

Features

- Low on resistance
- Low reverse transfer capacitances
- 100% single pulse avalanche energy test
- 100% ΔVDS test
- Pb-Free plating / Halogen-Free / RoHS compliant

Applications

- Motor Control and Drive
- Charge/Discharge for Battery Management System
- Synchronous Rectifier for SMPS

Key Parameters

V_{DS}	30V
$R_{DS(on)typ.}$	2.2mΩ
I_D	150A
V_{TH}	1.6V
$C_{iss@10V}$	4394pF
Q_{gd}	18.3nC



LEAD FREE

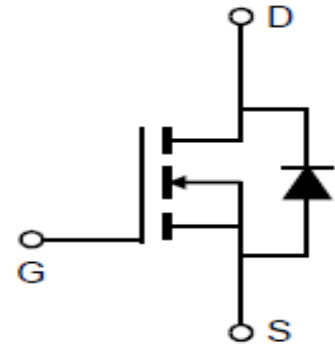
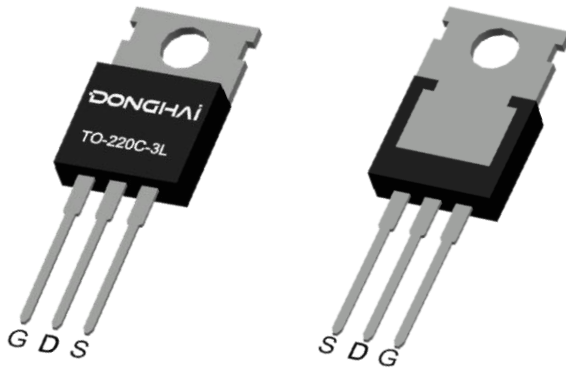


Halogen FREE



RoHS COMPLIANT

TO-220



Marking & Packing Information

Part #	Package	Marking	Tube/Reel	Qty(pcs)
DTG023N03L	TO-220	DTG023N03L	Tube	1000/box

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	30	V
Gate-Source voltage	V_{GS}	±20	V
Continuous drain current $T_C = 25^\circ\text{C}$ $T_C = 100^\circ\text{C}$	I_D	150 95	A
Pulsed drain current ($T_C = 25^\circ\text{C}$, t_p limited by T_{jmax})	$I_{D\ pulse}$	600	A
Avalanche energy, single pulse ($L=0.5\text{mH}$, $R_g=25\Omega$)	E_{AS}	462	mJ
Power dissipation $T_C = 25^\circ\text{C}$ $T_A = 25^\circ\text{C}$	P_{tot}	96	W
		1.7	W
Operating junction and storage temperature	T_j, T_{stg}	-55...+150	$^\circ\text{C}$

Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance, junction – case.	R_{thJC}	1.30	$^\circ\text{C}/\text{W}$
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	75	

Electrical Characteristic (at $T_j = 25^\circ\text{C}$, unless otherwise specified)

Static Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Drain-source breakdown voltage	BV_{DSS}	30	-	-	V	$V_{GS}=0V, I_D=250\mu\text{A}$
Gate threshold voltage	$V_{GS(th)}$	1.2	1.6	2.2	V	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$
Zero gate voltage drain current	I_{DSS}	-	-	1	μA	$V_{DS}=30V, V_{GS}=0V$ $T_j=25^\circ\text{C}$
		-	-	100		$T_j=125^\circ\text{C}$
Gate-source leakage current	I_{GSS}	-	-	100	nA	$V_{GS}=20V, V_{DS}=0V$
Drain-source on-state resistance	$R_{DS(on)}$	-	2.2	2.7	mΩ	$T_j=25^\circ\text{C}$ $V_{GS}=10V, I_D=90A$
		-	3.5	4.2		$V_{GS}=4.5V, I_D=90A$

