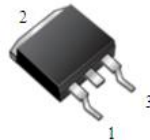
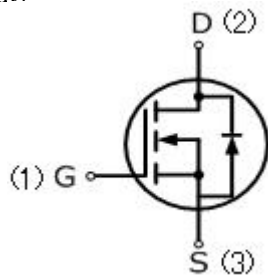


12N65(B,H)

12 Amps,650 Volts N-CHANNEL Power MOSFET

FEATURE

- 12A,650V, $R_{DS(ON)MAX}=0.80\ \Omega$ @ $V_{GS}=10V/6A$
- Low gate charge
- Low C_{iss}
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability
- Halogen free



TO-263-2L
12N65B



TO-262-3L
12N65H

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

Parameter	Symbol	12N65(B,H)	UNIT
Drain-Source Voltage	V_{DSS}	650	V
Gate-Source Voltage	V_{GSS}	± 30	
Continuous Drain Current	I_D	12	A
Pulsed Drain Current(Note1)	I_{DM}	48	
Single Pulse Avalanche Energy (Note 2)	E_{AS}	550	mJ
Reverse Diode dV/dt (Note 3)	dv/dt	5	V/ns
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55to+150	$^\circ\text{C}$
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	T_L	260	$^\circ\text{C}$

Parameter	Symbol	12N65(B,H)	Units
Thermal resistance , Channel to Case	$R_{th(ch-c)}$	0.83	$^\circ\text{C}/\text{W}$
Thermal resistance , Channel to Ambient	$R_{th(ch-a)}$	62.5	$^\circ\text{C}/\text{W}$
Maximum Power Dissipation	$T_C=25^\circ\text{C}$ P_D	150	W

Electrical Characteristics (T _c =25°C, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250uA	650	—	—	V
Breakdown Temperature Coefficient	ΔBV _{DSS} /ΔT _J	Reference to 25°C , I _D =250uA	—	0.7	—	V/°C
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =650V, V _{GS} =0V	—	—	1	uA
Gate-Body Leakage Current, Forward	I _{GSSF}	V _{GS} =30V, V _{DS} =0V	—	—	100	nA
Gate-Body Leakage Current, Reverse	I _{GSSR}	V _{GS} =-30V, V _{DS} =0V	—	—	-100	nA
On Characteristics						
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250uA	2	—	4	V
Drain-Source On-State Resistance	R _{DS(on)}	V _{GS} =10V, I _D =6A	—	0.66	0.80	Ω
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V, f=1.0MHZ	—	1993	—	pF
Output Capacitance	C _{oss}		—	160	—	pF
Reverse Transfer Capacitance	C _{rss}		—	9.5	—	pF
Switching Characteristics						
Turn-On Delay Time	t _{d(on)}	V _{DD} =325V, I _D =12A, R _G =10Ω (Note3,4)	—	28	—	ns
Turn-On Rise Time	t _r		—	26	—	ns
Turn-Off Delay Time	t _{d(off)}		—	64	—	ns
Turn-Off Fall Time	t _f		—	45	—	ns
Total Gate Charge	Q _g	V _{DS} =520V, I _D =12A, V _{GS} =10V, (Note3,4)	—	40	—	nC
Gate-Source Charge	Q _{gs}		—	10	—	nC
Gate-Drain Charge	Q _{gd}		—	14	—	nC
Drain-Source Body Diode Characteristics and Maximum Ratings						
Continuous Diode Forward Current	I _S		—	—	12	A
Pulsed Diode Forward Current	I _{SM}		—	—	48	A
Diode Forward Voltage	V _{SD}	I _S =12A, V _{GS} =0V	—	—	1.5	V
Reverse Recovery Time	t _{rr}	V _{GS} =0V, I _S =12A, dI _F /dt=100A/us, (Note4)	—	651	—	ns
Reverse Recovery Charge	Q _{rr}		—	4.297	—	uC

