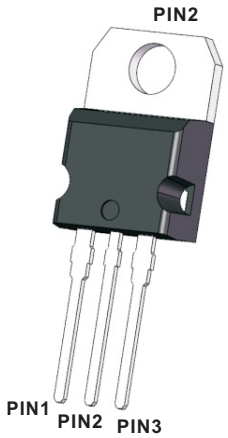
34A 100V N-CHANNEL POWER MOSFET

TO-220-3L(*Prefix :C)



RoHS COMPLIANT

Description

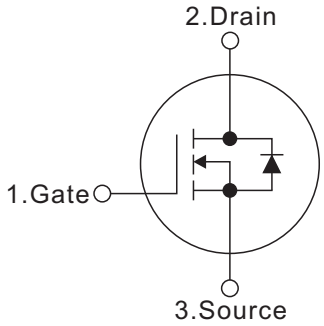
This model is an advanced trench MOSFET with better characteristics, such as fast switching time, low gate charge and low on state resistance.
Such enhanced MOSFET are commonly used in switching power supplies and adapters for high-speed switching applications.

Features

- $R_{DS(ON)}$ < 36mΩ @ V_{GS}=10V, I_D=12A
- Extremely low on impedance
- Low gate charge
- Superior switching characteristics

Mechanical data

- Case: TO-220-3L
- Approx. Weight: 2.04g (0.072oz)
- 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 Tc=25°C Tc=100°C	I_D	34 21	A
Pulsed Drain Current (Note 2)	I_{DM}	136	A
Avalanche Energy Single Pulsed (Note 3)	E_{AS}	36	mJ
Power Dissipation（Tc = 25°C)	P_D	96	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, V_{DD} = 50V, R_G = 25 Ω, Starting T_J = 25°C

Thermal Resistance

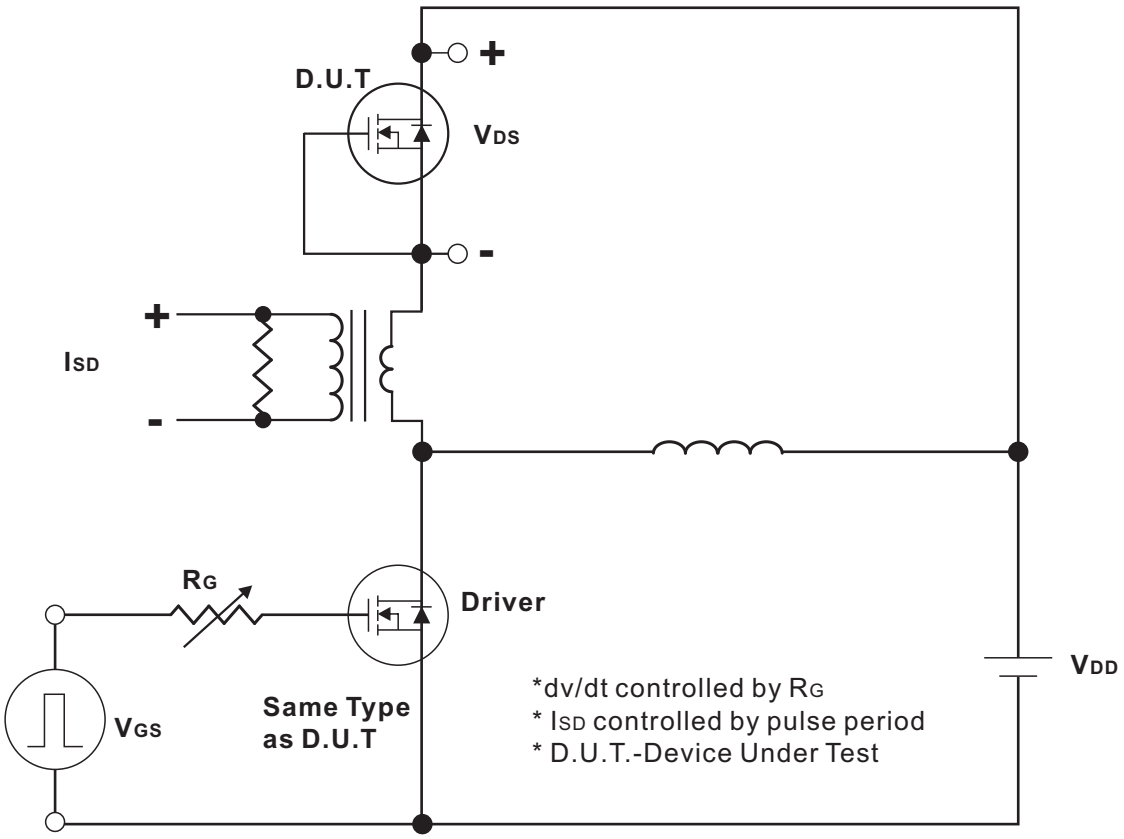
Parameter	Symbols	Ratings	Units
Thermal resistance, junction – case.	R_{thJC}	1.3	°C/W
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	57	°C/W

