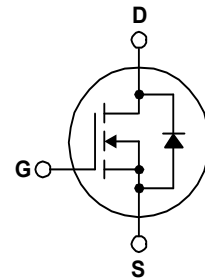
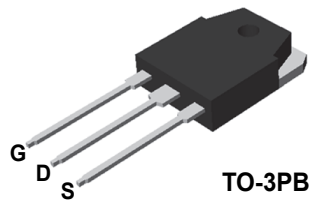


H12N90

N-Channel MOSFET

Features

- Low Gate Charge
- Low Crss
- 100% Avalanche Tested
- RoHS compliant



MOSFET Maximum Ratings $T_C = 25^\circ\text{C}$ unless otherwise noted.

Symbol	Parameter	H12N90	Unit
V_{DSS}	Drain to Source Voltage	900	V
I_D	Drain Current - Continuous ($T_C = 25^\circ\text{C}$) - Continuous ($T_C = 100^\circ\text{C}$)	12	A
		7.5	A
I_{DM}	Drain Current - Pulsed (Note 1)	48	A
V_{GSS}	Gate to Source Voltage	± 30	V
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	1200	mJ
I_{AR}	Avalanche Current (Note 1)	11.4	A
E_{AR}	Repetitive Avalanche Energy (Note 1)	30	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	5.0	V/ns
P_D	Power Dissipation ($T_C = 25^\circ\text{C}$) - Derate Above 25°C	300	W
		1.4	W/ $^\circ\text{C}$
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	$^\circ\text{C}$
T_L	Maximum Lead Temperature for Soldering Purpose, 1/8" from Case for 5 Seconds	300	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	H12N90	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max	0.42	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient, Max	40	$^\circ\text{C/W}$

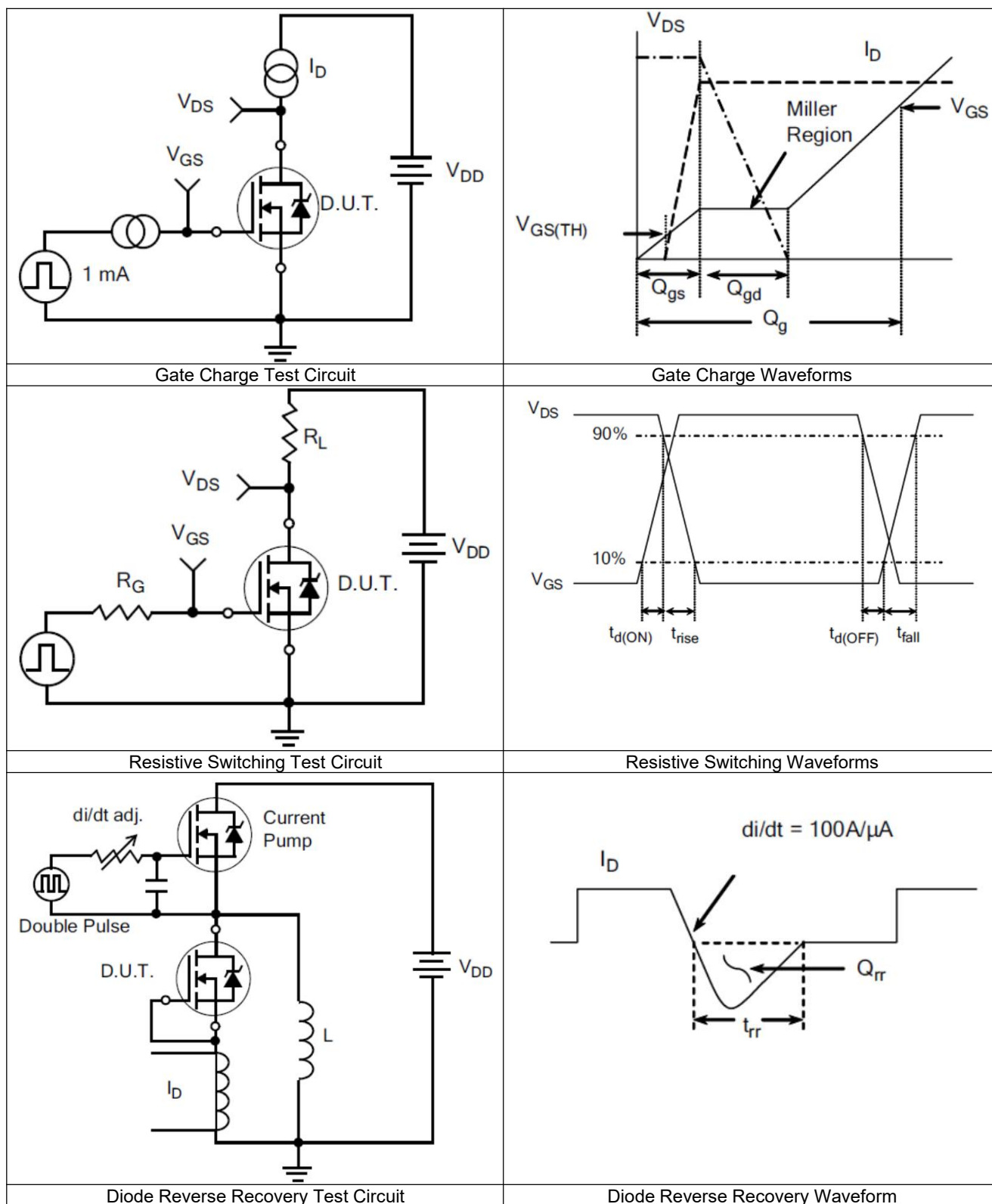
Electrical Characteristics T_C = 25°C unless otherwise noted.

