

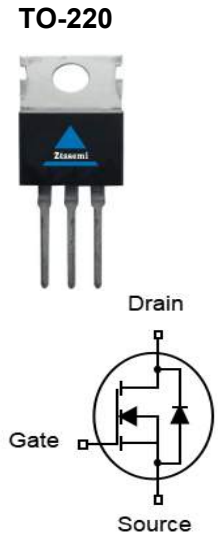
Features

- N-Channel
- Low FOM $R_{DS(on)} \times Q_{gd}$
- Ultra-low on-resistance
- Halogen-free (Note 1)
- RoHS compliant
- 100% EAS Tested

V_{DS}	150	V
$R_{DS(on),TYP}@ V_{GS}=10V$	5.6	m Ω
I_D	130	A



Part ID	Package Type	Marking	Packing
ZTG060N15	TO-220	ZTG060N15	1000pcs/Tape



Absolute Maximum Ratings $T_A = 25^\circ\text{C}$, unless otherwise specified

Symbol	Parameter	Rating	Unit	
Common Ratings ($T_c=25^\circ\text{C}$ Unless Otherwise Noted)				
V_{GS}	Gate-Source Voltage	± 20	V	
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	150	V	
T_J	Maximum Junction Temperature	150	$^\circ\text{C}$	
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$	
I_{DM}	Drain Current-Continuous@ Current-Pulsed (Note 2)	$T_c = 25^\circ\text{C}$ 440	A	
Mounted on Large Heat Sink				
I_D	Drain Current-Continuous (Note 1)	$T_c = 25^\circ\text{C}$	130	A
		$T_c = 100^\circ\text{C}$	70	A
P_D	Maximum Power Dissipation	190	W	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	0.65	$^\circ\text{C/W}$	
$R_{\theta JA}$	Thermal Resistance Junction-Ambient (Note 4)	50	$^\circ\text{C/W}$	
Drain-Source Avalanche Ratings				
EAS	Avalanche Energy, Single Pulsed (Note 3)	625	mJ	

Electrical Characteristics (T_J=25°C unless otherwise noted)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Electrical Characteristics @ T_J=25°C (unless otherwise stated)						
V(BR)DSS	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	150	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =150V, V _{GS} =0V	--	--	1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±20V, V _{DS} =0V	--	--	±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	2.0	3.0	4.0	V
R _{DS(on)}	Drain-Source On-State Resistance	V _{GS} =10V, I _D =20A	--	5.6	6.5	mΩ
Dynamic Electrical Characteristics @ T_J = 25°C (unless otherwise stated)						
C _{iss}	Input Capacitance	V _{DS} =75V, V _{GS} =0V, f=1MHz	--	5926	--	pF
C _{oss}	Output Capacitance		--	544	--	pF
C _{rss}	Reverse Transfer Capacitance		--	23	--	pF
R _g	Gate Resistance f=1MHz	f=1MHz	--	2.2	--	Ω
Q _g	Total Gate Charge	V _{DS} =75V, I _D =20A, V _{GS} =10V	--	83	--	nC
Q _{gs}	Gate-Source Charge		--	24.8	--	nC
Q _{gd}	Gate-Drain Charge		--	16.9	--	nC
Switching Characteristics						
T _{d(on)}	Turn-on Delay Time	V _{DD} =75V, R _L =3.75Ω, R _G =6Ω, V _{GS} =10V	--	32	--	ns
T _r	Turn-on Rise Time		--	49	--	ns
T _{d(off)}	Turn-Off Delay Time		--	80	--	ns
T _f	Turn-Off Fall Time		--	46	--	ns
Source- Drain Diode Characteristics @ T_J = 25°C (unless otherwise stated)						
I _{SD}	Source-Drain Current (Body Diode)		--	--	130	A
V _{SD}	Forward on voltage	I _S =1A, V _{GS} =0V	--	--	1.0	V
T _{rr}	Reverse Recovery Time	T _J =25°C, I _D =15A,	--	92	--	ns
Q _{rr}	Reverse Recovery Charge	di/dt=100A/μs	--	364	--	nC