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

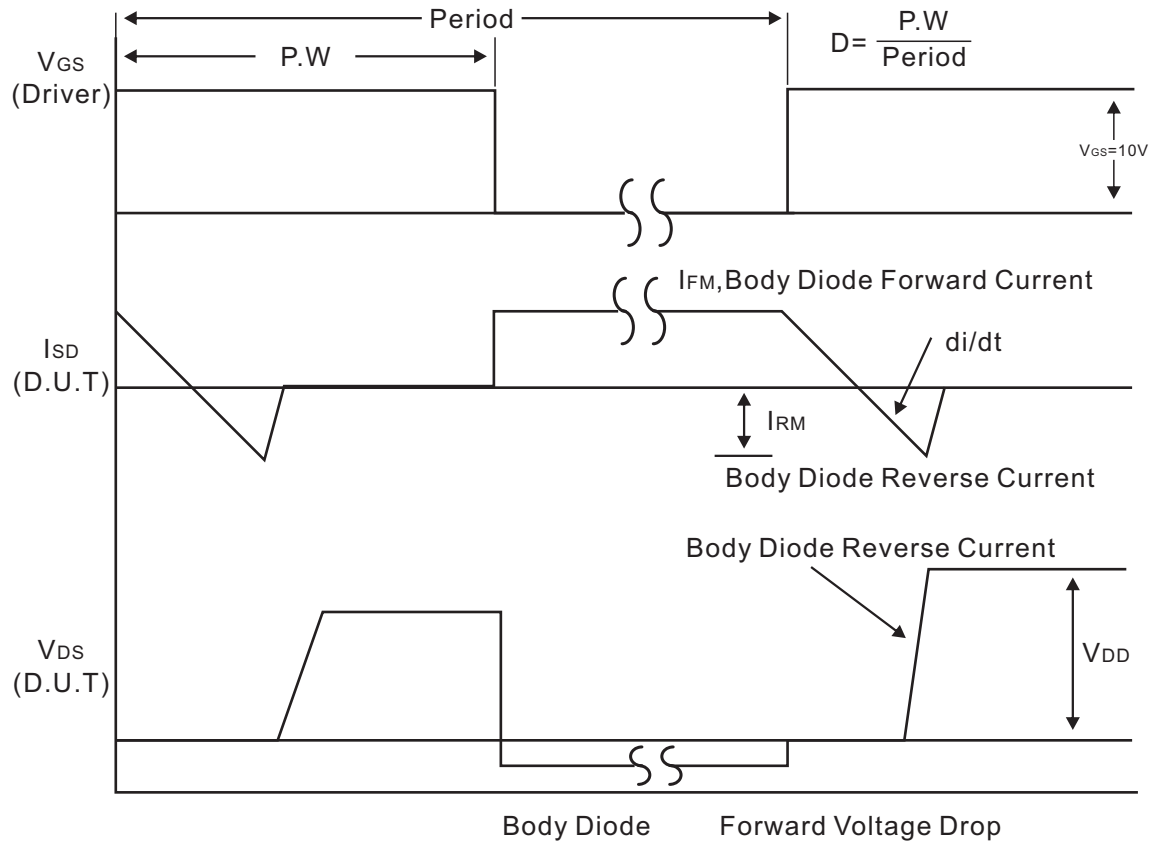
Parameter		Symbols	Test Conditions	Min	Typ	Max	Units
Off Characteristics							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V,I_D=250uA	100			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=100V,V_{GS}=0V,T_J=25℃			1.0	uA
			V_{DS}=80V,V_{GS}=0V,T_J=125℃			50	
Gate- Source Leakage Current	Forward	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	1		3	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V,I_D=12A		30	36	mΩ
Transconductance		g_{fs}	V_{DS}=10V,I_D=20A		59		S
Dynamic Characteristics							
Input Capacitance		C_{ISS}	V_{DS}=50V,		2410		pF
Output Capacitance		C_{OSS}	V_{GS}=0V,		107		pF
Reverse Transfer Capacitance		C_{RSS}	f=1.0MHz		84		pF
Gate resistance		R_G			2		Ω
Switching Characteristics							
Total Gate Charge (Note 1)		Q_G	V_{DS}=80V,V_{GS}=10V,		61		nC
Gate-Source Charge		Q_{GS}	I_D=12A,f=1MHz		7.1		nC
Gate-Drain Charge		Q_{GD}	(NOTE1,2)		14		nC
Turn-On Delay Time (Note 1)		$t_{D(ON)}$	V_{DS}=50V,V_{GS}=10V,		13		ns
Turn-On Rise Time		t_R	I_D=12A,R_G=3Ω		26		ns
Turn-Off Delay Time		$t_{D(OFF)}$	(NOTE1,2)		77		ns
Turn-Off Fall Time		t_F			17		ns
Drain-source Diode Characteristics And Maximum Ratings							
Diode continuous forward current		I_S				34	A
Drain-Source Diode Forward Voltage (Note 1)		V_{SD}	I_{SD}=34A,V_{GS}=0V			1.5	V
Reverse Recovery Time (Note 1)		trr	I_F=12A		50		ns
Reverse Recovery Charge		Qrr	di/dt=100A/us		75		nC

