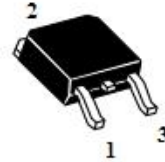
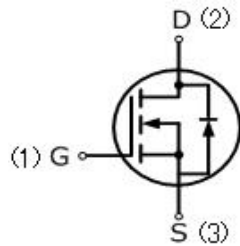


140N04(G,D)SL

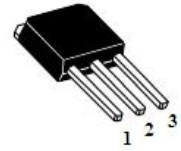
140 Amps, 40 Volts N-CHANNEL MOSFET

Features

- 140A, 40V, $R_{DS(ON)MAX}=2.8m\Omega @V_{GS}=10V/20A$
 $R_{DS(ON)MAX}=3.2m\Omega @V_{GS}=4.5V/20A$
- Low gate charge
- Low C_{iss}
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability



TO-252
140N04GSL



TO-251
140N04DSL

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

Parameter	Symbol	140N04(G,D)SL	UNIT
Drain-Source Voltage	V_{DSS}	40	V
Gate-Source Voltage	V_{GSS}	± 20	
Continuous Drain Current	I_D	140	A
Pulsed Drain Current (Note 1)	I_{DM}	380	
Single Pulse Avalanche Energy (Note 2)	E_{AS}	500	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to +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

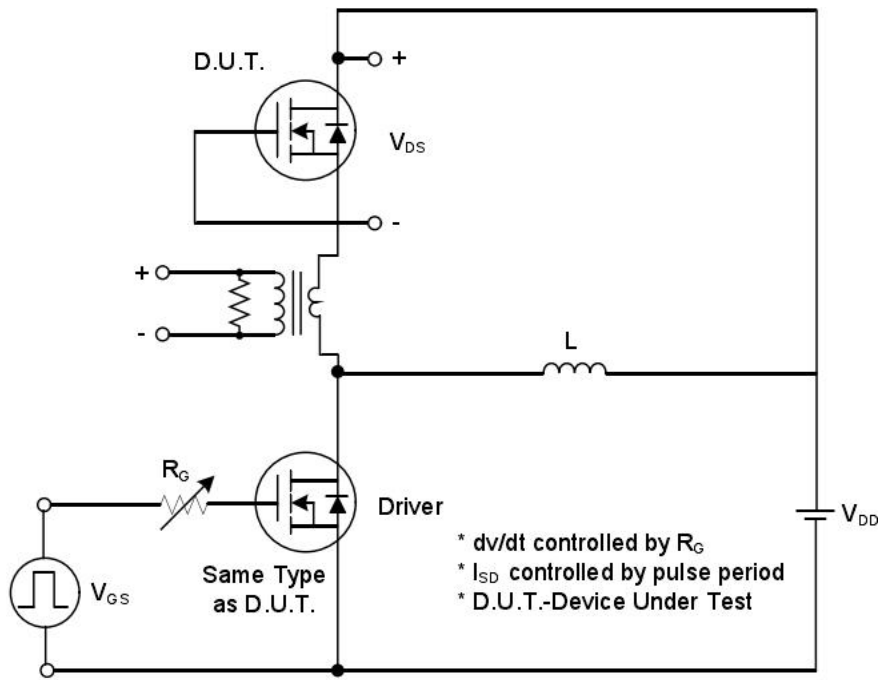
Parameter	Symbol	140N04(G,D)SL	Units
Thermal resistance, Junction to Case	$R_{th(j-c)}$	1.3	$^\circ\text{C}/\text{W}$
Maximum Power Dissipation	P_D	96	W

