



70A,60V N-CHANNEL POWER MOSFET

Description

This low-voltage power MOSFET is produced with advanced technology. It makes the power MOSFET have better characteristics, including low on resistance, low gate charge characteristics, fast switching time, low on resistance and better avalanche.

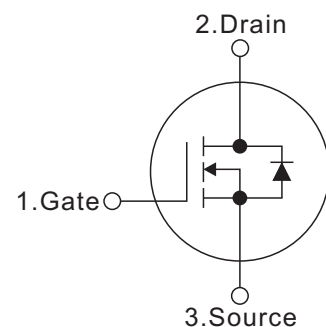
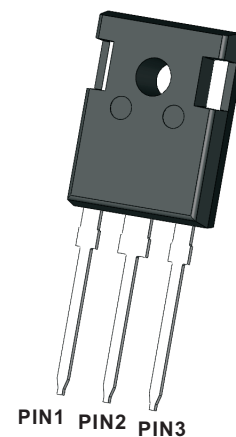
Features

- $R_{DS(ON)} < 9.0 \text{ m}\Omega @ V_{GS}=10\text{V}, I_D=78\text{A}$
- 100% Avalanche tested
- 100% ΔV_{DS} tested

Mechanical data

- Case: TO-247-3L
- Approx Weight: 2.04g (0.072oz)
- Lead free finish, RoHS compliant
- Case Material: "Green" molding compound, UL flammability classification 94V-0, "Halogen-free".

TO-247-3L(*Prefix :W)



Packing Marking And Ordering Information

Device Package	Device	Marking	Packing Type	QTY Per Tube	Inner box	Per Carton
TO-247-3L	W70N06A	W70N06A	Tube	30 Pcs	600 Pcs	1,200 Pcs

Absolute Maximum Ratings (Ta=25°C, Unless Otherwise Specified)

Parameter	Symbols	Ratings	Units
Drain-Source Voltage	V_{DSS}	60	V
Gate-Source Voltage	V_{GSS}	± 20	V
Continuous Drain Current	I_D	70	A
Pulsed Drain Current (Note 2)	I_{DM}	520	A
Avalanche Energy Single Pulsed (Note 3)	E_{AS}	2500	mJ
Power Dissipation ($T_c = 25^\circ\text{C}$)	P_D	300	W
Operating junction and storage temperature	T_J, T_{STG}	-55 ~ +150	$^\circ\text{C}$

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. $L = 0.5\text{mH}$, $I_{AS} = 100\text{A}$, $V_{DD} = 40\text{V}$, $R_G = 25 \Omega$, Starting $T_J = 25^\circ\text{C}$

Thermal Resistance

Parameter	Symbols	Ratings	Units
Thermal resistance, junction – case.	R_{thJC}	0.41	$^\circ\text{C}/\text{W}$
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	63	$^\circ\text{C}/\text{W}$