Dynamic Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Input Capacitance	C_{iss}	-	4394	-	pF	$V_{GS}=0V, V_{DS}=15V, f=1MHz$
Output Capacitance	C_{oss}	-	578	-		
Reverse Transfer Capacitance	C_{rss}	-	491	-		
Gate Total Charge	Q_G	-	86	-	nC	$V_{GS}=10V, V_{DS}=15V, I_D=90A$
Gate-Source charge	Q_{gs}	-	12	-		
Gate-Drain charge	Q_{gd}	-	18	-		
Turn-on delay time	$t_{d(on)}$	-	11	-	ns	$V_{GS}=10V, V_{DD}=10V, R_{G_ext}=3\Omega, I_D=60A$
Rise time	t_r	-	22	-		
Turn-off delay time	$t_{d(off)}$	-	62	-		
Fall time	t_f	-	26	-		

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Diode Max Current	I_S		-	150	A	-
Diode Forward Voltage	V_{SD}	-	-	1.2	V	$V_{GS}=0V, I_{SD}=60A$
Diode Reverse Recovery Time	t_{rr}	-	27	-	ns	$I_F=30A, dI/dt=100A/\mu s$
Diode Reverse Recovery Charge	Q_{rr}	-	20	-	nC	

Typical Characteristics Diagram

Fig1. Output Characteristics

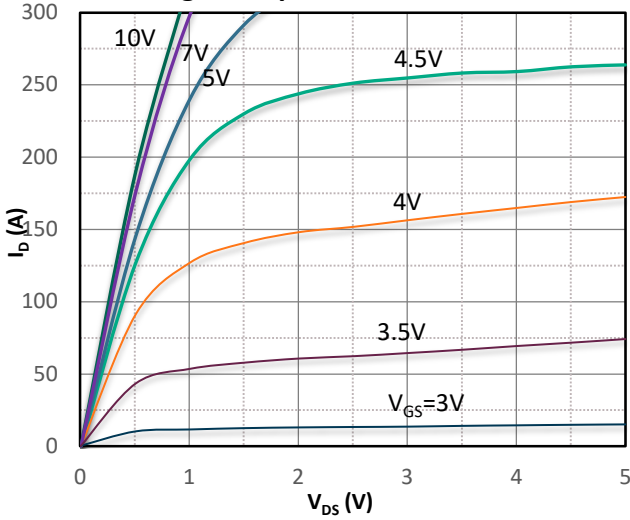


Fig2. Transfer Characteristics

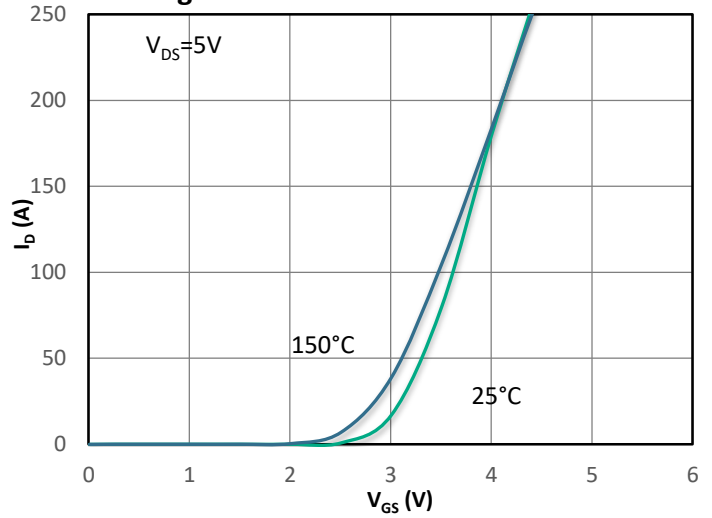


Fig3. Body-diode Forward Characteristics

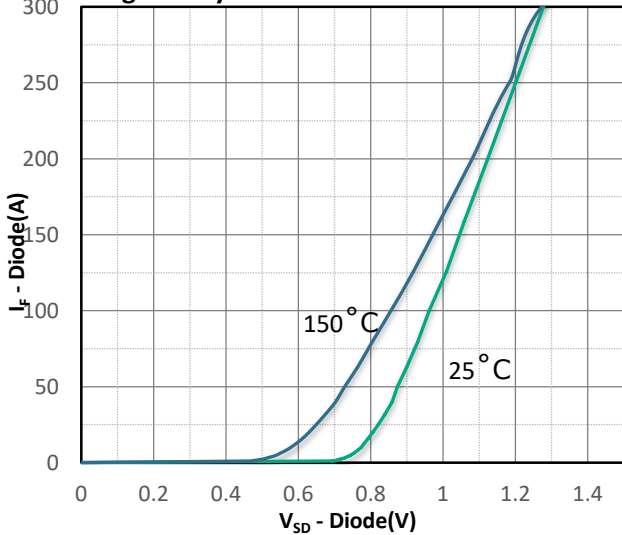


Fig4. Rds(on) vs. Temperature

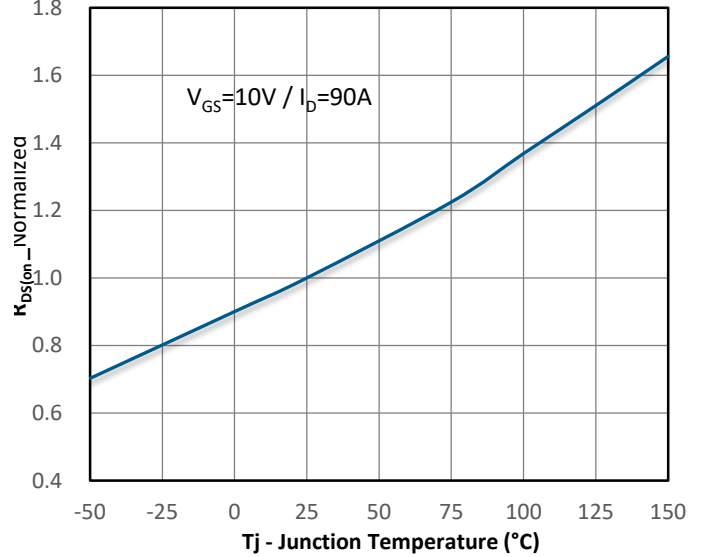


Fig5. Capacitance Characteristics

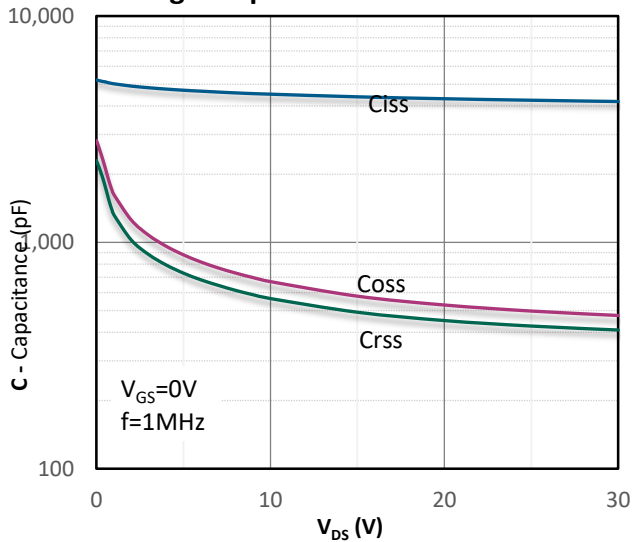
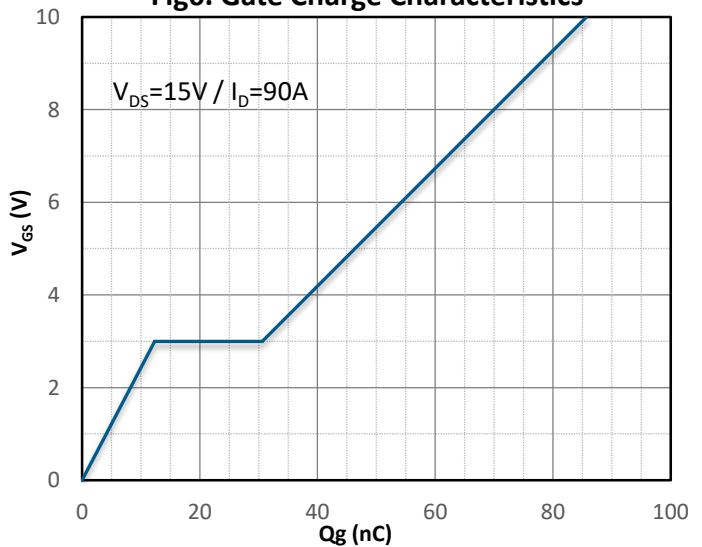


