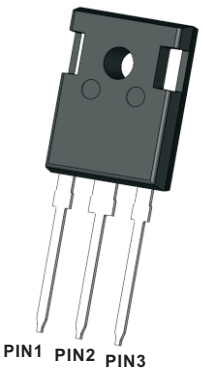
DESCRIPTION

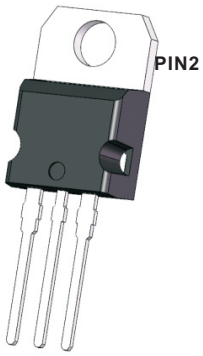
The WTM30N20VP/VMP is a high voltage power MOSFET and is designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and have a high rugged avalanche characteristics. This power MOSFET is usually used at high speed switching applications in switching power supplies and adaptors.

TO-247-3L



*Prefix :W

TO-220-3L



(*Prefix :C)

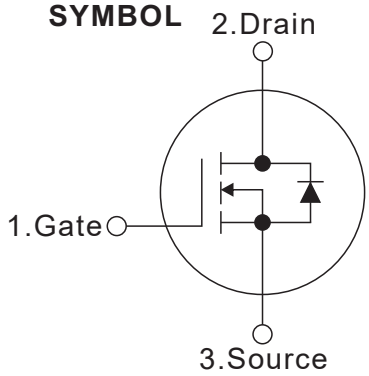
Features

- $R_{DS(ON)}$ < 0.075 Ω @ V_{GS}=10V, I_D=18A
- Fast switching capability
- Avalanche energy tested
- Improved dv/dt capability, high ruggedness

Mechanical data

- Case: TO-247-3L/TO-220-3L
- Approx. Weight: 6.3g (0.222oz)/2.0g (0.07oz)
- RoHS compliant
- Case Material: “Green” molding compound, UL flammability classification 94V-0,“Halogen-free”.

SYMBOL



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

PARAMETER		Symbols	RATINGS	Units
Drain-Source Voltage		V_{DS}	200	V
Gate-Source Voltage		V_{GS}	±30	V
Continuous Drain Current	Tc=25°C Tc=100°C	I_D	30 21	A
Pulsed Drain Current (Note 2)		I_{DM}	120	A
Avalanche Energy Single Pulsed (Note 3)		E_{AS}	1600	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	8.6	V/ns
Power Dissipation (Tc = 25°C)		P_D	178	W
Operating junction 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 = 10mH, V_{DD} = 50V, R_G = 25 Ω, Starting T_J = 25°C
4. Package limited current.

Thermal Resistance

PARAMETER	Symbols	RATINGS	Units
Thermal resistance, junction – case.	R_{thJC}	0.7	°C/W
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	40	°C/W