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	40	—	—	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =40V, V _{GS} =0V	—	—	1	uA
Gate-Body Leakage Current, Forward	I _{GSSF}	V _{GS} =20V, V _{DS} =0V	—	—	100	nA
Gate-Body Leakage Current, Reverse	I _{GSSR}	V _{GS} =-20V, V _{DS} =0V	—	—	-100	nA
On Characteristics						
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250uA	1.0	—	3.0	V
Drain-Source On-State Resistance	R _{DS(on)}	V _{GS} =10V, I _D =20A	—	2.3	2.8	mΩ
		V _{GS} =4.5V, I _D =20A	—	2.7	3.2	mΩ
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V, f=1.0MHZ	—	7800	—	pF
Output Capacitance	C _{oss}		—	1258	—	pF
Reverse Transfer Capacitance	C _{rss}		—	782	—	pF
Switching Characteristics						
Turn-On Delay Time	t _{d(on)}	V _{DD} =20V, I _D =70A, R _G =3.7Ω V _{GS} =10V (Note3,4)	—	25	—	ns
Turn-On Rise Time	t _r		—	82	—	ns
Turn-Off Delay Time	t _{d(off)}		—	86	—	ns
Turn-Off Fall Time	t _f		—	42	—	ns
Total Gate Charge	Q _g	V _{DS} =20V, I _D =70A, V _{GS} =4.5V (Note3,4)	—	170	—	nC
Gate-Source Charge	Q _{gs}		—	52	—	nC
Gate-Drain Charge	Q _{gd}		—	68	—	nC
Drain-Source Body Diode Characteristics and Maximum Ratings						
Diode Forward Voltage	V _{SD}	I _S =20A, V _{GS} =0V	—	—	1.1	V
Reverse Recovery Time	t _{rr}	V _{GS} =0V, I _S =40A, dI _F /dt=100A/us, (Note3)	—	30.9	—	ns
Reverse Recovery Charge	Q _{rr}		—	27	—	nC