Fig6. Gate Charge Characteristics



Typical Characteristics Diagram

Fig7. Rds(on) vs Drain Current

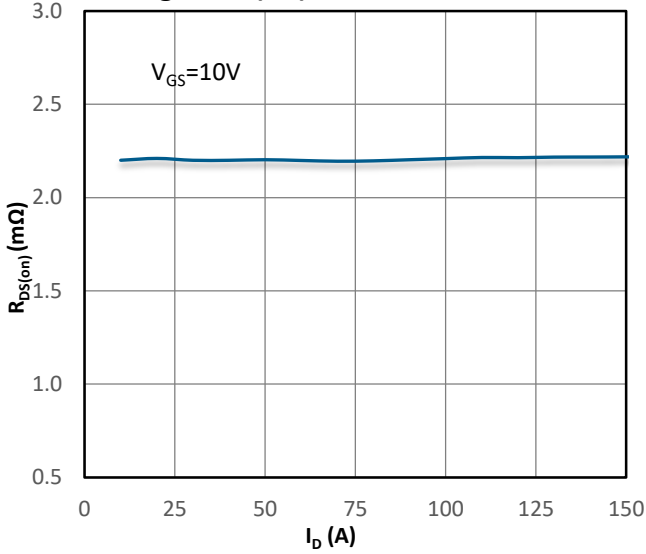


Fig8. Rds(on) vs Gate Voltage

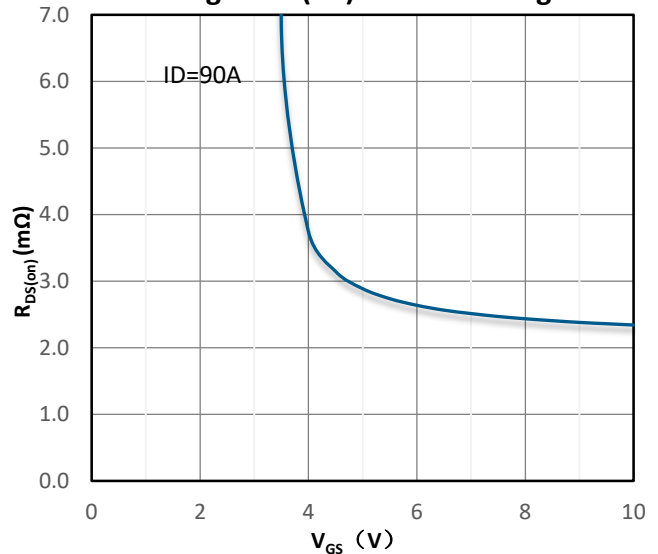


Fig9. Power De-rating

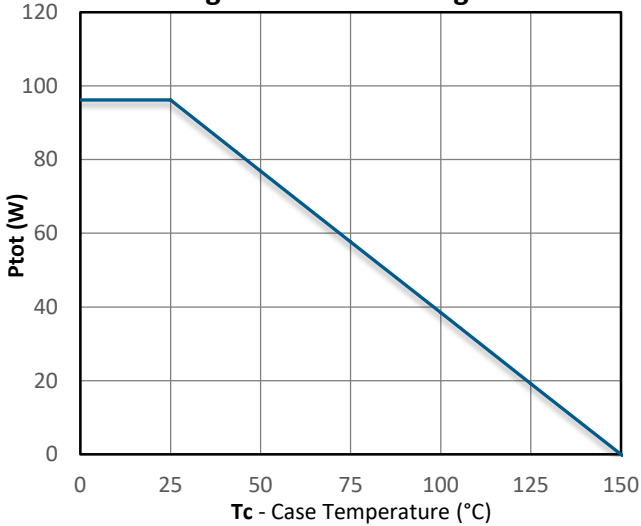