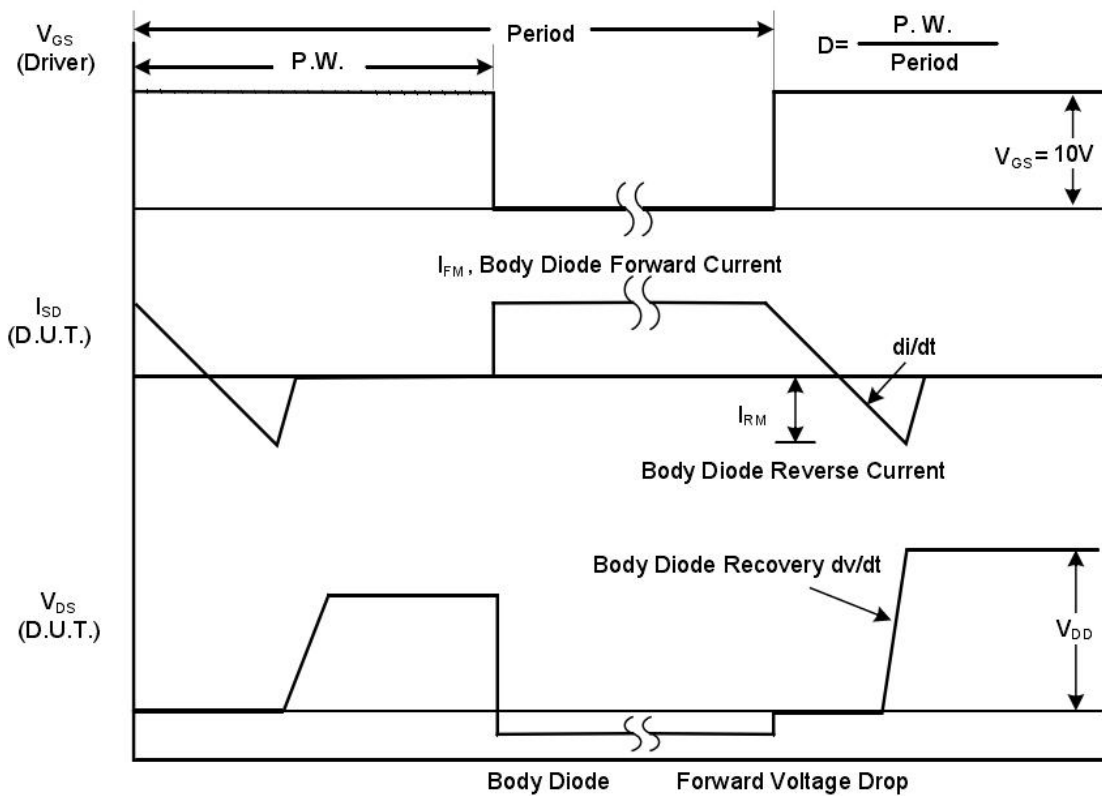
Notes

1. Repetitive Rating: pulse width limited by maximum junction temperature.
2. L=10mH, I_{AS}=10.5A, starting T_J=25°C.
3. I_{SD}=12A, dI/dt ≤ 100A/us, V_{DD} ≤ BV_{DSS}, starting T_J=25°C, Pulse width ≤ 300us; duty cycle ≤ 2%.
4. Repetitive rating; pulse width limited by maximum junction temperature.