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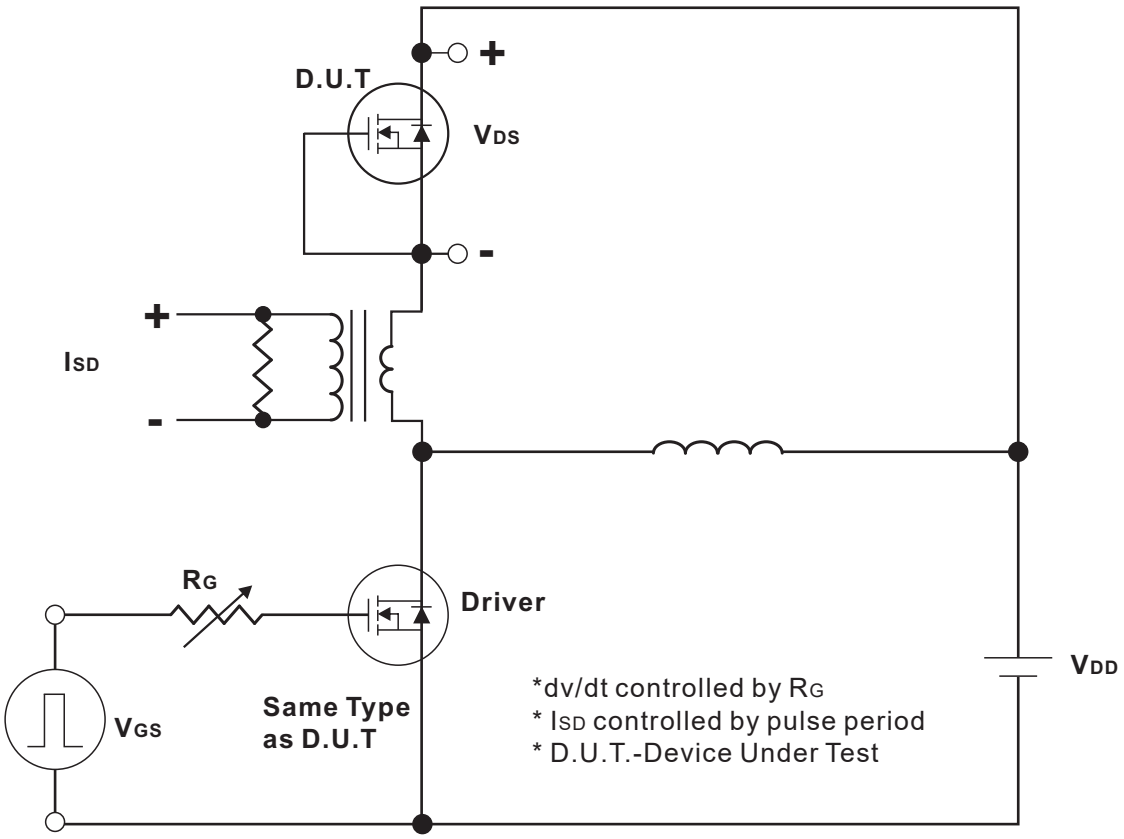
Electrical Characteristics (Ta=25°C, Unless Otherwise Specified)

Parameter	Symbols	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V,I_D=250uA	200			V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=200V,V_{GS}=0V			1.0	uA
Gate- Source Leakage Current	I_{GSS}	V_{GS}=±30V,V_{DS}=0V			±100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS},I_D=250uA	2.0		4.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V,I_D=18A		0.062	0.075	Ω
Transconductance	g_{fs}	V_{DS}=5V,I_D=18A		29		S
Dynamic Characteristics						
Input Capacitance	C_{ISS}	V_{DS}=50V,		2725		pF
Output Capacitance	C_{OSS}	V_{GS}=0V,		232		pF
Reverse Transfer Capacitance	C_{RSS}	f=1.0MHz		9.4		pF
Gate Resistance	Rg	VDS=0V,F_{REQ}=1.00MHz		1.7		Ω
Switching Characteristics						
Total Gate Charge (Note 1)	Q_G	V_{DS}=160V,V_{GS}=10V,		123		nC
Gate-Source Charge	Q_{GS}	I_D=18A(NOTE1,2)		21		nC
Gate-Drain Charge	Q_{GD}			57		nC
Turn-On Delay Time (Note 1)	$t_{D(ON)}$	V_{DS}=100V,V_{GS}=10V,		14		ns
Turn-On Rise Time	t_R	R_G=3.9Ω,I_D=18A		43		ns
Turn-Off Delay Time	$t_{D(OFF)}$	(NOTE1,2)		41		ns
Turn-Off Fall Time	t_F			33		ns
Drain-source Diode Characteristics And Maximum Ratings Description						
Drain-Source Diode Forward Voltage (Note 1)	V_{SD}	I_{SD}=18A,V_{GS}=0V			1.3	V
Diode continuous forward current	Is				30	A
Reverse Recovery time	trr	I_F=18A di/dt=100A/us		186		nS
Reverse Recovery Charge	Qrr			1.3		nC

