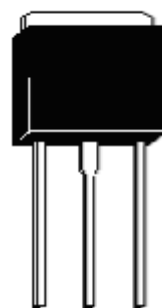


N-Channel Enhancement Mode Power MOSFET

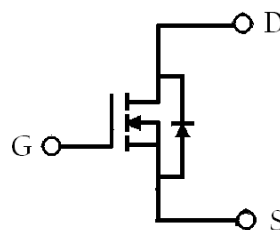
Features:

- Low On Resistance
- Simple Drive Requirement
- Low Gate Charge
- Fast Switching Characteristic
- RoHS compliant package
- Pb-free lead plating and halogen-free package

TO-251



G D S



G : Gate D : Drain S : Source

BV_{DSS}	500V
$I_D @ V_{GS}=10V, T_C=25^\circ C$	4.5A
$R_{DS(on)(TYP)} @ V_{GS}=10V, I_D=2.25A$	1.1 Ω

Ordering Information

Device	Package	Shipping
KIN5N50B	TO-251 (Pb-free lead plating and halogen-free package)	80 pcs/tube, 50 tubes/box

Absolute Maximum Ratings ($T_C=25^{\circ}C$)

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	V_{DS}	500	V
Gate-Source Voltage	V_{GS}	± 30	
Continuous Drain Current @ $T_C=25^{\circ}C$, $V_{GS}=10V$	I_D	4.5	A
Continuous Drain Current @ $T_C=100^{\circ}C$, $V_{GS}=10V$		2.8	
Pulsed Drain Current (Note 1)	I_{DM}	18	
Single Pulse Avalanche Energy (Note 2)	E_{AS}	90	mJ
Avalanche Current (Note 1)	I_{AS}	4.5	A
Repetitive Avalanche Energy (Note 1)	E_{AR}	4.8	mJ
Maximum Temperature for Soldering @ Lead at 0.125 in(0.318mm) from case for 10 seconds	T_L	300	$^{\circ}C$
Total Power Dissipation ($T_A=25^{\circ}C$) (Note 4)	P_D	2	W
Total Power Dissipation ($T_C=25^{\circ}C$)		48	W
Linear Derating Factor		0.38	W/ $^{\circ}C$
Operating Junction and Storage Temperature	T_j, T_{stg}	-55~+150	$^{\circ}C$

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{th,j-c}$	2.6	$^{\circ}C/W$
Thermal Resistance, Junction-to-ambient, max (Note 4)	$R_{th,j-a}$	50	
Thermal Resistance, Junction-to-ambient, max		110	

Note : 1.Repetitive rating; pulse width limited by maximum junction temperature.

2. $I_{AS}=4.5A$, $V_{DD}=50V$, $L=8mH$, $R_G=25\Omega$, starting $T_J=+25^{\circ}C$.

3. $I_{SD}\leq 4.5A$, $dI/dt\leq 100A/\mu s$, $V_{DD}\leq BV_{DSS}$, starting $T_J=+25^{\circ}C$.

4. When the device is mounted on 1 in² FR-4 board with 2 oz. copper, in a still air environment with $T_A=25^{\circ}C$.

Characteristics ($T_C=25^{\circ}C$, unless otherwise specified)