TEST CIRCUIT AND WAVEFORM



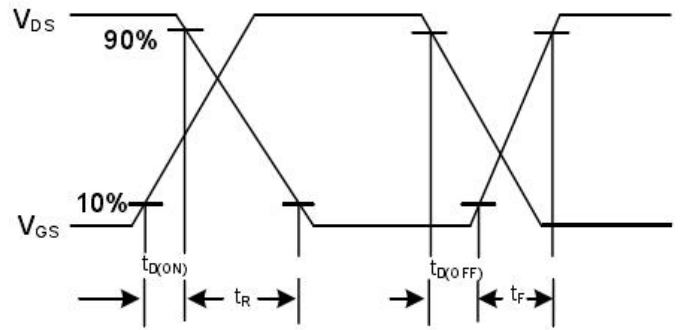
Peak Diode Recovery dv/dt Test Circuit



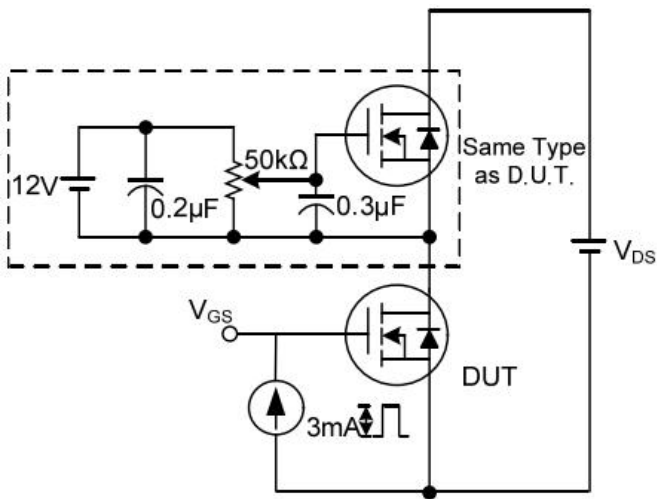
Peak Diode Recovery dv/dt Waveforms



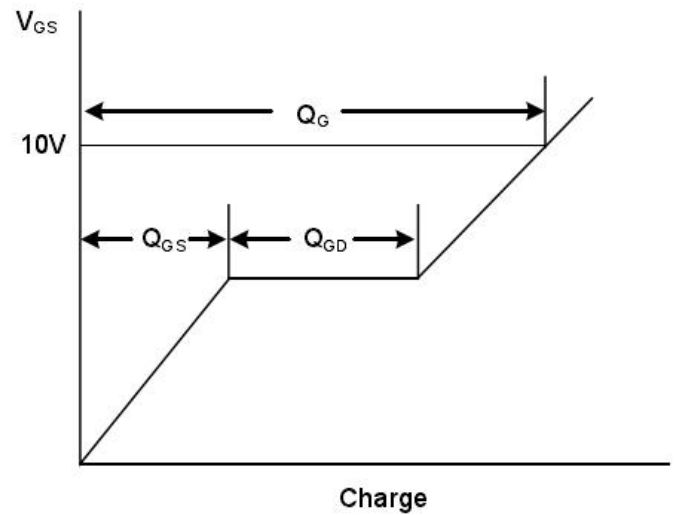
Switching Test Circuit



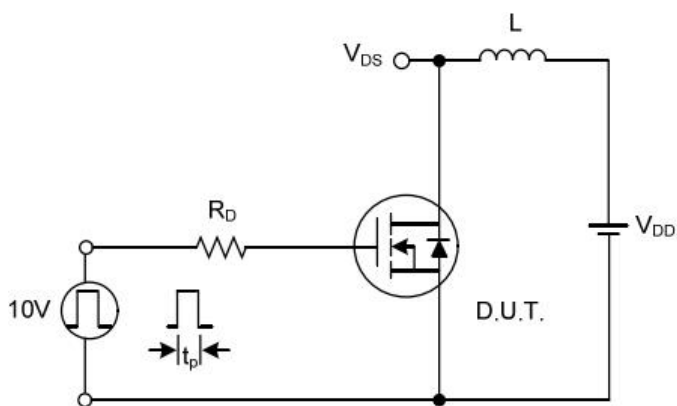
Switching Waveforms