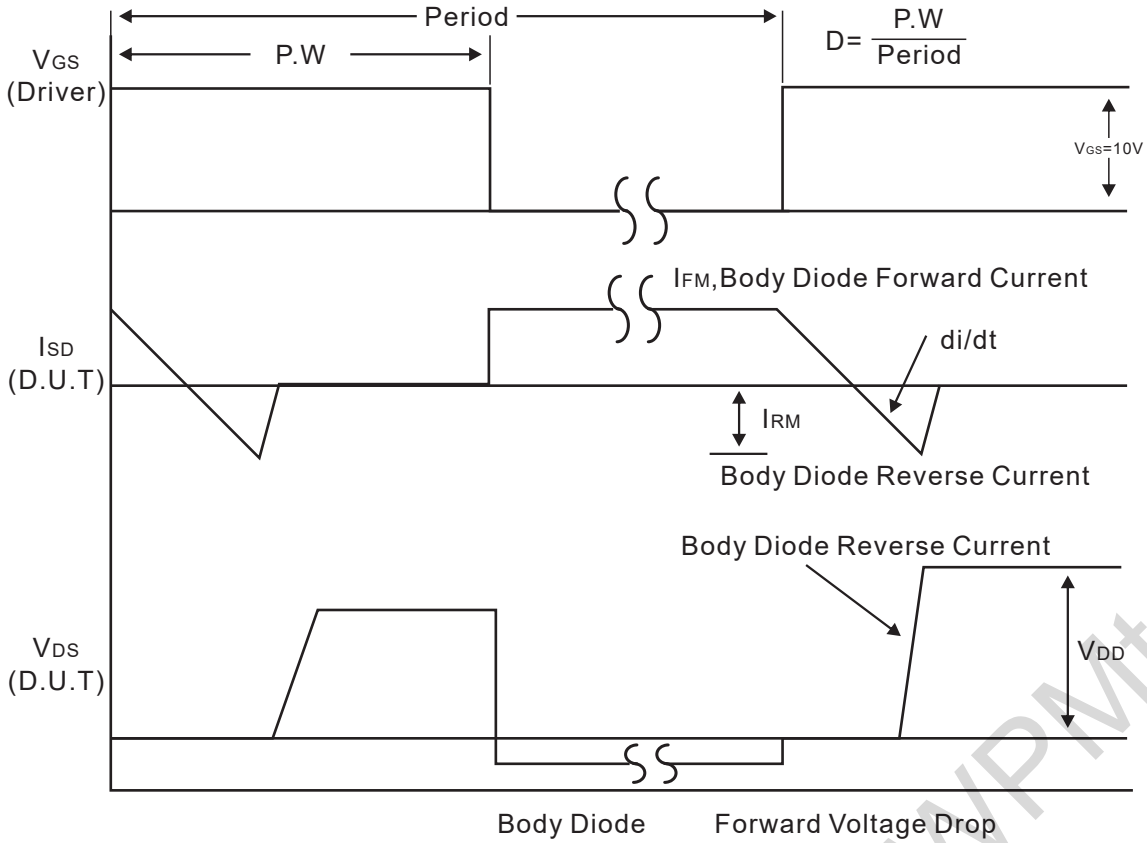
Notes:
1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating temperature.

