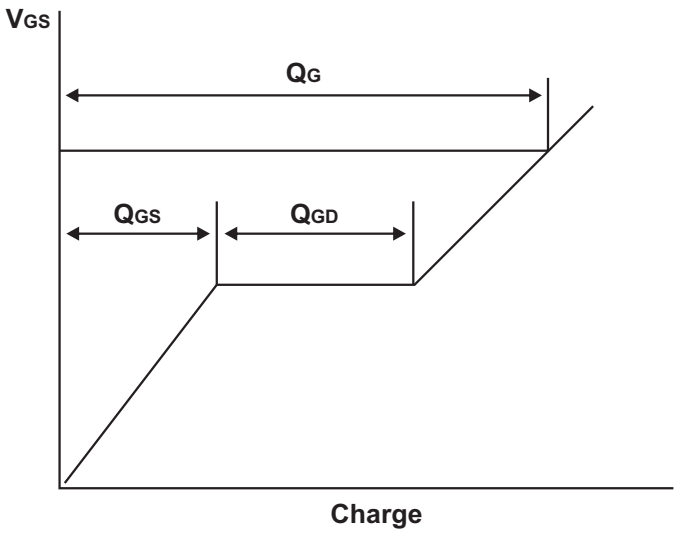
Switching Test Circuit



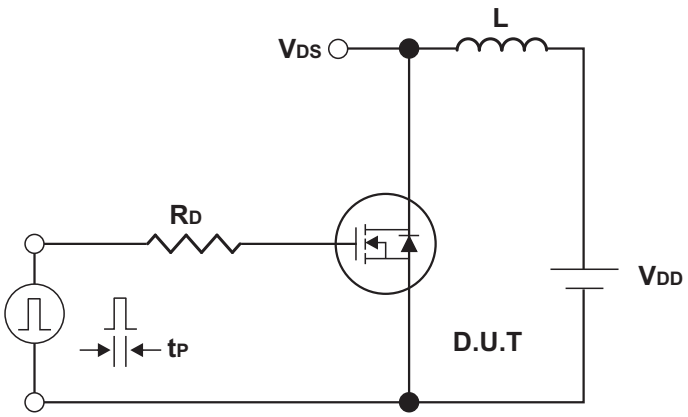
Switching Waveforms



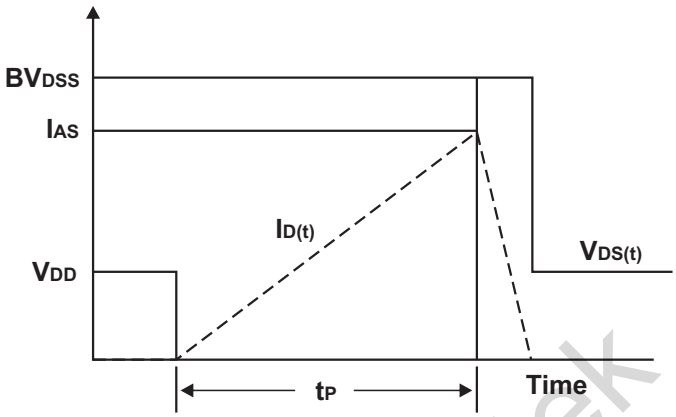
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