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

Test Circuits and waveforms

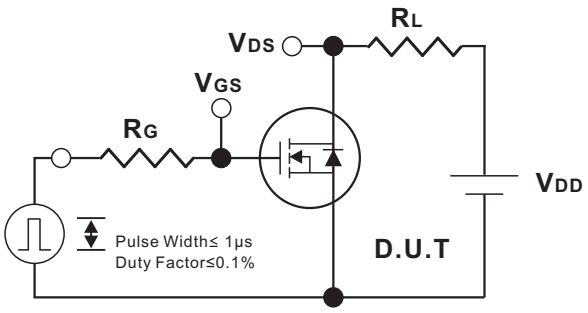


Peak Diode Recovery dv/dt Test Circuit

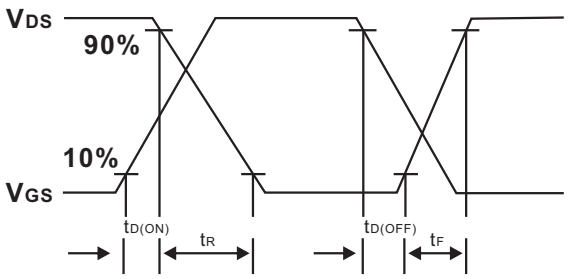


Peak Diode Recovery dv/dt Waveforms

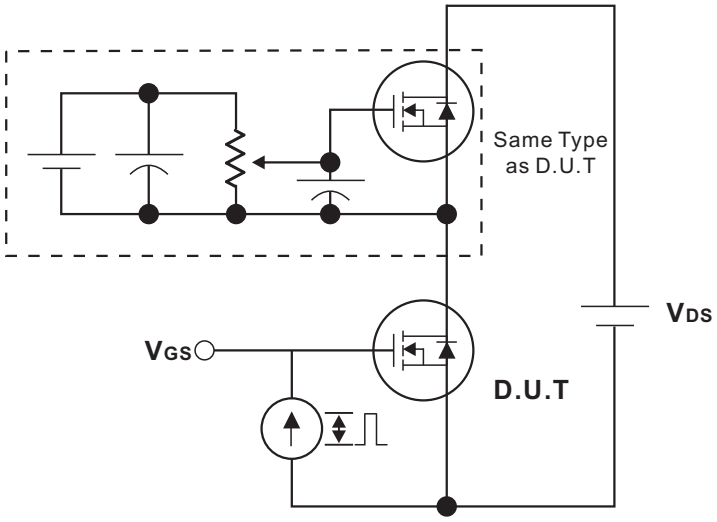