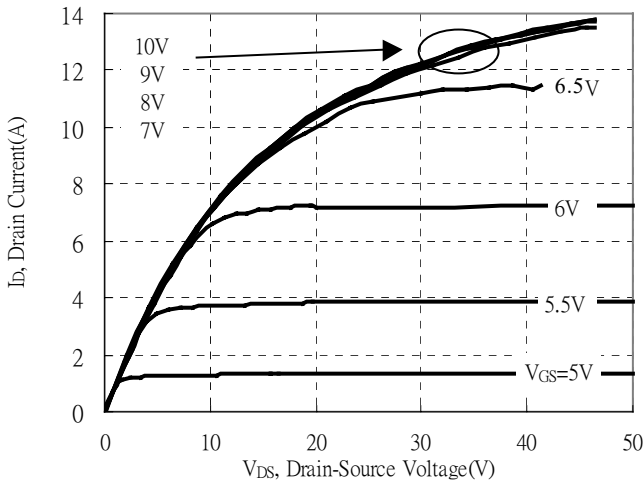
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	500	-	-	V	$V_{GS}=0V$, $I_D=250\mu A$, $T_j=25^{\circ}C$
$\Delta BV_{DSS}/\Delta T_j$	-	0.6	-	V/ $^{\circ}C$	Reference to $25^{\circ}C$, $I_D=250\mu A$
$V_{GS(th)}$	2.0	-	4.0	V	$V_{DS} = V_{GS}$, $I_D=250\mu A$
* G_{FS}	-	5	-	S	$V_{DS} = 15V$, $I_D=2.25A$
I_{GSS}	-	-	± 100	nA	$V_{GS}=\pm 30V$
I_{DSS}	-	-	1	μA	$V_{DS} = 500V$, $V_{GS} = 0V$
	-	-	10		$V_{DS} = 400V$, $V_{GS} = 0V$, $T_C=125^{\circ}C$
* $R_{DS(ON)}$	-	1.1	1.5	Ω	$V_{GS} = 10V$, $I_D=2.25A$
Dynamic					
* Q_g	-	17.4	-	nC	$I_D=4.5A$, $V_{DD}=400V$, $V_{GS}=10V$
* Q_{gs}	-	3.4	-		
* Q_{gd}	-	7.6	-		

*t _{d(ON)}	-	10.6	-	ns	V _{DD} =250V, I _D =4.5A, V _{GS} =10V, R _G =25Ω
*t _r	-	10	-		
*t _{d(OFF)}	-	35	-		
*t _f	-	31.2	-		
C _{iss}	-	572	-	pF	V _{GS} =0V, V _{DS} =25V, f=1MHz
C _{oss}	-	65	-		
C _{rss}	-	32	-		
Source-Drain Diode					
*I _S	-	-	4.5	A	
*I _{SM}	-	-	18		
*V _{SD}	-	-	1.5	V	I _S =4.5A, V _{GS} =0V
*t _{rr}	-	260	-	ns	V _{GS} =0, I _F =4.5A, dI _F /dt=100A/μs
*Q _{rr}	-	1.1	-	μC	

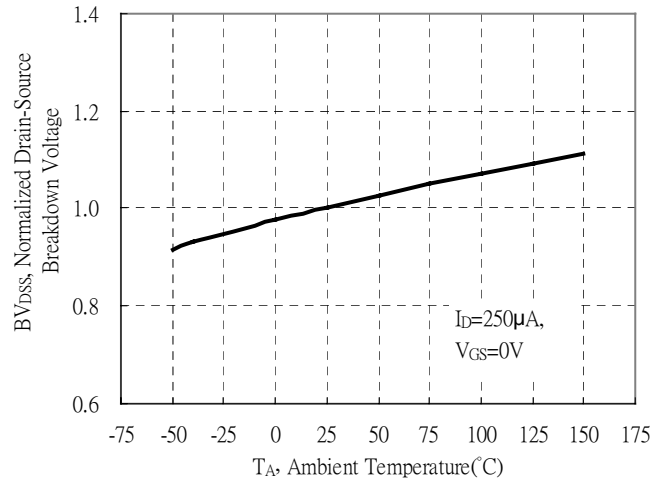
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

