

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

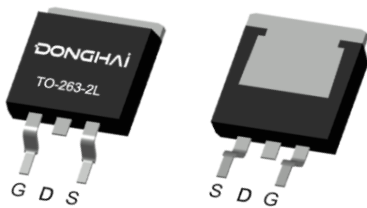
- Power switching applications
- DC-DC converters
- Full bridge control

Key Parameters

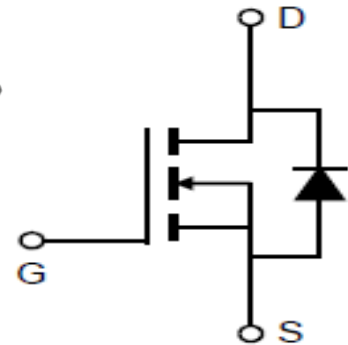
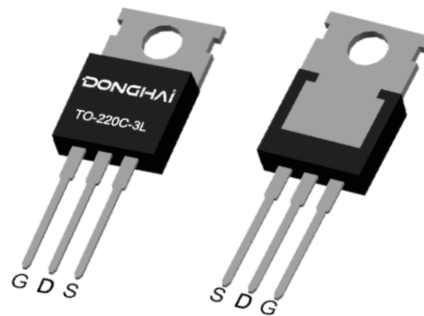
V_{DS}	100V
$R_{DS(on)typ. (TO-263)}$	1.7mΩ
$R_{DS(on)typ. (TO-220)}$	1.9mΩ
V_{TH}	3V
I_D (Silicon limit)	364A
I_D (Package limit)	240A
$C_{iss@10V}$	10802pF
Q_{gd}	44nC



TO-263



TO-220



Marking & Packing Information

Part #	Package	Marking	Tube/Reel	Qty(pcs)
DSE022N10N3	TO-263	DSE022N10N3	Tape & Reel	800/box
DSG024N10N3	TO-220	DSG024N10N3	Tube	1000/box

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	100	V
Gate-Source voltage	V_{GS}	±20	V
Continuous drain current $T_C = 25^\circ\text{C}$ (Silicon limit) $T_C = 25^\circ\text{C}$ (Package limit) $T_C = 100^\circ\text{C}$ (Package limit)	I_D	364 240 240	A
Pulsed drain current ($T_C = 25^\circ\text{C}$, t_p limited by T_{jmax})	$I_{D\ pulse}$	960	A
Avalanche energy, single pulse ($L=0.5\text{mH}$, $R_g=25\Omega$)	E_{AS}	2025	mJ
Power dissipation $T_C = 25^\circ\text{C}$ $T_A = 25^\circ\text{C}$	P_{tot}	375	W
		2.3	W
Operating junction and storage temperature	T_j, T_{stg}	-55...+175	$^\circ\text{C}$

Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance, junction – case.	R_{thJC}	0.4	$^\circ\text{C}/\text{W}$
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	65	

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}	100	-	-	V	$V_{GS}=0\text{V}, I_D=250\mu\text{A}$
Gate threshold voltage	$V_{GS(th)}$	2.0	3.0	4.0	V	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$
Zero gate voltage drain current	I_{DSS}	-	-	1	μA	$V_{DS}=100\text{V}, V_{GS}=0\text{V}$ $T_j=25^\circ\text{C}$
		-	-	100		$T_j=125^\circ\text{C}$
Gate-source leakage current	I_{GSS}	-	-	100	nA	$V_{GS}=20\text{V}, V_{DS}=0\text{V}$
Drain-source on-state resistance	$R_{DS(on)}$	-	1.7	2.2	mΩ	$V_{GS}=10\text{V}, I_D=90\text{A}$, TO-263, $T_j=25^\circ\text{C}$
		-	1.9	2.4		TO-220, $T_j=25^\circ\text{C}$
Transconductance	g_{fs}	-	216	-	S	$V_{DS}=5\text{V}, I_D=90\text{A}$