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Test Circuits and waveforms



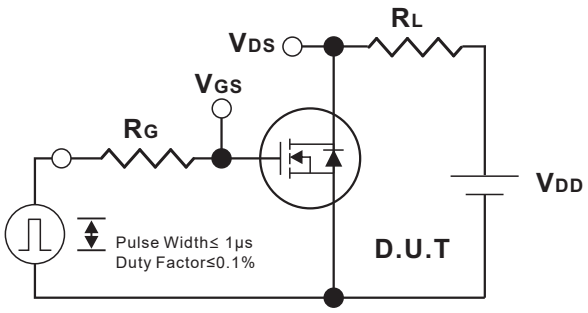
Peak Diode Recovery dv/dt Test Circuit



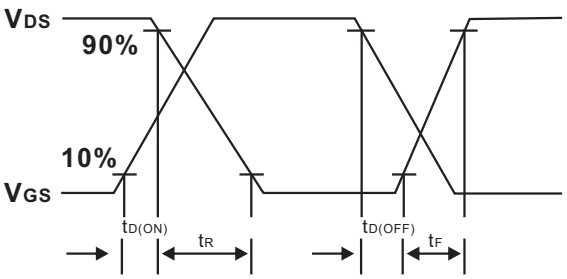
Peak Diode Recovery dv/dt Waveforms

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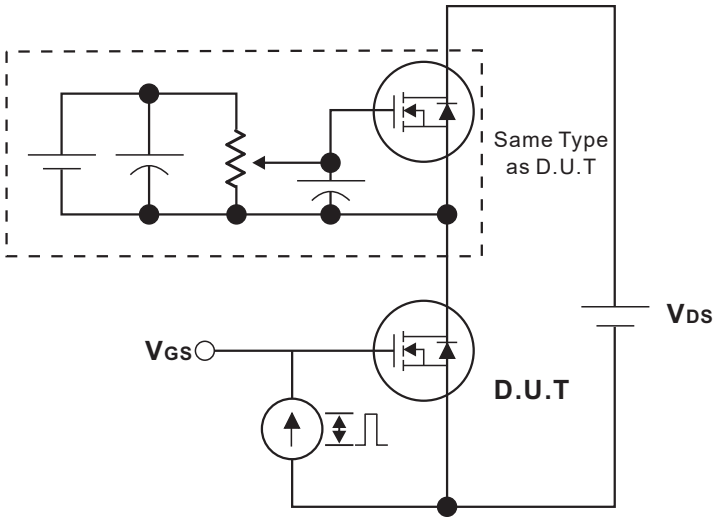
Test Circuits and waveforms