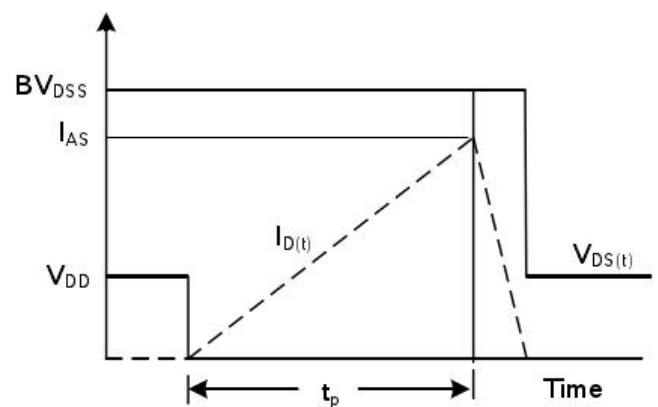
Gate Charge Test Circuit



Gate Charge Waveform

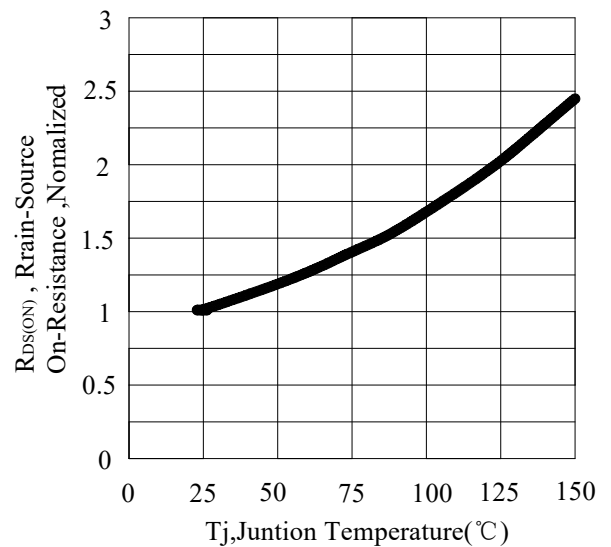
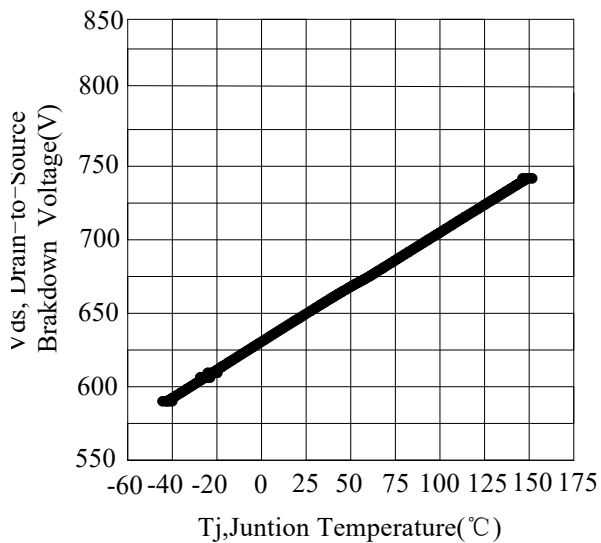
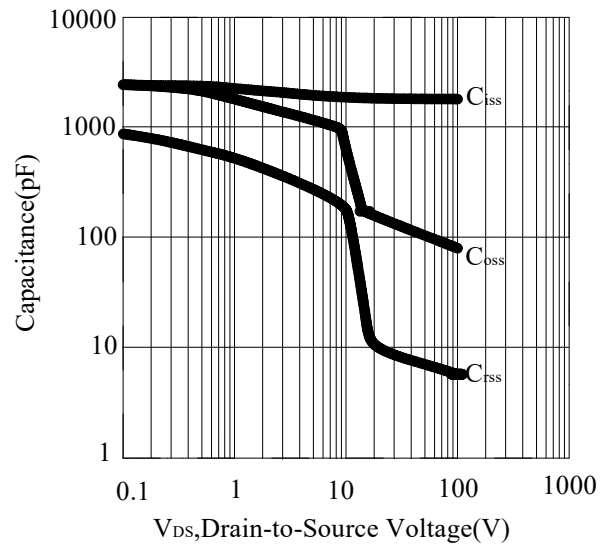
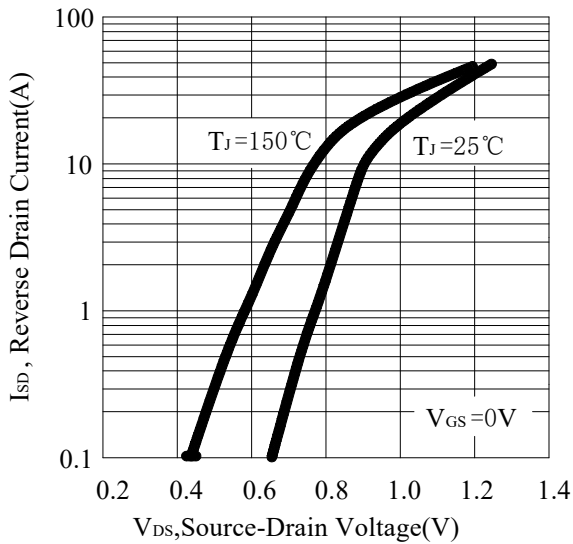
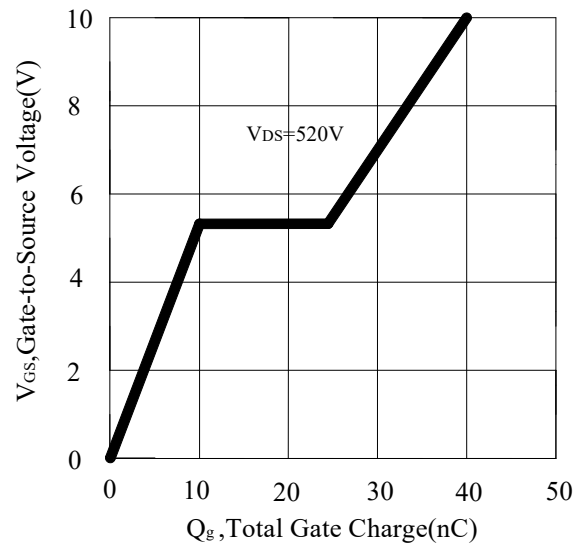
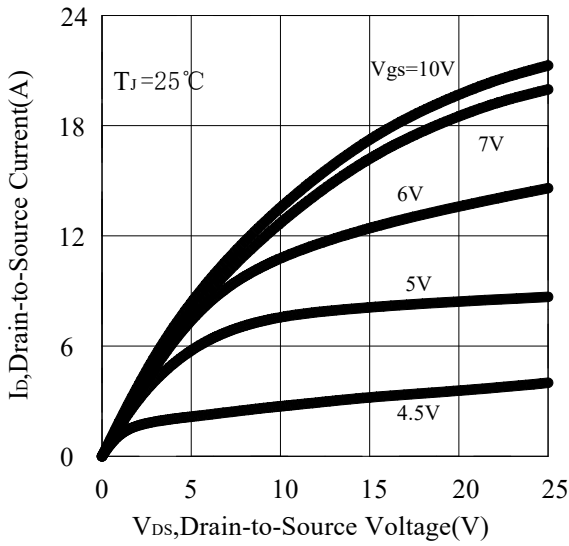