Notes:

1. The max drain current rating is package limited
2. Repetitive Rating: Pulse width limited by maximum junction temperature
3. L = 0.5 mH, V_{DD} = 75V, I_{AS} = 50 A, R_G = 25 Ω, Starting T_J = 25 °C
4. Mount on minimum PCB layout

Electrical Characteristics Diagrams

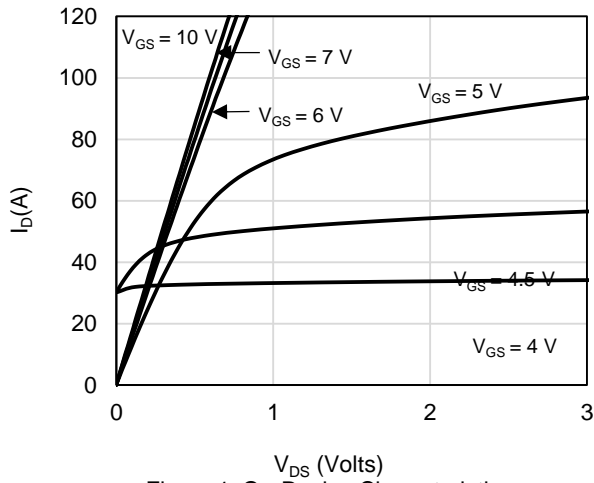


Figure 1: On-Region Characteristics

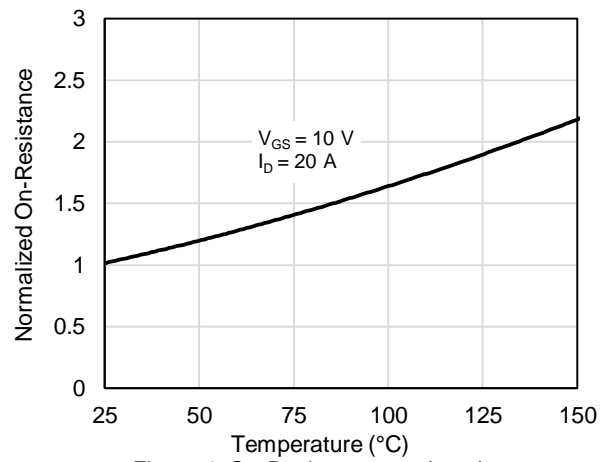