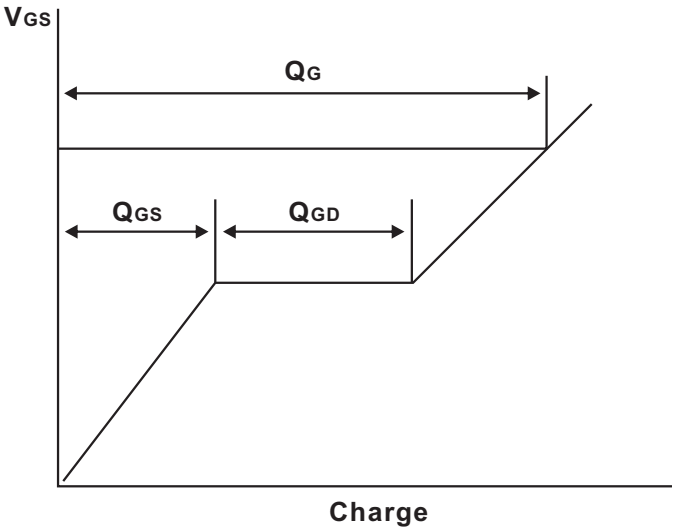
Switching Test Circuit



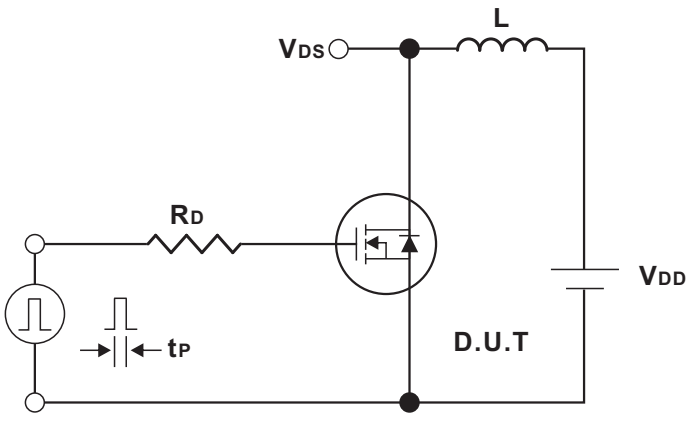
Switching Waveforms



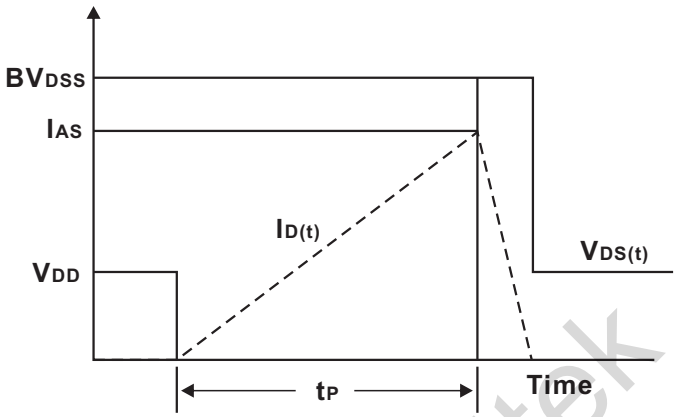
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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Typical Characteristics

