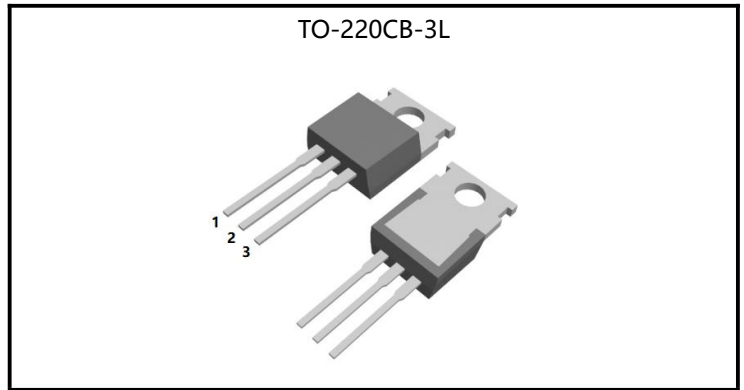


## MOSFET

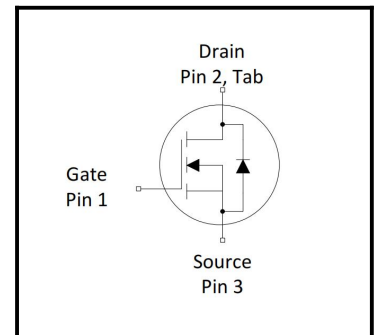
110 Amps, 100 Volts N-CHANNEL MOSFET

### FEATURE

- ◆ Low gate charge
- ◆ Low Ciss
- ◆ Fast switching
- ◆ 100% avalanche tested
- ◆ Improved dv/dt capability
- ◆ RoHS 2.0 Compliant



Parameter	Values	Unit
Bvdss	100	V
Id	110	A
Rdson(max)	5	mΩ



Ordering Code	Marking	Package	Packaging
PW050N10CS	PW050N10CS	TO-220CB-3L	Tube

## Absolute Maximum Ratings( $T_C=25^{\circ}\text{C}$ , unless otherwise noted)

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Drain-Source Voltage	$V_{DSS}$	-	-	100	V	-
Gate-Source Voltage	$V_{GS}$	-20	-	20	V	-
Continuous Drain Current(Package Limited)	$I_D$	-	-	110	A	$T_C=25^{\circ}\text{C}$
		-	-	66	A	$T_C=100^{\circ}\text{C}$
Pulsed Drain Current(Note1)	$I_{DM}$	-	-	440	A	-
Single Pulse Avalanche Energy	$E_{AS}$	-	-	320	mJ	$L=0.4\text{mH}, V_D=50\text{V}, T_C=25^{\circ}\text{C}$
Maximum Power Dissipation	$P_D$	-	-	184	W	$T_C=25^{\circ}\text{C}$
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55	-	150	$^{\circ}\text{C}$	-
Maximum lead temperature for soldering purposes, 1/8"from case for 5 seconds	$T_L$	-	-	260	$^{\circ}\text{C}$	-

## Thermal Characteristics

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Thermal resistance , Channel to Case	$R_{th(ch-c)}$	-	-	0.68	$^{\circ}\text{C}/\text{W}$	-

## Electrical Characteristics ( $T_C=25^{\circ}\text{C}$ , unless otherwise noted)

### Static characteristics

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Drain-Source Breakdown Voltage	$BV_{DSS}$	100	-	-	V	$V_{GS}=0\text{V}, I_D=250\mu\text{A}$
Zero Gate Voltage Drain Current	$I_{DSS}$	-	-	1	$\mu\text{A}$	$V_{DS}=100\text{V}, V_{GS}=0\text{V}$
Gate-Body Leakage Current, Forward	$I_{GSSF}$	-	-	100	nA	$V_{GS}=20\text{V}, V_{DS}=0\text{V}$
Gate-Body Leakage Current, Reverse	$I_{GSSR}$	-	-	-100	nA	$V_{GS}=-20\text{V}, V_{DS}=0\text{V}$
Gate-Source Threshold Voltage	$V_{GS(th)}$	2.0	-	4.0	V	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$
Drain-Source On-State Resistance	$R_{DS(on)}$	-	3.9	5	$\text{m}\Omega$	$V_{GS}=10\text{V}, I_D=20\text{A}$
Gate Resistance	$R_g$	-	1.6	-	$\Omega$	$V_{GS}=0\text{V}, V_{DS}$ Open, $f=1\text{MHz}$

## Dynamic characteristics

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Input Capacitance	$C_{iss}$	-	6100	-	pF	$V_{DS}=50V, V_{GS}=0V, f=1.0MHz$
Output Capacitance	$C_{oss}$	-	790	-	pF	$V_{DS}=50V, V_{GS}=0V, f=1.0MHz$
Reverse Transfer Capacitance	$C_{rss}$	-	30	-	pF	$V_{DS}=50V, V_{GS}=0V, f=1.0MHz$
Turn-On Delay Time	$t_{d(on)}$	-	21.6	-	ns	$V_{DD}=50V, R_G=3\Omega, V_{GS}=10V, I_D=20A$
Turn-On Rise Time	$t_r$	-	18	-	ns	$V_{DD}=50V, R_G=3\Omega, V_{GS}=10V, I_D=20A$
Turn-Off Delay Time	$t_{d(off)}$	-	39	-	ns	$V_{DD}=50V, R_G=3\Omega, V_{GS}=10V, I_D=20A$
Turn-Off Fall Time	$t_f$	-	8.2	-	ns	$V_{DD}=50V, R_G=3\Omega, V_{GS}=10V, I_D=20A$