Figure 4: On-Resistance vs. Junction Temperature

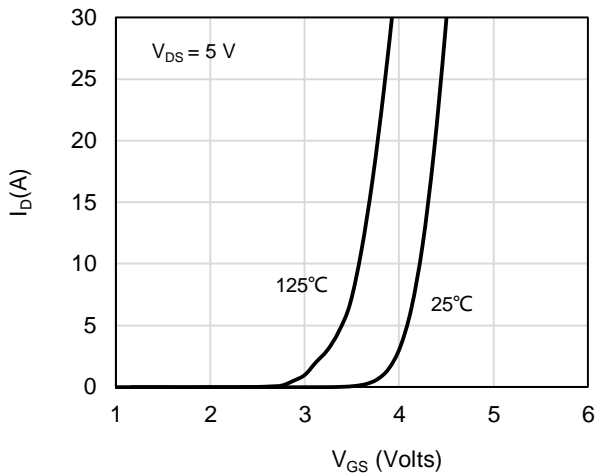


Figure 2: Transfer Characteristics

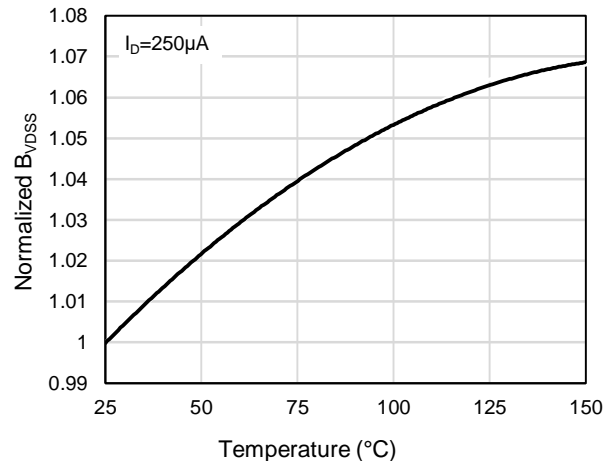


Figure 5: Breakdown Voltage vs. Junction Temperature

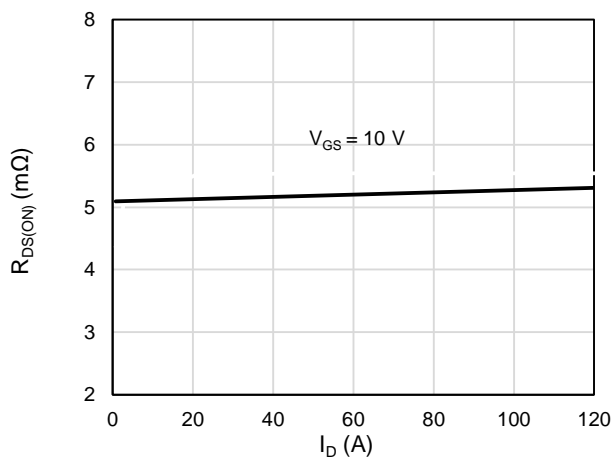


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

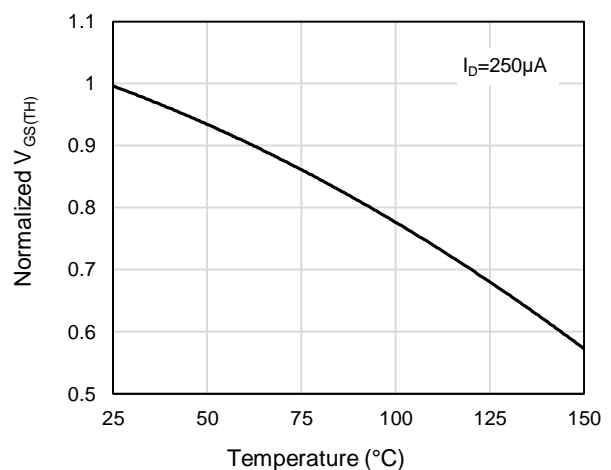