Typical Characteristics

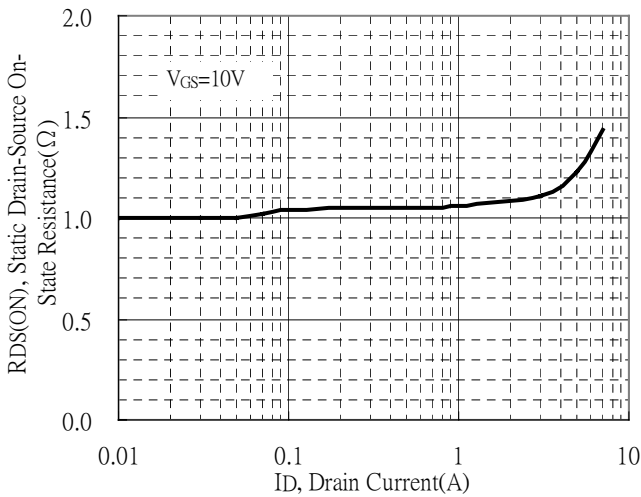
Typical Output Characteristics



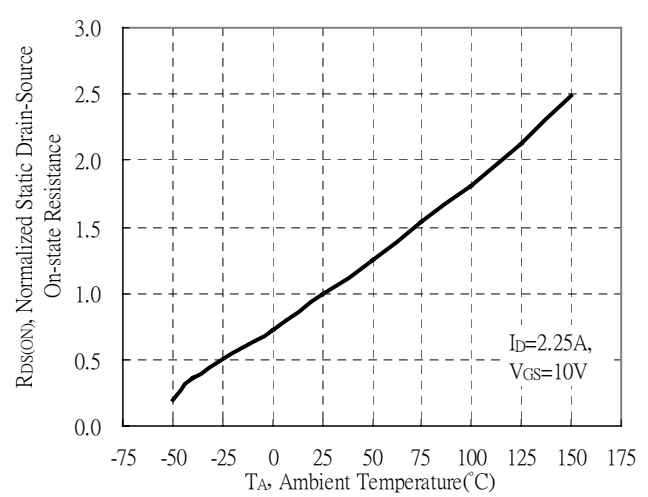
Brekdown Voltage vs Ambient Temperature



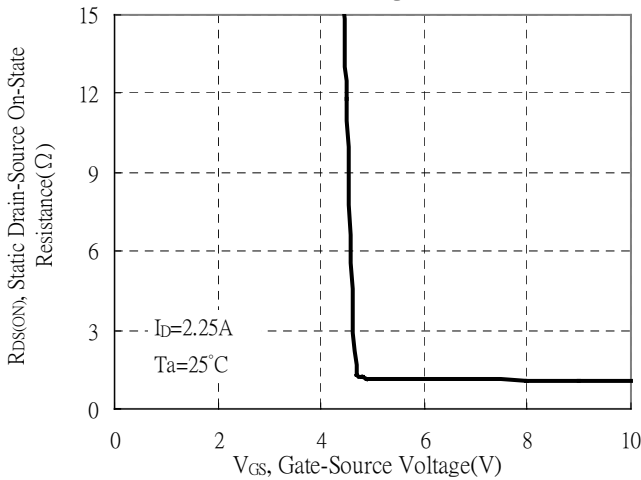
Static Drain-Source On-State resistance vs Drain Current



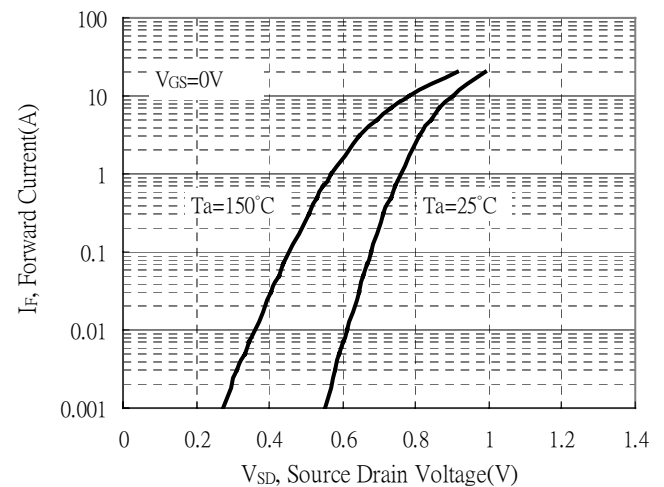
Static Drain-Source On-resistance vs Ambient Temperature