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

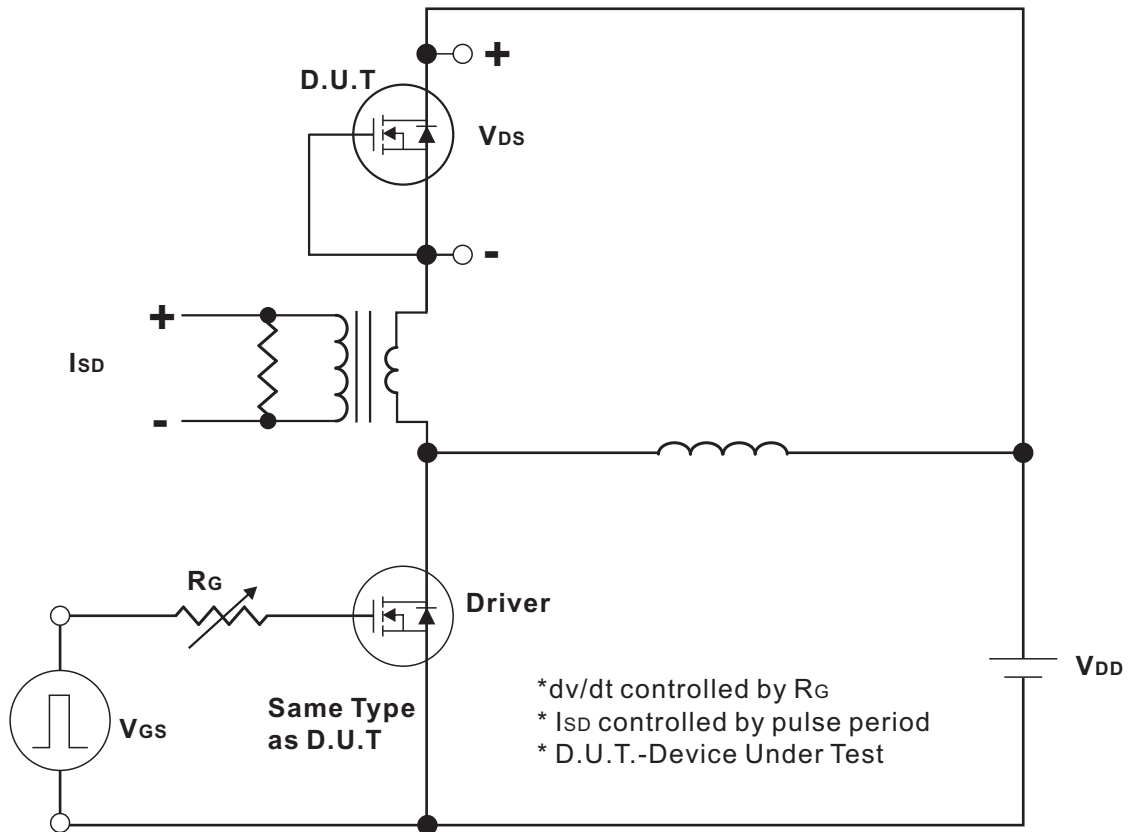
Parameter	Symbols	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	60			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=60V, V_{GS}=0V$			10	μA
Gate- Source Leakage Current	Forward	I_{GSS}			100	nA
	Reverse				-100	
On Characteristics						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0		4.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=78A$		7.5	9.1	m Ω
Transconductance	g_{fs}	$V_{DS}=25V, I_D=78A$		56		S
Dynamic Characteristics						
Input Capacitance	C_{ISS}	$V_{DS}=25V,$ $V_{GS}=0V,$ $f=1.0MHz$		10275		pF
Output Capacitance	C_{OSS}			3184		pF
Reverse Transfer Capacitance	C_{RSS}			461		pF
Gate resistance	R_G			0.7		Ω
Switching Characteristics						
Total Gate Charge (Note 1)	Q_G	$V_{DS}=48V, V_{GS}=10V,$ $I_D=130A$ (NOTE1,2)		190		nC
Gate-Source Charge	Q_{GS}			55		nC
Gate-Drain Charge	Q_{GD}			90		nC
Turn-On Delay Time (Note 1)	$t_{D(ON)}$	$V_{DS}=30V, V_{GS}=10V,$ $R_G=4.3\Omega, I_D=130A$ (NOTE1,2)		25		ns
Turn-On Rise Time	t_R			190		ns
Turn-Off Delay Time	$t_{D(OFF)}$			110		ns
Turn-Off Fall Time	t_F			185		ns
Drain-source Diode Characteristics And Maximum Ratings Description						
Drain-Source Diode Forward Voltage (Note 1)	V_{SD}	$I_{SD}=130A, V_{GS}=0V$			3.0	V
Reverse Recovery Time (Note 1)	t_{rr}	$I_F=130A$ $di/dt=100A/\mu s$		160		ns
Reverse Recovery Charge	Q_{rr}			0.9		μC

Notes:

