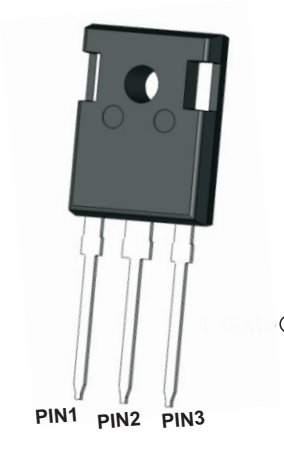
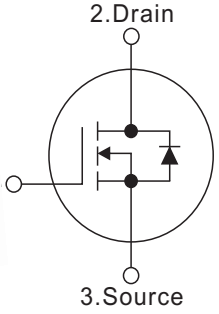
105A, 100V N-CHANNEL POWER MOSFET

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



RoHS COMPLIANT



Description

This model is an advanced SGT MOSFET with better characteristics, such as fast switching time, low gate charge and low on state resistance.
Such enhanced MOSFET are commonly used in switching power supplies and adapters for high-speed switching applications.

Features

- SGT technology
- $R_{DS(ON)}$ < 6.0mΩ @ V_{GS}=10V, I_D=30A
- Extremely low on impedance
- Low gate charge
- Superior switching characteristics

Mechanical data

- Case: TO-247-3L
- Approx Weight: 6.3g (0.22oz)
- RoHS compliant
- Case Material: “Green” molding compound, UL flammability classification 94V-0,“Halogen-free”.

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

Parameter	Symbols	Ratings	Units
Drain-Source Voltage	V_{DSS}	100	V
Gate-Source Voltage	V_{GSS}	±20	V
Continuous Drain Current	I_D	105	A
Pulsed Drain Current (Note 2)	I_{DM}	315	A
Avalanche Energy Single Pulsed (Note 3)	E_{AS}	200	mJ
Power Dissipation (Tc = 25°C)	P_D	148	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 = 0.5mH,VDD=25V,R_G = 25 Ω, Starting T_J = 25°C

Thermal Resistance

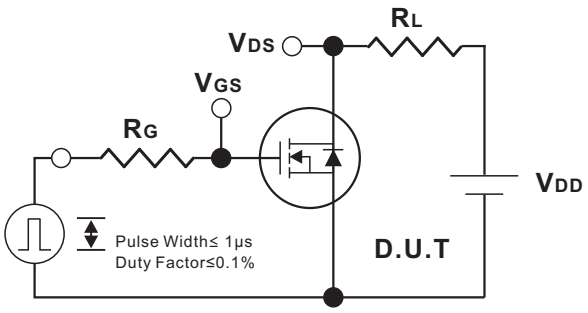
Parameter	Symbols	Ratings	Units
Thermal resistance, junction – case.	R_{thJC}	0.84	°C/W
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	62	°C/W