## Gate charge characteristics

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Total Gate Charge	$Q_g$	-	102	-	nC	$V_{DS}=50V, I_D=20A, V_{GS}=10V$
Gate-Source Charge	$Q_{gs}$	-	21	-	nC	$V_{DS}=50V, I_D=20A, V_{GS}=10V$
Gate-Drain Charge	$Q_{gd}$	-	29	-	nC	$V_{DS}=50V, I_D=20A, V_{GS}=10V$

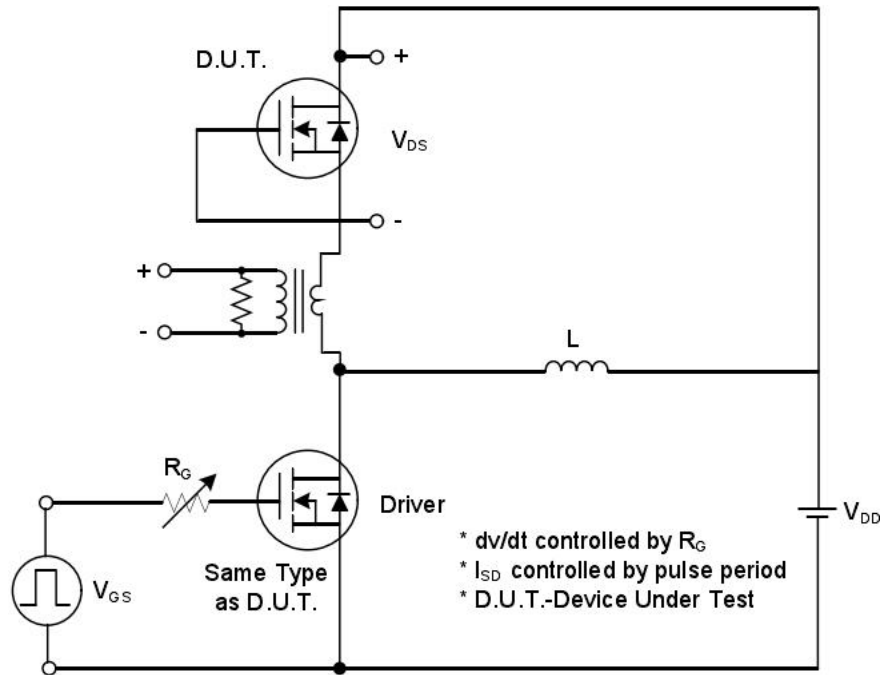
## Reverse diode

Parameter	Symbol	Values			Unit	Note/Test Conditions
		Min	Typ	Max		
Continuous Diode Forward Current	$I_S$	-	-	110	A	-
Pulsed Diode Forward Current	$I_{SM}$	-	-	440	A	-
Diode Forward Voltage	$V_{SD}$	-	-	1.2	V	$I_S=20A, V_{GS}=0V$
Reverse Recovery Time	$t_{rr}$	-	76	-	ns	$I_F=20A$
Reverse Recovery Charge	$Q_{rr}$	-	125	-	nC	$di/dt=100A/\mu s, (Note2)$

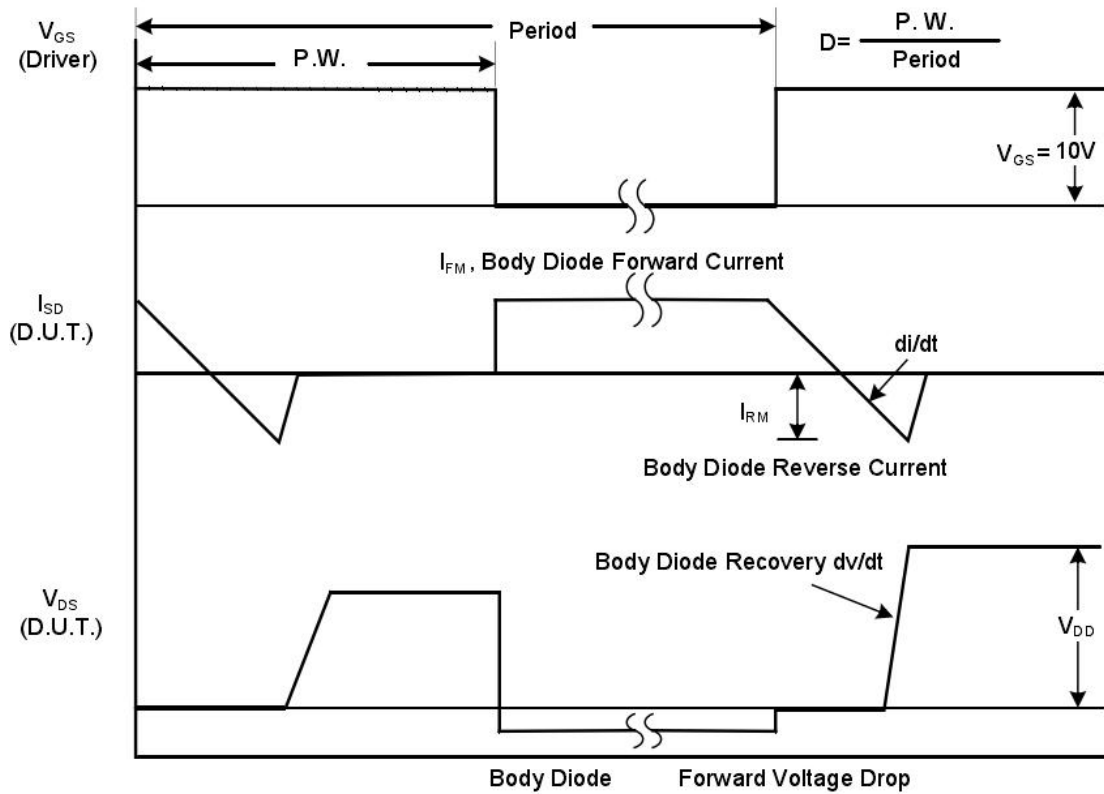
## Notes

1. Repetitive Rating:pulse width limited by maximum junction temperature.
2. Pulse width $\leq 300\mu s$ ,duty cycle $\leq 2\%$ .