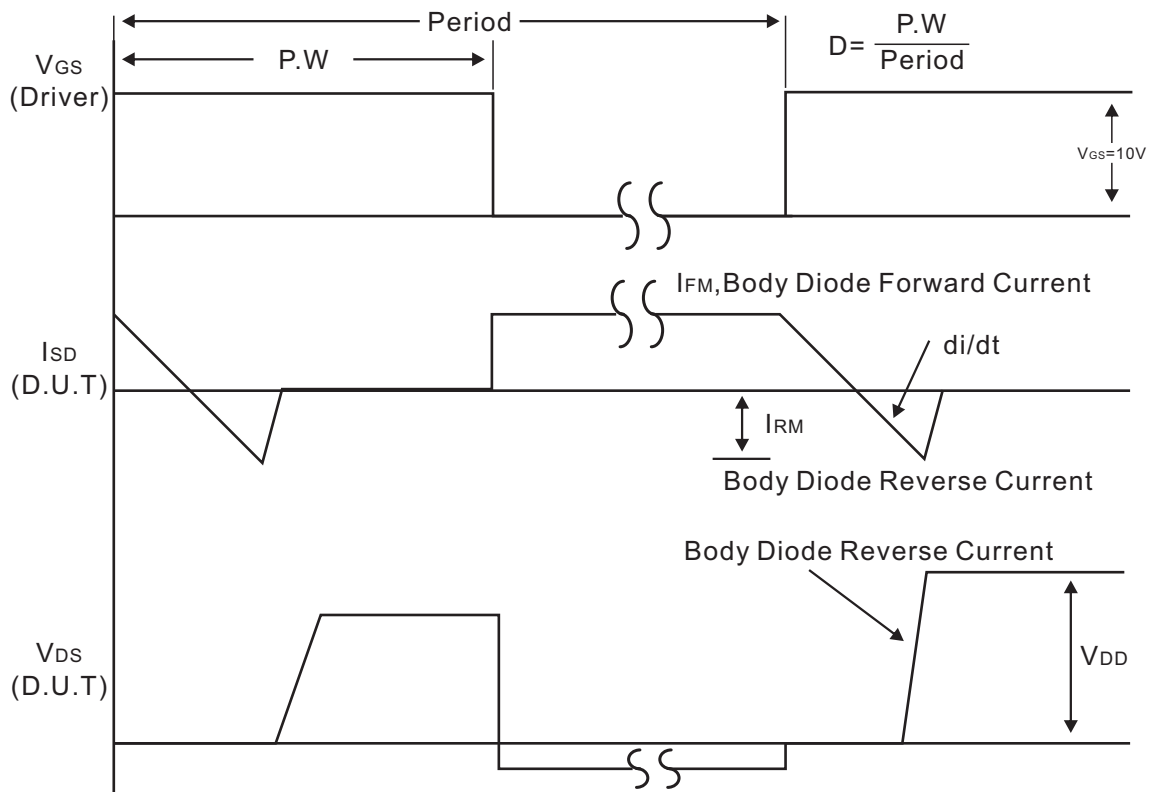
1. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.
2. Essentially independent of operating temperature.