Figure 6: Threshold Voltage vs. Junction Temperature

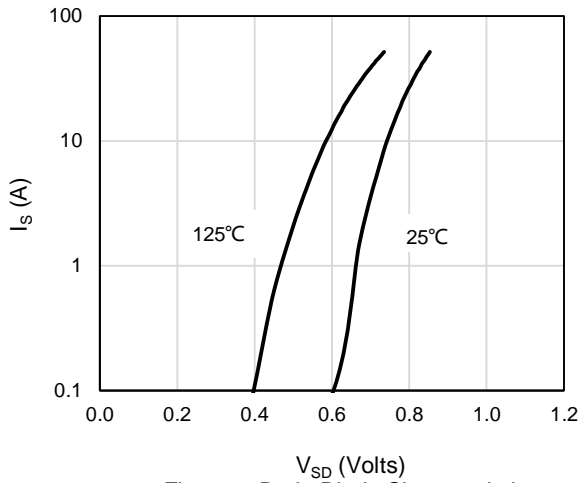


Figure 7: Body-Diode Characteristics

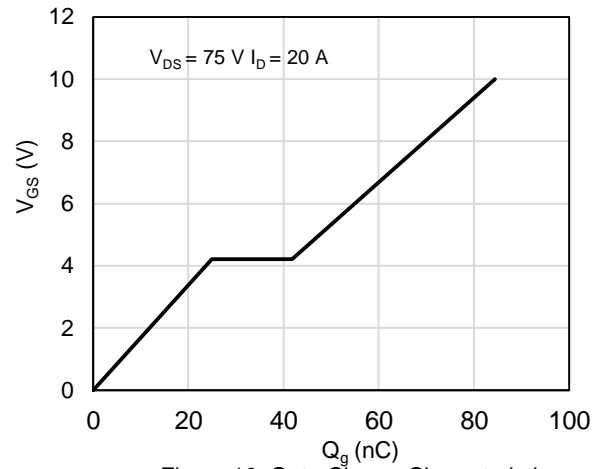


Figure 10: Gate-Charge Characteristics

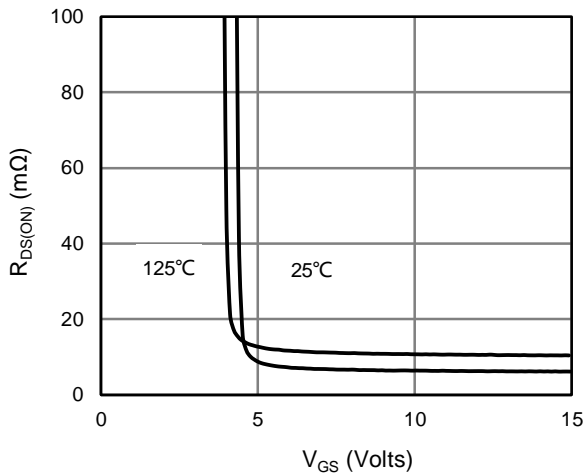


Figure 8: On-Resistance vs. Gate-Source Voltage

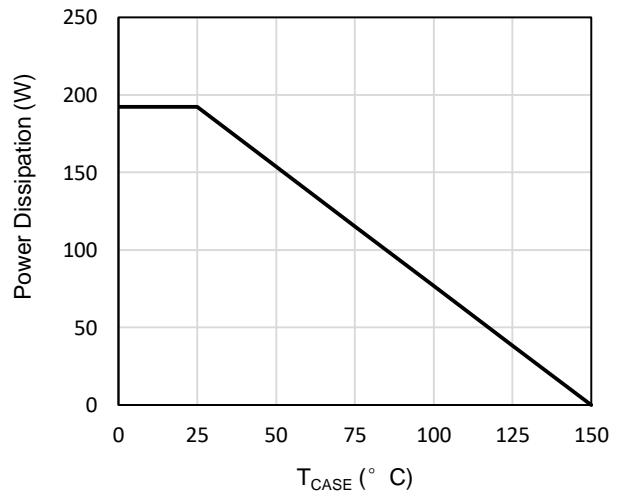


Figure 11: Power De-rating