Static Drain-Source On-State Resistance vs Gate-Source Voltage

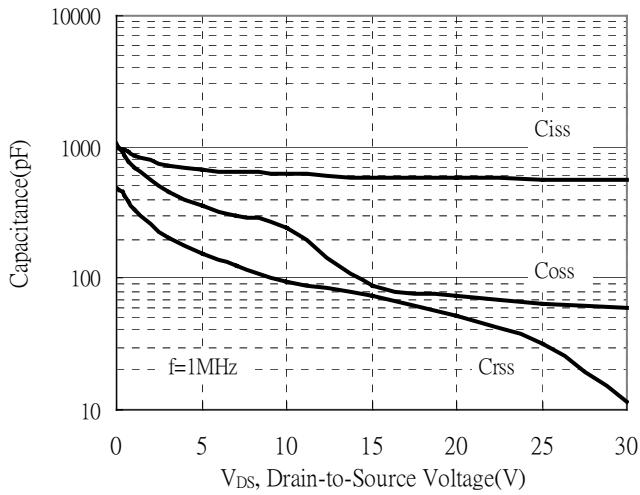


Forward Drain Current vs Source-Drain Voltage

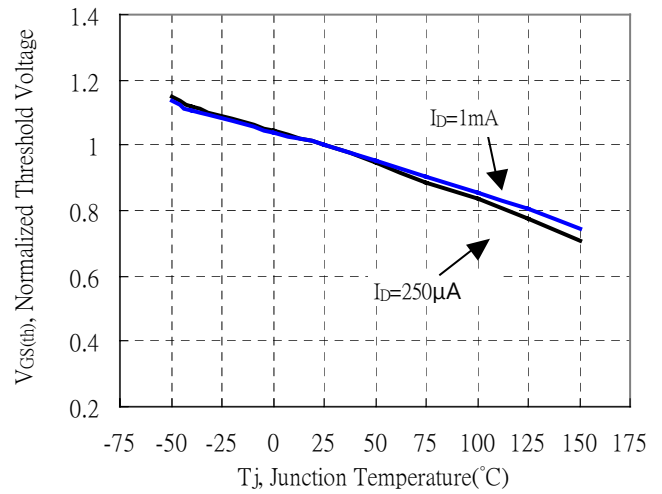


Typical Characteristics(Cont.)

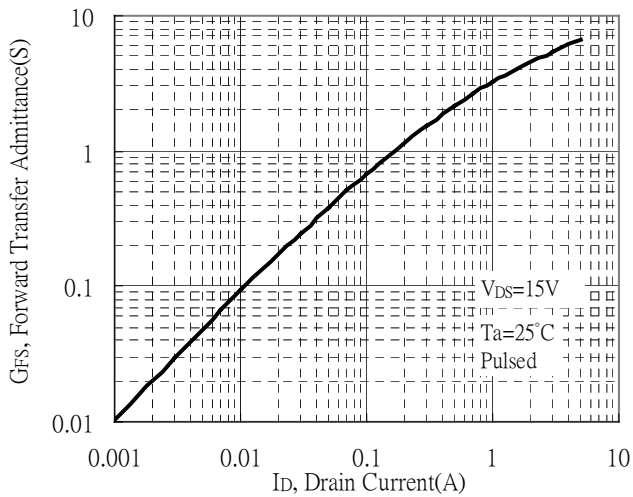
Capacitance vs Reverse Voltage



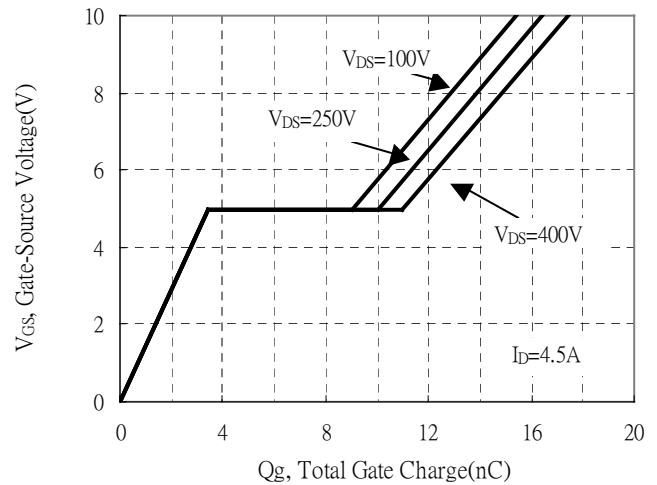
Threshold Voltage vs Junction Temperature