Dynamic Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Input Capacitance	C_{iss}	-	10802	-	pF	$V_{GS}=0V, V_{DS}=50V, f=1MHz$
Output Capacitance	C_{oss}	-	3463	-		
Reverse Transfer Capacitance	C_{rss}	-	150	-		
Gate Total Charge	Q_G	-	177	-	nC	$V_{GS}=10V, V_{DS}=50V, I_D=70A$
Gate-Source charge	Q_{gs}	-	50.5	-		
Gate-Drain charge	Q_{gd}	-	44	-		
Gate plateau voltage	$V_{plateau}$	-	4.6	-	V	
Turn-on delay time	$t_{d(on)}$	-	33	-	ns	$V_{GS}=10V, V_{DD}=50V, R_{G_ext}=3\Omega, I_D=90A$
Rise time	t_r	-	68	-		
Turn-off delay time	$t_{d(off)}$	-	103	-		
Fall time	t_f	-	80	-		

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Diode Max Current	I_S		-	240	A	-
Diode Forward Voltage	V_{SD}	-	-	1.2	V	$V_{GS}=0V, I_{SD}=90A$
Diode Reverse Recovery Time	t_{rr}	-	177	-	ns	$I_F=20A, dI/dt=100A/\mu s$
Diode Reverse Recovery Charge	Q_{rr}	-	195	-	nC	