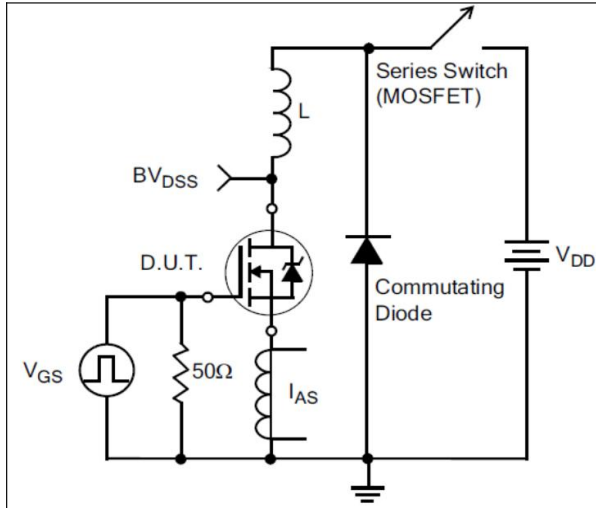
Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0 V, I _D = 250 μA	900	--	--	V
ΔBV _{DSS} / ΔT _J	Breakdown Voltage Temperature Coefficient	I _D = 250 μA, Referenced to 25°C	--	1.0	--	V/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 900 V, V _{GS} = 0 V	--	--	1.0	μA
		V _{DS} = 720 V, T _C = 125°C	--	--	125	μA
I _{GSSF}	Gate-Body Leakage Current, Forward	V _{GS} = 30 V, V _{DS} = 0 V	--	--	100	nA
I _{GSSR}	Gate-Body Leakage Current, Reverse	V _{GS} = -30 V, V _{DS} = 0 V	--	--	-100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250 μA	2.0	--	4.0	V
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} = 10 V, I _D = 5.7 A	--	0.75	0.96	Ω
g _{FS}	Forward Transconductance	V _{DS} = 25 V, I _D = 5.7 A	--	32	--	S
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} = 25 V, V _{GS} = 0 V, f = 1.0 MHz	--	2700	3500	pF
C _{oss}	Output Capacitance		--	260	340	pF
C _{rss}	Reverse Transfer Capacitance		--	30	40	pF
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{DD} = 450 V, I _D = 11.4 A, R _G = 25 Ω (note 4)	--	65	140	ns
t _r	Turn-On Rise Time		--	135	280	ns
t _{d(off)}	Turn-Off Delay Time		--	165	340	ns
t _f	Turn-Off Fall Time		--	90	190	ns
Q _g	Total Gate Charge	V _{DS} = 720 V, I _D = 11.4 A, V _{GS} = 10 V (note 4)	--	72	94	nC
Q _{gs}	Gate-Source Charge		--	16	--	nC
Q _{gd}	Gate-Drain Charge		--	35	--	nC
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain-Source Diode Forward Current		--	--	11.4	A
I _{SM}	Maximum Pulsed Drain-Source Diode Forward Current		--	--	45.6	A
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} = 0 V, I _S = 11.4 A	--	--	1.4	V
t _{rr}	Reverse Recovery Time	V _{GS} = 0 V, I _S = 11.4 A, dI _F / dt = 100 A/μs	--	850	--	ns
Q _{rr}	Reverse Recovery Charge		--	11.2	--	μC

Notes :