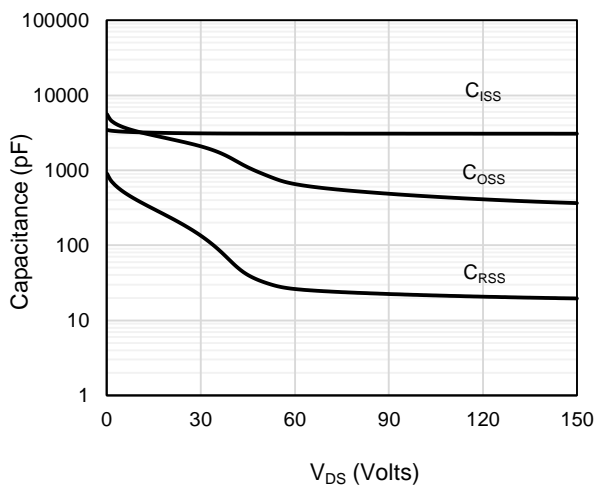


Figure 9: Capacitance Characteristics

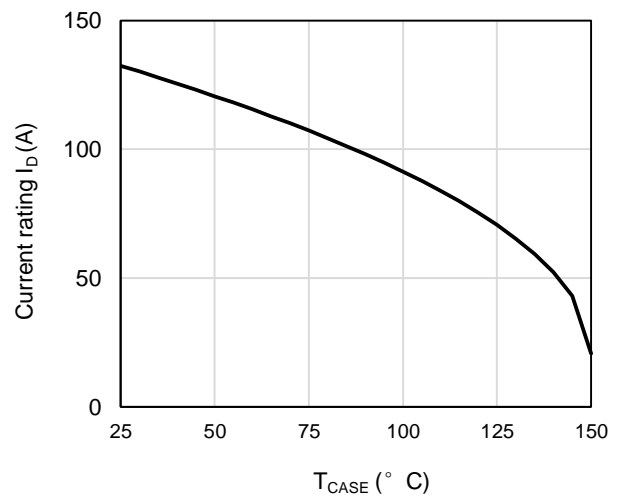


Figure 12: Current De-rating

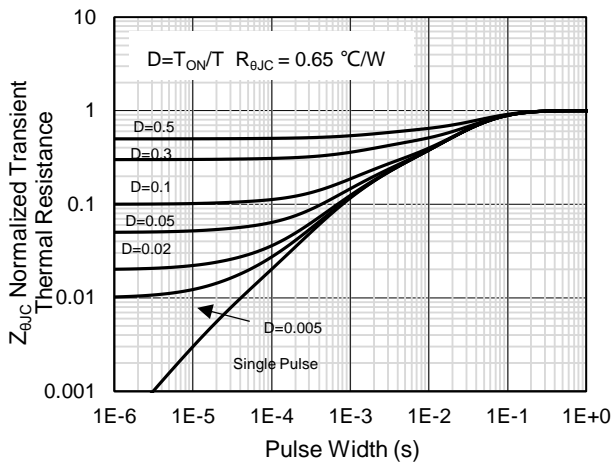


Figure 13: Normalized Maximum Transient Thermal Impedance

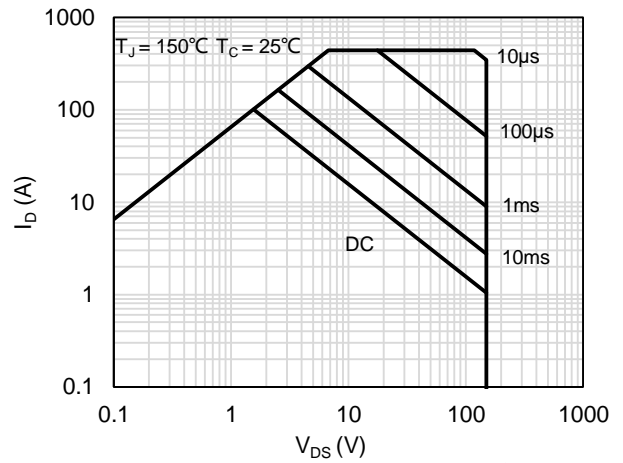
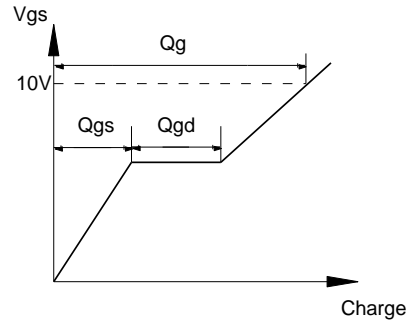
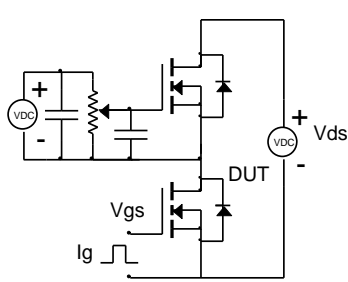