Test Circuits and waveforms



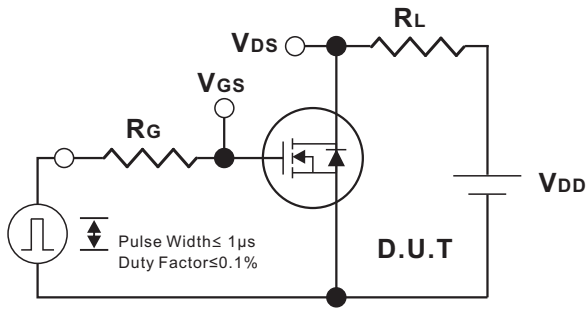
Peak Diode Recovery dv/dt Test Circuit



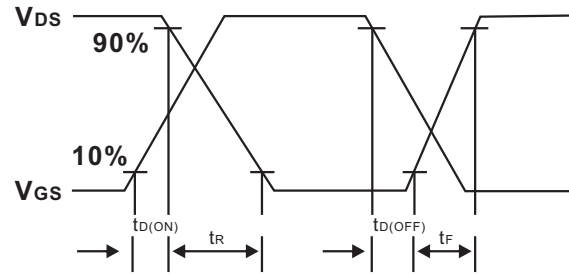
Peak Diode Recovery dv/dt Waveforms



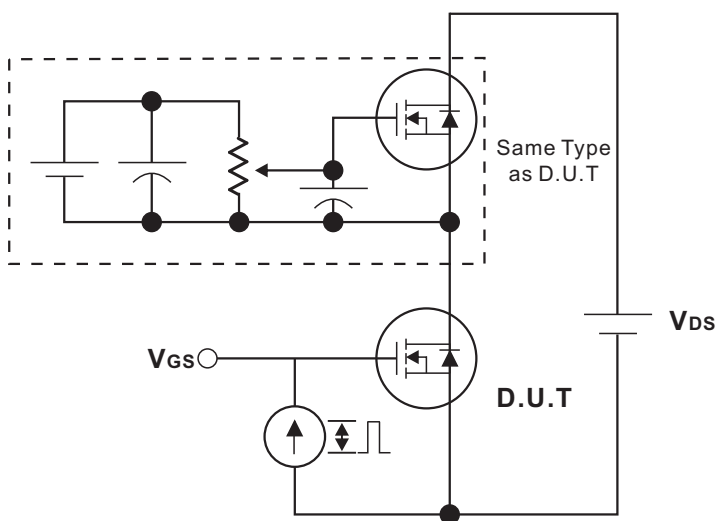
Test Circuits and waveforms



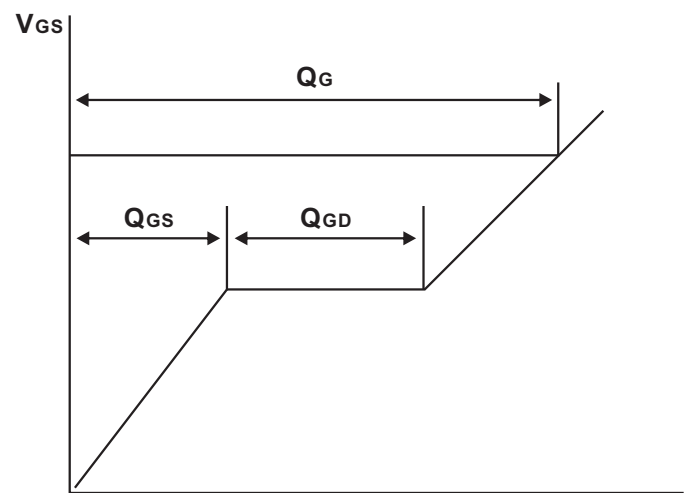
Switching Test Circuit



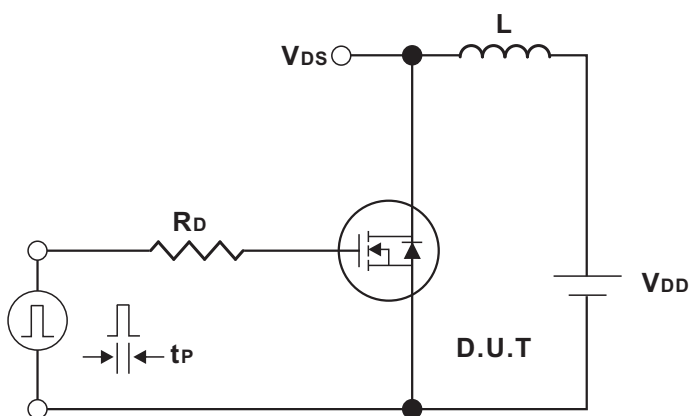
Switching Waveforms



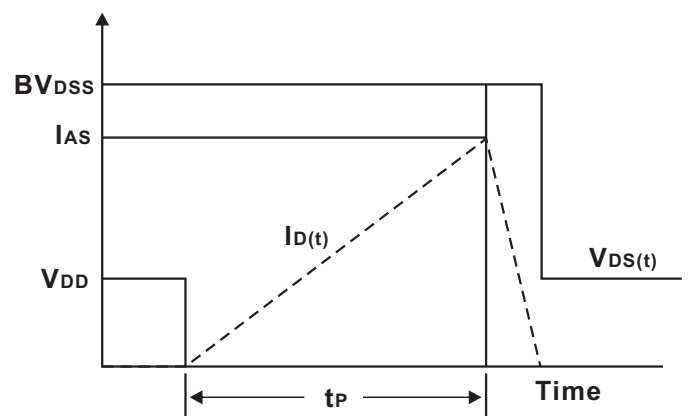
Gate Charge Test Circuit



Charge
Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms



Typical Characteristics

Fig.1 Output Characteristics