Typical Characteristics

Fig.1 Typical Output Characteristics

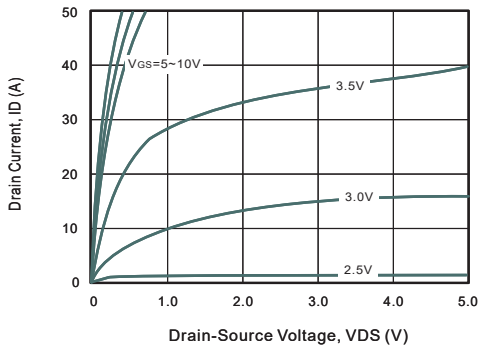


Fig.2 Power Dissipation

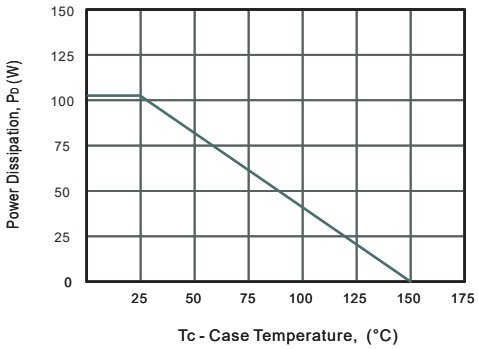


Fig.3 Drain Current Derating

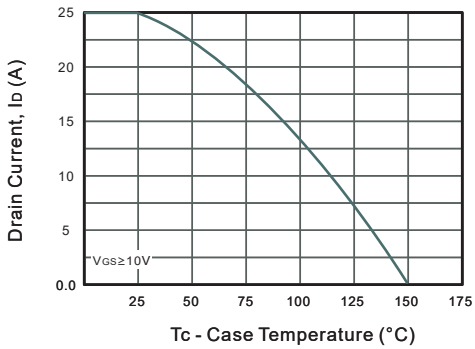


Fig.4 Drain-Source On-Resistance vs. Drain Current

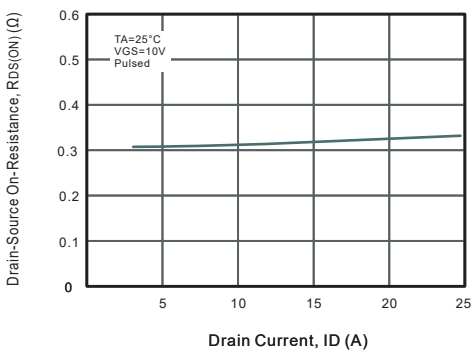


Fig.5 Gate Threshold Voltage vs. Junction Temperature

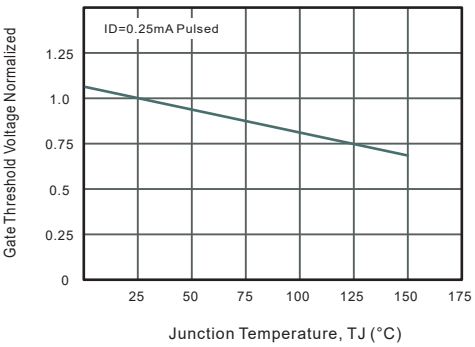


Fig.6 Body-diode Forward Characteristics

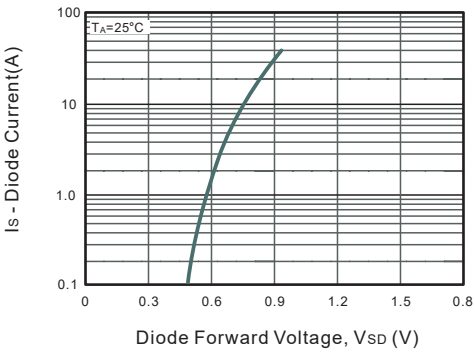


Fig.7 Drain-Source On-Resistance vs. Junction Temperature

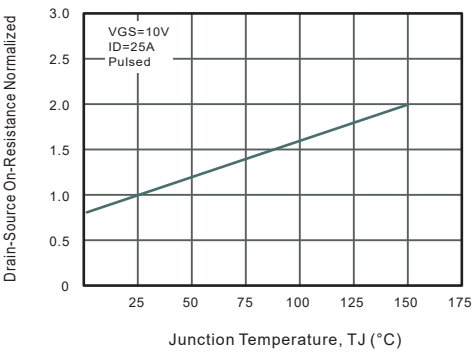
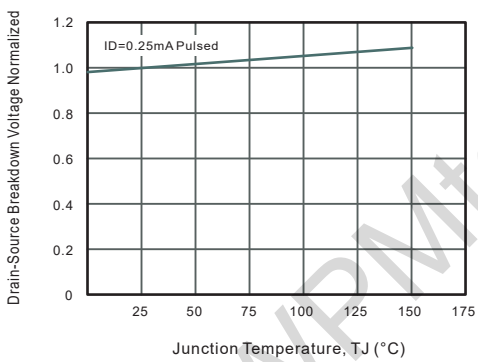