Test Circuits and waveforms



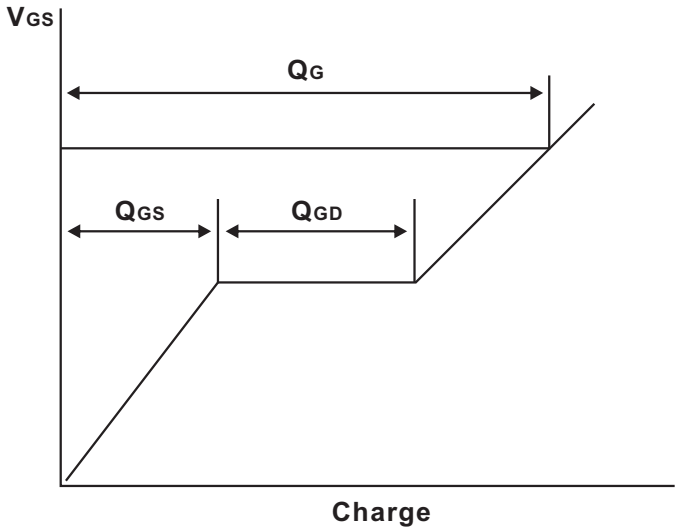
Switching Test Circuit



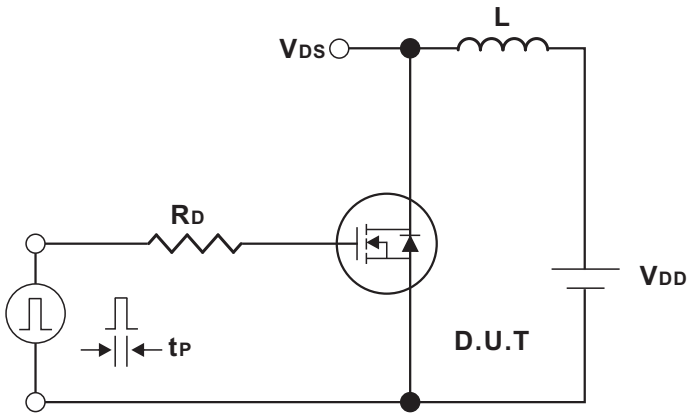
Switching Waveforms



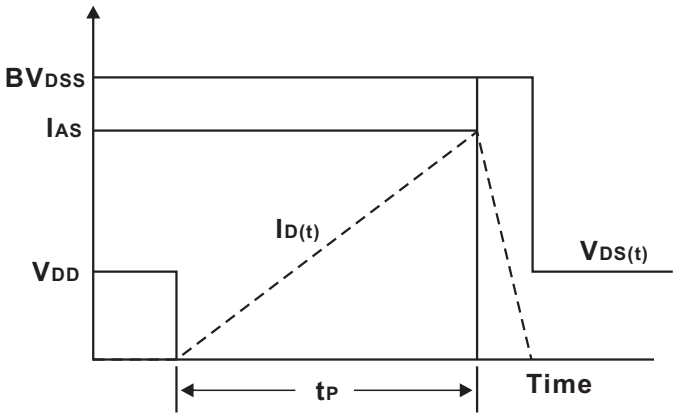
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