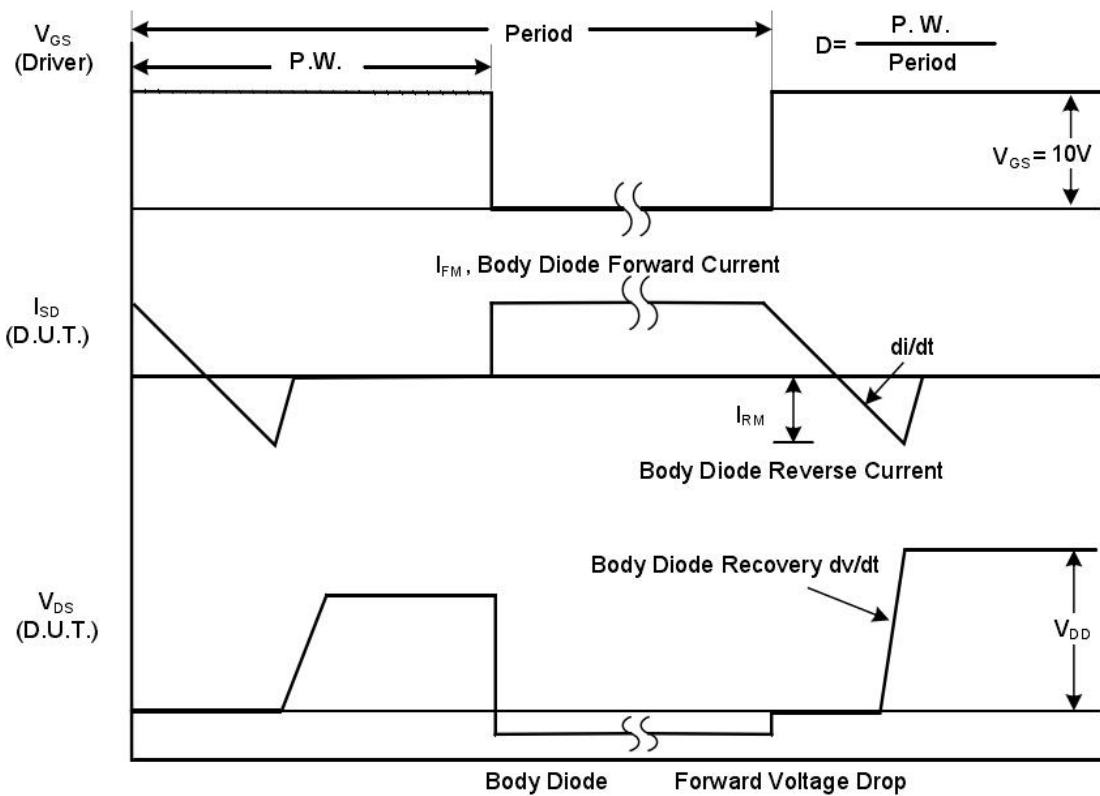
Notes

1. Repetitive Rating: pulse width limited by maximum junction temperature.
2. V_{DD}=10V, L=0.5mH, R_g=25Ω, T_J=25°C.
3. dI/dt=200A/us, starting T_J=25°C. Pulse width≤300us; duty cycle≤2%.
4. Repetitive rating; pulse width limited by maximum junction temperature.

