

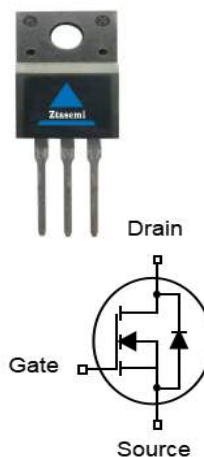
Features

- Super-Junction MOSFET
- Low ON Resistance
- Improved dv/dt Capability
- 100% Avalanche Tested
- RoHS compliant
- 100% EAS Tested

V_{DS}	650	V
$R_{DS(on),TYP}@ V_{GS}=10V$	520	m Ω
I_D	8	A



Part ID	Package Type	Marking	Packing
ZT65R580F	TO-220F	ZT65R580F	1000pcs/Tape

TO-220F


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	± 30	V	
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	650	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)	$T_c=25^\circ\text{C}$ 24	A	
Mounted on Large Heat Sink				
I_D	Drain Current-Continuous (Note 1)	$T_c=25^\circ\text{C}$	8	A
		$T_c=100^\circ\text{C}$	4.8	A
P_D	Maximum Power Dissipation	104	W	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	1.2	$^\circ\text{C/W}$	
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	98	$^\circ\text{C/W}$	
Drain-Source Avalanche Ratings				
EAS	Avalanche Energy, Single Pulsed (Note 3)	122	mJ	
dv/dt	MOSFET dv/dt Ruggedness($V_{DS}=0\sim 400\text{V}$)	50	mJ	
dv/dt	Reverse Diode dv/dt (Note 4)	15	V/ns	

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	650	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =650V, V _{GS} =0V	--	--	1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±30V, V _{DS} =0V	--	--	±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	2.8	3.3	3.8	V
R _{DS(on)}	Drain-Source On-State Resistance	V _{GS} =10V, I _D =4A	--	520	580	mΩ
Dynamic Electrical Characteristics @ T_J = 25°C (unless otherwise stated)						
C _{iss}	Input Capacitance	V _{DS} =100V, V _{GS} =0V, f=1MHz	--	465	--	pF
C _{oss}	Output Capacitance		--	22	--	pF
C _{rss}	Reverse Transfer Capacitance		--	0.9	--	pF
R _g	Gate Resistance	f=1MHz	--	14	--	Ω
Q _g	Total Gate Charge	V _{DS} =325V, I _D =8A, V _{GS} =10V	--	11.2	--	nC
Q _{gs}	Gate-Source Charge		--	2.46	--	nC
Q _{gd}	Gate-Drain Charge		--	4.66	--	nC
Switching Characteristics						
T _{d(on)}	Turn-on Delay Time	V _{DS} =325V, I _D =8A, R _G =25Ω, V _{GS} =10V	--	15.2	--	ns
T _r	Turn-on Rise Time		--	18	--	ns
T _{d(off)}	Turn-Off Delay Time		--	60.3	--	ns
T _f	Turn-Off Fall Time		--	16.8	--	ns
Source- Drain Diode Characteristics @ T_J = 25°C (unless otherwise stated)						
V _{SD}	Forward on voltage	I _S =8A, V _{GS} =0V	--	--	1.3	V
T _{rr}	Reverse Recovery Time	T _J =25°C, I _S =8A, V _{GS} =0V di/dt=100A/μs	--	211	--	ns
Q _{rr}	Reverse Recovery Charge		--	1.75	--	μC

Notes:

1. Drain current is limited by maximum junction temperature.
2. Repetitive rating : pulse width limited by junction temperature.
3. L = 60mH, I_{AS} = 2A, V_{DD} = 50V, R_G=25Ω, Starting at T_J = 25°C
4. I_{SD} ≤ I_D, di/dt = 100A/us, V_{DD} ≤ 400V, Starting at T_J = 25°C

Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

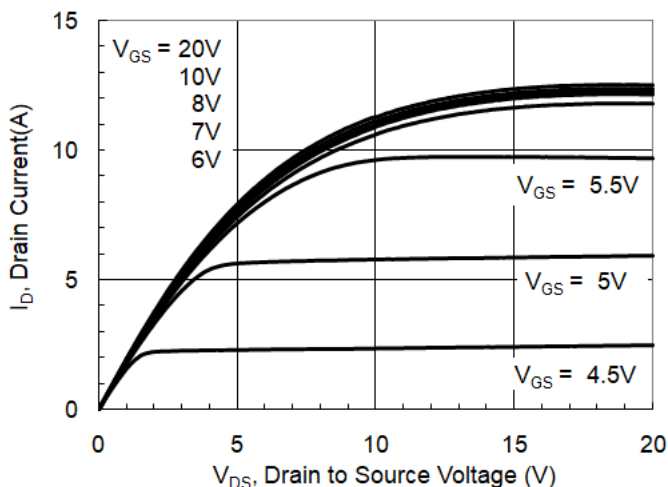


Fig1. Output characteristics

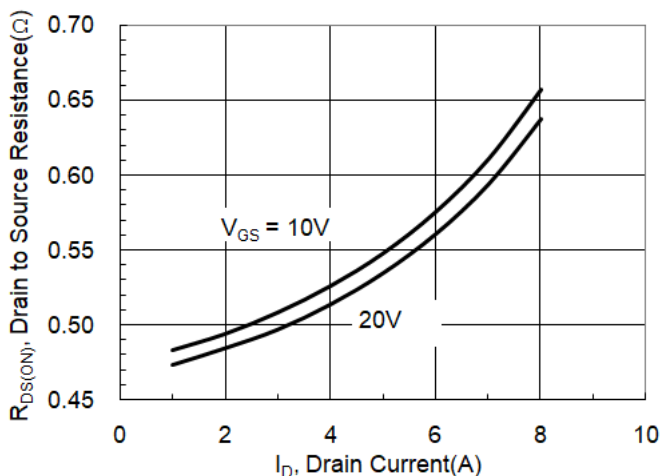


Fig4. Drain-source on-state resistance

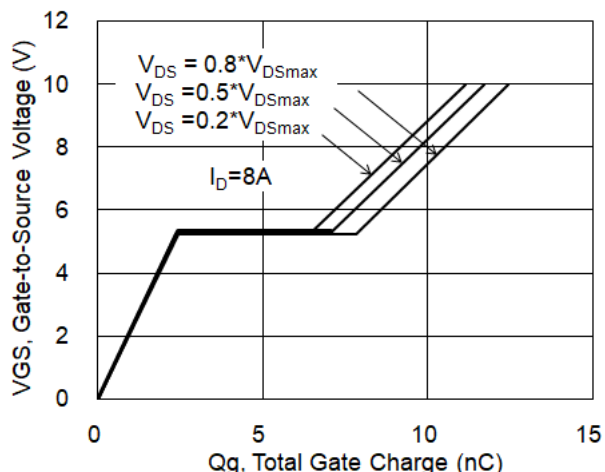


Fig2. Gate charge characteristics

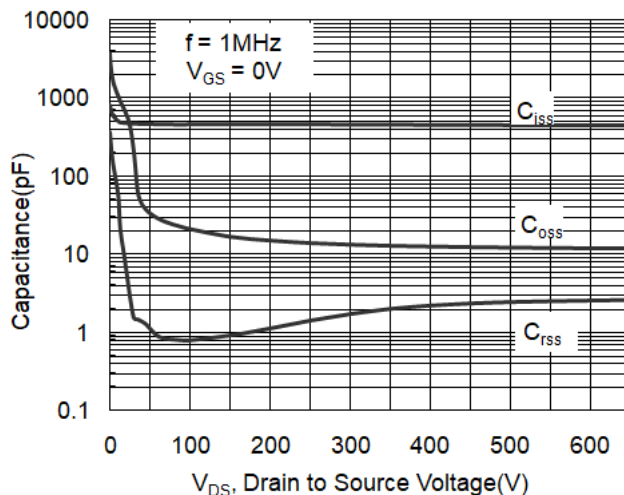