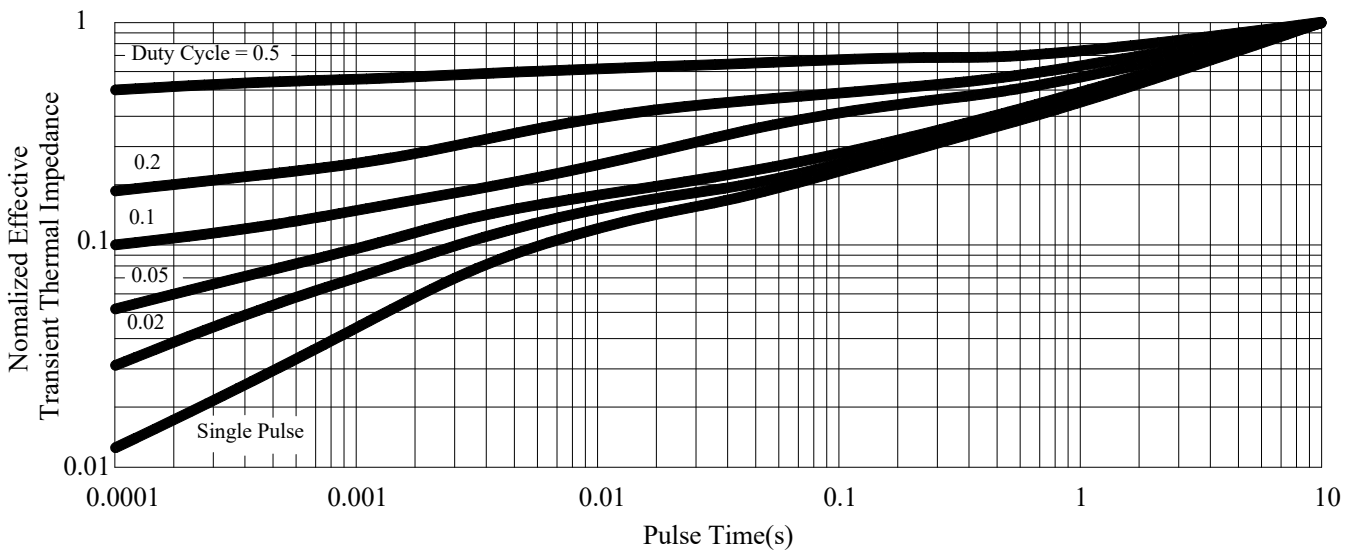
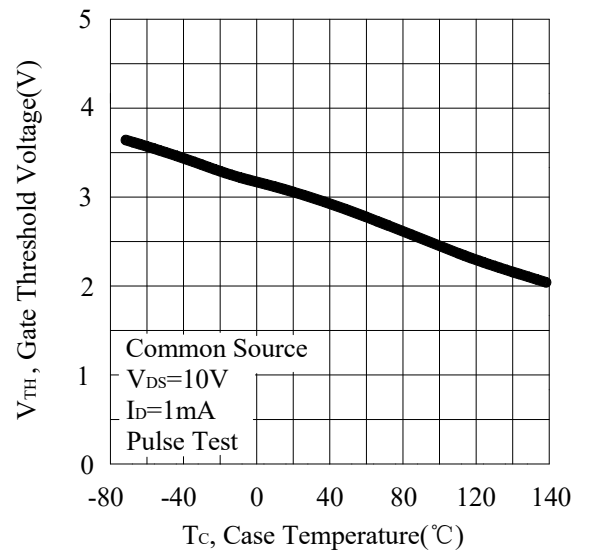
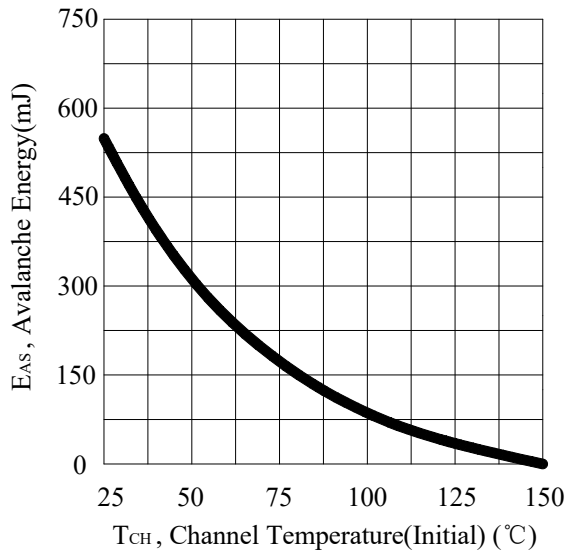
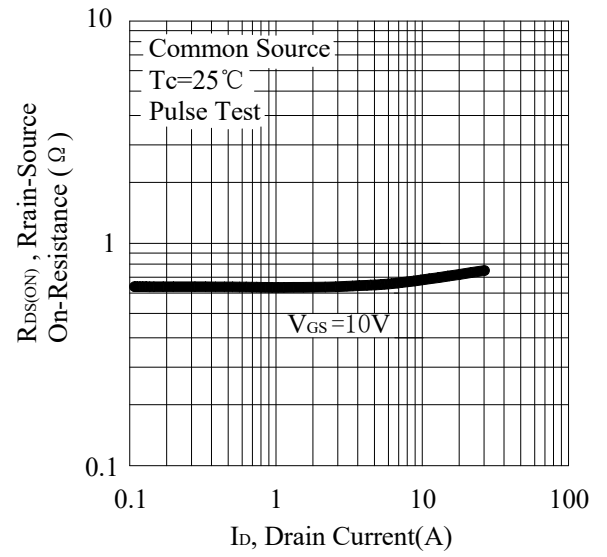
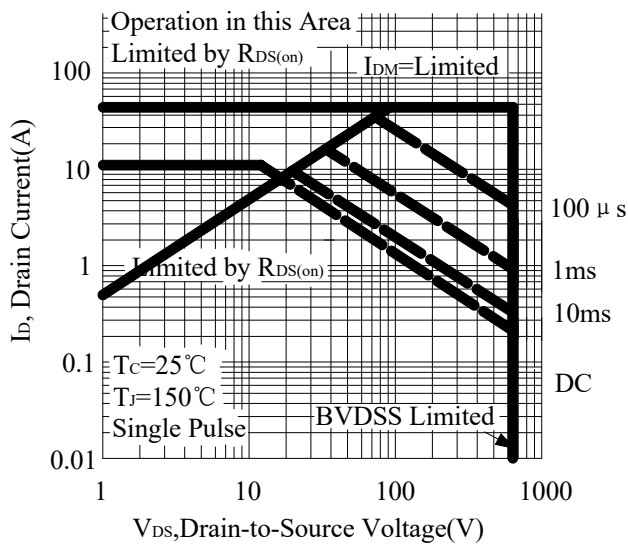
Unclamped Inductive Switching Test Circuit