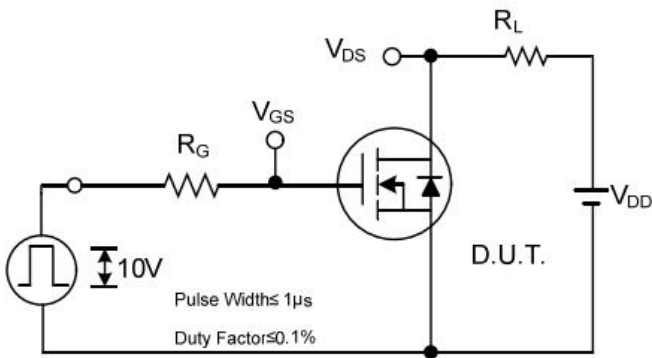
TEST CIRCUIT AND WAVEFORM



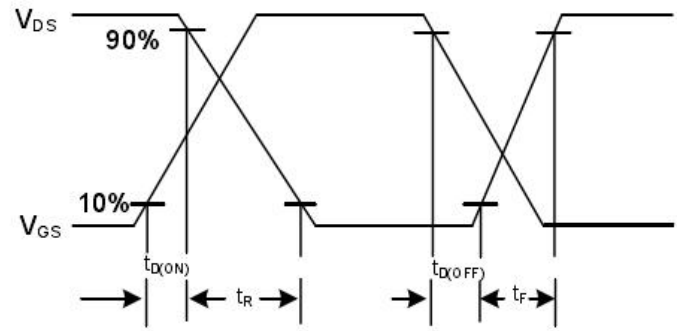
Peak Diode Recovery dv/dt Test Circuit



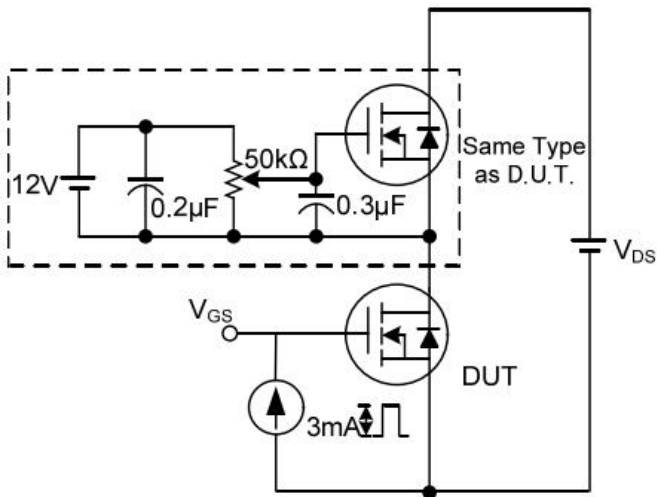
Peak Diode Recovery dv/dt Waveforms