Typical Characteristics Diagram

Fig1. Output Characteristics

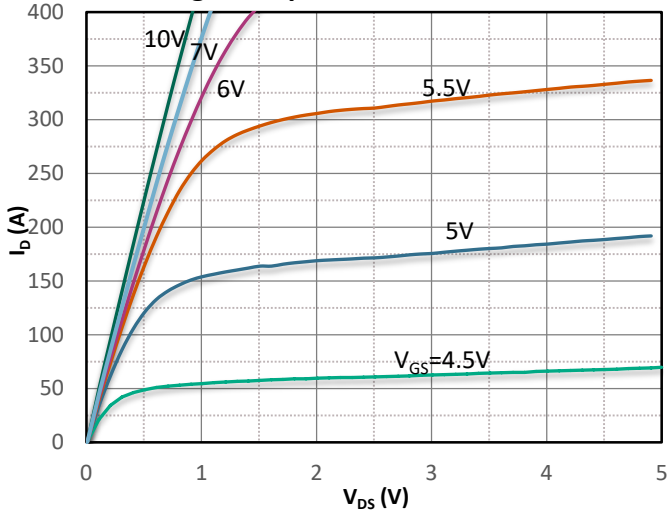


Fig2. Transfer Characteristics

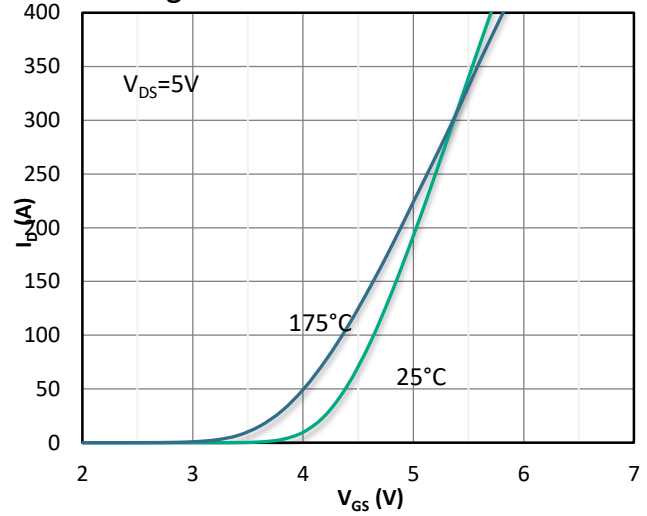


Fig3. R_{DS(on)} vs Drain Current

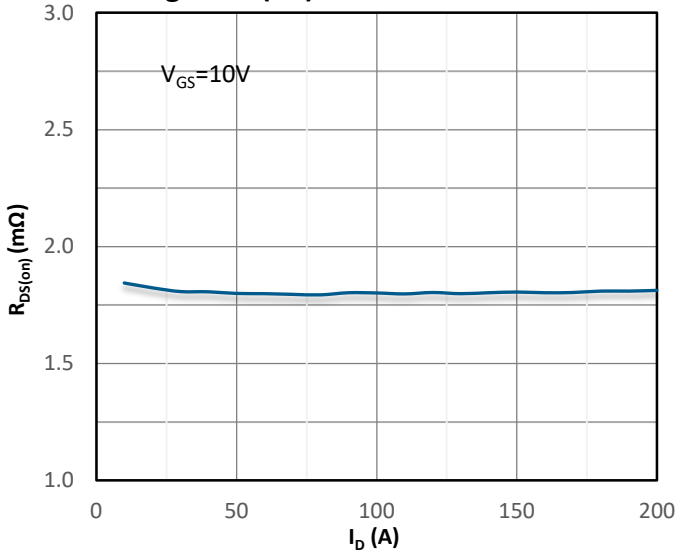


Fig 4. R_{DS(on)} vs Gate Voltage

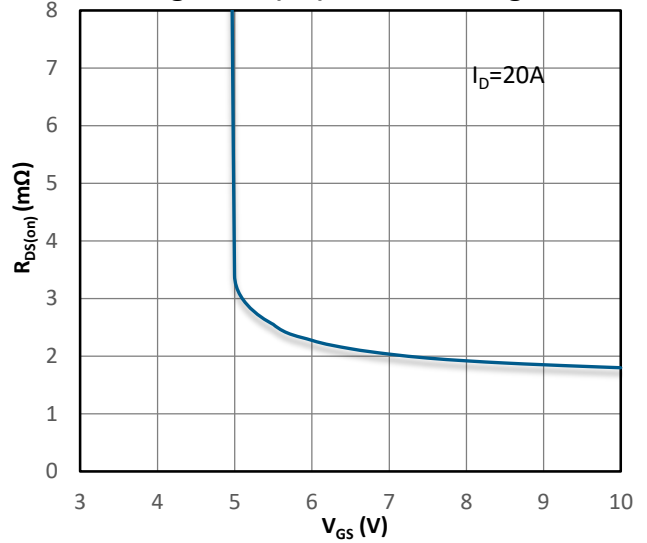


Fig5. R_{DS(on)} vs. Temperature

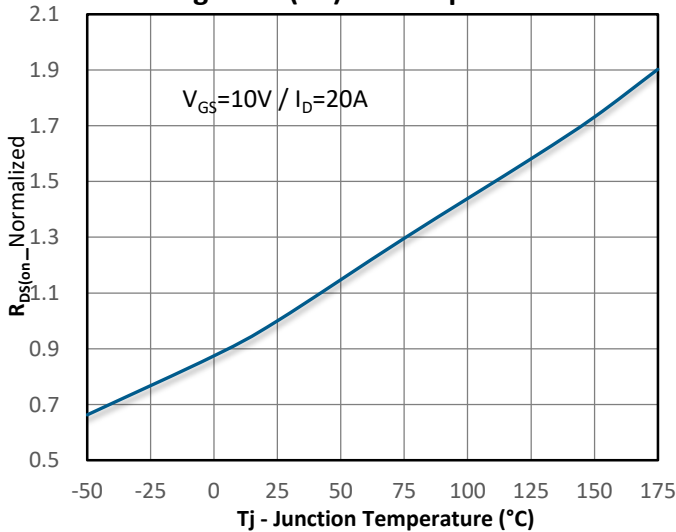
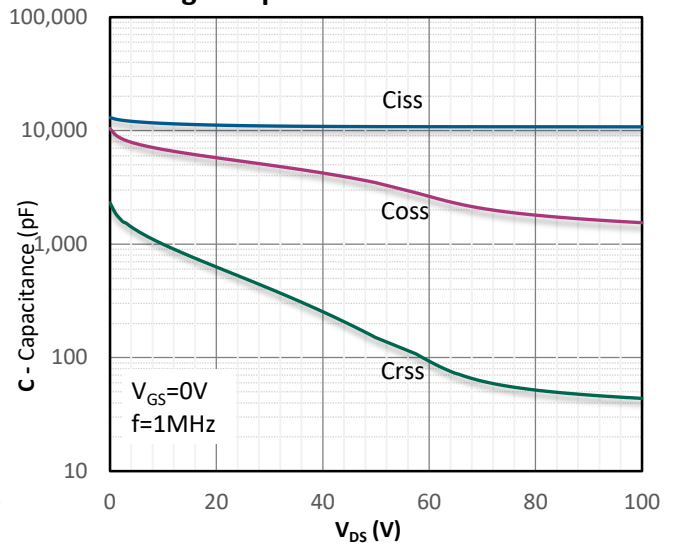
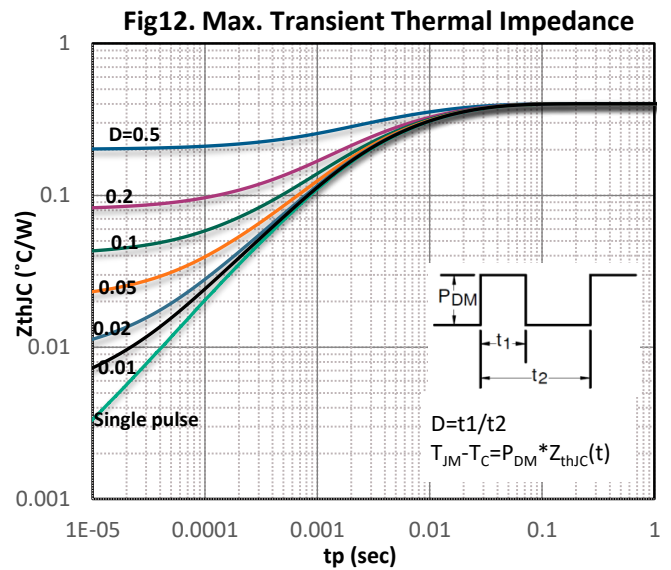
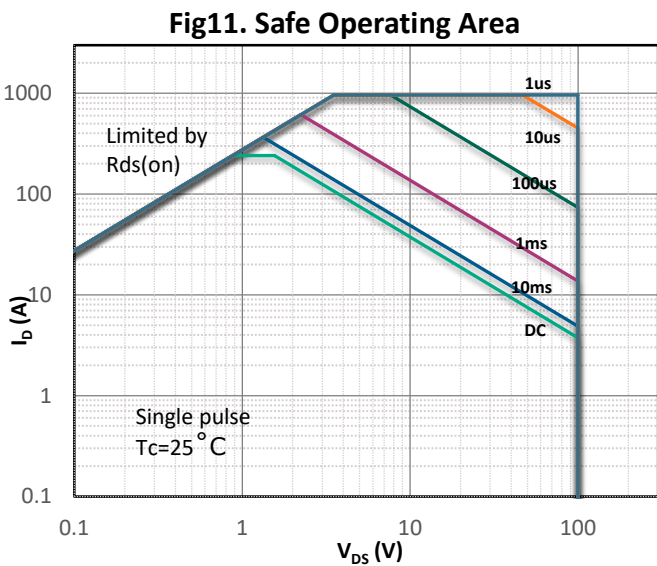
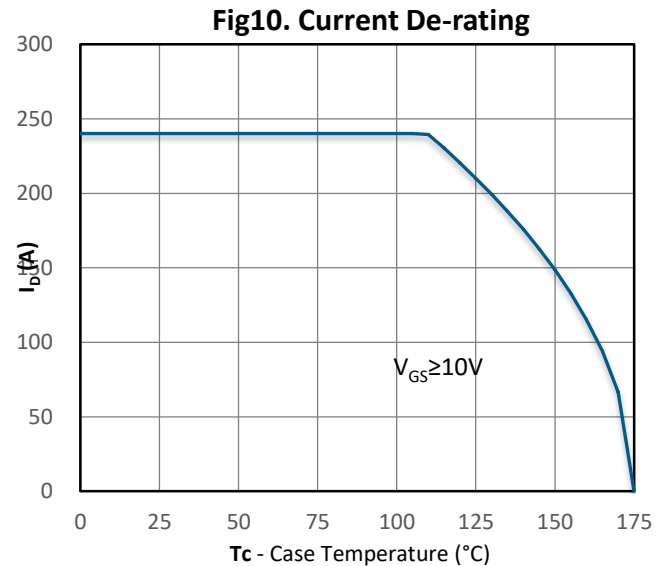
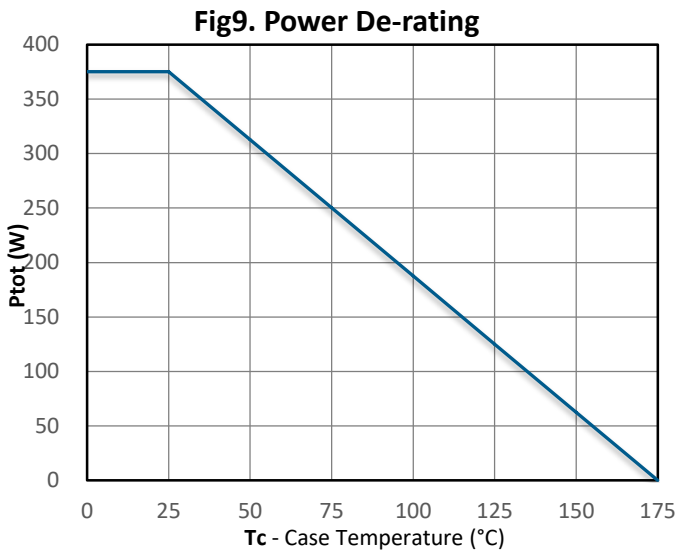
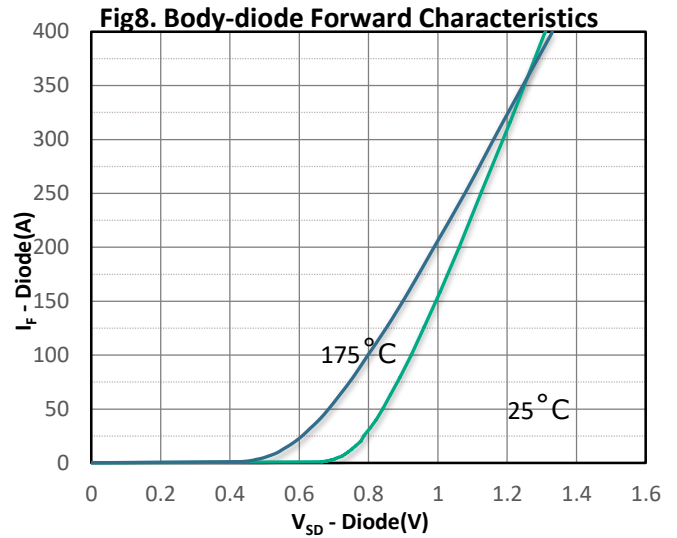
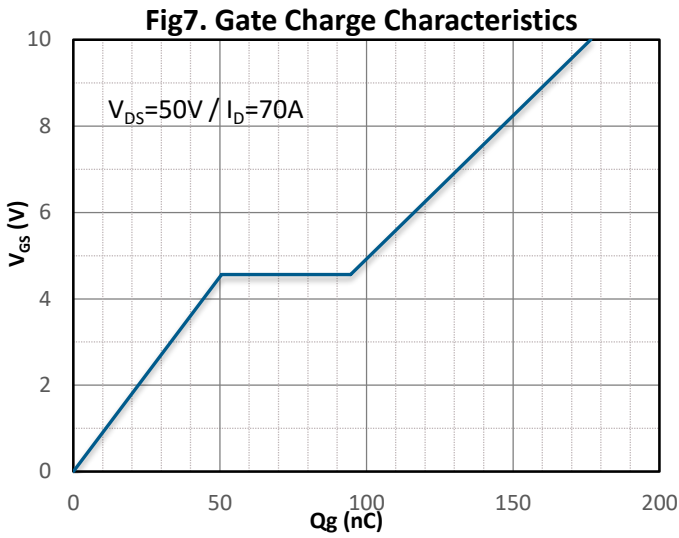


Fig6. Capacitance Characteristics

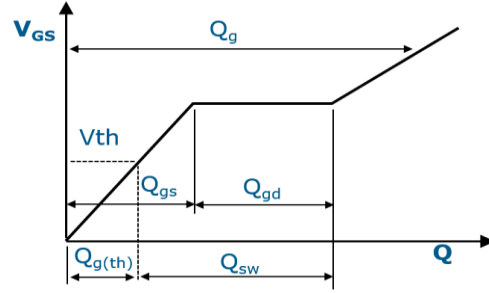
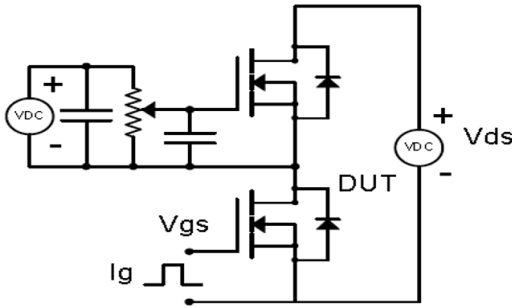


Typical Characteristics Diagram

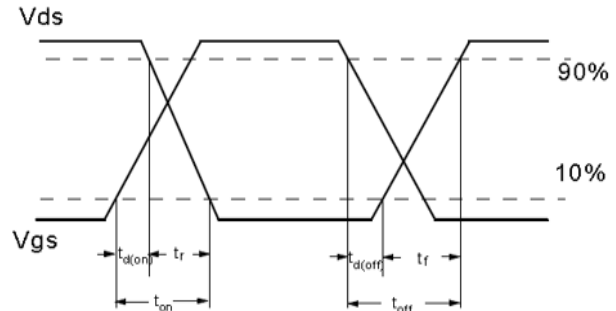
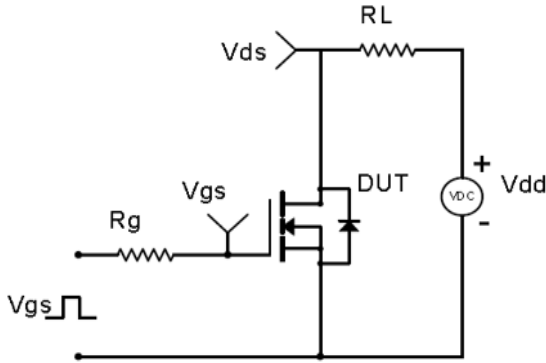


Test Circuit & Waveform

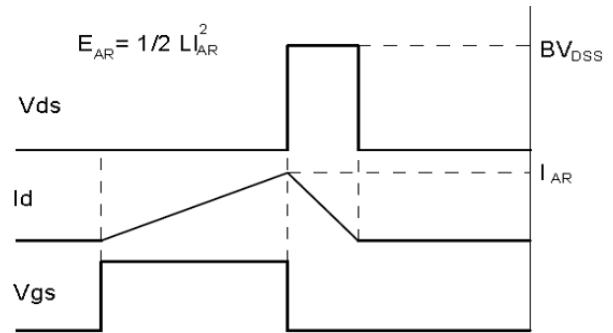
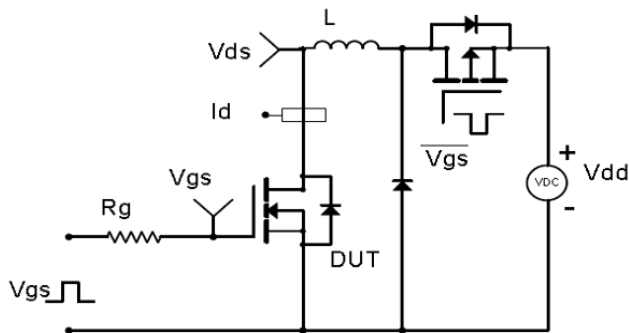
Gate Charge Test Circuit & Waveform



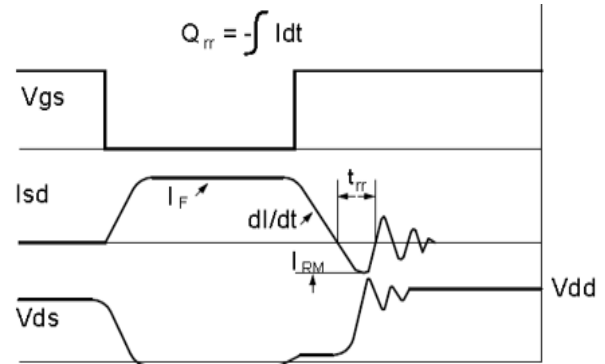
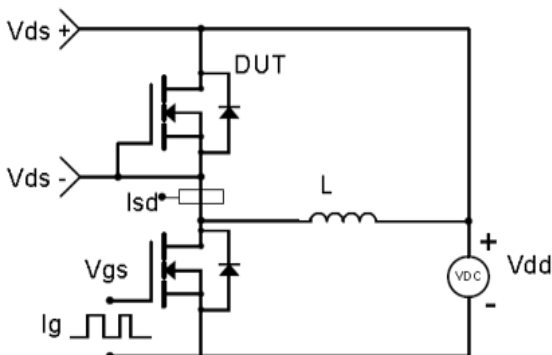
MOSFET Switching Test Circuit & Waveform



E_{AS} Test Circuit & Waveform

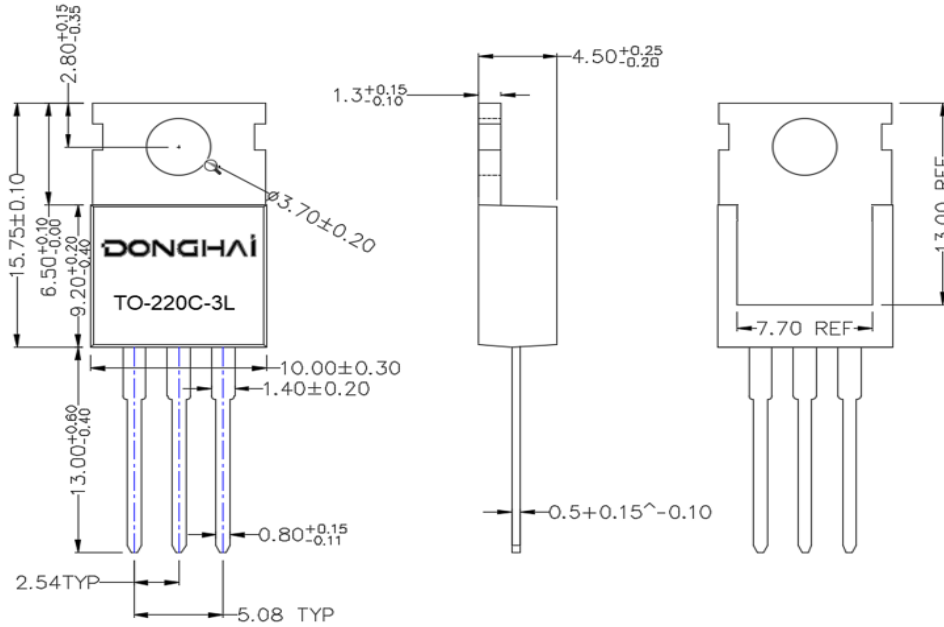


Diode Recovery Test Circuit & Waveform



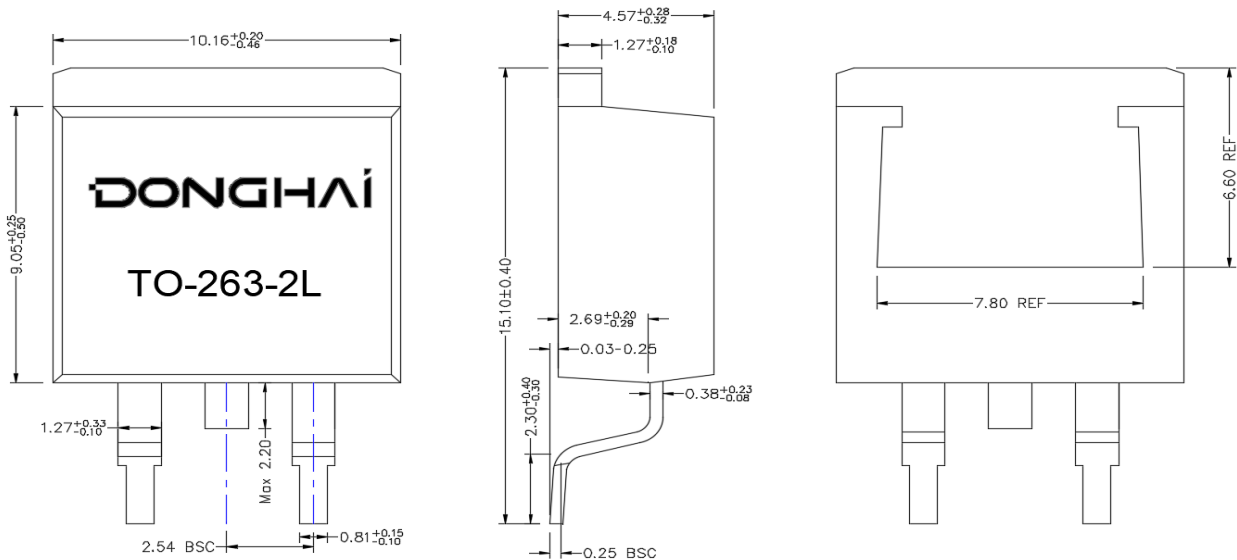
Package Outline : TO-220

*Dimensions in mm



Package Outline : TO-263

*Dimensions in mm



Revision History

Revision	Date	Major changes
1.0	2023/9/8	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.

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