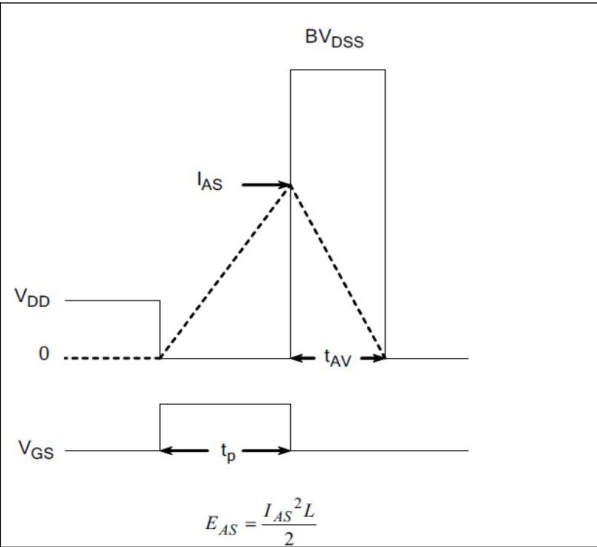
1. Repetitive Rating : Pulse width limited by maximum junction temperature.
2. L = 15 mH, I_{AS} = 11.4 A, V_{DD} = 50 V, R_G = 25 Ω, starting T_J = 25°C.
3. I_{SD} ≤ 11.4 A, di/dt ≤ 200 A/μs, V_{DD} ≤ BV_{DSS}, starting T_J = 25°C.
4. Essentially independent of operating temperature.

Typical Test Circuit and Waveform

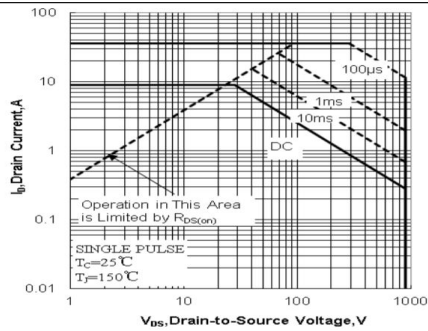




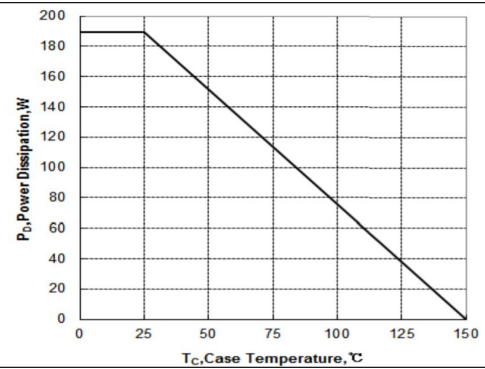
Unclamped Inductive Switching Test Circuit



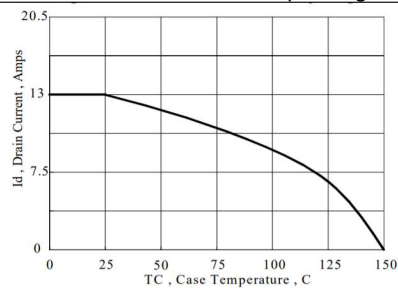
Unclamped Inductive Switching Waveform



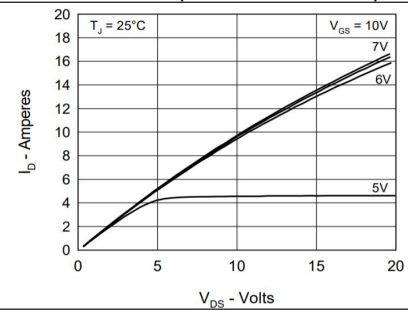
Maximum Forward Bias Safe Operating Area



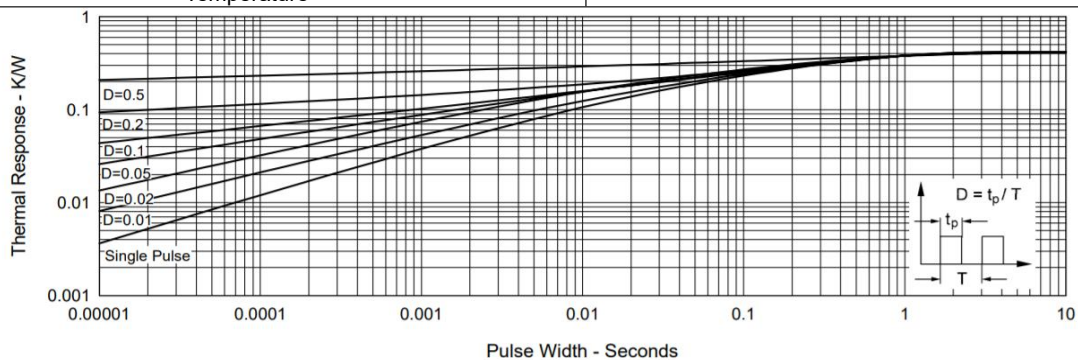
Maximum Power dissipation vs Case Temperature