Fig 5. Capacitance Characteristics

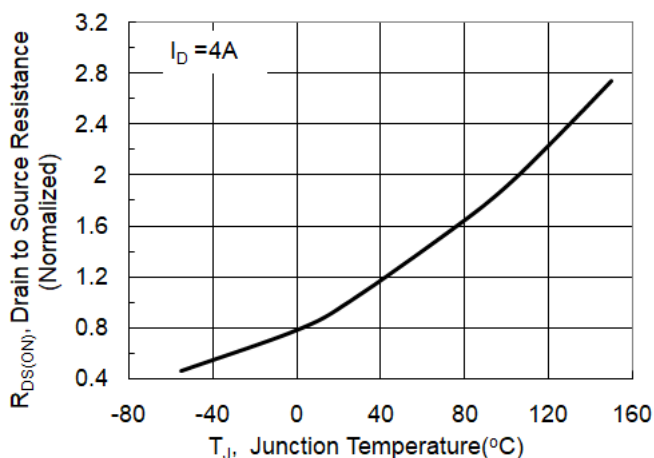


Fig 3. $R_{DS(ON)}$ vs junction temperature

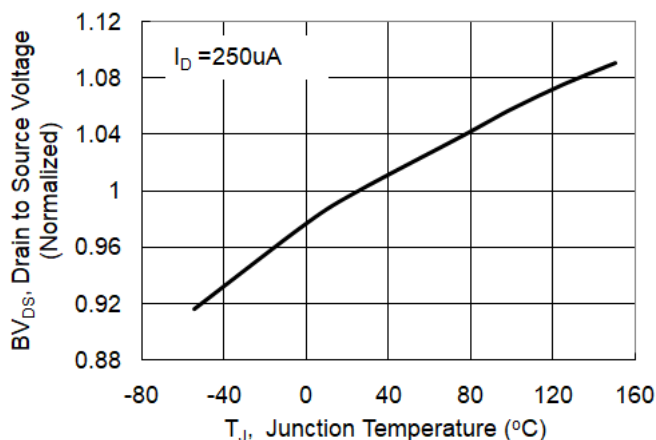


Fig 6. BV_{DS} vs junction temperature

Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

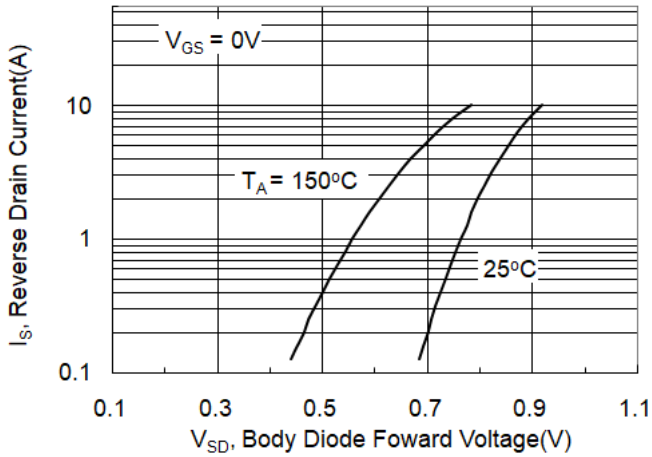


Fig 7 . Forward characteristics of reverse diode