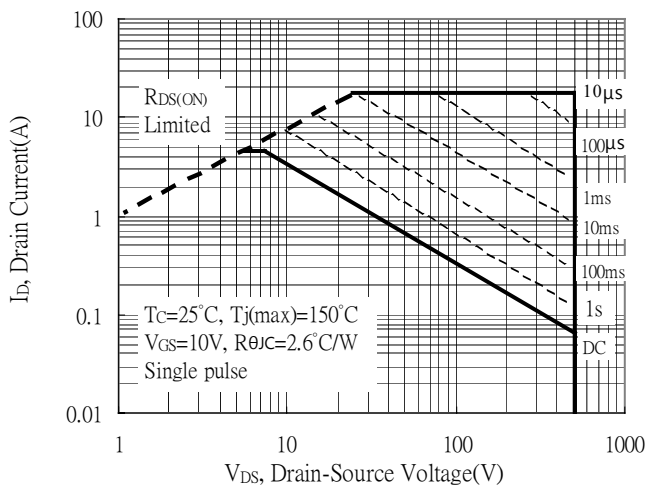
Forward Transfer Admittance vs Drain Current



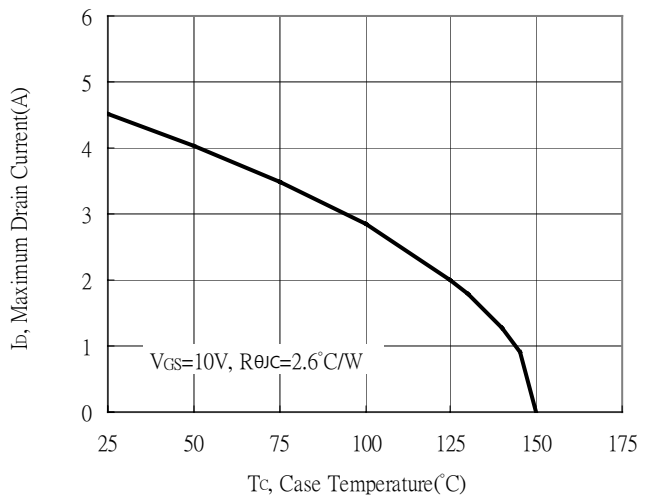
Gate Charge Characteristics



Maximum Safe Operating Area

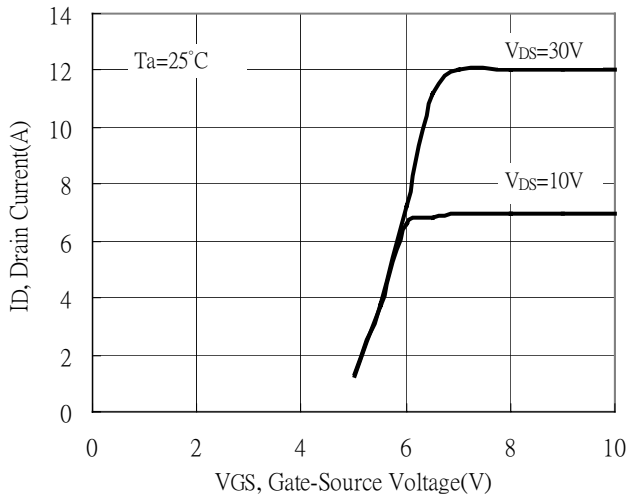


Maximum Drain Current vs Case Temperature

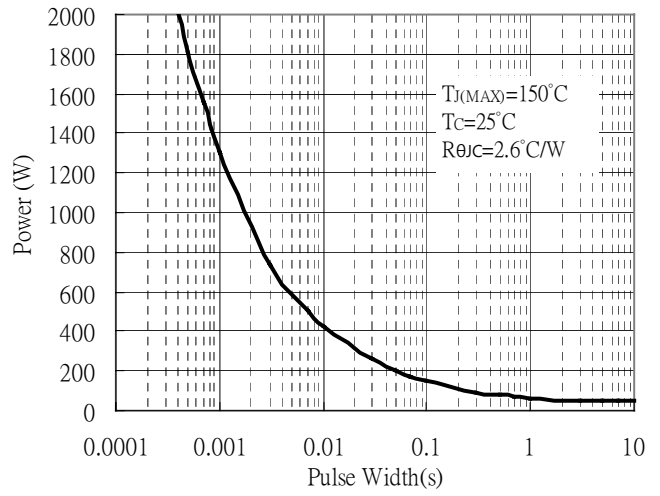


Typical Characteristics(Cont.)