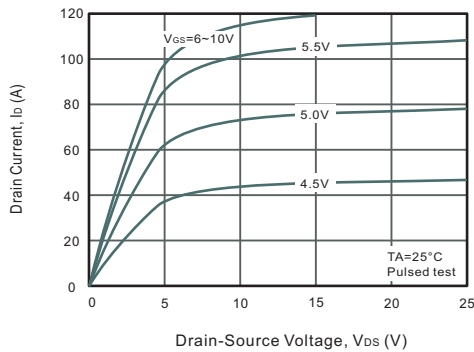


Fig.2 Power Dissipation

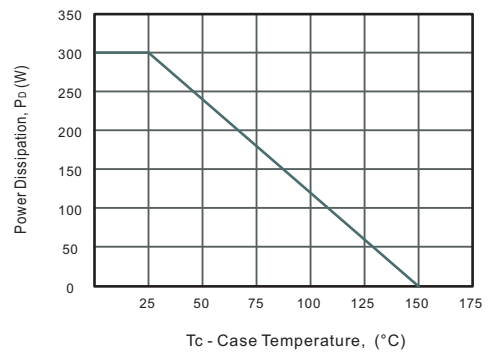


Fig.3 Drain Current Derating

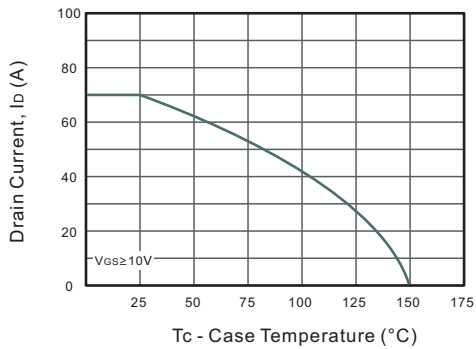


Fig.4 Drain-Source On-Resistance vs. Drain Current

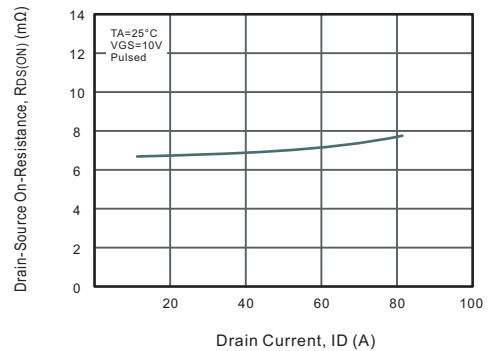


Fig.5 Gate Threshold Voltage vs. Junction Temperature

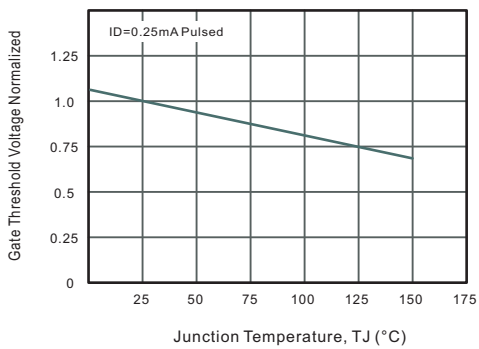


Fig.6 Body-diode Forward Characteristics

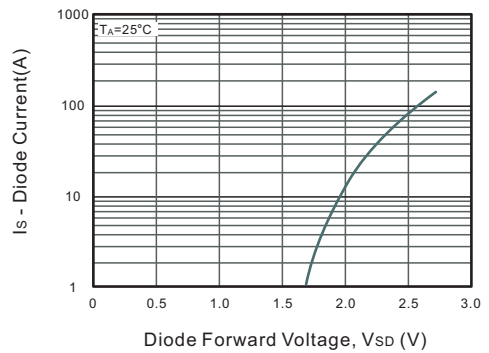


Fig.7 Drain-Source On-Resistance vs. Junction Temperature

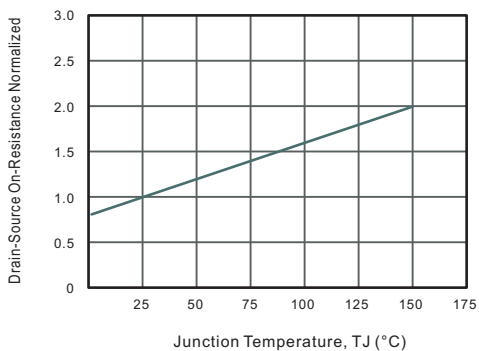
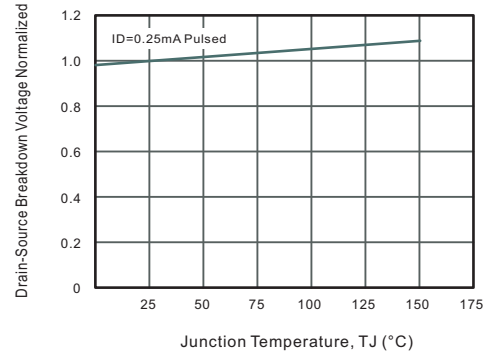