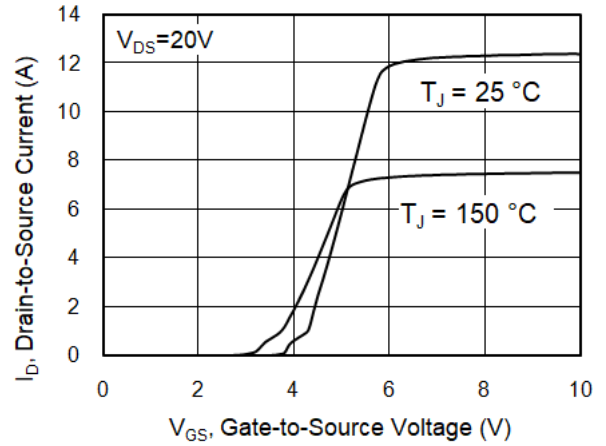


Fig 9 . Transfer characteristics

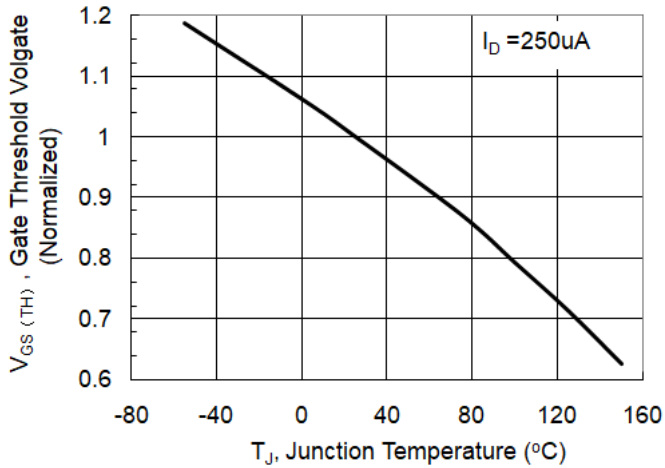


Fig 8 . $V_{GS(TH)}$ vs junction temperature

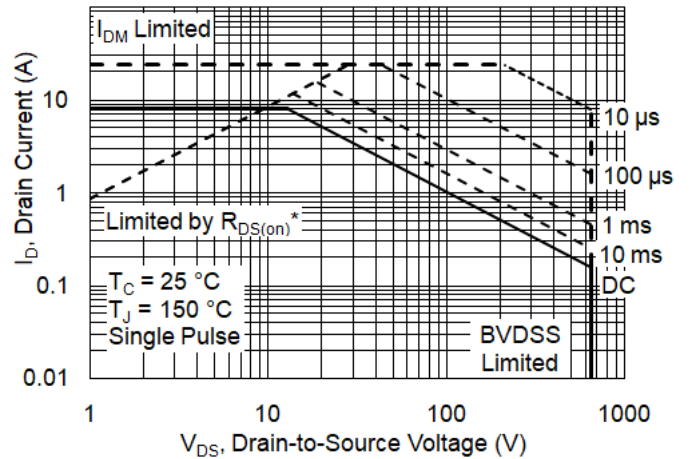


Fig 10 . Safe operating area(TO-252)

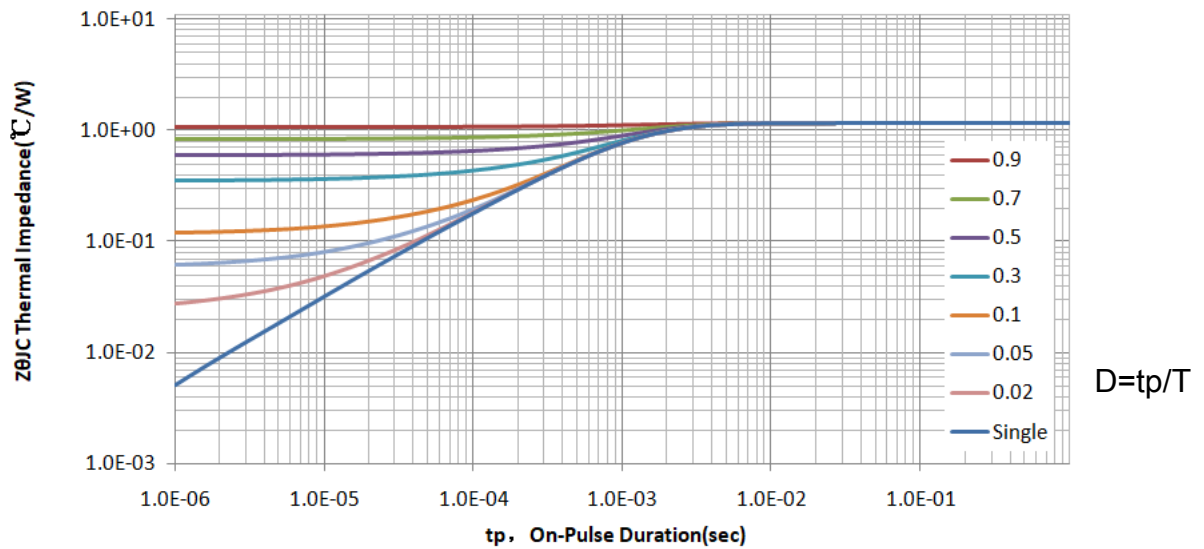


Fig 11 . Transient thermal impedance (TO-252)