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

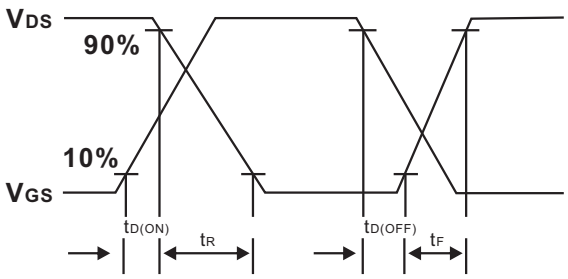
Parameter		Symbols	Test Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V,I_D=250uA	100			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=100V,V_{GS}=0V			1.0	uA
Gate- Source Leakage Current	Forward	I_{GSS}	V_{GS}=20V,V_{DS}=0V			100	nA
	Reverse		V_{GS}=-20V,V_{DS}=0V			-100	
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=30A		5.3	6.0	mΩ
Transconductance		g_{fs}	V_{DS}=5V,I_D=20A		20		S
DYNAMIC CHARACTERISTICS							
Input Capacitance		C_{ISS}	V_{DS}=25V,		2779		pF
Output Capacitance		C_{OSS}	V_{GS}=0V,		1529		pF
Reverse Transfer Capacitance		C_{RSS}	f=1.0MHz		126		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge (Note 1)		Q_G	V_{DS}=50V,V_{GS}=10V,		75		nC
Gate-Source Charge		Q_{GS}	I_D=20A, f=1.0MHz		17		nC
Gate-Drain Charge		Q_{GD}	(NOTE1,2)		13		nC
Turn-On Delay Time (Note 1)		$t_{D(ON)}$	V_{DS}=50V,V_{GS}=10V,		15.4		ns
Turn-On Rise Time		t_R	R_G=3.0Ω,I_D=20A		13		ns
Turn-Off Delay Time		$t_{D(OFF)}$	(NOTE1,2)		34		ns
Turn-Off Fall Time		t_F			6.2		ns
Gate resistance		R_G	V_{GS}=0V,V_{DS}=0V,f=1MHz		1.6		Ω
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS							
Drain-Source Diode Forward Voltage (Note 1)		V_{SD}	I_{SD}=20A,V_{GS}=0V			1.2	V
Reverse Recovery Time (Note 1)		trr	I_F=20A		55		ns
Reverse Recovery Charge		Qrr	di/dt=100A/us		101		uC