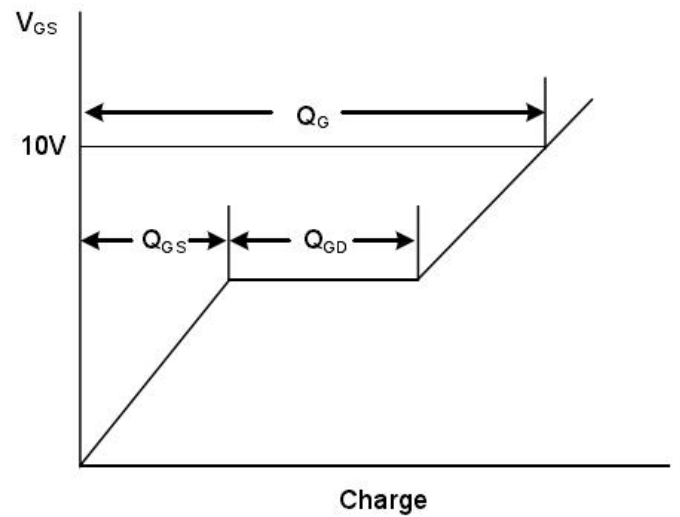
Switching Test Circuit



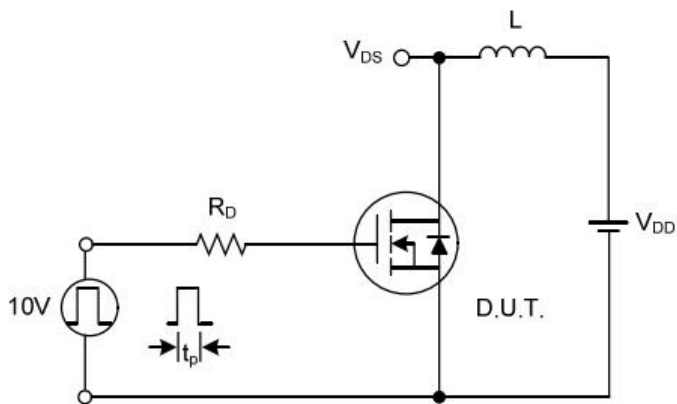
Switching Waveforms



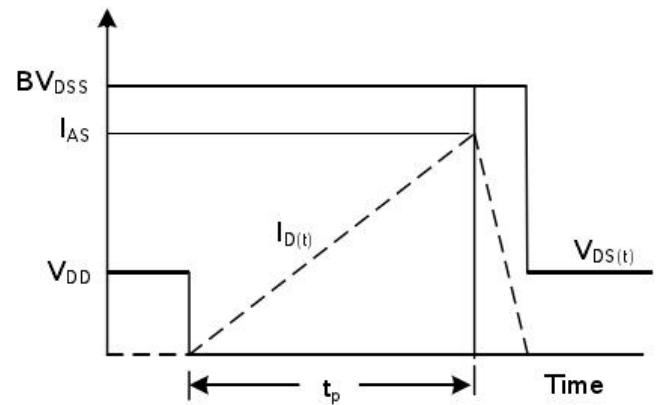
Gate Charge Test Circuit



Gate Charge Waveform