Fig.8 Breakdown Voltage vs. Junction Temperature





Typical Characteristics

Fig.9 Capacitance Characteristics

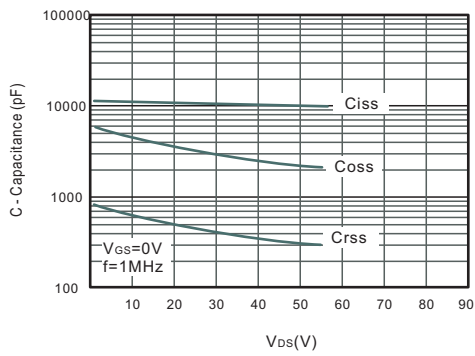


Fig.10 Gate Charge Characteristics

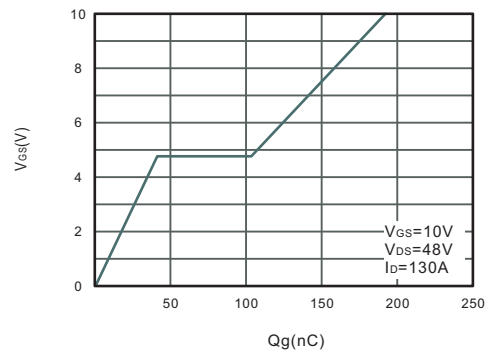


Fig.11 Safe Operating Area

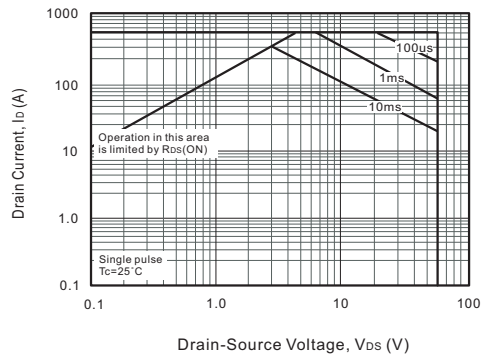
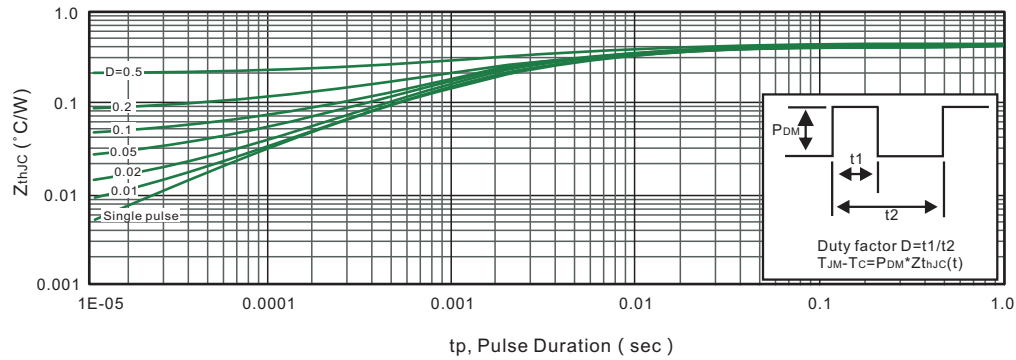