Fig10. Current De-rating

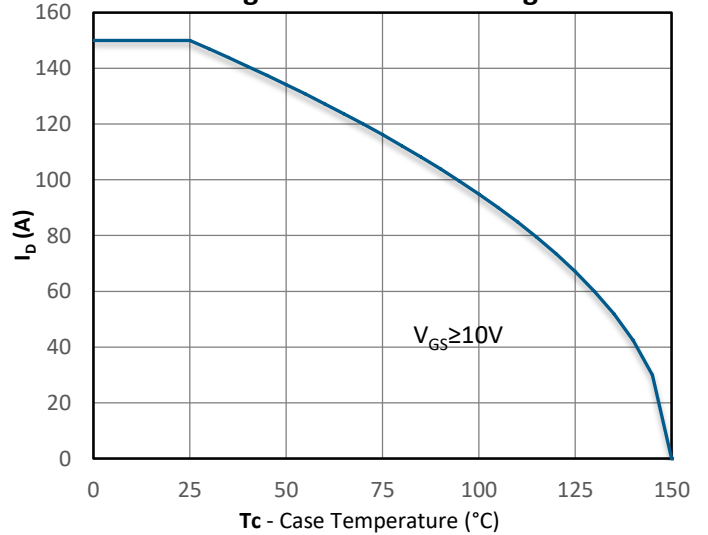


Fig11. Safe Operating Area

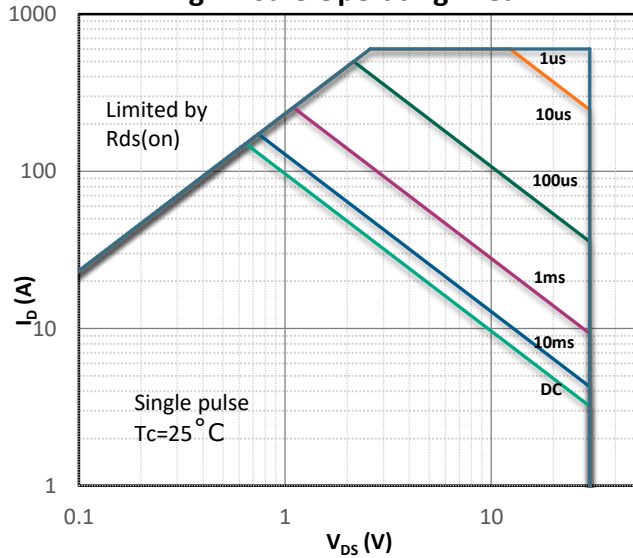
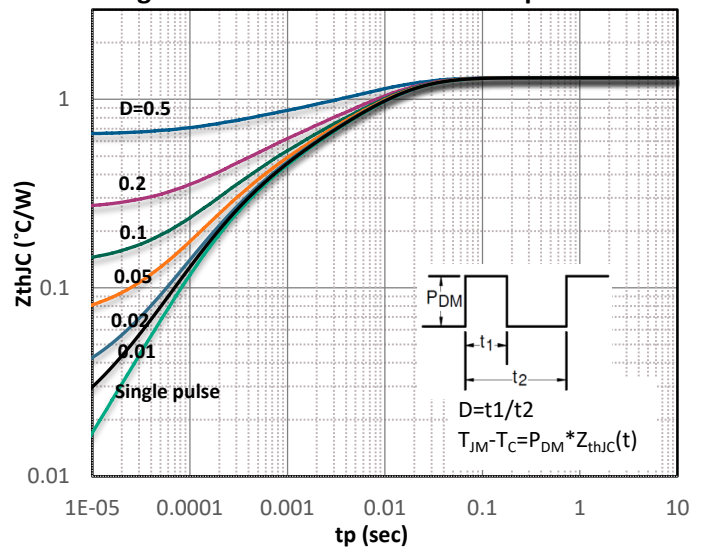
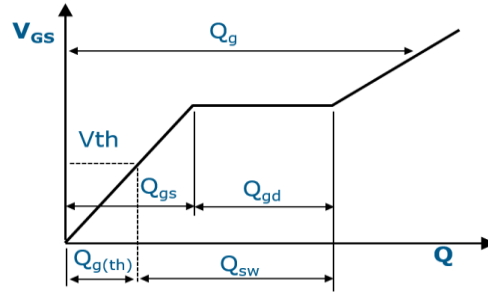
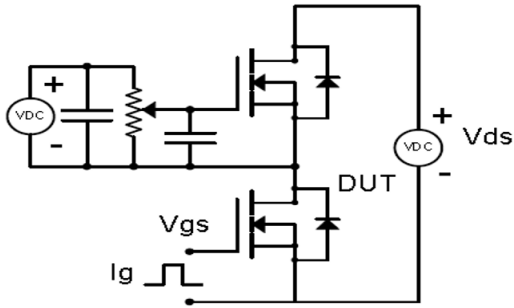