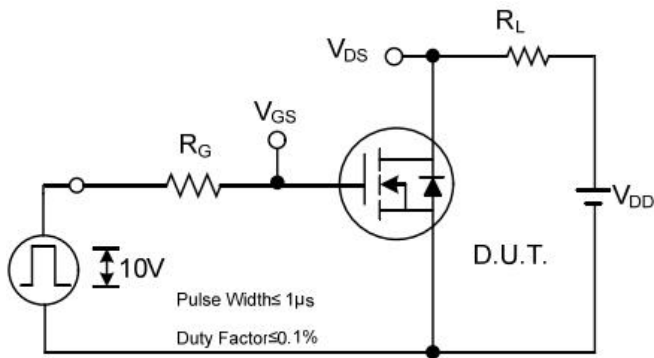
## RATING AND CHARACTERISTIC CURVES



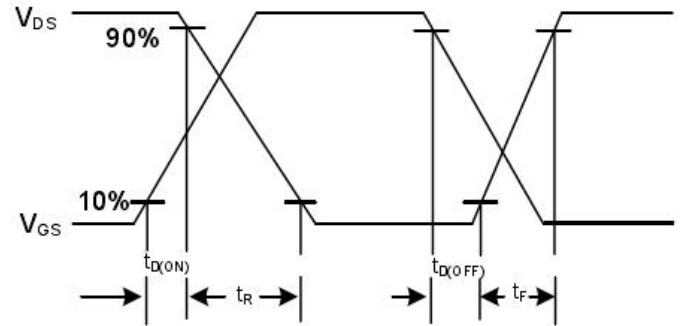
**Peak Diode Recovery  $dv/dt$  Test Circuit**



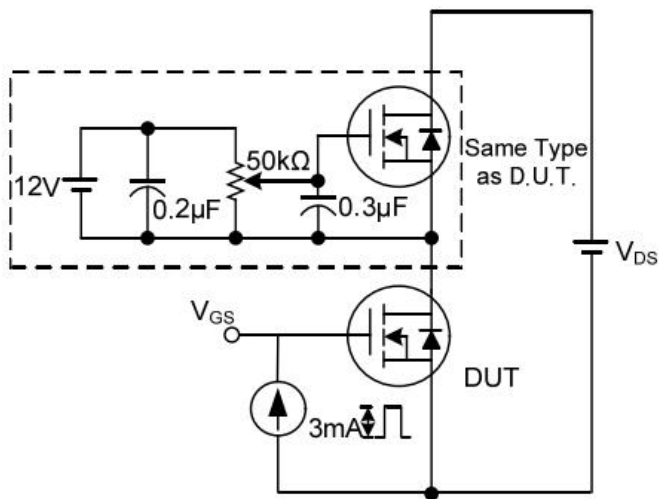
**Peak Diode Recovery  $dv/dt$  Waveforms**