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

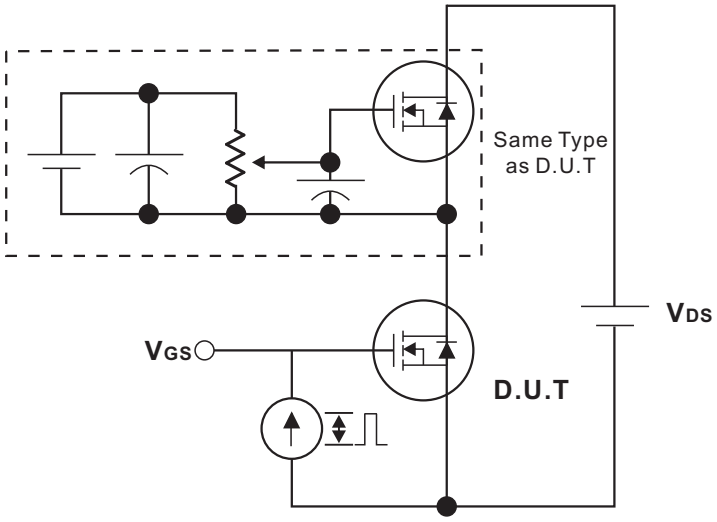
Test Circuits and waveforms



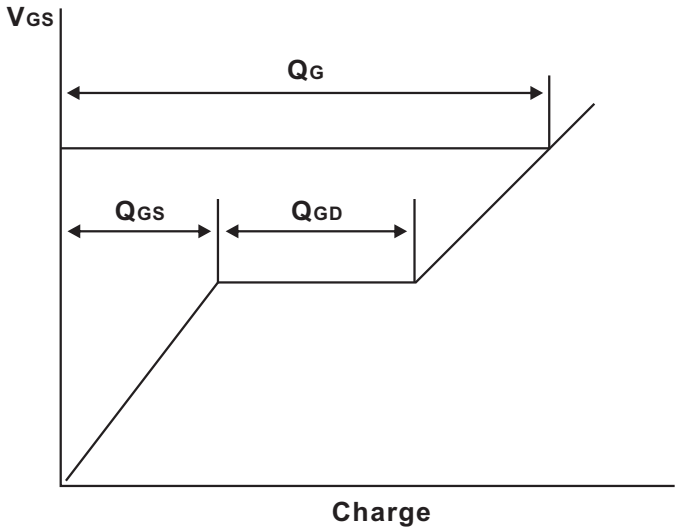
Switching Test Circuit



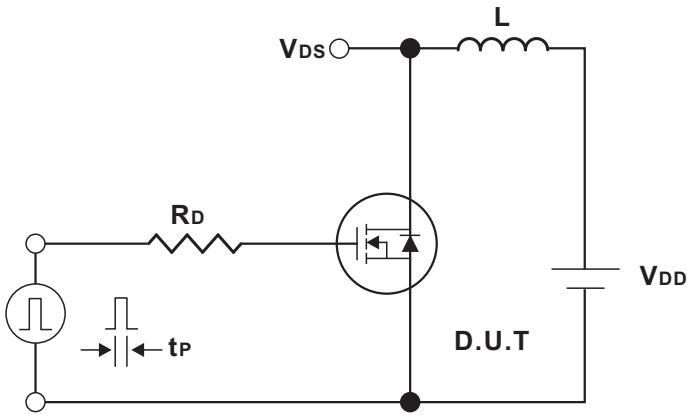
Switching Waveforms



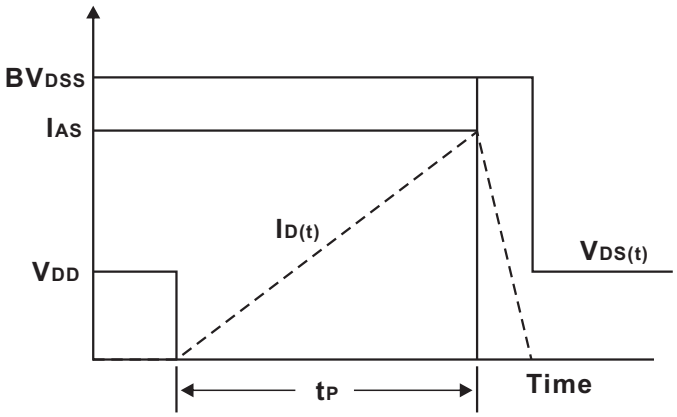
Gate Charge Test Circuit