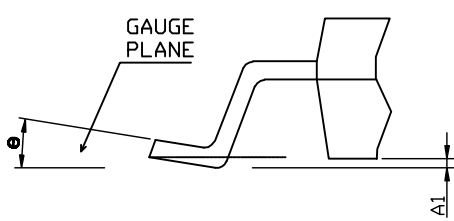
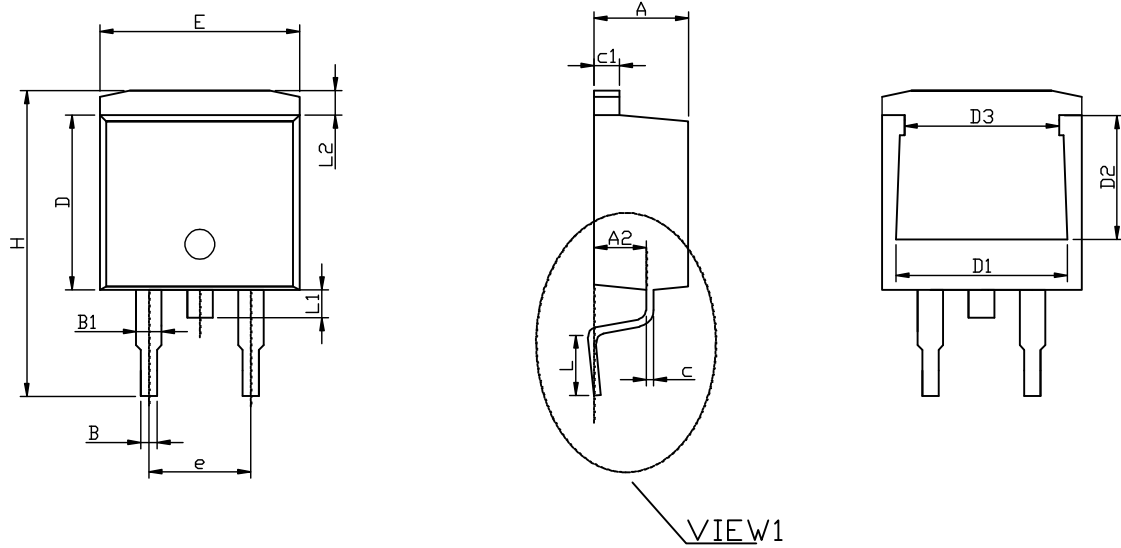
Unclamped Inductive Switching Waveforms