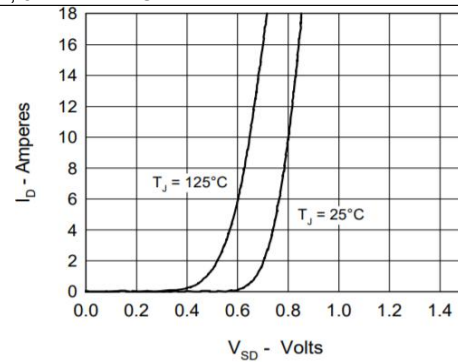
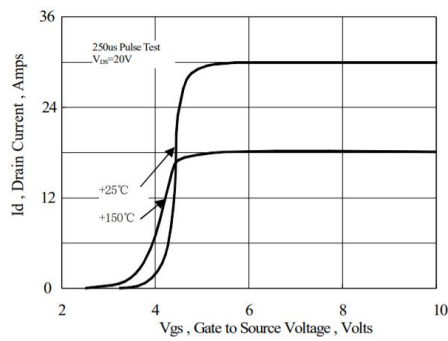
Maximum Continuous Drain Current vs Case Temperature



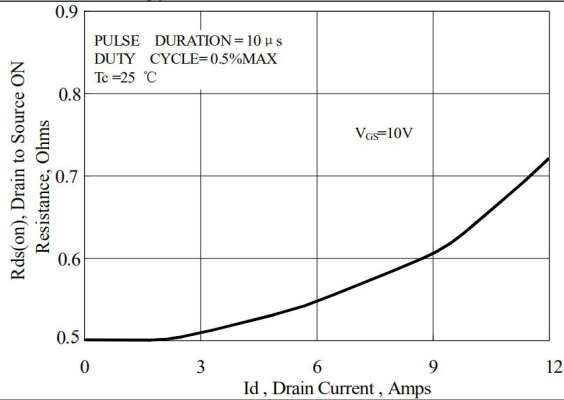
Typical Output Characteristics



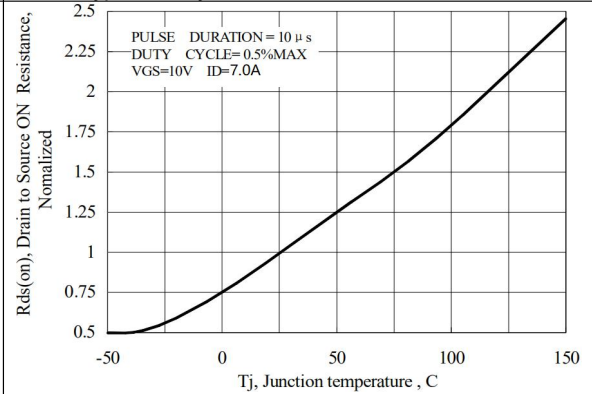
Maximum Effective Thermal Impedance, Junction to Case



Typical Transfer Characteristics

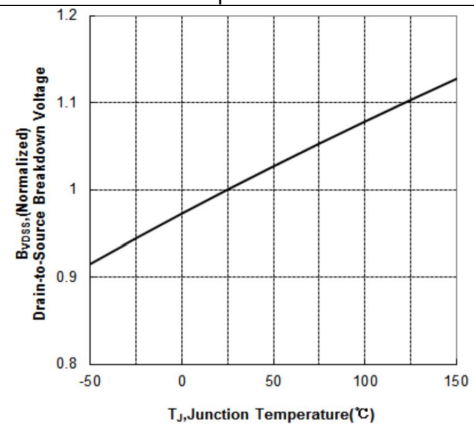
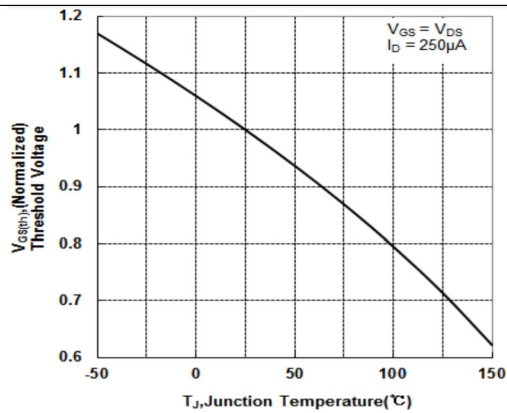