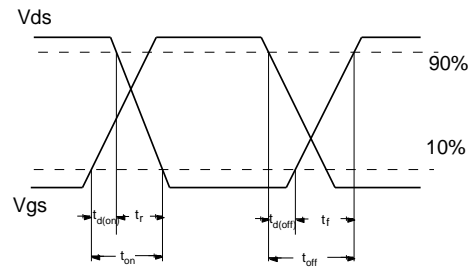
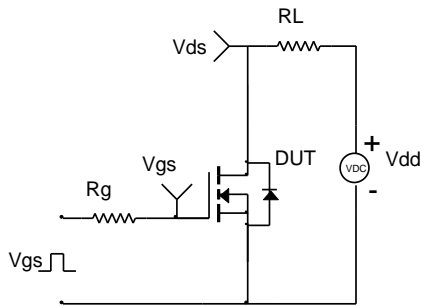
Figure 14: Maximum Forward Biased Safe Operating Area

Test Circuit and Waveform

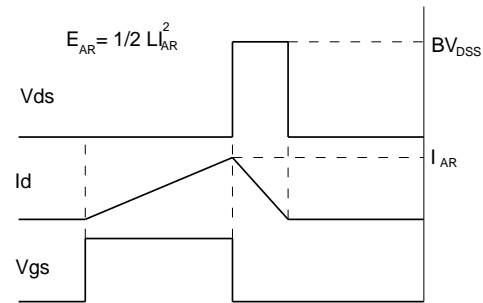
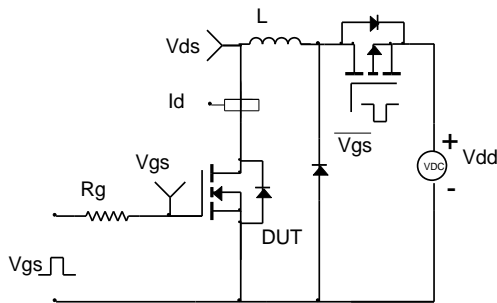
Gate Charge Test Circuit & Waveform



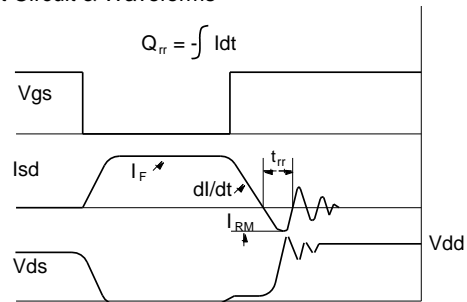
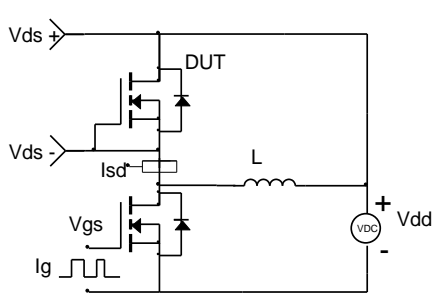
Resistive Switching Test Circuit & Waveforms