Gate Charge Waveform

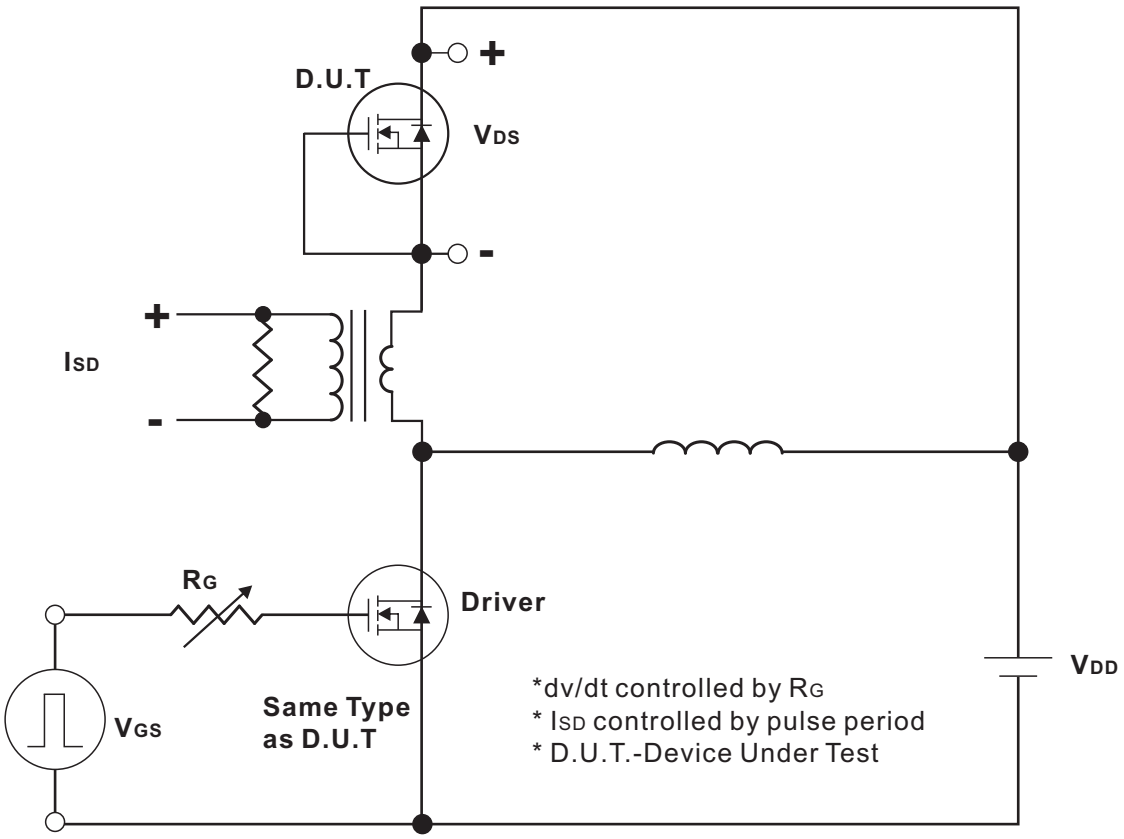


Unclamped Inductive Switching Test Circuit

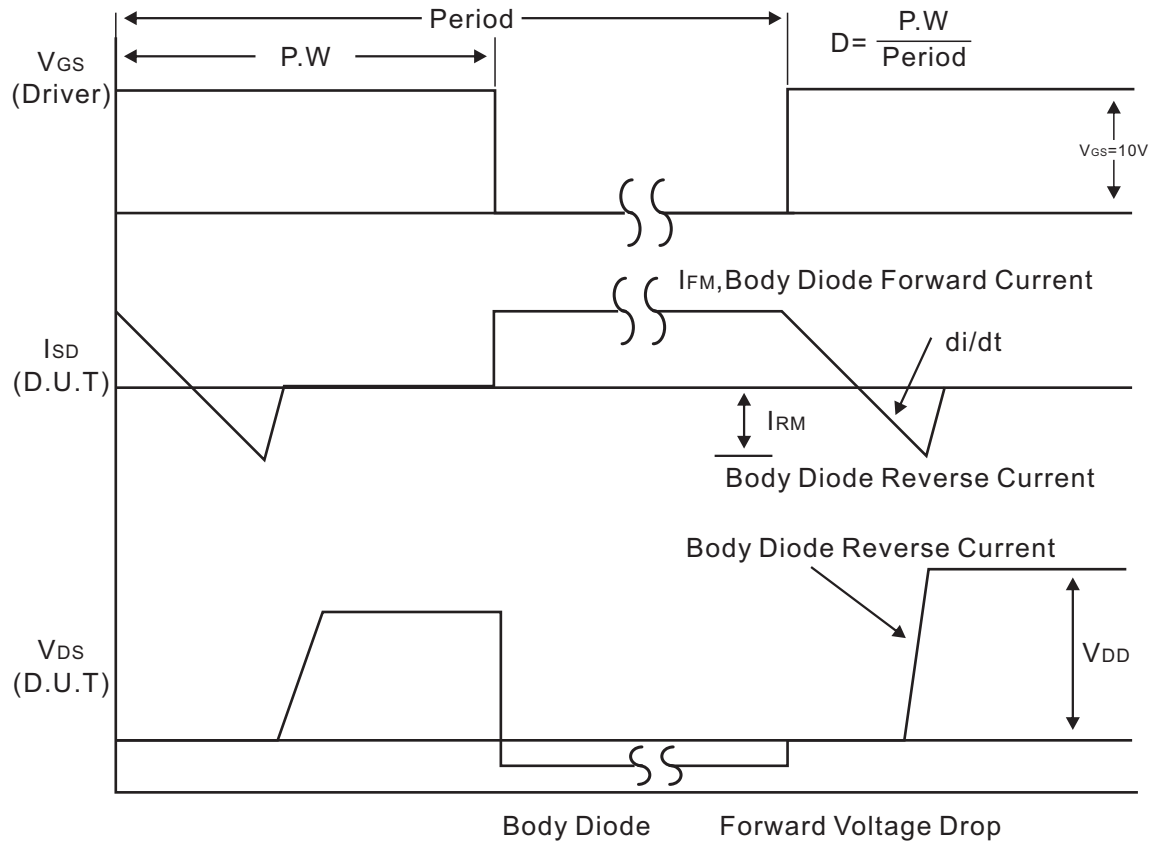


Unclamped Inductive Switching Waveforms

Test Circuits and waveforms



Peak Diode Recovery dv/dt Test Circuit



Peak Diode Recovery dv/dt Waveforms

Typical Characteristics