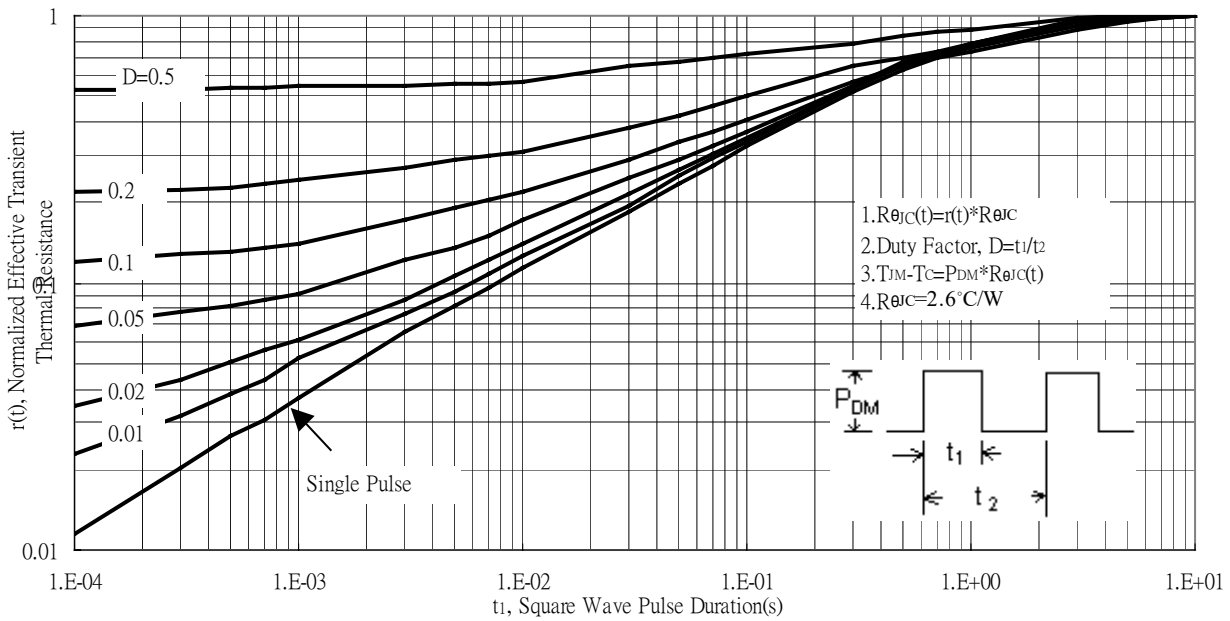
Drain Current vs Gate-Source Voltage



Single Pulse Power Rating, Junction to Case



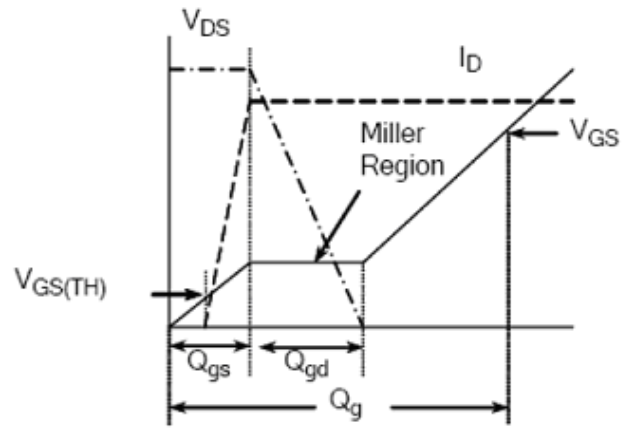
Transient Thermal Response Curves



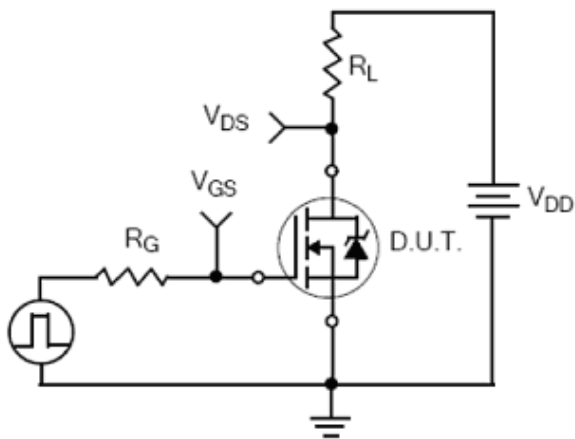
Test Circuit and Waveforms



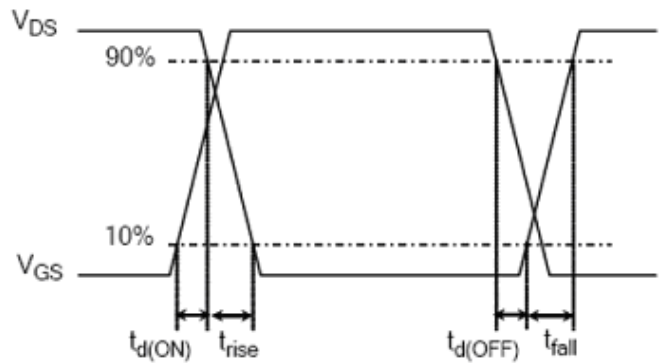
