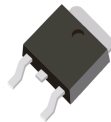


FEATURES

- $R_{DS(ON)} < 1.75\Omega @ V_{GS} = 10V$
- Fast Switching Capability
- Avalanche Energy Specified
- Improved dv/dt Capability, High Ruggedness

APPLICATIONS

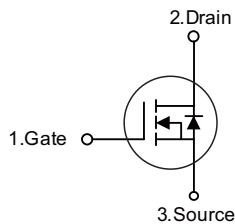
- High frequency switching mode power supply
- Electronic ballast
- LED power supply



PRODUCT CHARACTERISTICS

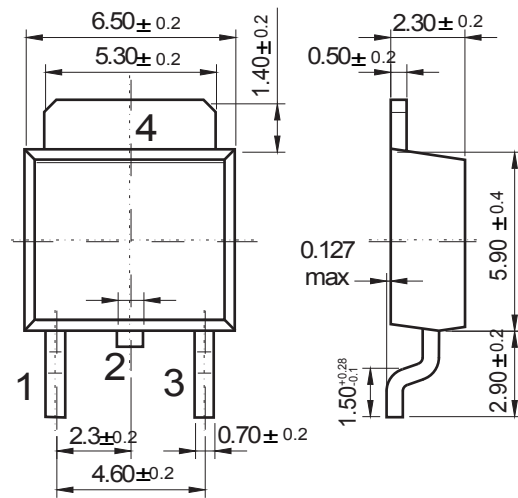
TO-252

VDSS	500V
$R_{DS(on)max}(@V_{GS} = 10 V)$	1.75 Ω
Qg@type	24nC
ID	5A



TO-252

Unit: mm



ABSOLUTE MAXIMUM RATINGS (T_c = 25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	V _{DSS}	500	V
Gate-Source Voltage	V _{GSS}	±30	V
Drain Current	Continuous	I _D	5
	Pulsed (Note 2)	I _{DM}	20
Avalanche Current (Note 2)	I _{AR}	5	A
Avalanche Energy	Single Pulsed (Note 3)	E _{AS}	300
	Repetitive (Note 2)	E _{AR}	7.3
Peak Diode Recovery dv/dt (Note 4)	dv/dt	4.5	V/ns
Power Dissipation	P _D	125	W
Junction Temperature	T _J	+150	°C
Storage Temperature	T _{STG}	-55~+150	°C

Note: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. Repetitive Rating: Pulse width limited by maximum junction temperature