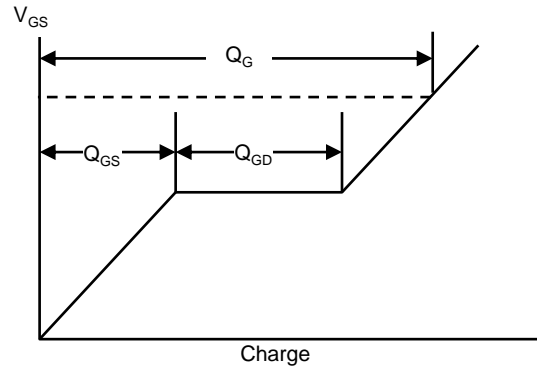
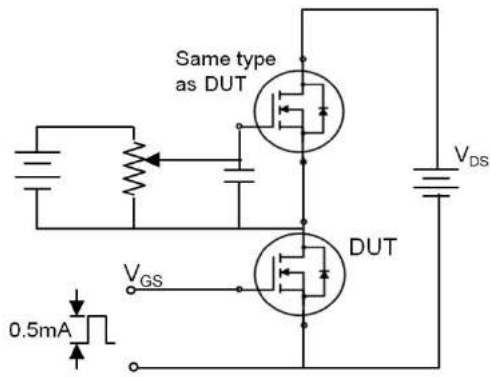


Fig A. Gate charge test circuit & waveform

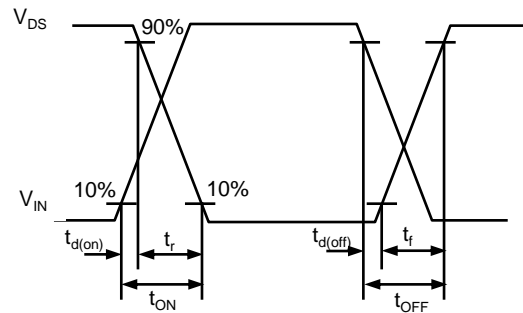
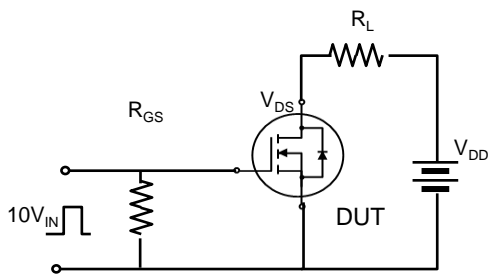


Fig B. Switching time test circuit & waveform

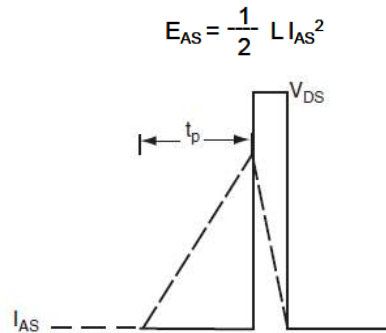
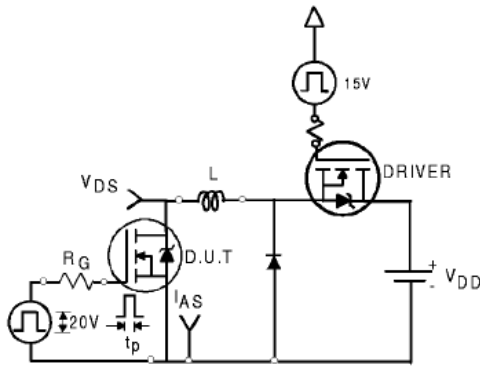
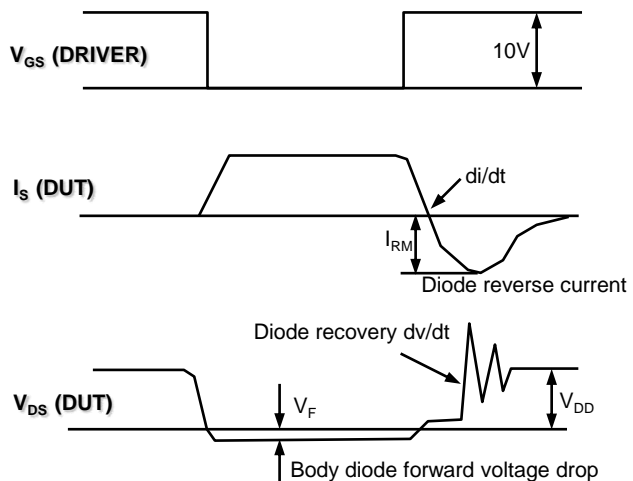
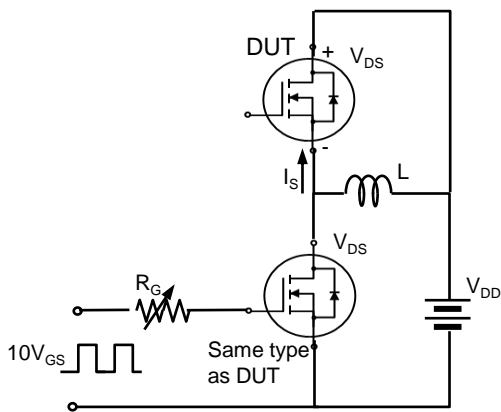