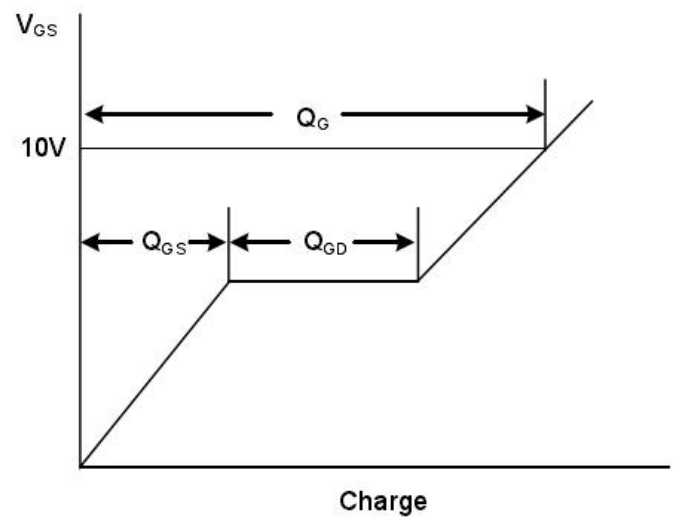
**Switching Test Circuit**



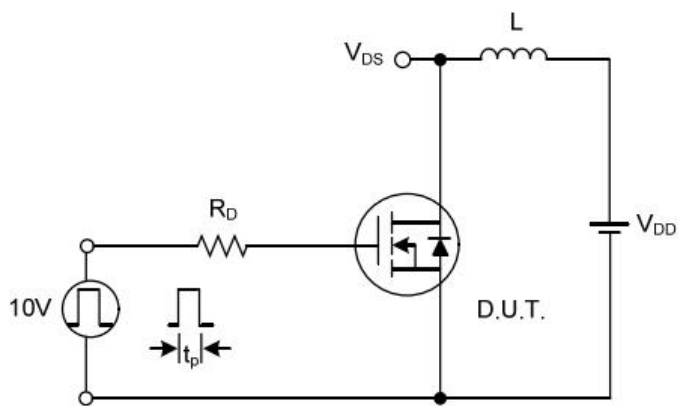
**Switching Waveforms**



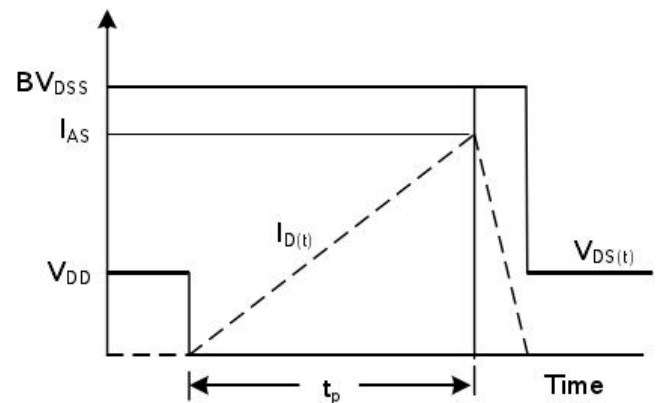