RATING AND CHARACTERISTIC CURVES

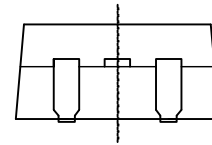




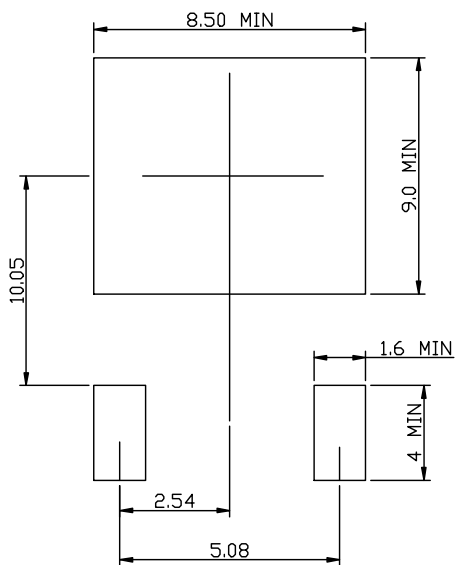
TO-263-2L PACKAGE OUTLINE



VIEW1



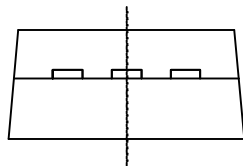
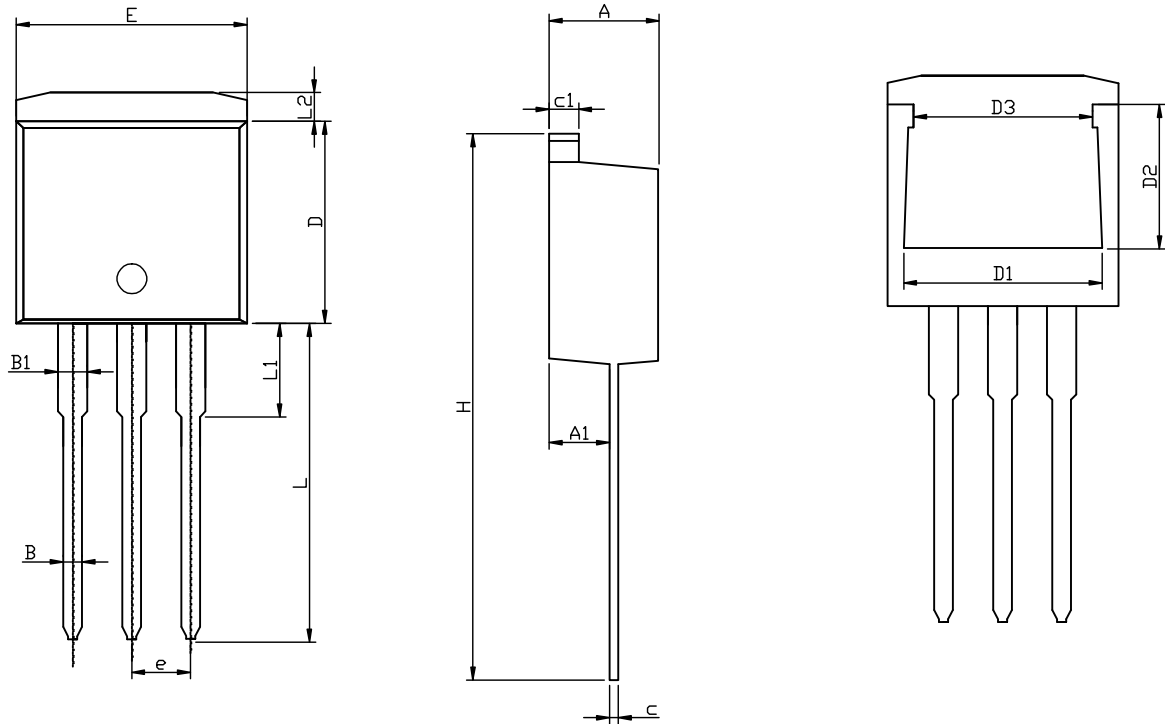
RECOMMENDED LAND PATTERN



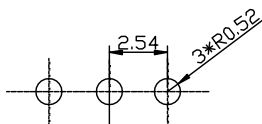
	MIN	NOM	MAX
A	4.50	4.70	4.90
A1	0.05	0.15	0.30
A2	2.45	2.60	2.70
B	0.72	0.82	0.92
B1	1.12	1.27	1.42
c	0.28	0.38	0.48
c1	1.17	1.27	1.37
D	8.46	8.66	8.86
D1	7.90	8.10	8.40
D2	5.50	5.70	5.90
D3	7.10	7.30	7.50
E	9.85	10.15	10.45
e		5.08BCS	
H	14.75	15.15	15.55
L	2.30	2.55	2.80
L1	1.20	1.40	1.60
L2	1.01	1.23	1.50
θ	0°	7°	8°