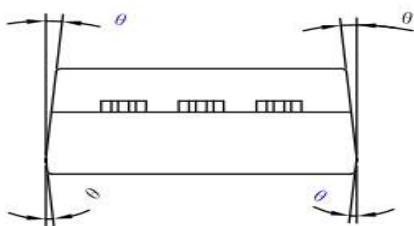
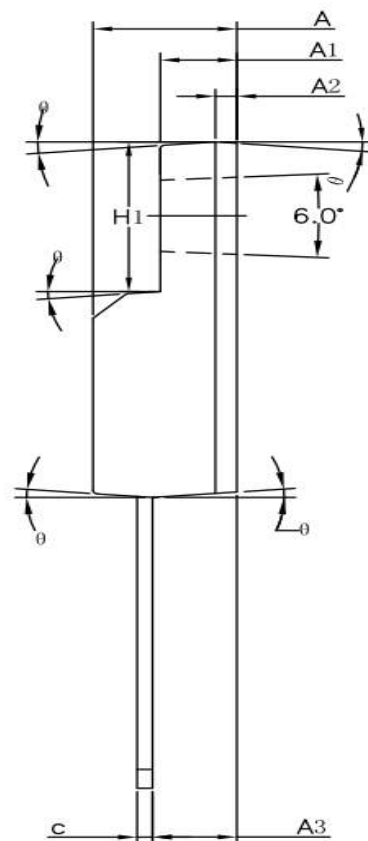
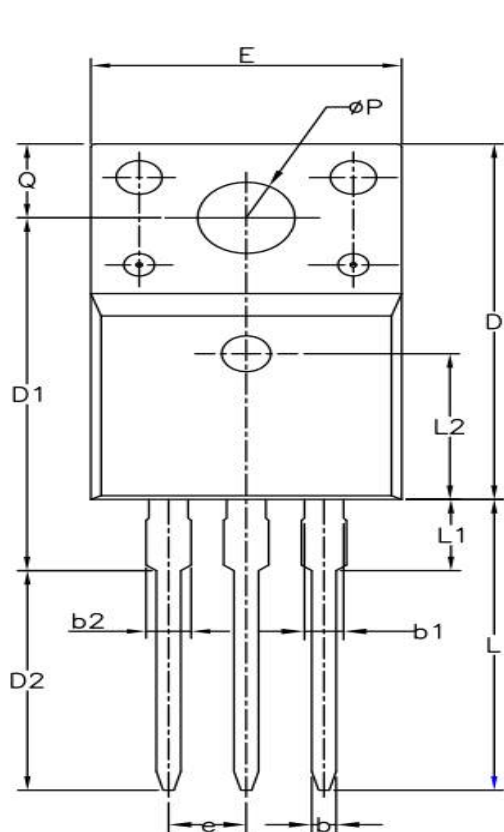
Fig C. Unclamped Inductive switching test circuit & waveform



*. dv/dt controlled by R_G
*. I_S controlled by pulse period

Fig D. Peak diode recovery dv/dt test circuit & waveform

TO-220-3L Package Information



SYMBOL	MIN	NOM	MAX
A	4.50	4.70	4.83
A1	2.34	2.54	2.74
A2	0.70 REF		
A3	2.56	2.76	2.93
b	0.70	—	0.90
b1	1.18	—	1.38
b2	—	—	1.47
c	0.45	0.50	0.60
D	15.67	15.87	16.07
D1	15.55	15.75	15.95
D2	9.60	9.80	10.0
E	9.96	10.16	10.36
e	2.54BSC		
H1	6.48	6.68	6.88
L	12.68	12.98	13.28
L1	—	—	3.50
L2	6.50REF		
∅P	3.08	3.18	3.28
Q	3.20	—	3.40
θ 1	1°	3°	5°

Customer Service

Sales and Service:

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