**Gate Charge Test Circuit**



**Gate Charge Waveform**



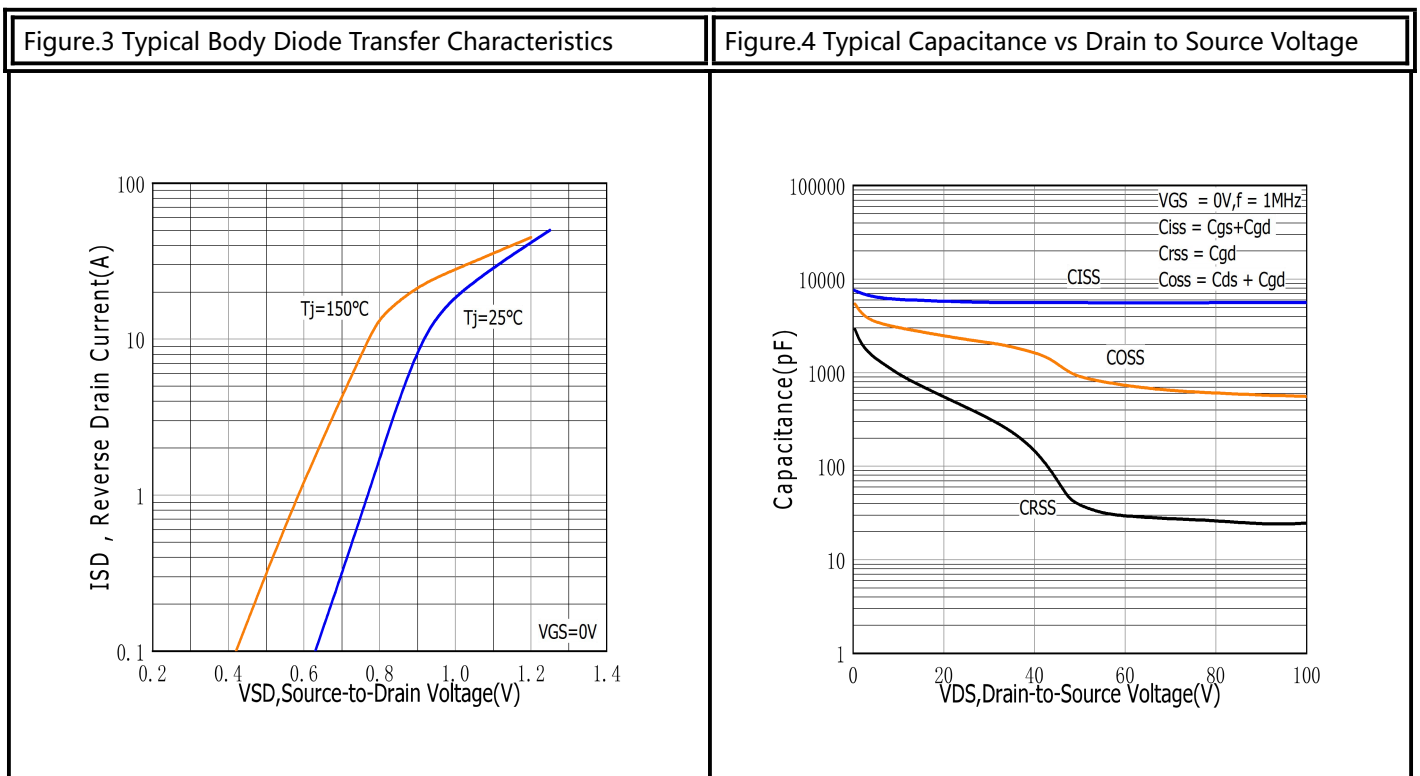
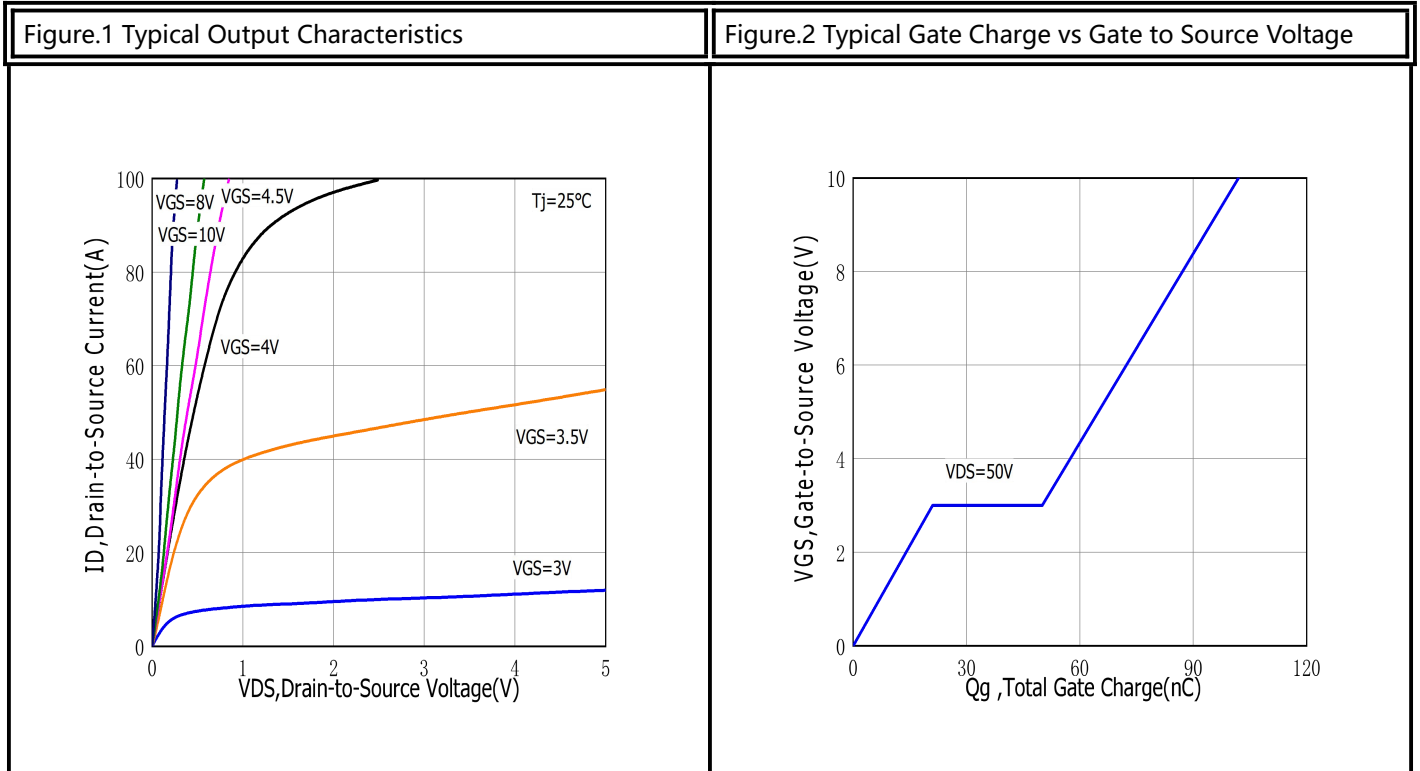
**Unclamped Inductive Switching Test Circuit**