Gate Charge Test Circuit



Gate Charge Waveform

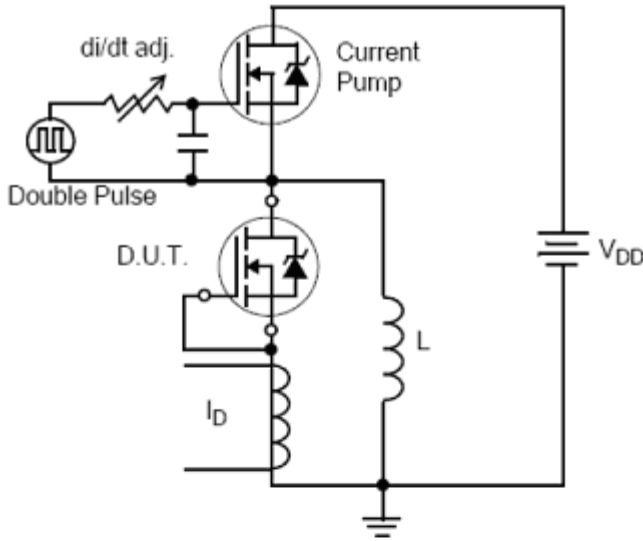


Resistive Switching Test Circuit

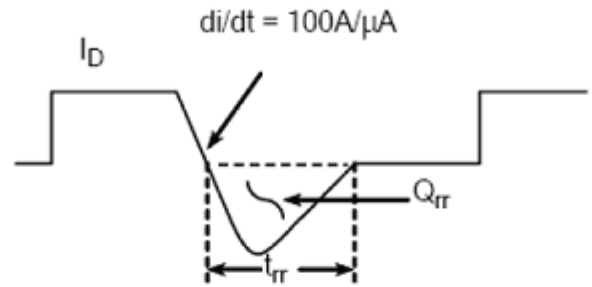


Resistive Switching Waveforms

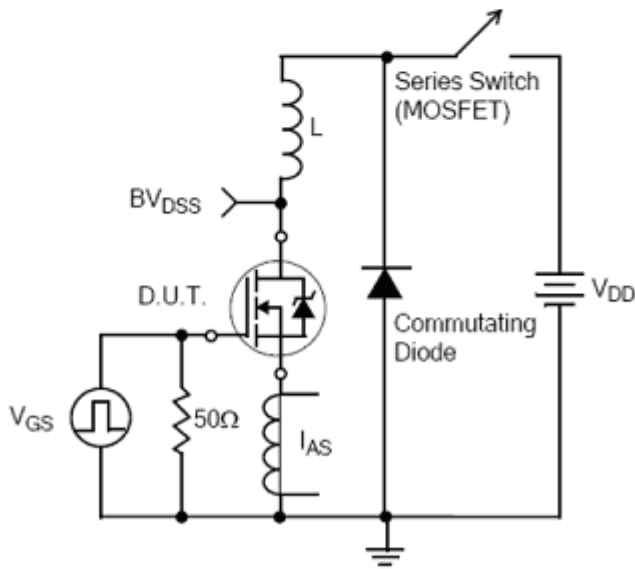
Test Circuit and Waveforms(Cont.)