Fig.1 Output characteristics

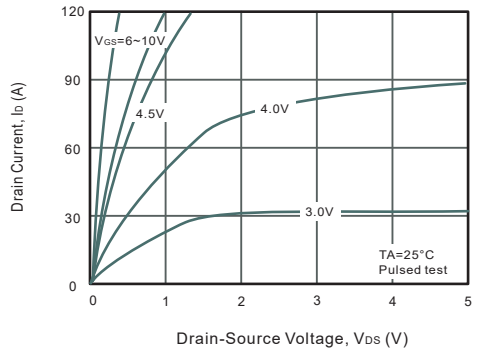


Fig.2 Power Dissipation

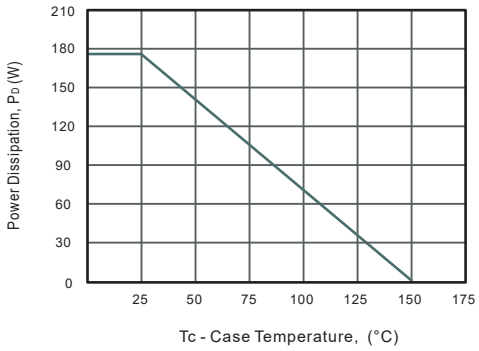


Fig.3 Drain Current Derating

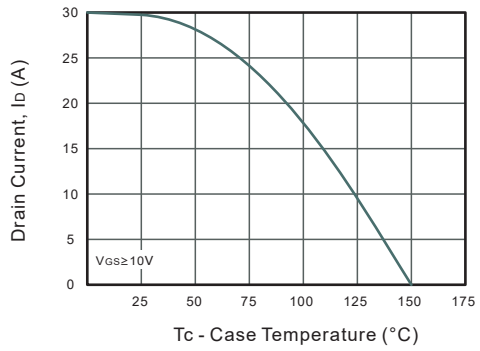


Fig.4 Drain-Source On-Resistance vs. Drain Current

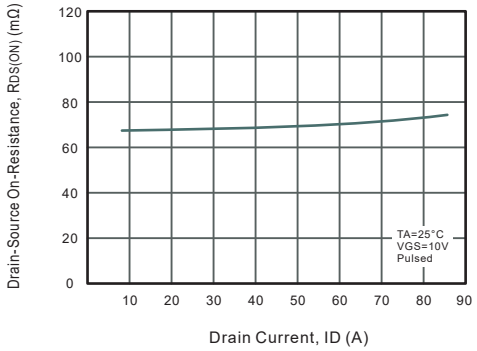


Fig.5 Gate Threshold Voltage vs. Junction Temperature

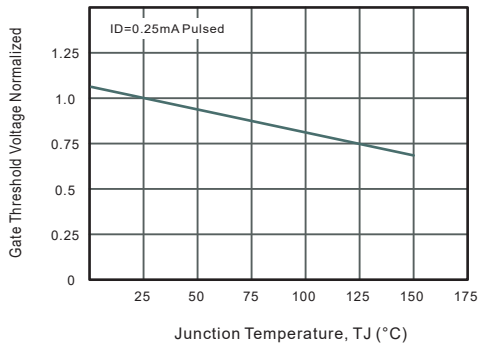


Fig.6 Body-diode Forward Characteristics

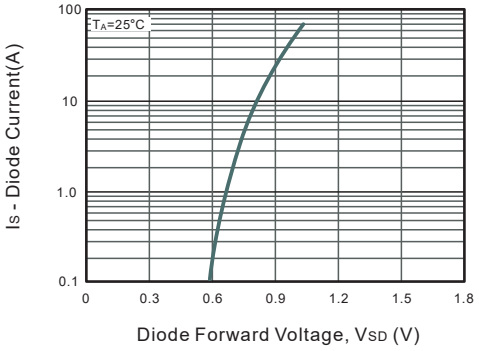


Fig.7 Drain-Source On-Resistance vs. Junction Temperature

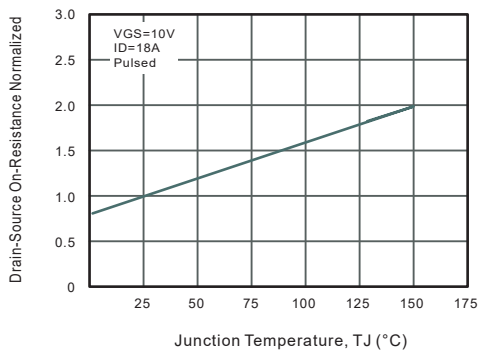
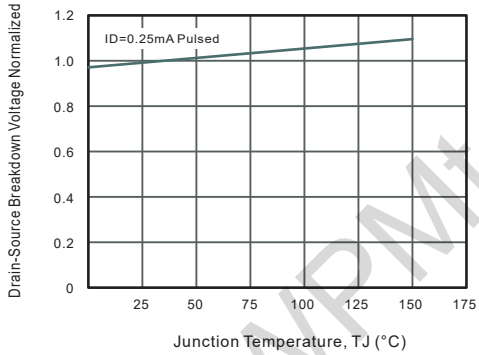


Fig.8 Breakdown Voltage vs. Junction Temperature



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Typical Characteristics

Fig.9 Capacitance Characteristics

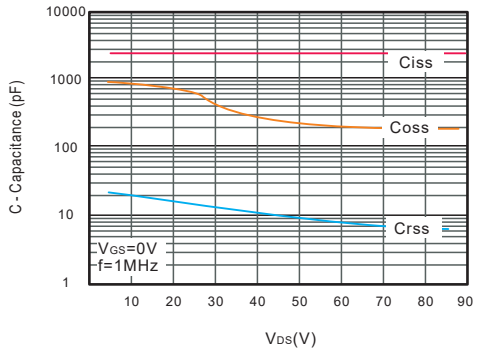


Fig.10 Gate Charge Characteristics

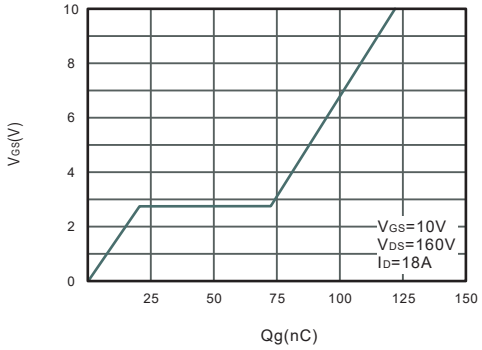


Fig.11 Safe Operating Area

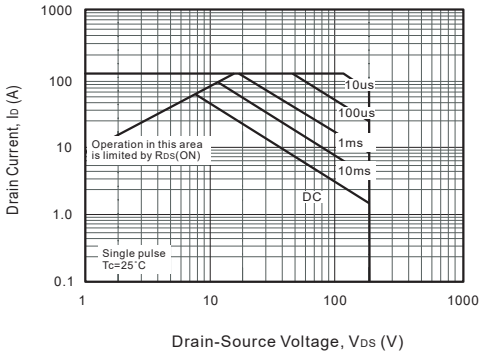
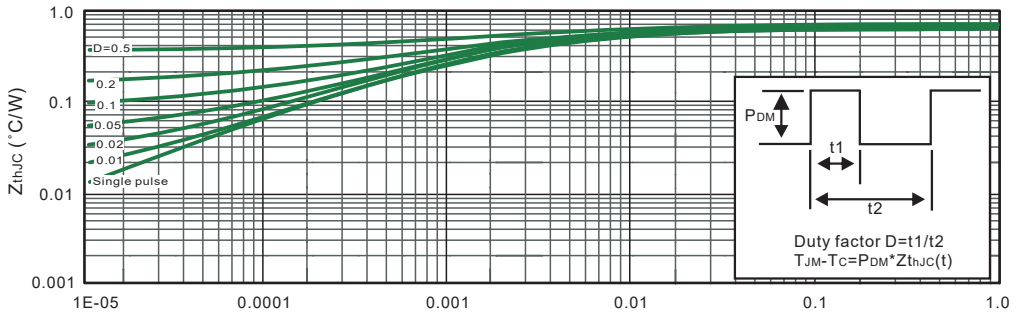