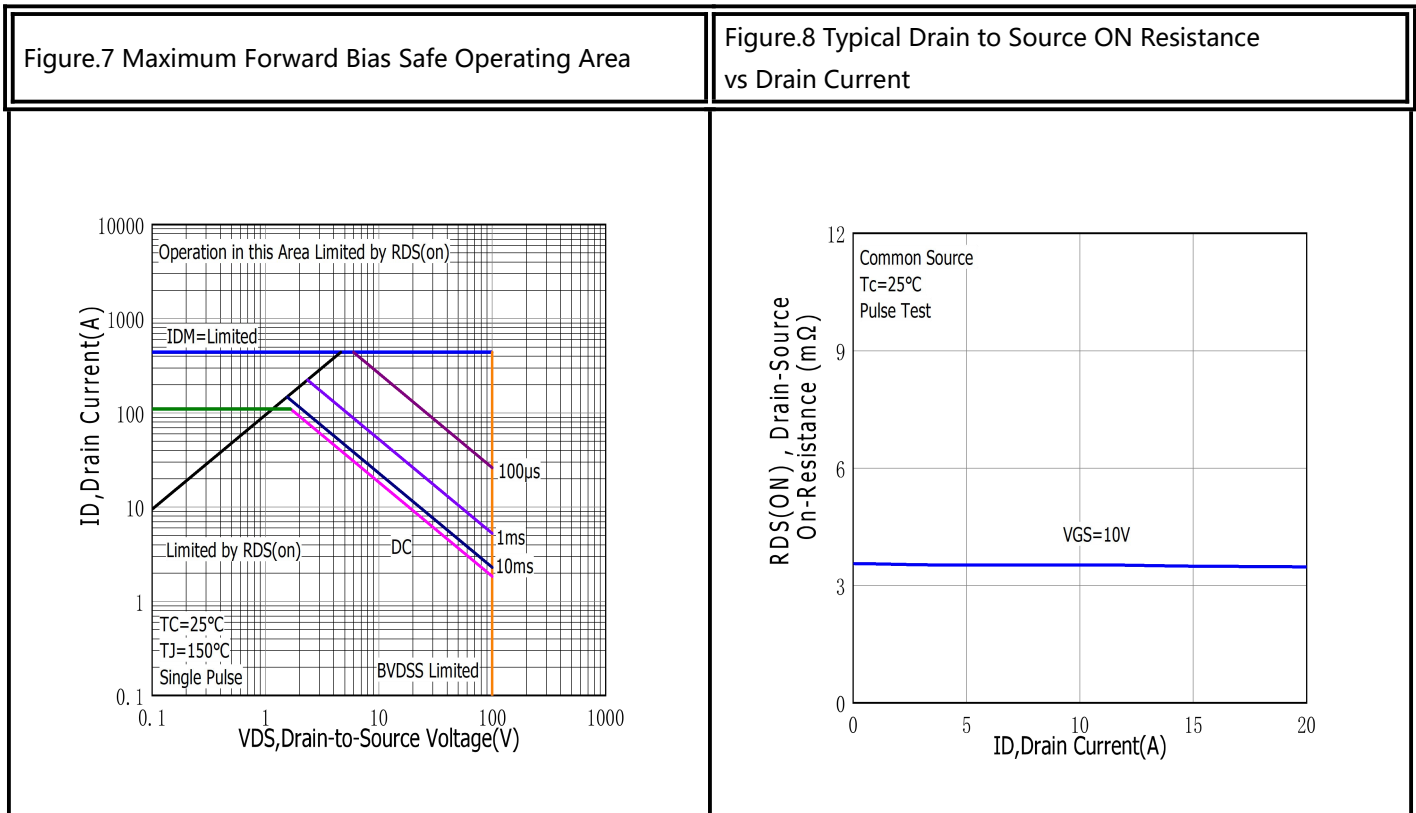
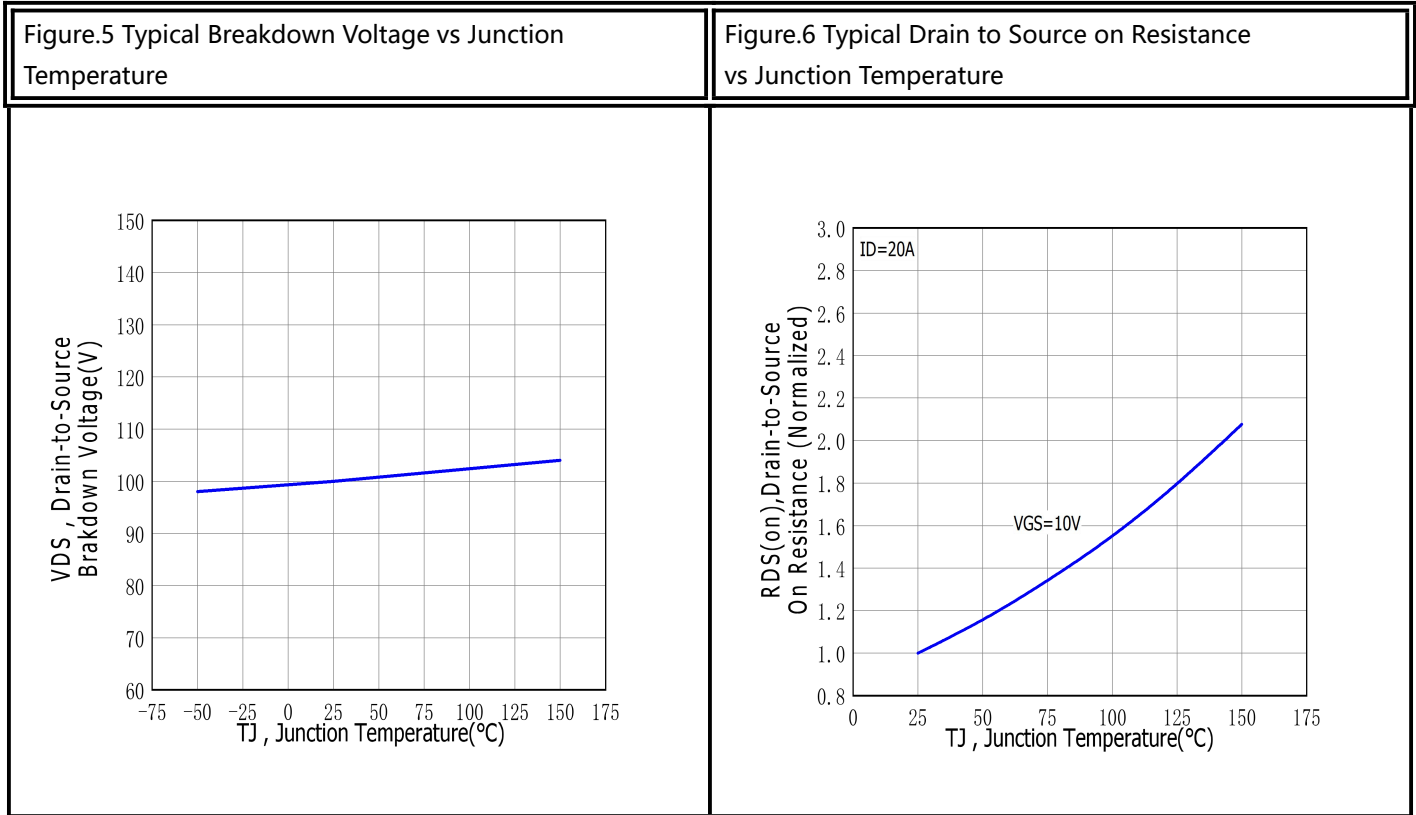