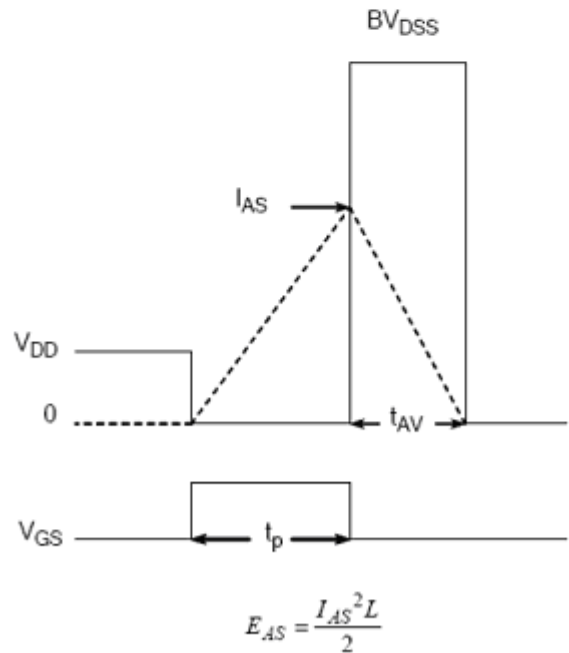
Diode Reverse Recovery Test Circuit



Diode Reverse Recovery Waveform

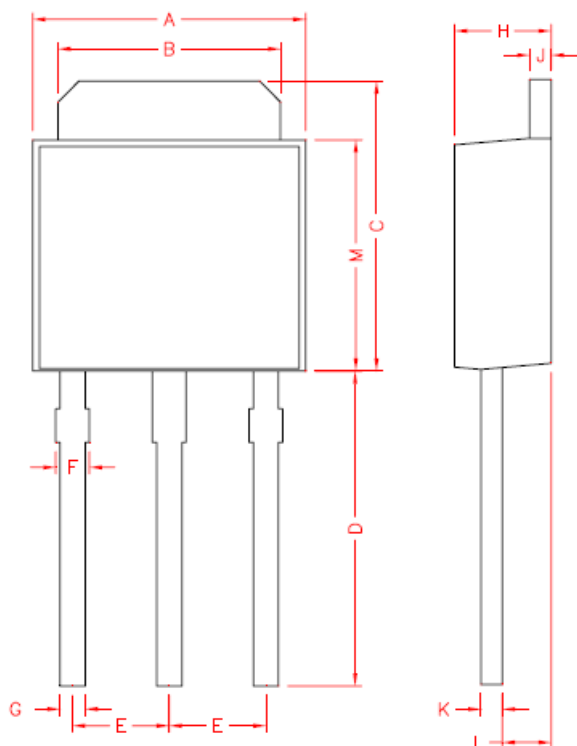


Unclamped Inductive Switching Test Circuit

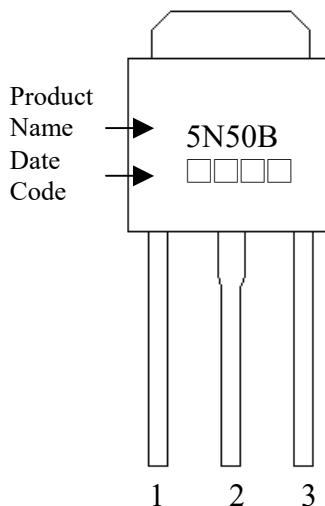


Unclamped Inductive Switching Waveforms

TO-251 Dimension



Marking:



Style: Pin 1.Gate 2.Drain 3.Source

3-Lead TO-251 Plastic Package

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	6.40	6.80	0.252	0.268	G	0.50	0.70	0.020	0.028
B	5.20	5.50	0.205	0.217	H	2.20	2.40	0.087	0.094
C	6.80	7.20	0.268	0.283	J	0.45	0.55	0.018	0.022
D	7.20	7.80	0.283	0.307	K	0.45	0.60	0.018	0.024
E	2.30 REF		0.091 REF		L	0.90	1.50	0.035	0.059
F	0.60	0.90	0.024	0.035	M	5.40	5.80	0.213	0.228