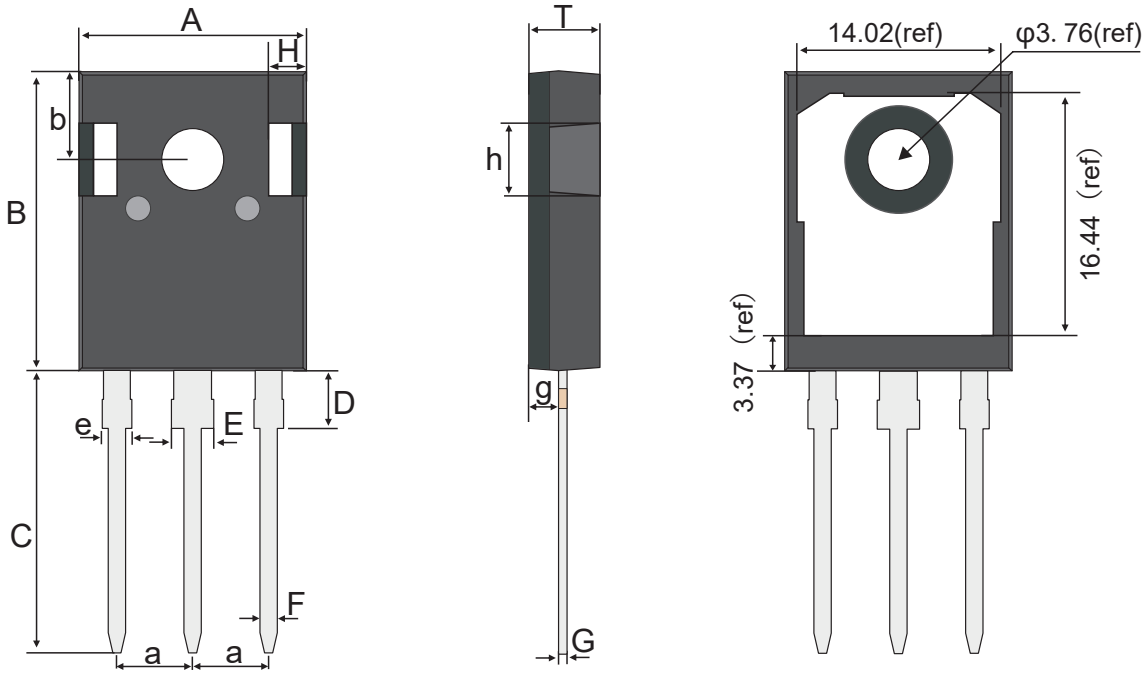
Fig.12 Max. Transient Thermal Impedance



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Package Outline
Through Hole Package ; 3 leads