Typical Characteristics

Fig.1 Output Characteristics

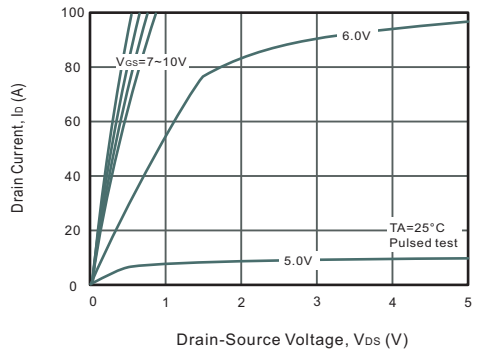


Fig.2 Power Dissipation

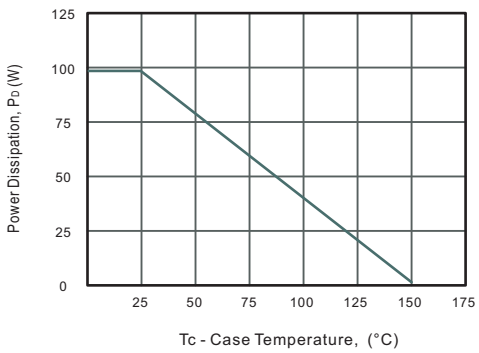


Fig.3 Drain Current Derating

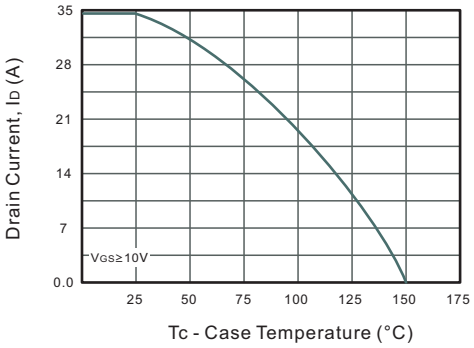


Fig.4 Drain-Source On-Resistance vs. Drain Current

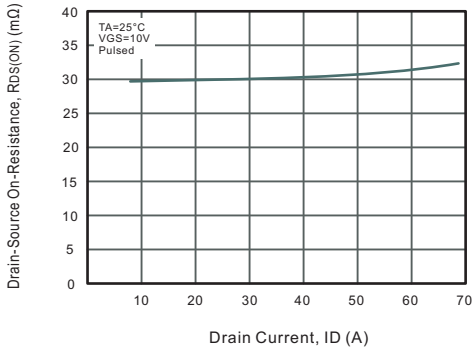


Fig.5 Gate Threshold Voltage vs. Junction Temperature

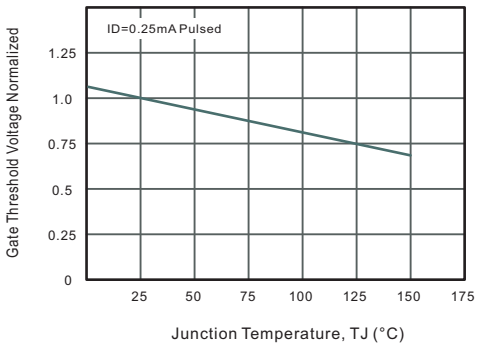


Fig.6 Body-diode Forward Characteristics

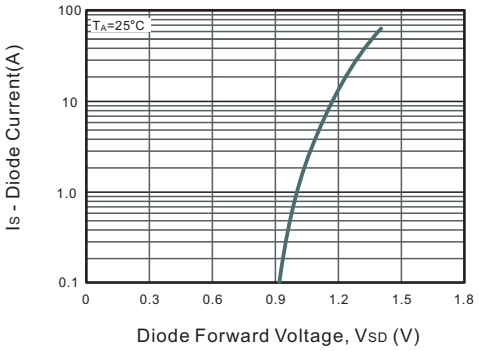


Fig.7 Drain-Source On-Resistance vs. Junction Temperature

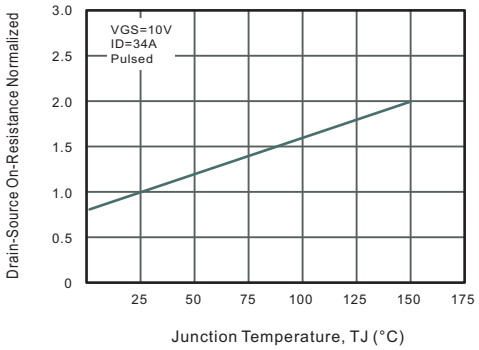
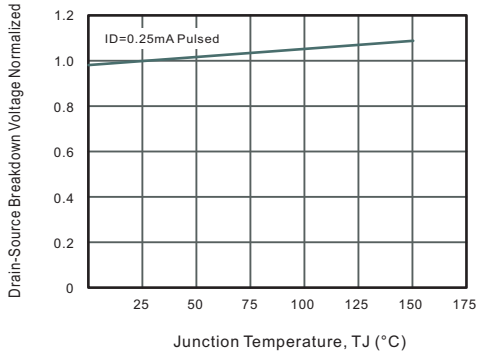