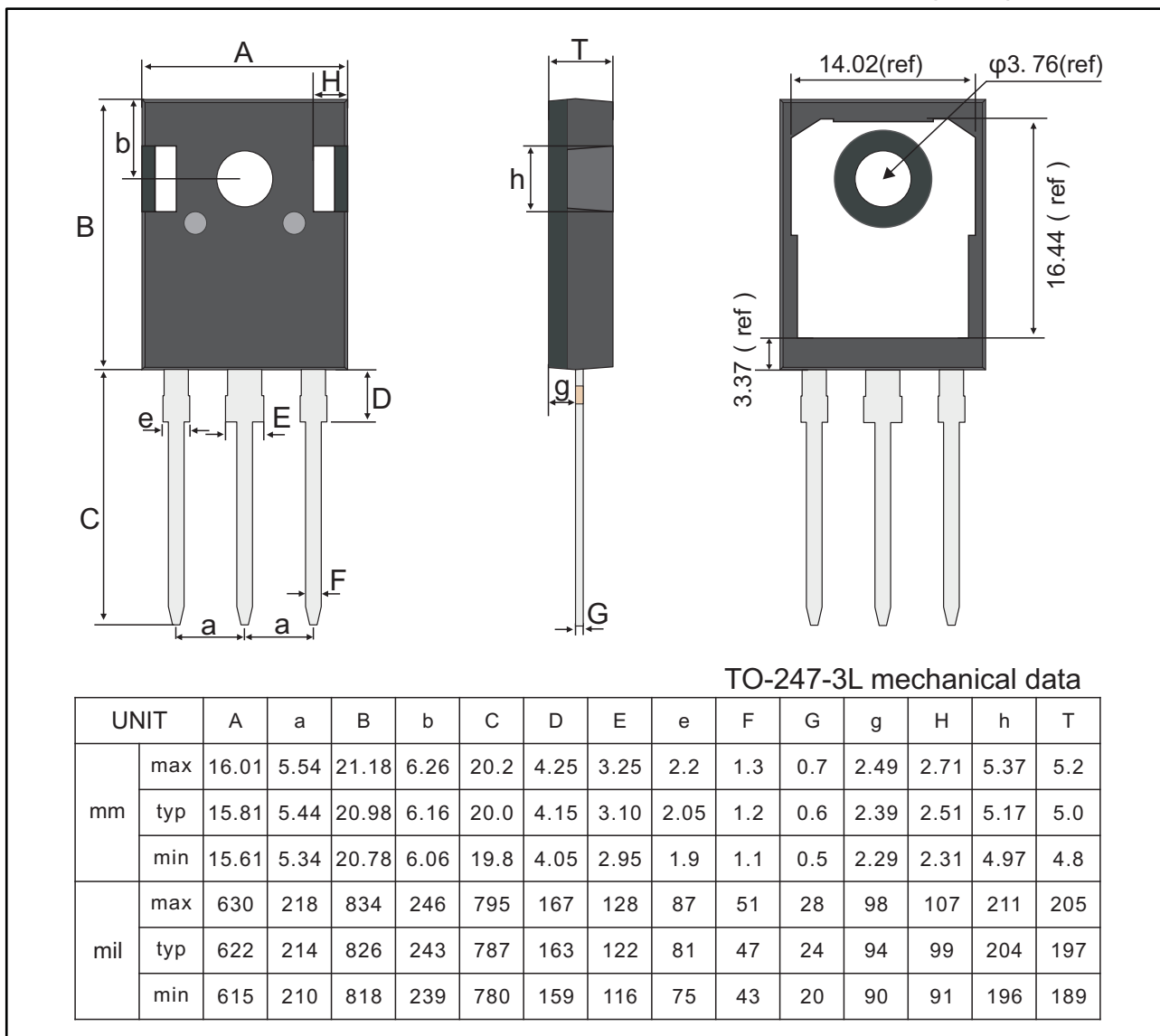
Fig.12 Max. Transient Thermal Impedance



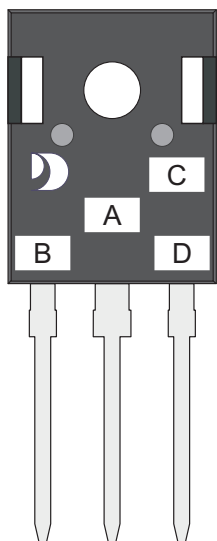


Package Outline
Through Hole Package ; 3 leads

TO-247-3L



Marking Diagram



- Unmarkable Surface
- Marking Composition Field
- a: Ejector Pin Mark
- A: Marking Area
- B: Lot Code
- C: Additional Information
- D: Date Code (YWW)
- Y: Years(0~9)
- WW: Week



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