Fig.1 Output characteristics

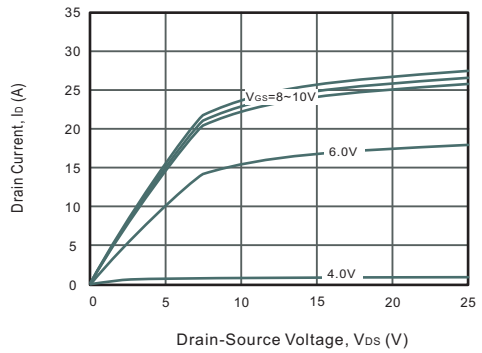


Fig.2 Power Dissipation

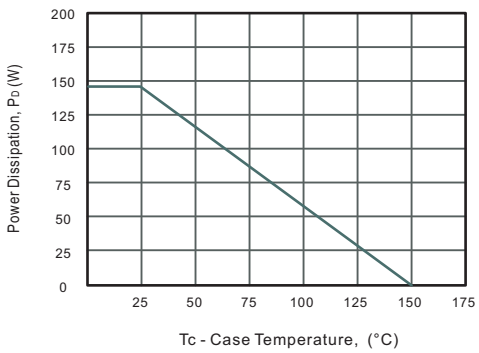


Fig.3 Drain Current Derating

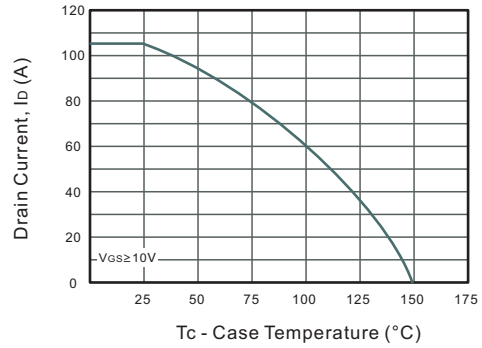


Fig.4 Drain-Source On-Resistance vs. Drain Current

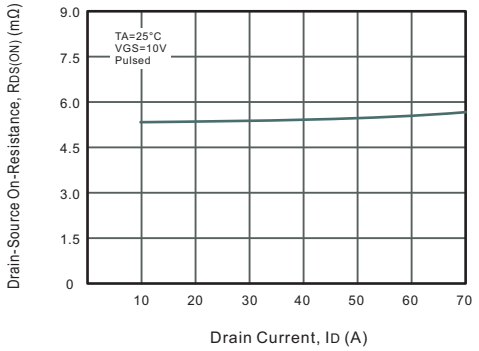