TO-247-3L

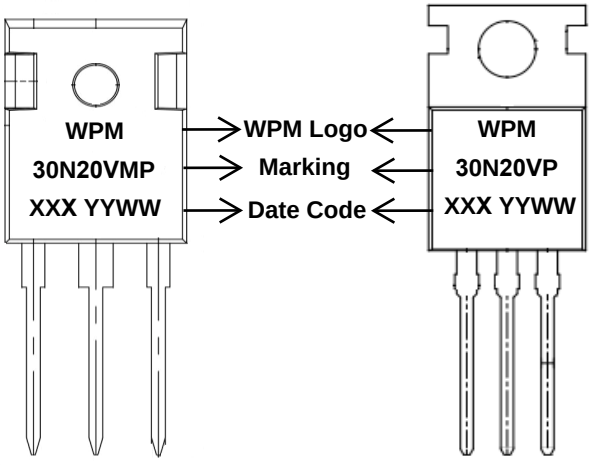


TO-247-3L mechanical data

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

TO-247 **TO-220**

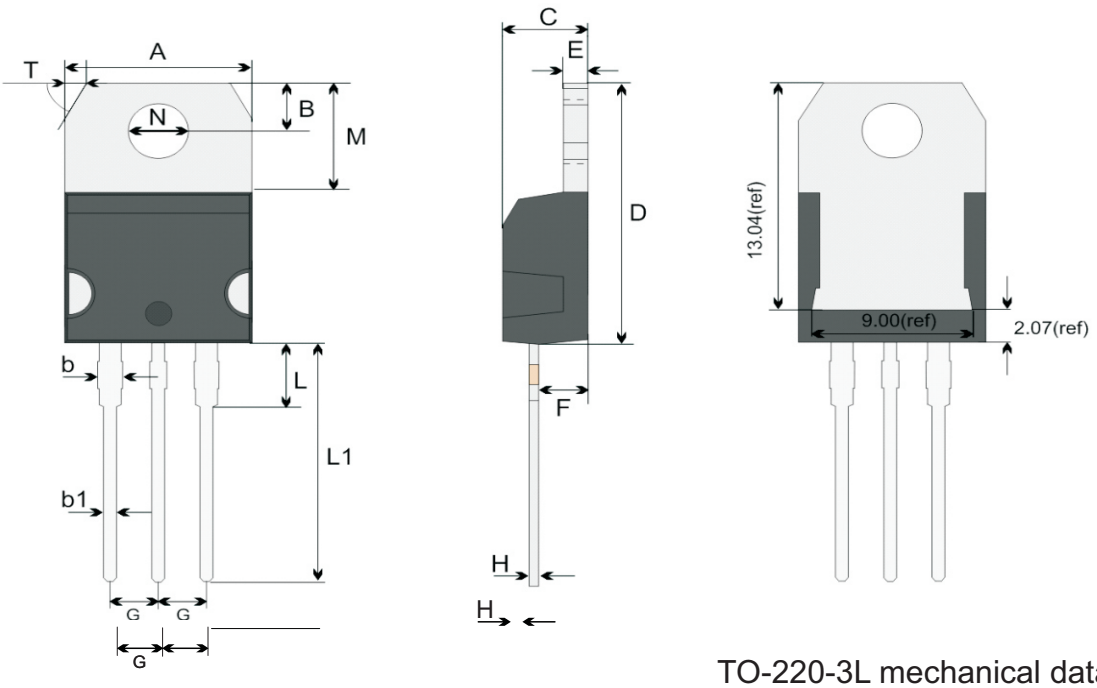


WTM30N20VMP **WTM30N20VP**

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Package Outline
Through Hole Package ; 3 leads

TO-220-3L



TO-220-3L mechanical data

UNIT		A	B	b	b1	C	D	E	F	G	H	L	L1	M	N	T
mm	max	10.28	2.84	1.67	0.9	4.65	15.54	1.37	2.79	2.64	0.6	3.88	13.13	6.39	3.82 typ.	1.19 58° ref.
	typ	10.18	2.74	1.47	0.8	4.45	15.34	1.27	2.59	2.54	0.5	3.68	12.93	6.19		
	min	10.08	2.64	1.27	0.7	4.25	15.14	1.17	2.39	2.44	0.4	3.48	12.73	5.99		
mil	max	405	112	66	35	183	612	54	110	104	24	153	517	252	150 typ.	47 58° ref.
	typ	401	108	58	31	175	604	50	102	100	20	145	509	244		
	min	397	104	50	28	167	596	46	94	96	16	137	501	236		

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