Fig.8 Breakdown Voltage vs. Junction Temperature



Typical Characteristics

Fig.9 Capacitance Characteristics

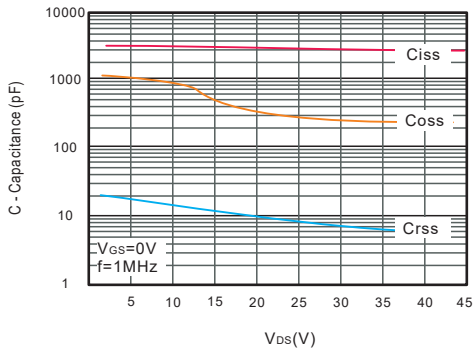


Fig.10 Gate Charge Characteristics

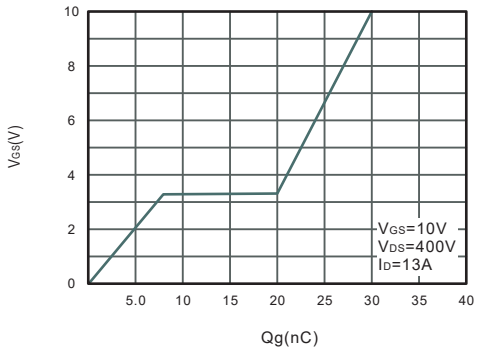


Fig.11 Safe Operating Area

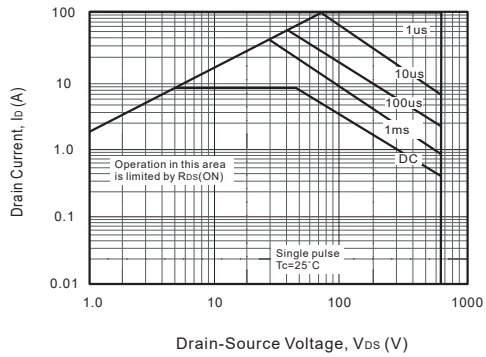
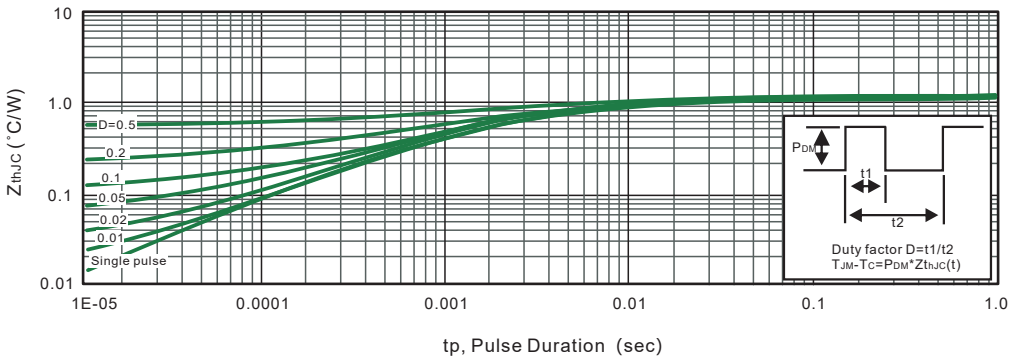
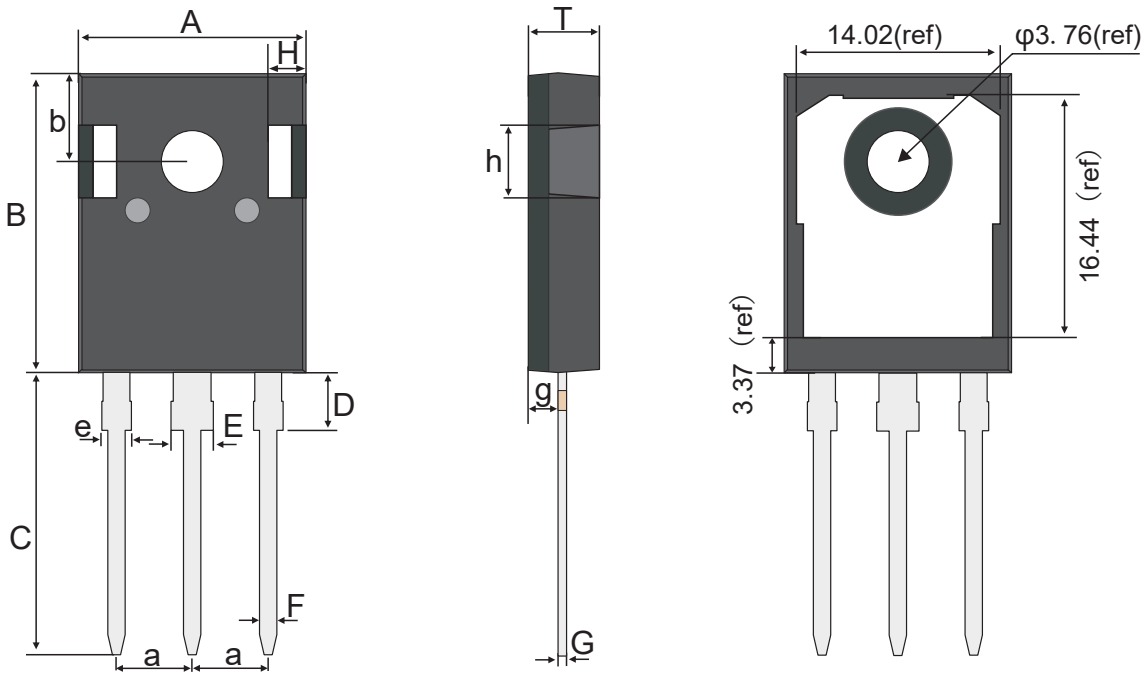


Fig.12 Max. Transient Thermal Impedance



Package Outline
Through Hole Package ; 3 leads

TO-247-3L

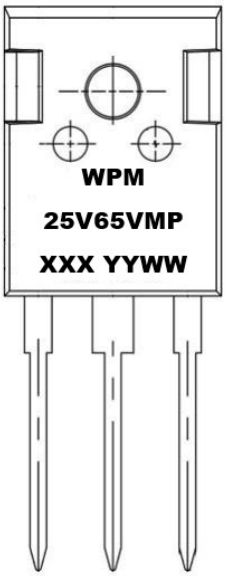


TO-247-3L mechanical data

UNIT		A	a	B	b	C	D	E	e	F	G	g	H	h	T
mm	max	16.01	5.54	21.18	6.26	20.2	4.25	3.25	2.2	1.3	0.7	2.49	2.71	5.37	5.2
	typ	15.81	5.44	20.98	6.16	20.0	4.15	3.10	2.05	1.2	0.6	2.39	2.51	5.17	5.0
	min	15.61	5.34	20.78	6.06	19.8	4.05	2.95	1.9	1.1	0.5	2.29	2.31	4.97	4.8
mil	max	630	218	834	246	795	167	128	87	51	28	98	107	211	205
	typ	622	214	826	243	787	163	122	81	47	24	94	99	204	197
	min	615	210	818	239	780	159	116	75	43	20	90	91	196	189

Marking Information

TO-247



TO-220F

WPM=WPMtek's Logo
25N65VF=Marking
XXX YYWW=Date Code