Fig.5 Gate Threshold Voltage vs. Junction Temperature

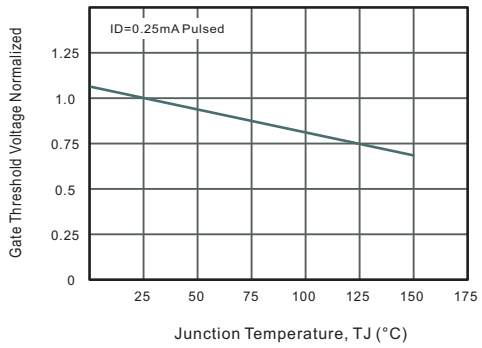


Fig.6 Body-diode Forward Characteristics

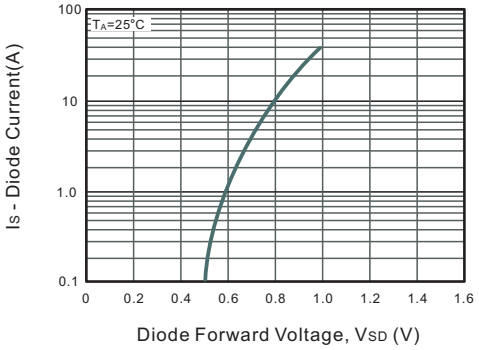


Fig.7 Drain-Source On-Resistance vs. Junction Temperature

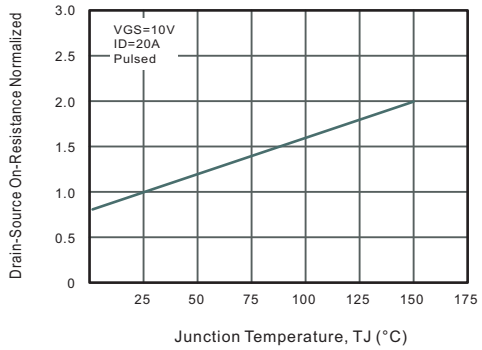
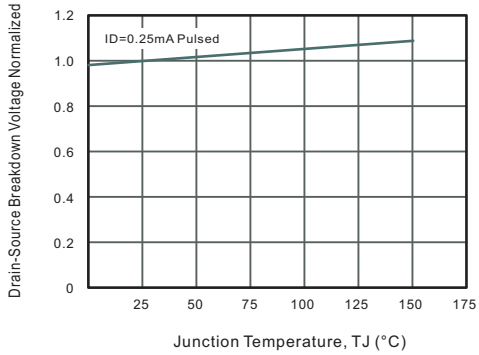