**Unclamped Inductive Switching Waveforms**



## RATING AND CHARACTERISTIC CURVES





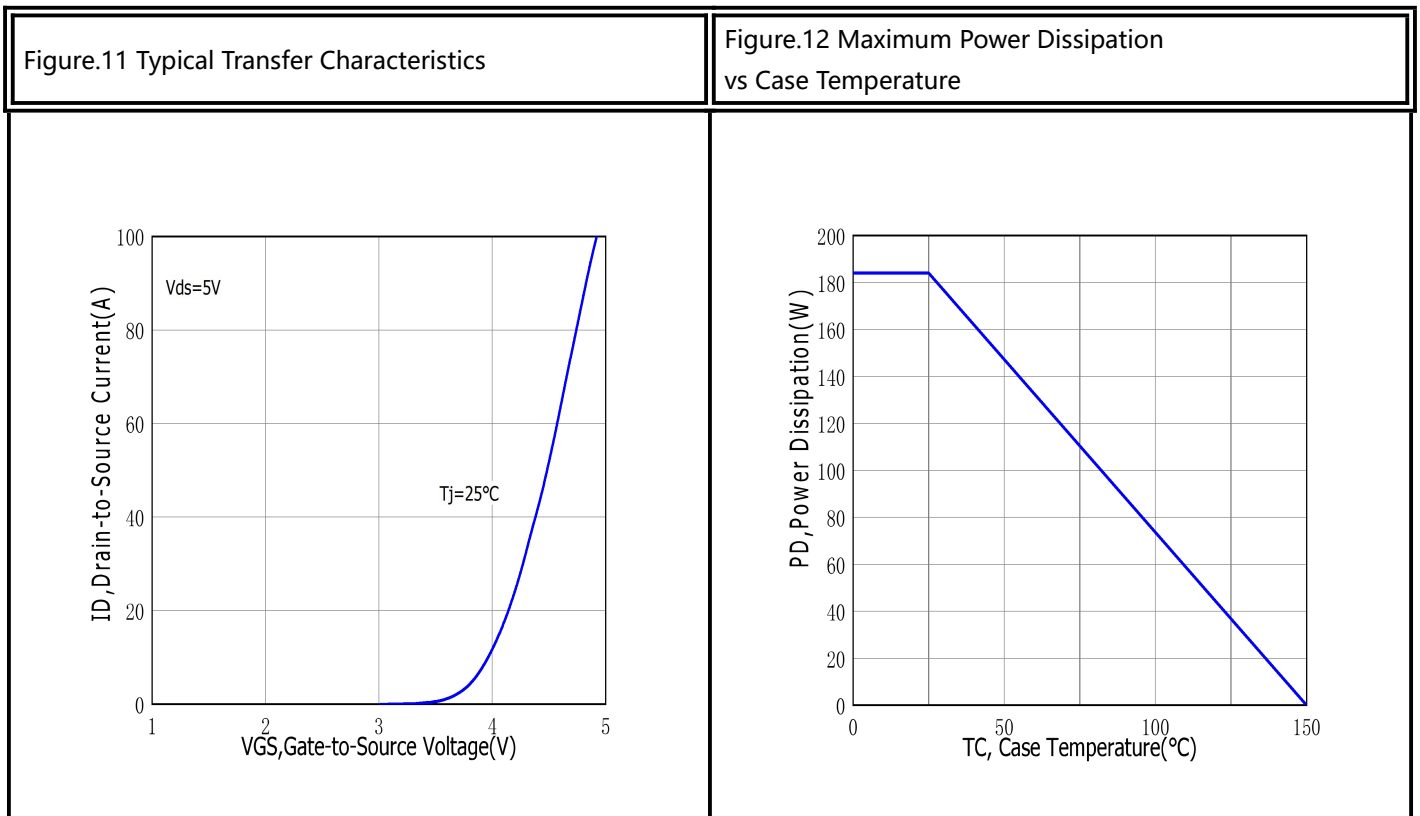
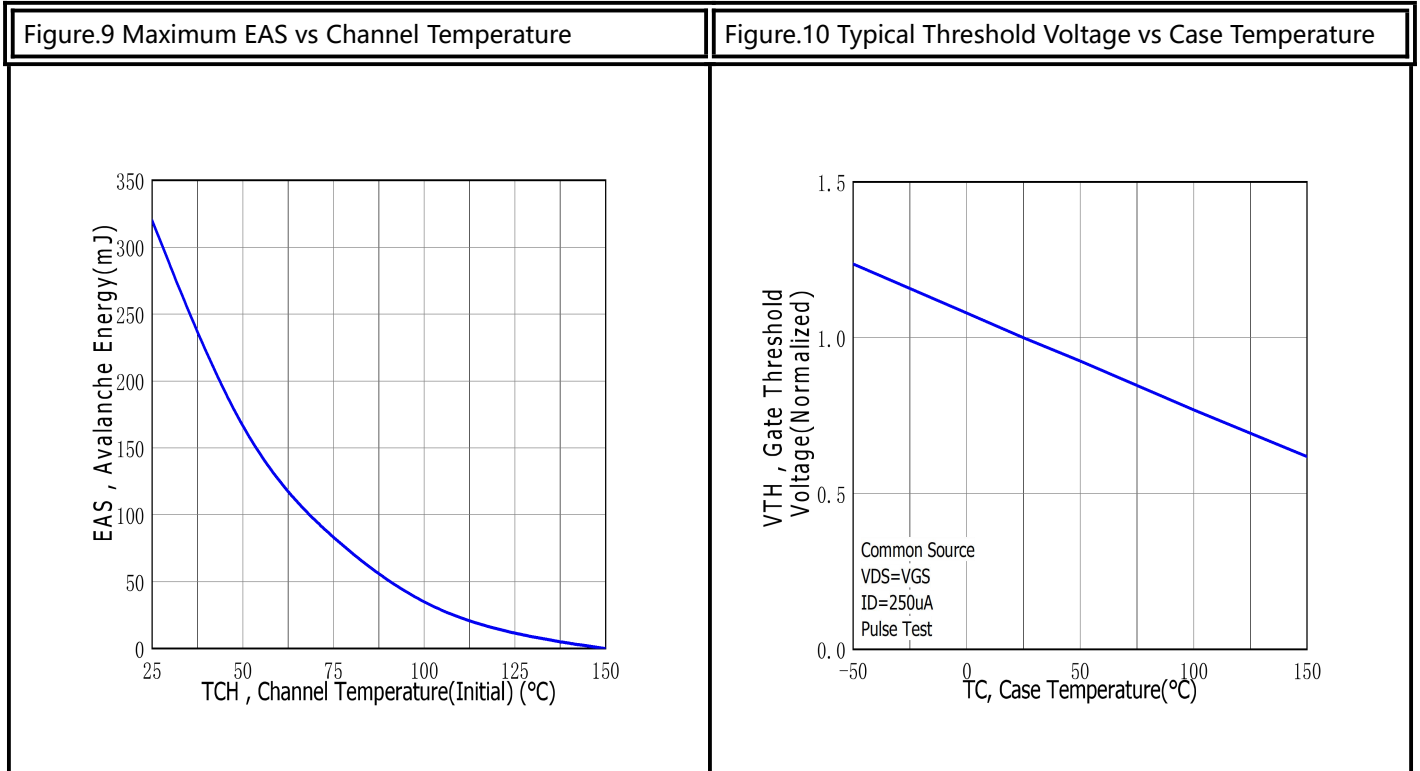
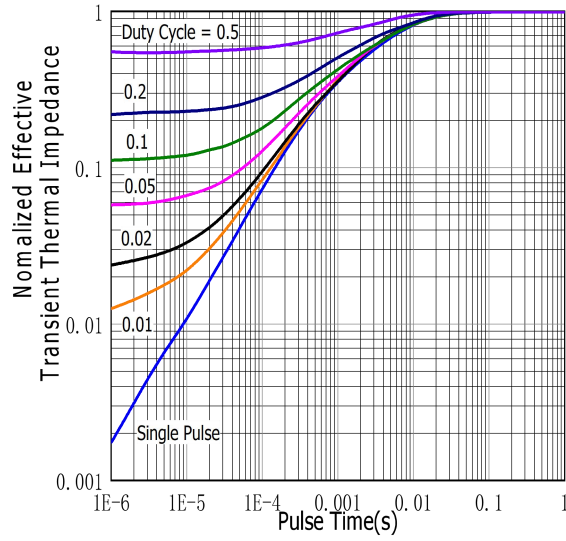