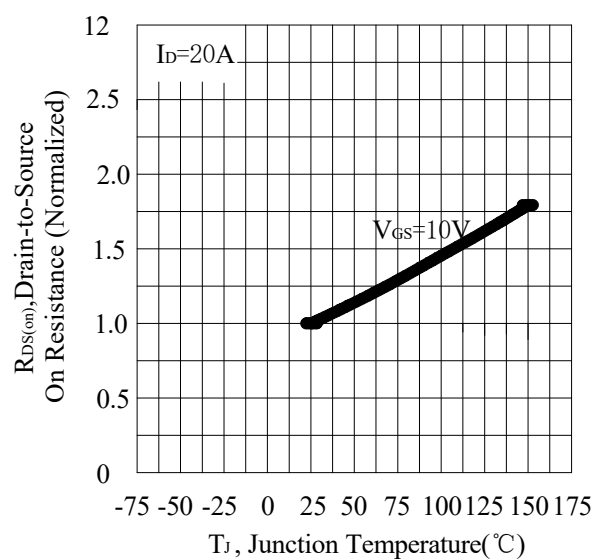
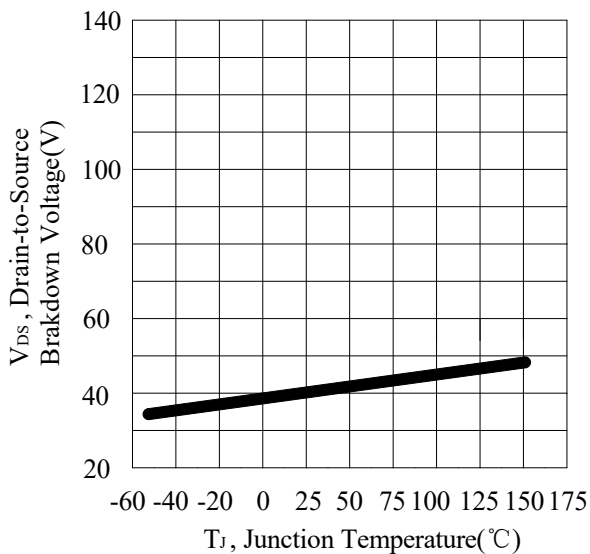
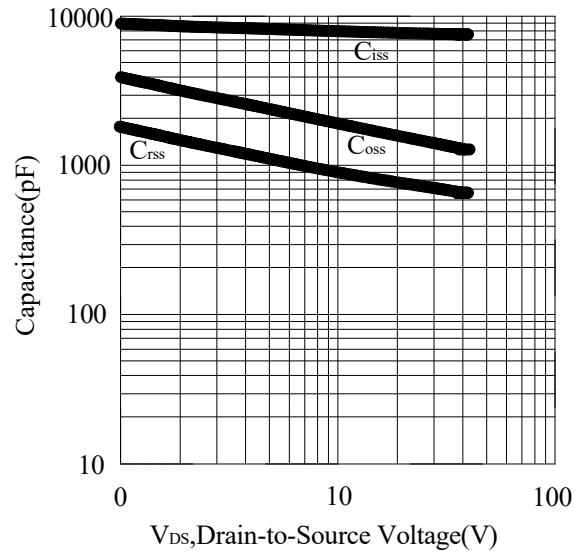
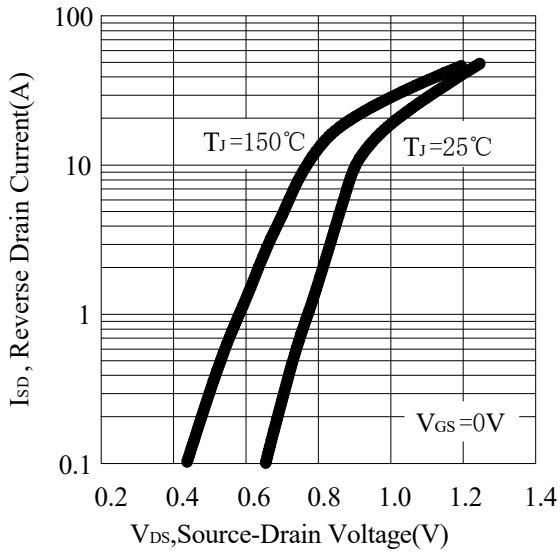
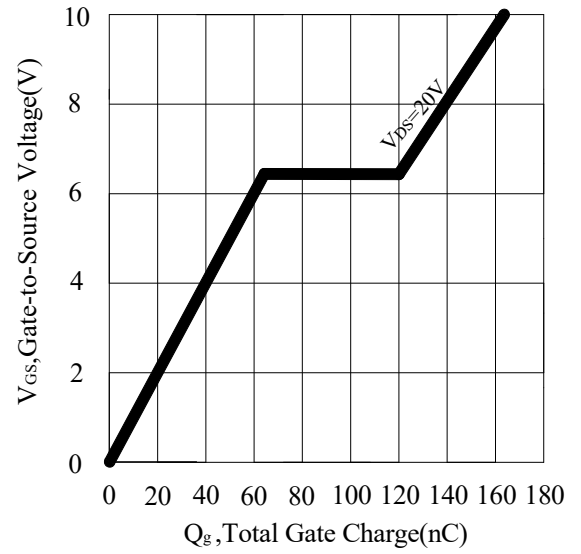
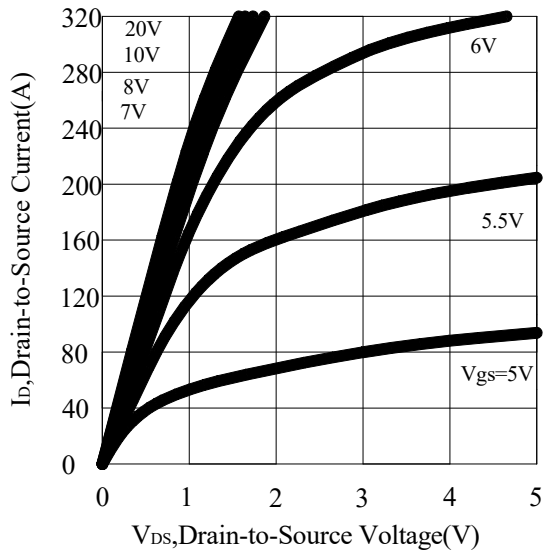