3. L = 21.5mH, I_{AS} = 5A, V_{DD} = 50V, R_G = 25 Ω , Starting T_J = 25°C

4. I_{SD} ≤ 5A, di/dt ≤ 200A/ μ s, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

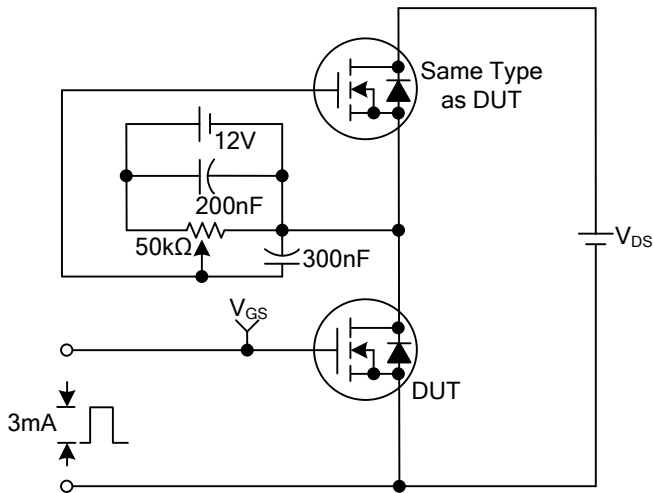
5N50

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

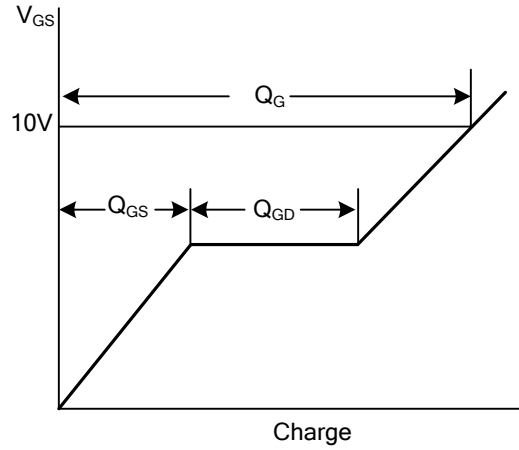
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	500			V
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C , $I_D=250\mu\text{A}$		0.5		$\text{V}/^\circ\text{C}$
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=500\text{V}$, $V_{GS}=0\text{V}$			1	μA
		$V_{DS}=400\text{V}$, $T_C=125^\circ\text{C}$			10	
Gate- Source Leakage Current	Forward	I_{GSS}			100	nA
	Reverse					
					-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	2.0		4.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=2.5\text{A}$		1.45	1.75	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{GS}=0\text{V}$, $V_{DS}=25\text{V}$, $f=1.0\text{MHz}$		480	625	pF
Output Capacitance	C_{OSS}			80	105	pF
Reverse Transfer Capacitance	C_{RSS}			15	20	pF
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	$V_{GS}=10\text{V}$, $V_{DS}=400\text{V}$, $I_D=5\text{A}$ (Note 1, 2)		18	24	nC
Gate to Source Charge	Q_{GS}			2.2		nC
Gate to Drain Charge	Q_{GD}			9.7		nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DD}=250\text{V}$, $I_D=5\text{A}$, $R_G=25\Omega$ (Note 1, 2)		12	35	ns
Rise Time	t_R			46	100	ns
Turn-OFF Delay Time	$t_{D(OFF)}$			50	110	ns
Fall-Time	t_F			48	105	ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I_S				5	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				20	A
Drain-Source Diode Forward Voltage	V_{SD}	$I_S=5\text{A}$, $V_{GS}=0\text{V}$			1.4	V
Reverse Recovery Time	t_{rr}	$I_S=5\text{A}$, $V_{GS}=0\text{V}$, $di_F/dt=100\text{A}/\mu\text{s}$ (Note 1)		83		ns
Reverse Recovery Charge	Q_{RR}			0.25		μC

Note: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$
 2. Essentially independent of operating temperature

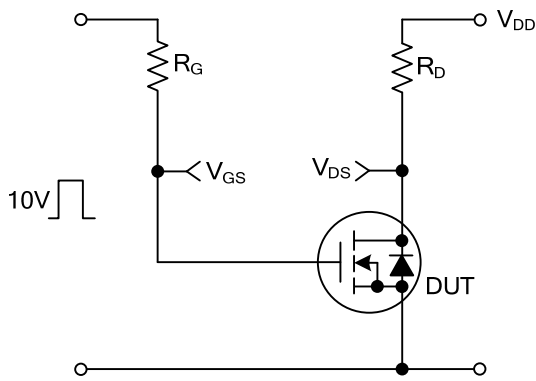
RATING AND CHARACTERISTIC CURVES (5N50)



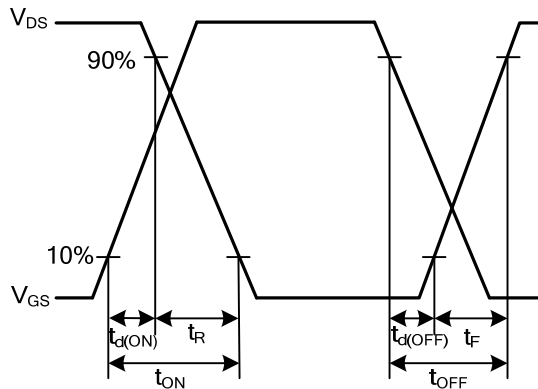
Gate Charge Test Circuit



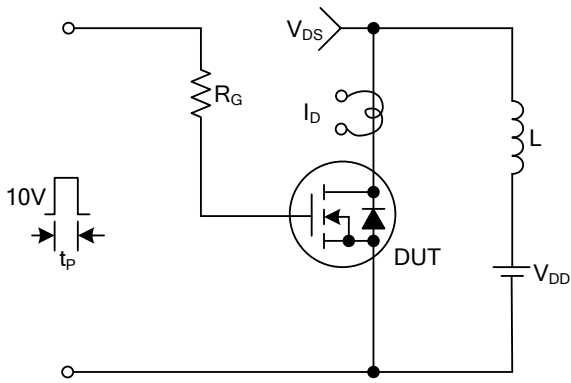
Gate Charge Waveforms



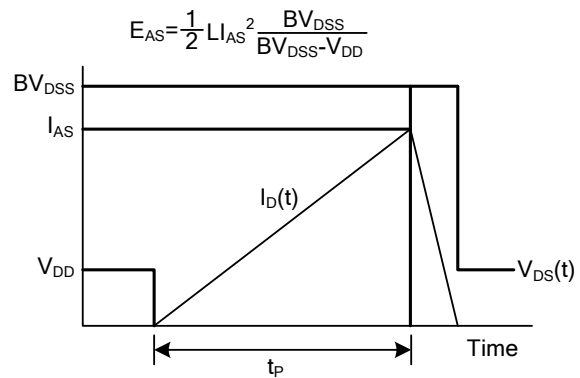
Resistive Switching Test Circuit



Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms