

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

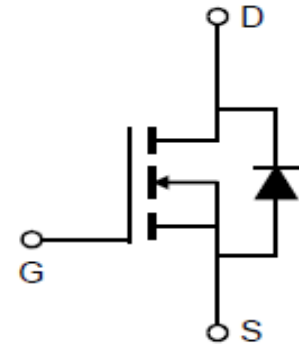
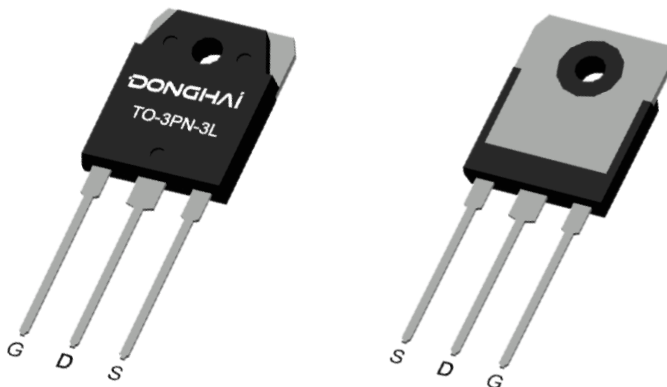
- Power switching applications
- DC-DC converters
- Full bridge control

Key Parameters

V_{DS}	200V
$R_{DS(on)typ.}$	11mΩ
I_D	110A
$C_{iss@10V}$	4260pF
Q_{gd}	9nC



TO-3PN



Marking & Packing Information

Part #	Package	Marking	Tube/Reel	Qty(pcs)
DSN108N20N	TO-3PN	DSN108N20N	Tube	300/box

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	200	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	110 78	A
Pulsed drain current ($T_C = 25^\circ\text{C}$, t_p limited by T_{jmax})	$I_{D\ pulse}$	440	A
Avalanche energy, single pulse ($L=0.5\text{mH}$, $R_g=25\Omega$)	E_{AS}	1190	mJ
Power dissipation $T_C = 25^\circ\text{C}$ $T_A = 25^\circ\text{C}$	P_{tot}	333	W
		2.3	
Operating junction and storage temperature	T_j, T_{stg}	-55...+175	°C

Notes: 1. EAS was tested at $T_j = 25^\circ\text{C}$, $L = 0.5\text{mH}$, $I_d=48\text{A}$.

Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance, junction – case.	R_{thJC}	0.45	°C/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}	200	-	-	V	$V_{GS}=0\text{V}$, $I_D=250\mu\text{A}$
Gate threshold voltage	$V_{GS(th)}$	2.5	-	4.5	V	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$
Zero gate voltage drain current	I_{DSS}	-	-	1	μA	$V_{DS}=180\text{V}$, $V_{GS}=0\text{V}$ $T_j=25^\circ\text{C}$
		-	-	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	$R_{DS(on)}$		11	13	mΩ	$V_{GS}=10\text{V}$, $I_D=60\text{A}$, $T_j=25^\circ\text{C}$
Transconductance	g_{fs}	-	80	-	S	$V_{DS}=5\text{V}$, $I_D=60\text{A}$

Dynamic Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Input Capacitance	C_{iss}	-	4260	-	pF	$V_{GS}=0V, V_{DS}=100V,$ $f=1MHz$
Output Capacitance	C_{oss}	-	367	-		
Reverse Transfer Capacitance	C_{rss}	-	18	-		
Gate Total Charge	Q_G	-	57	-	nC	$V_{GS}=10V, V_{DS}=100V,$ $I_D=60A$
Gate-Source charge	Q_{gs}	-	25	-		
Gate-Drain charge	Q_{gd}	-	9	-		
Gate plateau voltage	$V_{plateau}$	-	5.4	-	V	
Turn-on delay time	$t_{d(on)}$	-	19	-	ns	$V_{GS}=10V, V_{DD}=100V,$ $I_D=60A, R_{G_ext}=3\Omega$
Rise time	t_r	-	72	-		
Turn-off delay time	$t_{d(off)}$	-	43	-		
Fall time	t_f	-	12	-		
Gate resistance	R_G	-	2.5	-	Ω	$V_{GS}=0V, V_{DS}=0V,$ $f=1MHz$

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Diode Max Current	I_S		-	110	A	-
Diode Forward Voltage	V_{SD}	-	-	1.2	V	$V_{GS}=0V, I_{SD}=60A$
Diode Reverse Recovery Time	t_{rr}	-	123	-	ns	$I_F=60A,$ $dI/dt=100A/\mu s$
Diode Reverse Recovery Charge	Q_{rr}	-	485	-	nC	

Typical Characteristics Diagram

Fig1. Output Characteristics

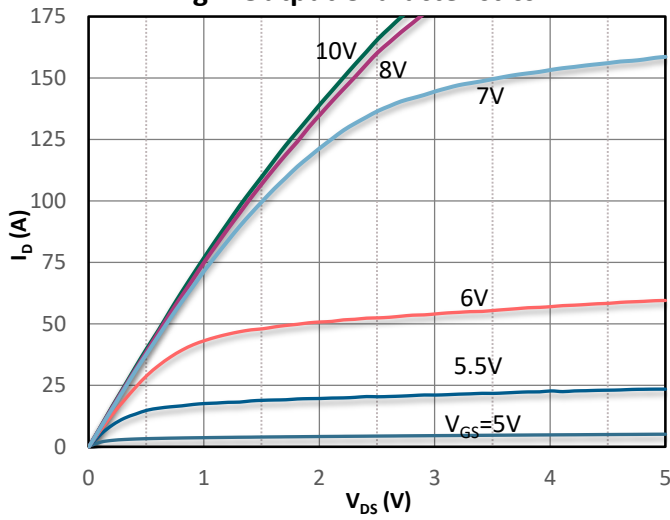


Fig2. Transfer Characteristics

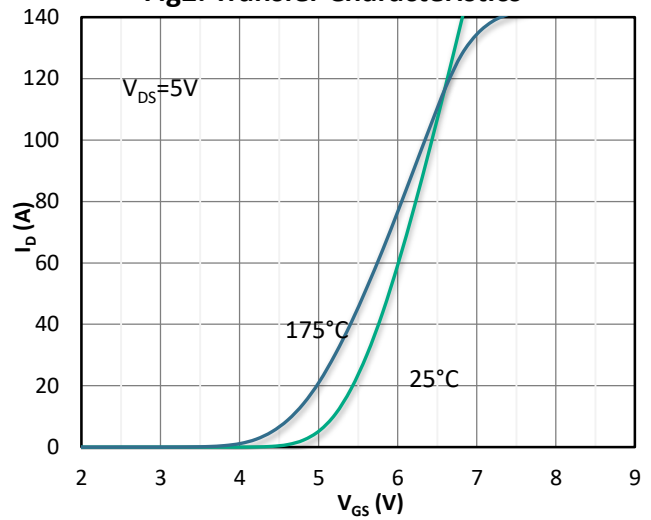


Fig3. Body-diode Forward Characteristics

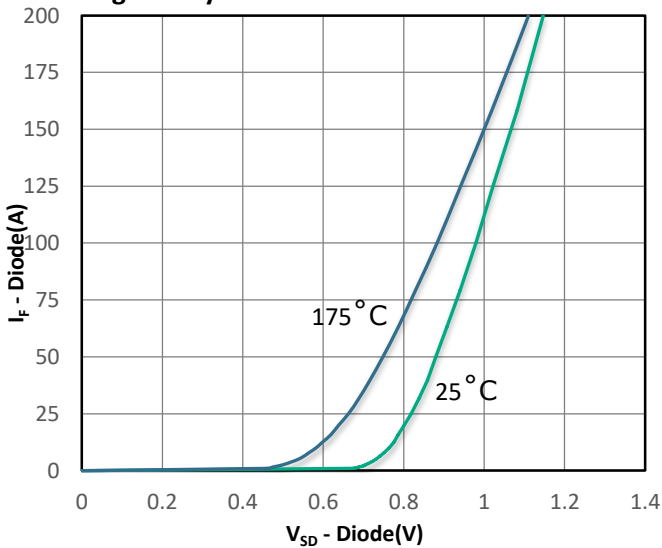


Fig 4. Rds(on) vs Gate Voltage

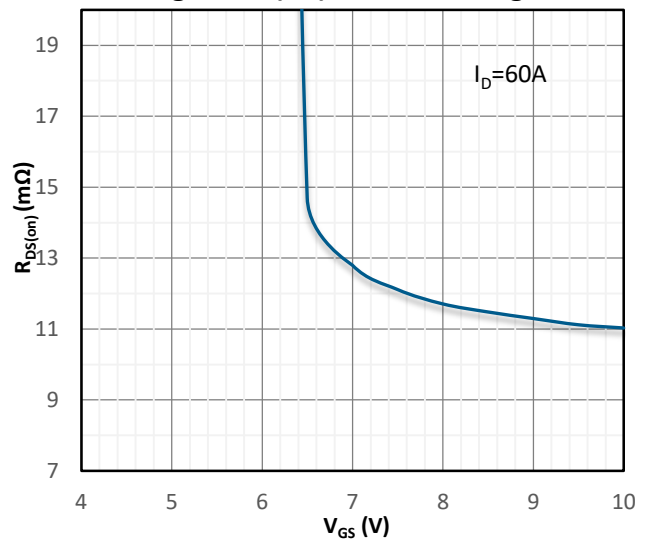


Fig5. Rds(on) vs. Temperature

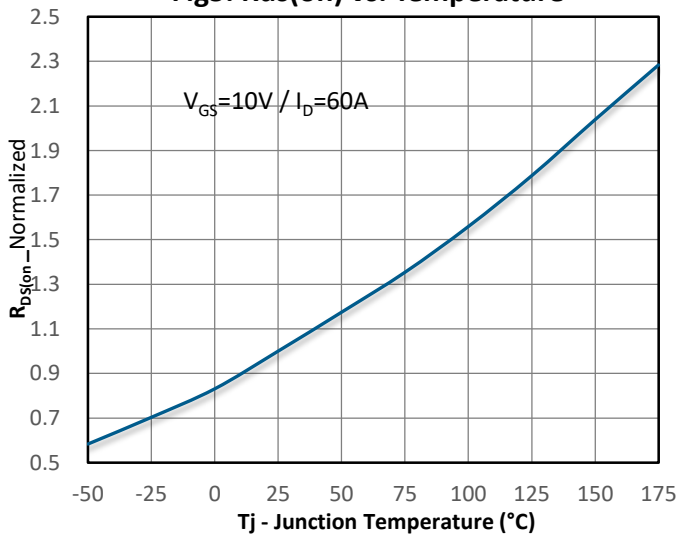
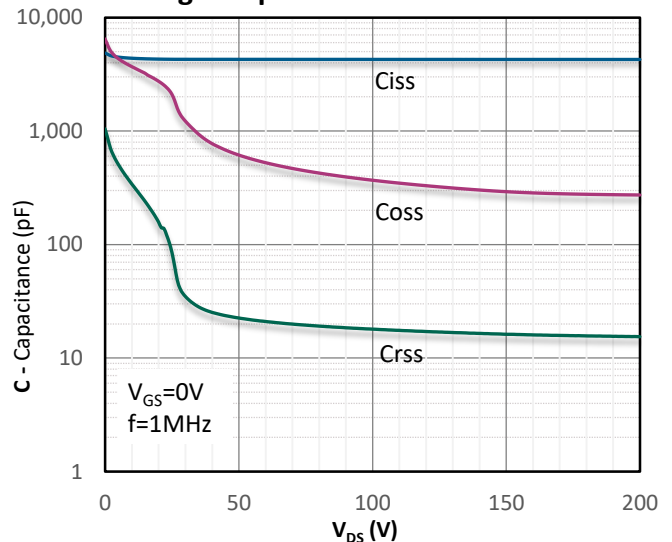
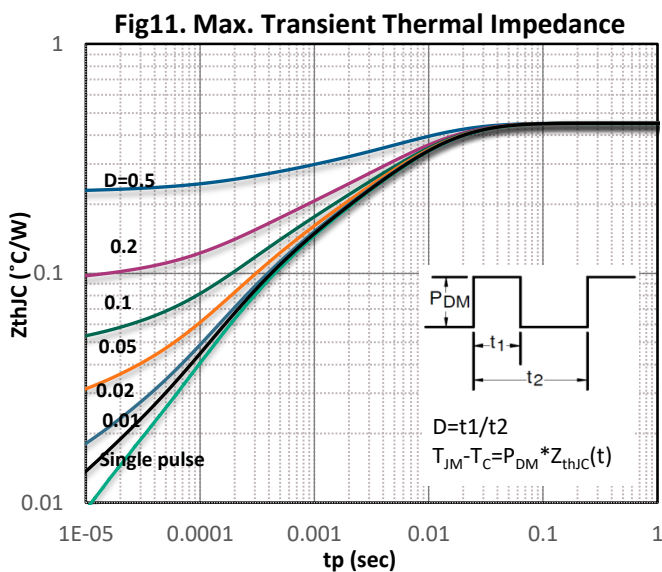
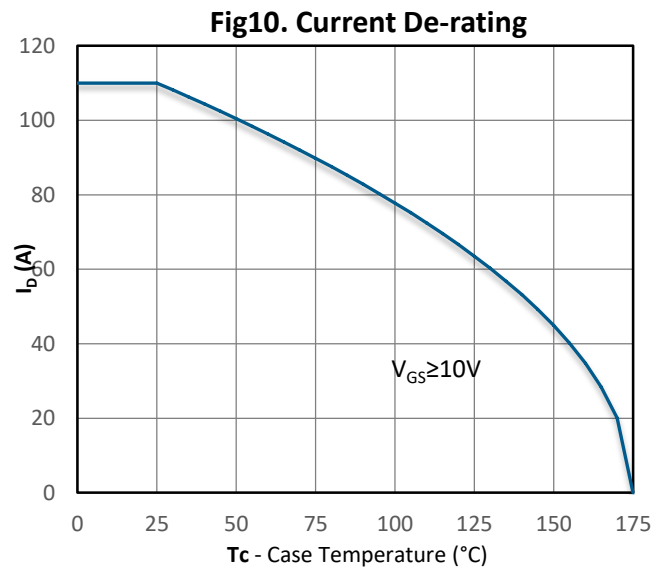
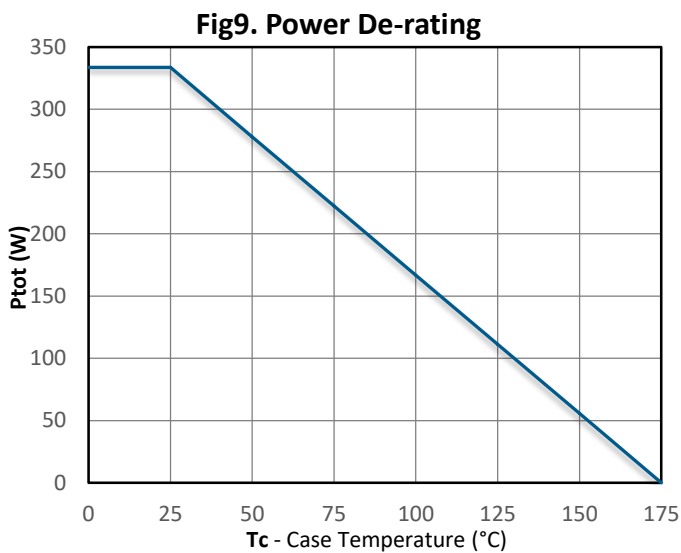
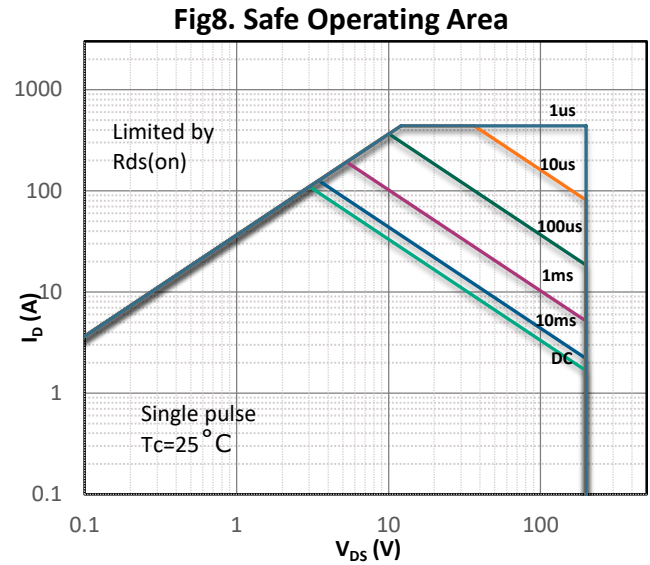
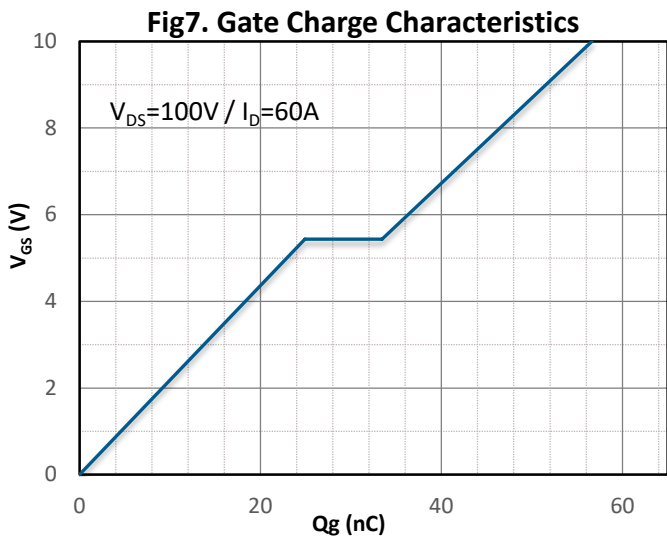


Fig6. Capacitance Characteristics

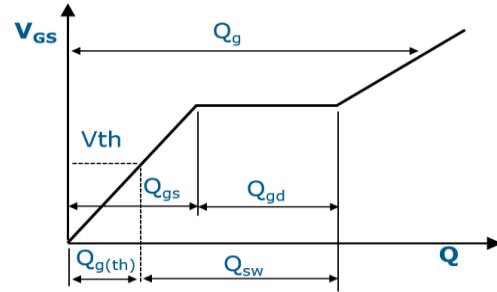
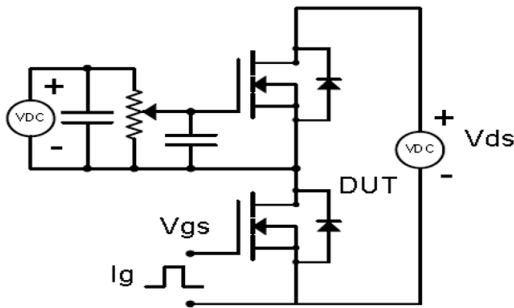


Typical Characteristics Diagram

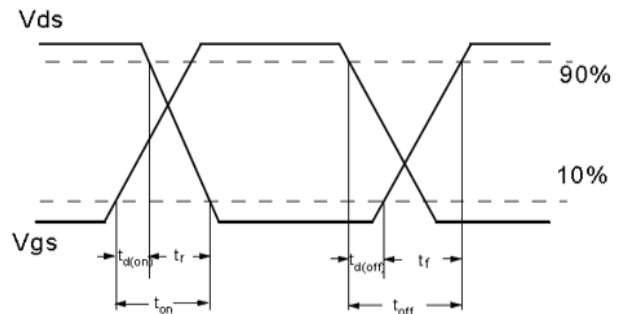
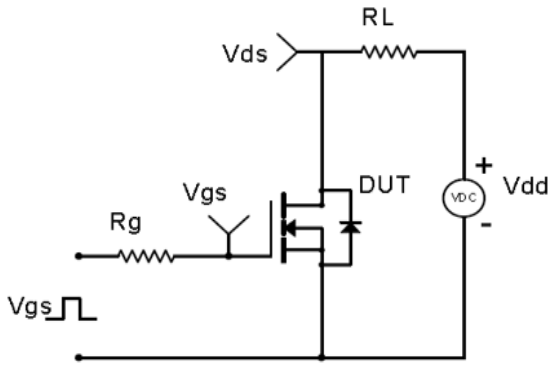


Test Circuit & Waveform

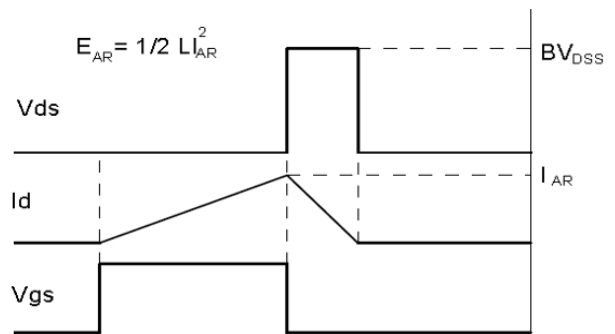
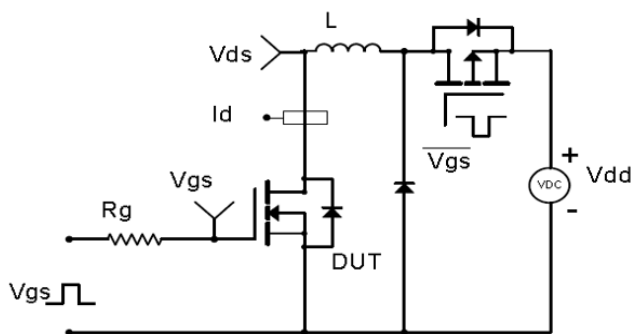
Gate Charge Test Circuit & Waveform



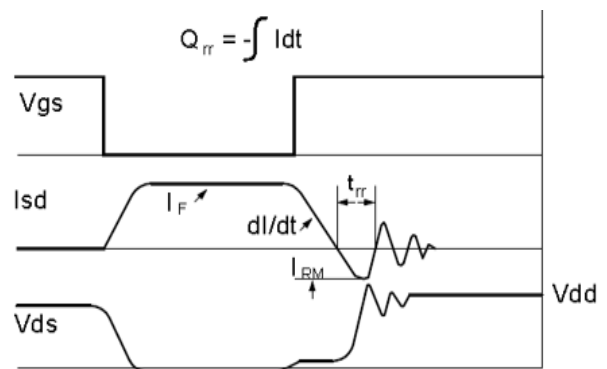
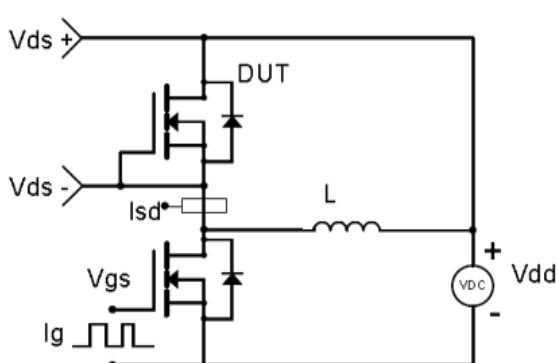
MOSFET Switching Test Circuit & Waveform



E_{AS} Test Circuit & Waveform

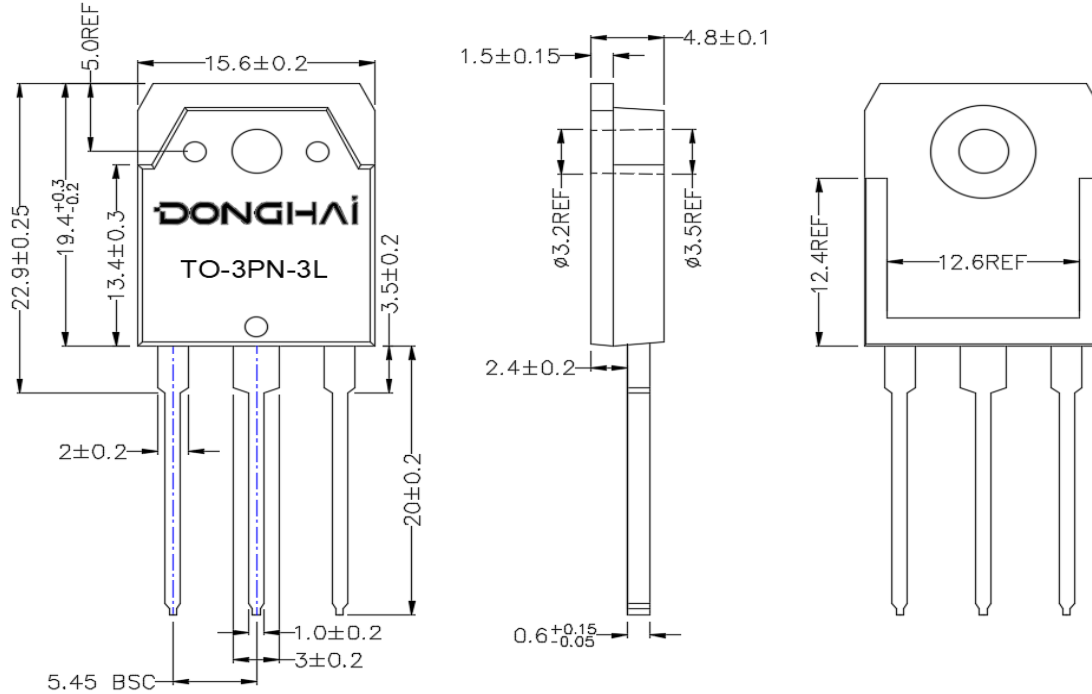


Diode Recovery Test Circuit & Waveform



Package Outline : TO-3PN

*Dimensions in mm



Revision History

Revision	Date	Major changes
1.0	2023/8/28	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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