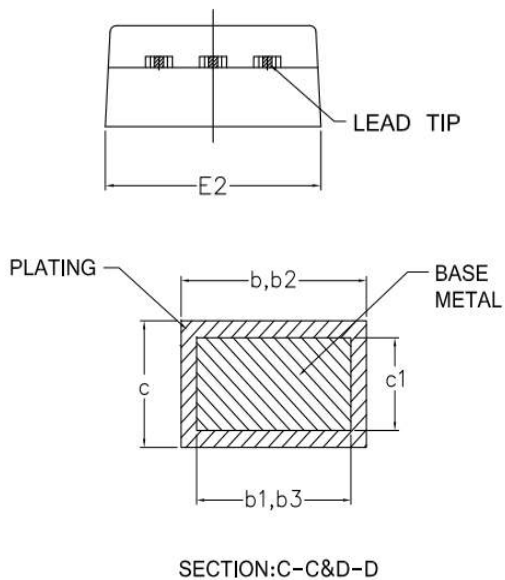
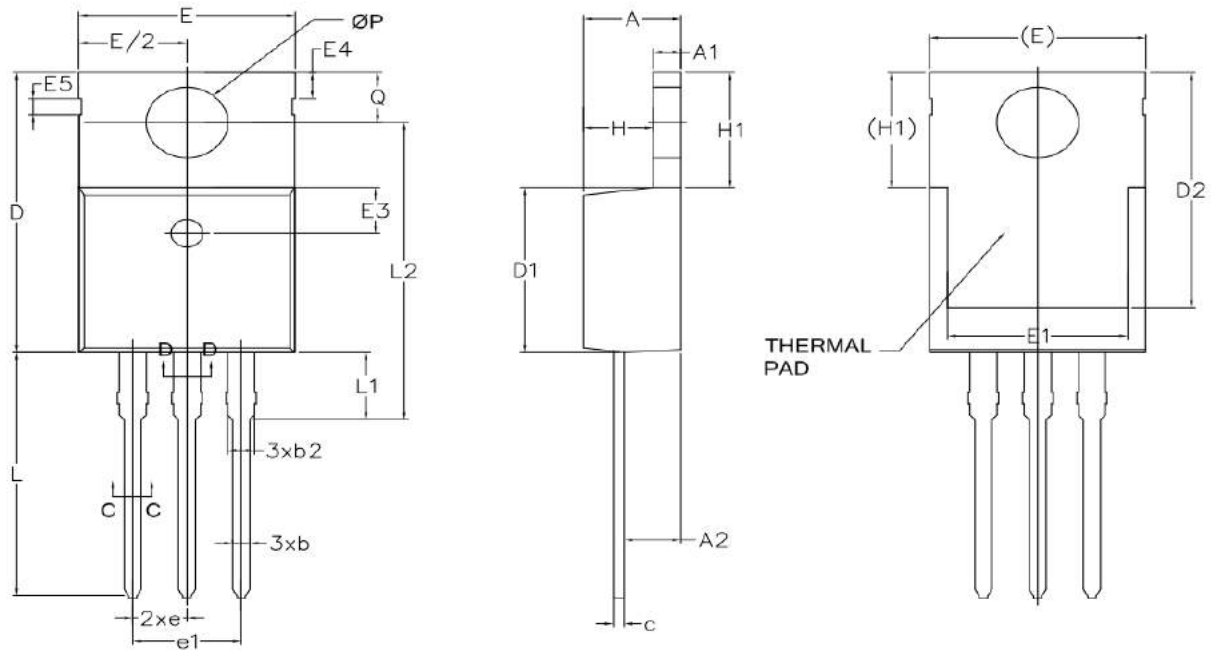
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



TO-220-3L Package Information



SYMBOLS	COMMON		
	MM		
	MIN.	NOM.	MAX.
A	4.47	4.57	4.67
A1	1.20	1.30	1.40
A2	2.35	2.67	2.90
b	0.71	0.80	0.91
b1	0.71	0.80	0.86
b2	1.22	1.27	1.36
b3	1.22	1.27	1.31
c	0.47	0.50	0.60
c1	0.47	0.50	0.55
D	14.70	15.30	15.80
D1	8.90	9.00	9.47
D2	11.75	/	13.60
E	9.70	/	10.37
E1	7.00	8.44	8.89
E2	9.80	10.11	10.20
E3	2.40	2.50	2.60
E4	1.27	1.42	1.57
E5	0.90TYP		
e	2.54BSC		
e1	5.08BSC		
H	3.00	3.27	3.40
H1	6.15	6.30	6.45
L	12.90	13.45	14.80
L1	2.54	3.69	3.84
L2	12.13	16.25	16.5
∅P	3.60	3.84	3.90
Q	2.65	2.74	2.95

Customer Service

Sales and Service:

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