Fig12. Max. Transient Thermal Impedance

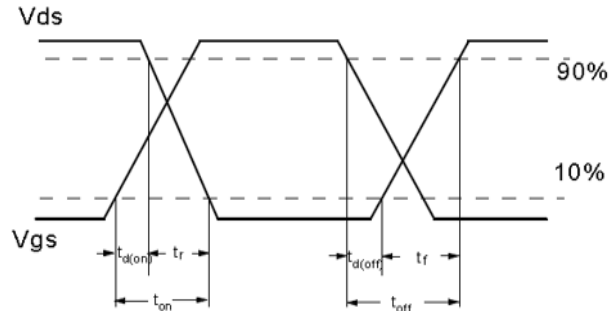
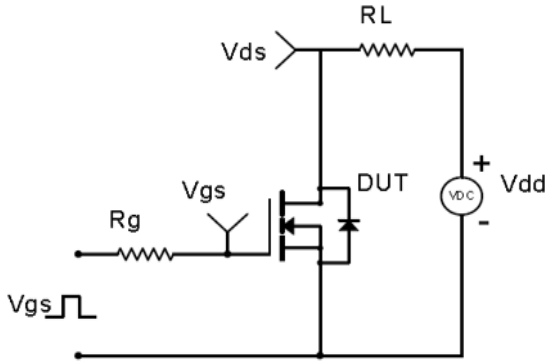


Test Circuit & Waveform

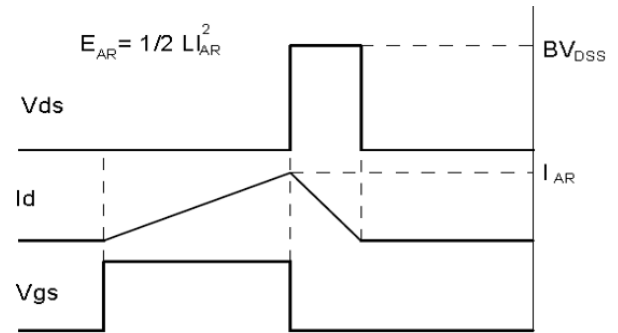
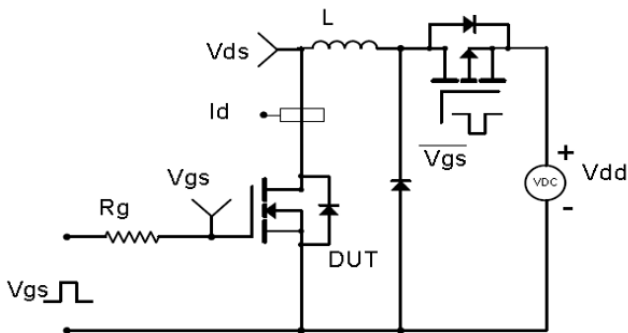
Gate Charge Test Circuit & Waveform



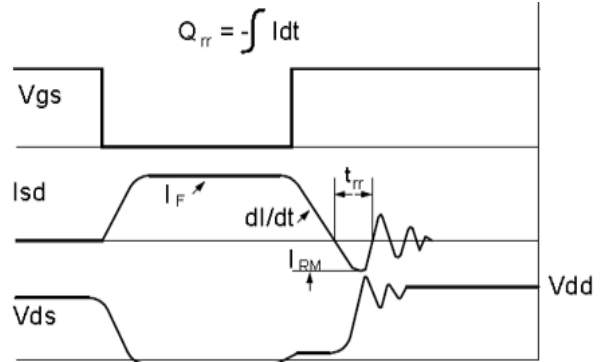
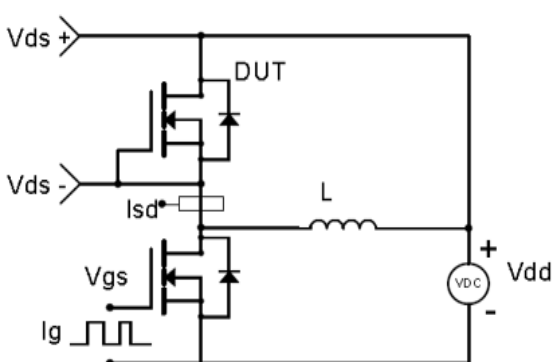
MOSFET Switching Test Circuit & Waveform