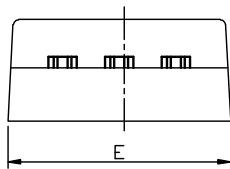
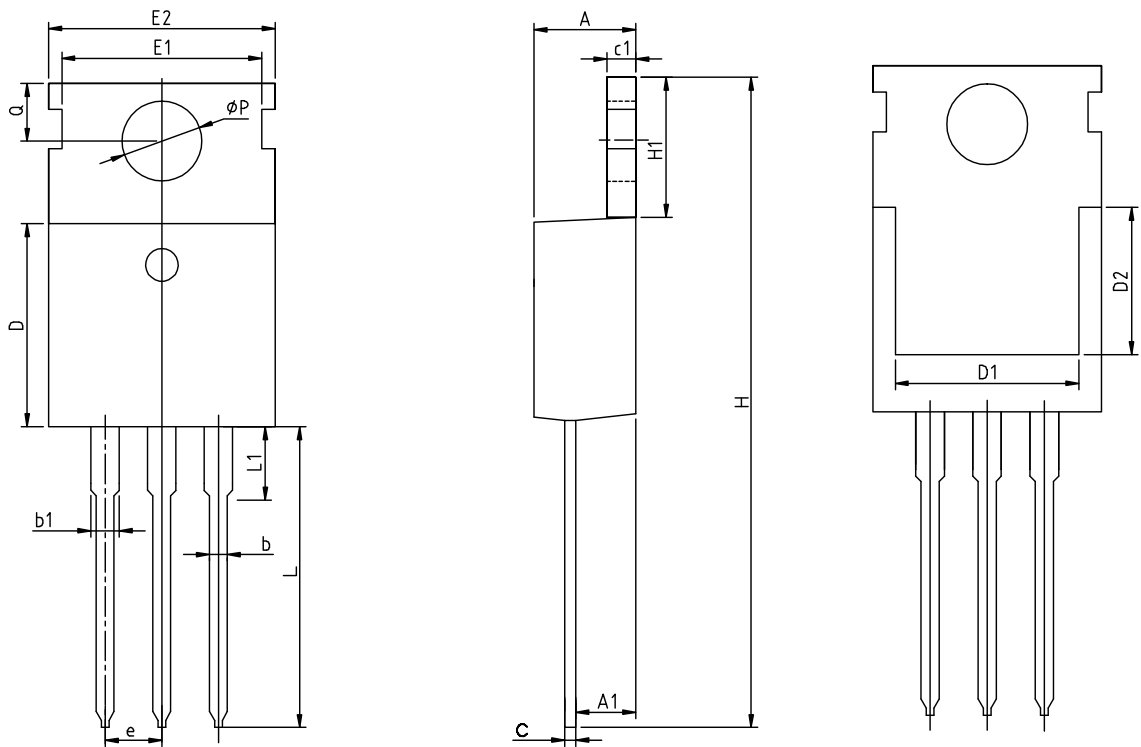




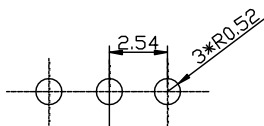
Figure.13 Maximum Effective Thermal Impedance , Junction to Case



## TO-220CB-3L PACKAGE OUTLINE



RECOMMENDED LAND PATTERN



UNIT: mm

	MIN	NOM	MAX
A	4.40	4.60	4.80
A1	2.25	2.40	2.55
b	0.72	0.82	0.92
b1	1.12	1.27	1.42
c	0.40	0.50	0.60
c1	1.20	1.30	1.40
D	8.80	9.10	9.40
D1	7.75	7.95	8.15
D2	6.55	6.75	6.95
e		2.54BSC	
E	9.65	10.00	10.35
E1		8.70	
E2	9.70	10.00	10.30
H	28.70	29.20	29.70
H1	6.25	6.50	6.85
L	13.20	13.50	13.80
L1	2.80	3.10	3.40
Q	2.60	2.80	3.00
$\Phi P$	3.45	3.60	3.75