Fig.8 Breakdown Voltage vs. Junction Temperature



Typical Characteristics

Fig.9 Capacitance Characteristics

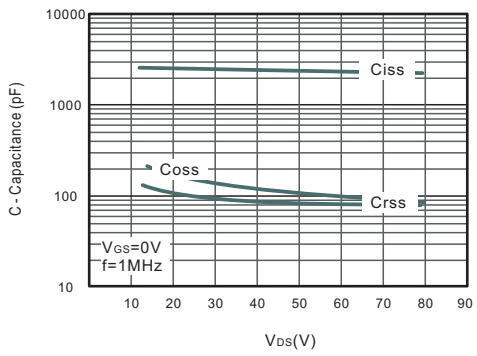


Fig.10 Gate Charge Characteristics

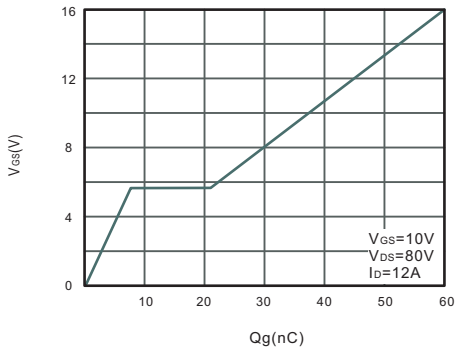


Fig.11 Safe Operating Area

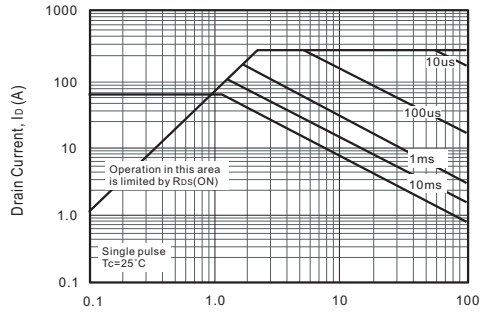
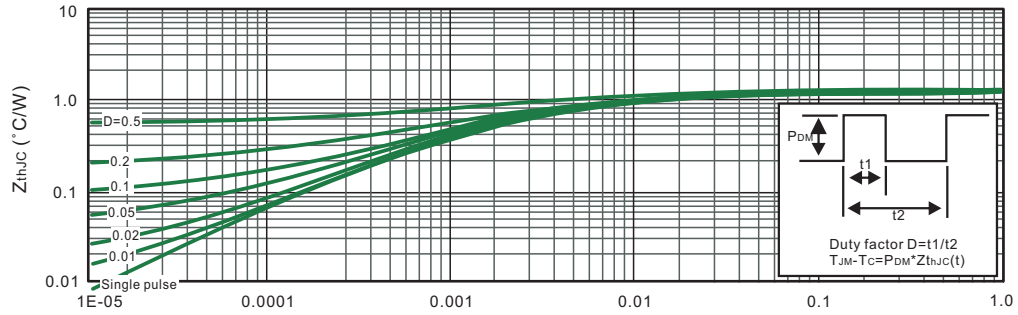
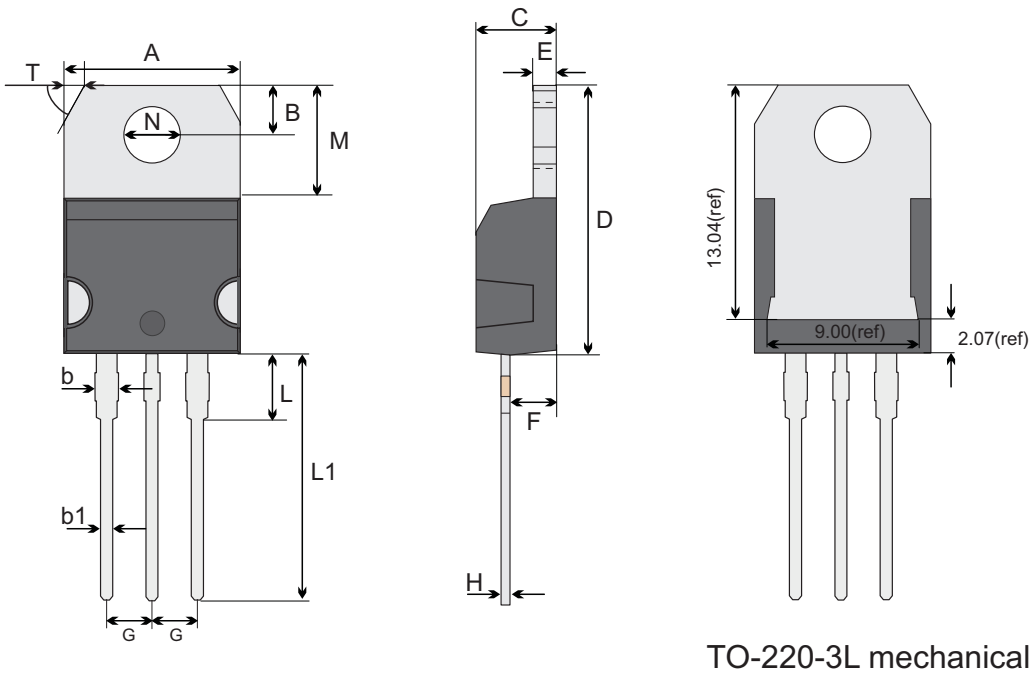


Fig.12 Max. Transient Thermal Impedance



Package Outline
Through Hole Package ; 3 leads

TO-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	92	16	137	501	236		

Marking

Type number	Marking code
C30RN100XR	C30RN100XR

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