EAS Test Circuit & Waveform

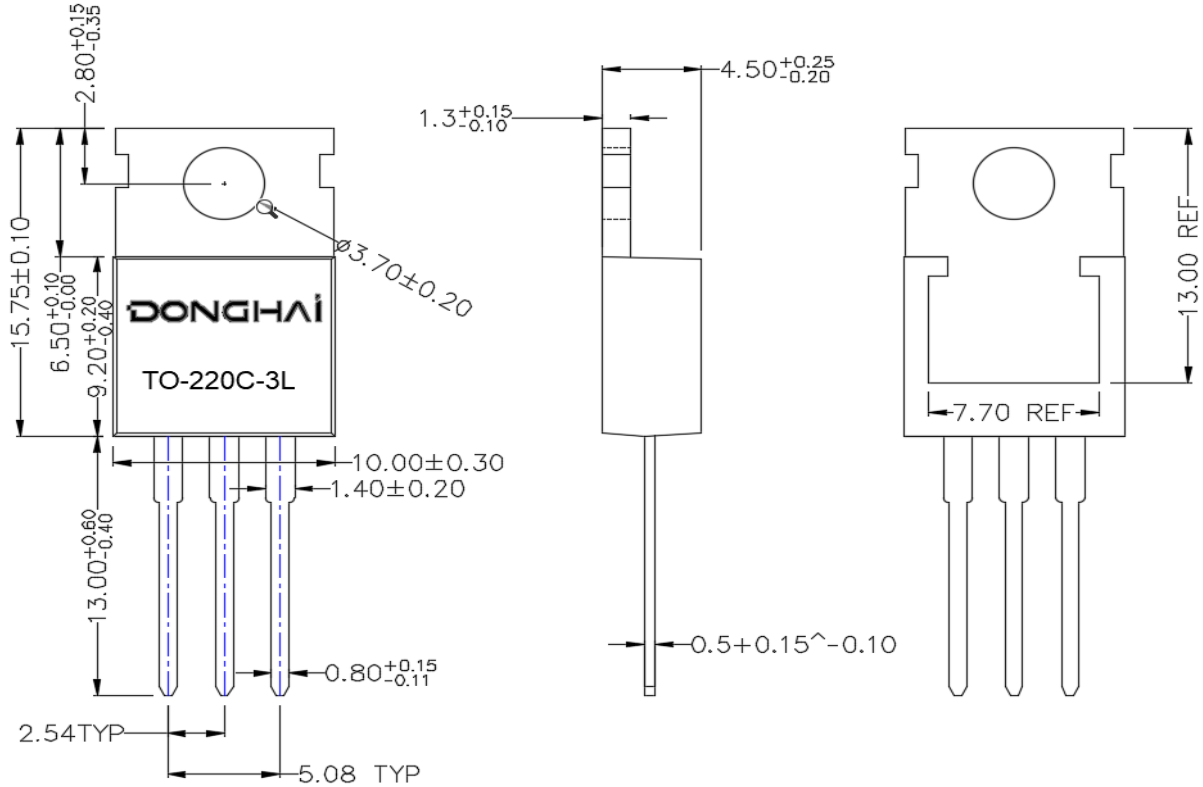


Diode Recovery Test Circuit & Waveform



Package Outline : TO-220

*Dimensions in mm



Revision History

Revison	Date	Major changes
1.0	2023/10/23	Release of formal version

Disclaimer

Unless otherwise specified in the datasheet, the product is designed and qualified as a standard commercial product and is not intended for use in applications that require extraordinary levels of quality and reliability, such as aviation, aerospace, life-support devices or systems.

Any and all semiconductor products have certain probability to fail or malfunction, which may result in personal injury, death or property damage. Customer are responsible for providing adequate safe measures when design their systems.

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