Fig.8 Breakdown Voltage vs. Junction Temperature



Typical Characteristics

Fig.9 Capacitance Characteristics

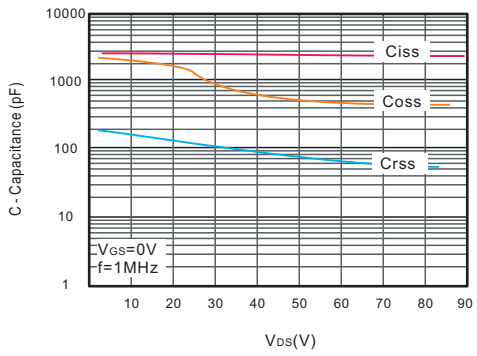


Fig.10 Gate Charge Characteristics

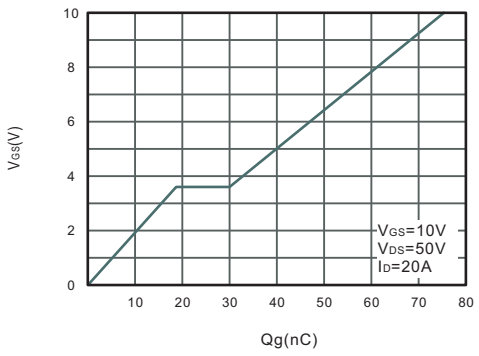


Fig.11 Safe Operating Area

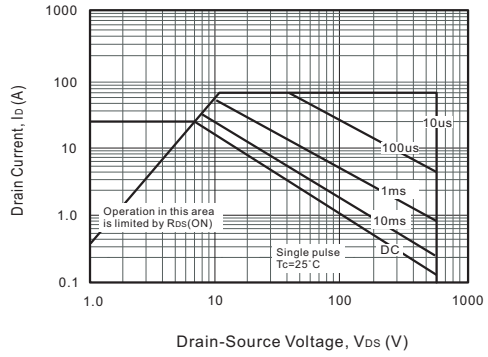
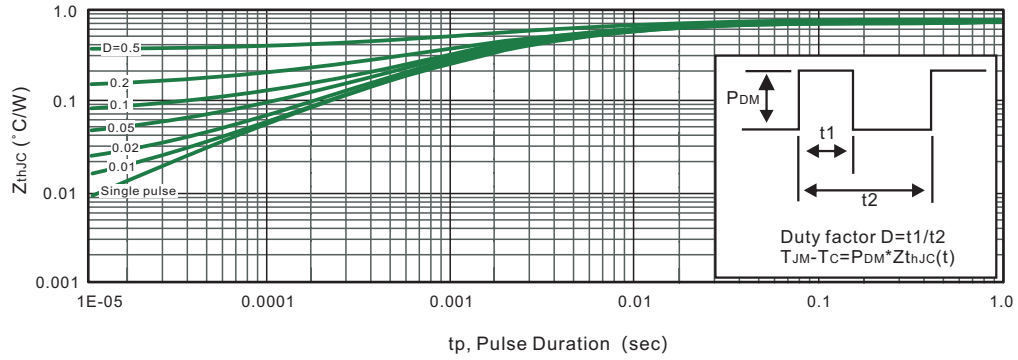
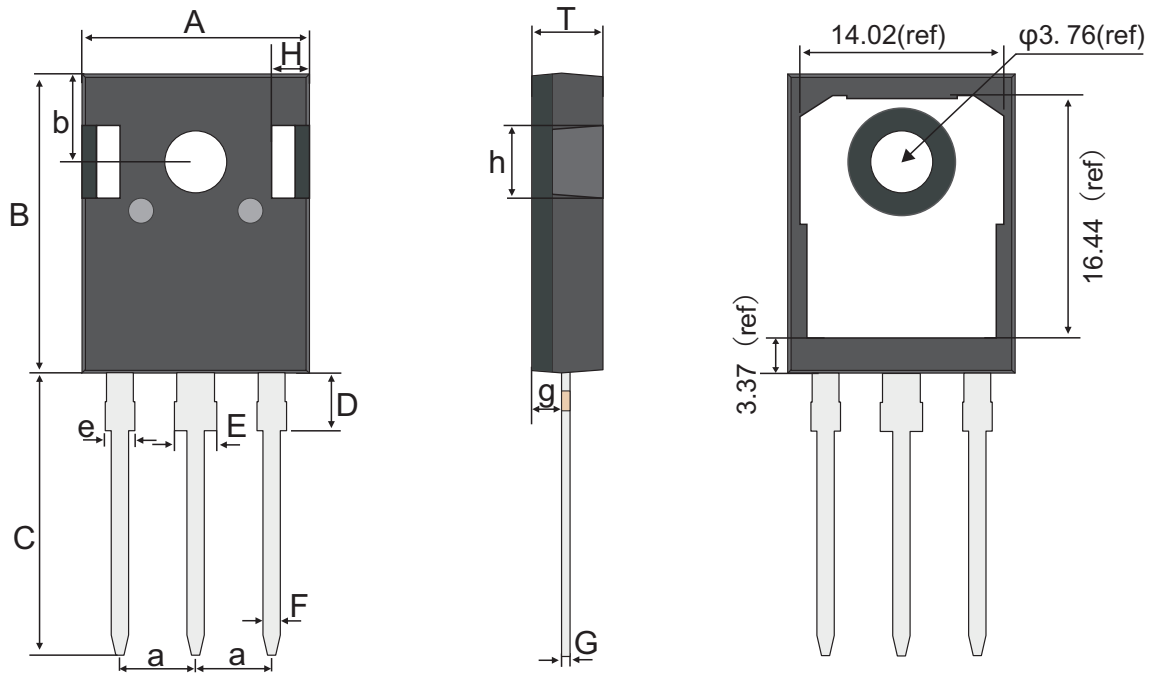


Fig.12 Max. Transient Thermal Impedance



Package Outline
Through Hole Package ; 3 leads

TO-247-3L



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

Type number	Marking code
W5R3NS100HY	W5R3NS100HY

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