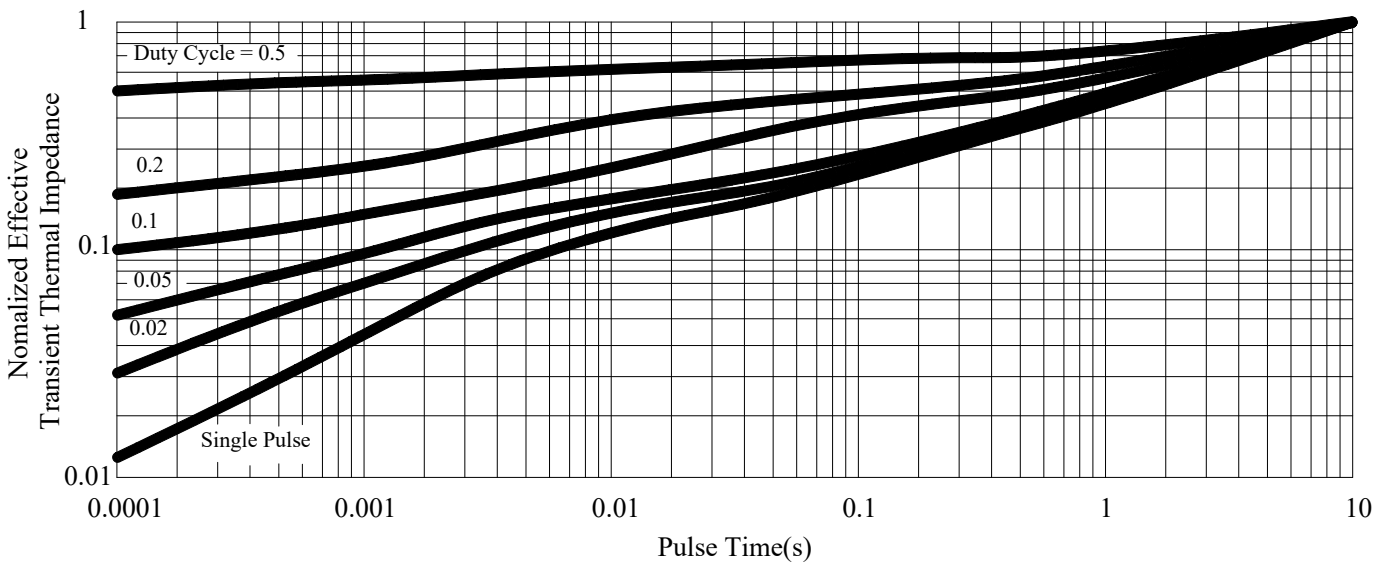
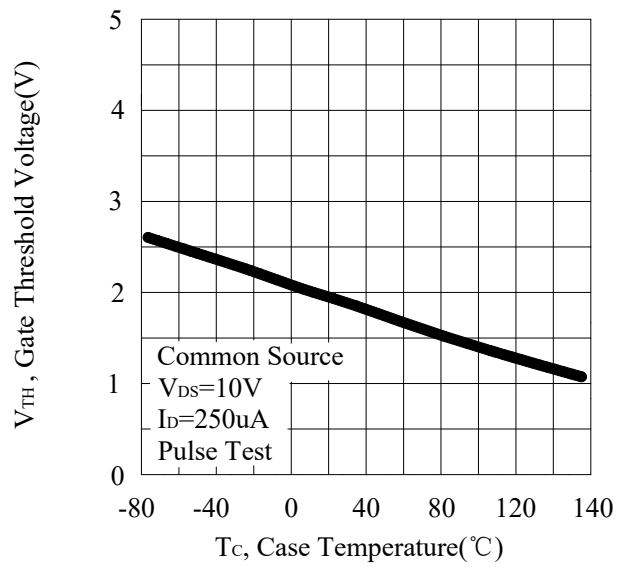
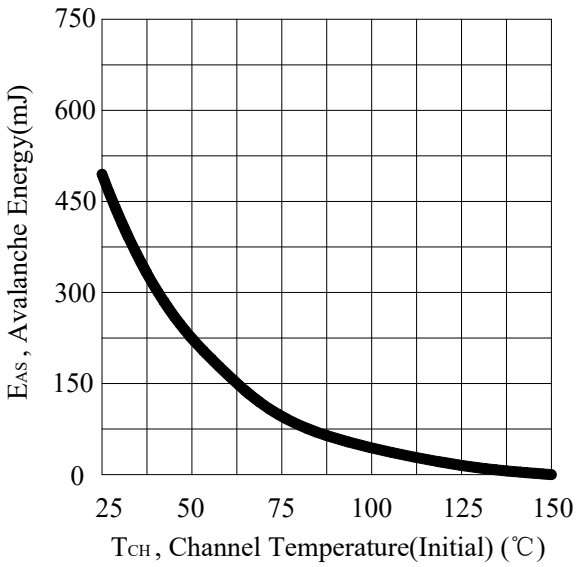
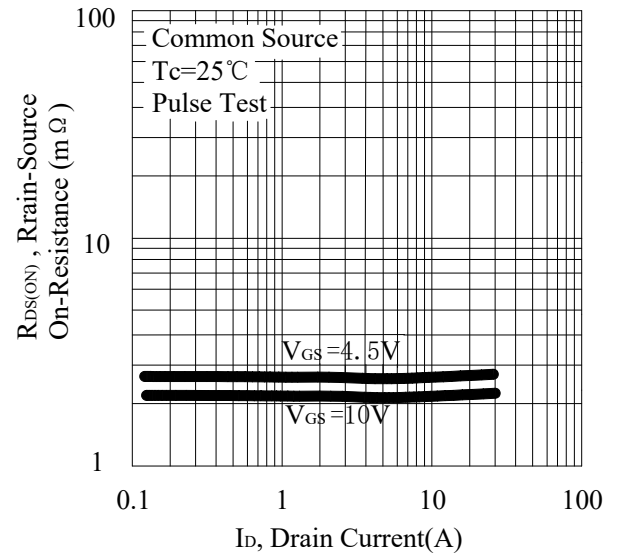
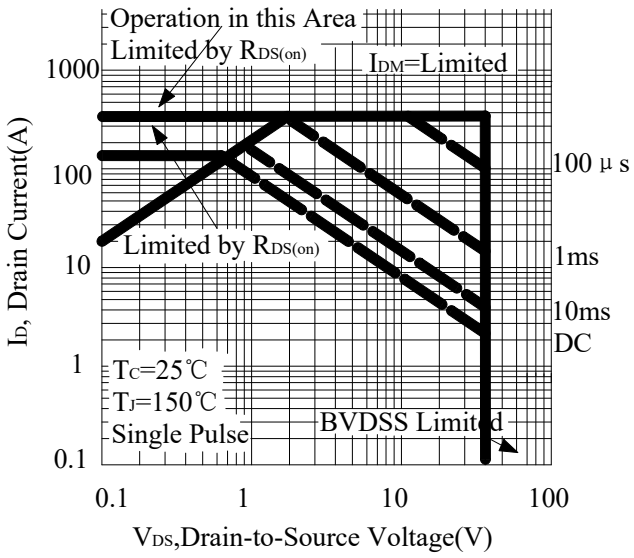
Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