Typical Body Diode Transfer Characteristics



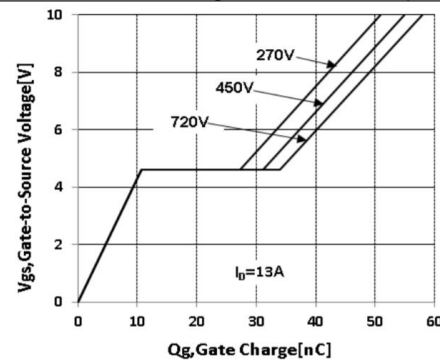
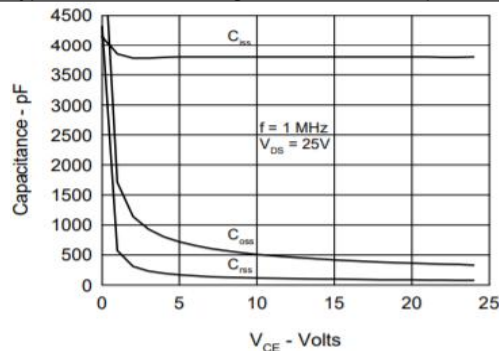
Typical Drain to Source ON Resistance vs Drain Current

Typical Drain to Source on Resistance vs Junction Temperature



Typical Theshold Voltage vs Junction Temperature

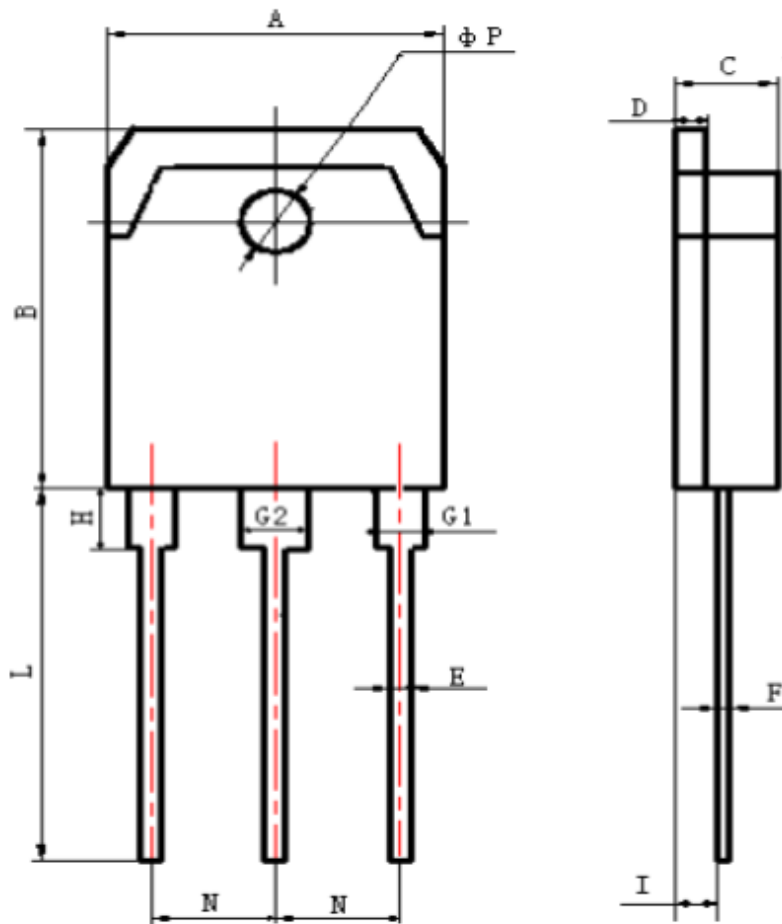
Typical Breakdown Voltage vs Junction Temperature



Typical Capacitance vs Drain to Source Voltage

Typical Gate Charge vs Gate to Source Voltage

Mechanical Dimensions



Symbol	unit(mm)	
	MIN	MAX
A	15.10	15.90
B	19.50	20.50
C	4.70	4.90
D	1.40	1.60
E	0.90	1.10
F	0.50	0.70
G1	2.00	2.20
G2	3.00	3.20
H	3.00	3.60
I	1.20	1.60
L	19.5	20.9
N	5.25	5.65
Φ P	3.10	3.30

TO-3PB