UNIT: mm

TO-262-3L PACKAGE OUTLINE



RECOMMENDED LAND PATTERN

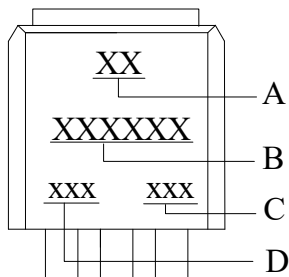


UNIT: mm

	MIN	NOM	MAX
A	4.50	4.70	4.90
A1	2.45	2.60	2.70
B	0.72	0.82	0.92
B1	1.12	1.27	1.42
c	0.28	0.38	0.48
c1	1.17	1.27	1.37
D	8.46	8.66	8.86
D1	7.90	8.10	8.40
D2	5.50	5.70	5.90
D3	7.10	7.30	7.50
E	9.85	10.15	10.45
e		2.54	
H	23.20	23.60	24.00
L	13.10	13.60	14.10
L1	3.85	4.05	4.35
L2	1.01	1.23	1.50

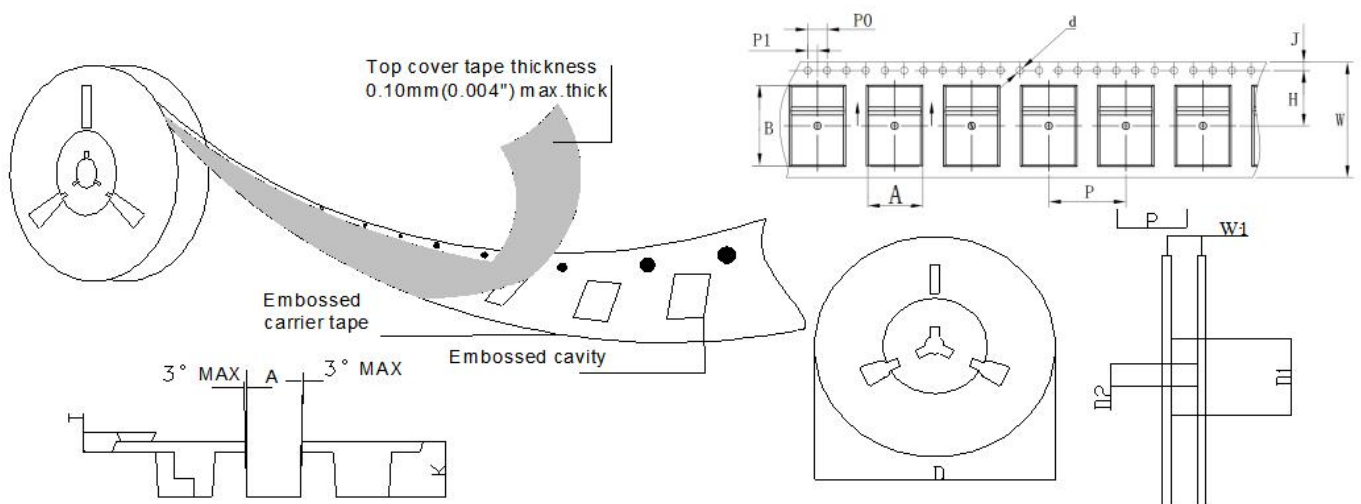
Marking and packaging illustration

1、Marking



SYMBOL	Explanation
A	Trademark
B	Product Name
C	Date Code
D	Product Information

2、Packaging



SPECIFICATIONS mm(inch)		PACKAGE	SPECIFICATIONS mm(inch)		PACKAGE
ITEM	SYM BOL	TO-263	ITEM	SYM BOL	TO-263
Carrier width	A	11.65(0.459)Typ	Carrier depth	K	5.15(0.203)Typ
Carrier length	B	17.05(0.672)Typ	Punch hole pitch	P	16.00(0.630)Typ
Sprocket hole	d	ø1.50(0.059)Typ	Sprocket hole pitch	P0	4.00(0.157)Typ
Reel outer diameter	D	330.0(13.0)Typ	Embossment center	P1	2.00(0.079)Typ
Reel inner diameter	D1	90.0(3.54)Typ	Overall tape thickness	T	0.40(0.016)Typ
Feed hole diameter	D2	13.0(0.512)Typ	Tape width	W	24.0(0.945)Typ
Sprocket hole position	J	1.75(0.069)Typ	Reel width	W1	25.5(1.000)Typ
Punch hole position	H	11.50(0.453)Typ			