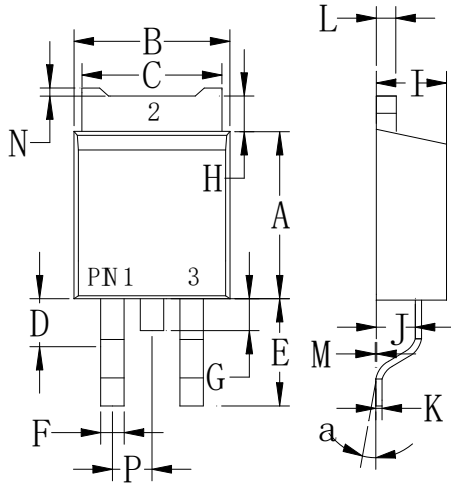
RATING AND CHARACTERISTIC CURVES





PACKAGE OUTLINE DIMENSIONS

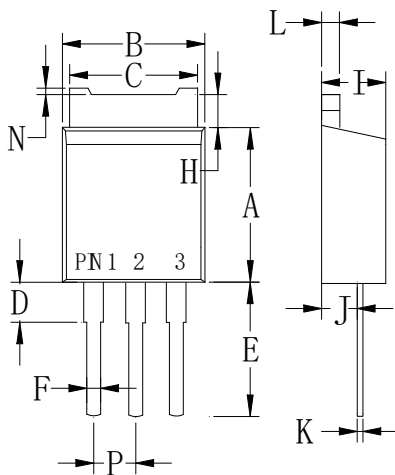
TO-252



TO-252		
Dim	Min	Max
A	.230 (5.85)	.246 (6.25)
B	.250 (6.35)	.264 (6.75)
C	.207 (5.27)	.218 (5.54)
D	.037 (0.93)	.045 (1.14)
E	.106 (2.70)	.138 (3.50)
F	.028 (0.72)	.033 (0.84)
G	.024 (0.60)	.041 (1.05)
H	.028 (0.72)	.043 (1.10)
I	.085 (2.15)	.096 (2.45)
J	.037 (0.95)	.047 (1.20)
K	.018 (0.45)	.026 (0.65)
L	.018 (0.45)	.024 (0.60)
P	.081 (2.05)	.094 (2.40)
M	.000 (0.00)	.006 (0.15)
N	--	.008 (0.20)
a	0°	10°

Dimensions in inches and (millimeters)

TO-251



TO-251		
Dim	Min	Max
A	.230 (5.85)	.246 (6.25)
B	.250 (6.35)	.266 (6.75)
C	.207 (5.27)	.218 (5.54)
D	.037 (0.93)	.045 (1.14)
E	.173 (4.40)	.205 (5.20)
F	.028 (0.72)	.033 (0.84)
H	.028 (0.70)	.043 (1.10)
I	.085 (2.15)	.096 (2.45)
J	.037 (0.95)	.047 (1.20)
K	.018 (0.45)	.026 (0.65)
L	.018 (0.45)	.024 (0.60)
N	--	.008 (0.20)
P	.081 (2.05)	.094 (2.40)

Dimensions in inches and (millimeters)