

# SLP25N10T

## 100V N-Channel MOSFET

### General Description

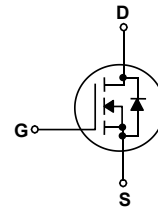
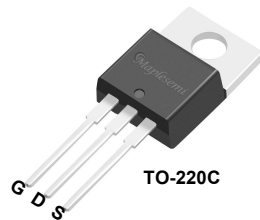
This Power MOSFET is produced using Msemitek's advanced TRENCH technology. This advanced technology has been especially tailored to minimize conduction loss, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.

### Application

- PWM Application
- Load Switch
- Power Management

### Features

- N-Channel: 100V 25A
- $R_{DS(on)Typ} = 40m\Omega @ V_{GS} = 10V$
- $R_{DS(on)Typ} = 45m\Omega @ V_{GS} = 4.5V$
- Very Low On-resistance  $R_{DS(ON)}$
- Low  $C_{rss}$
- Fast switching
- 100% avalanche tested
- Improved  $dv/dt$  capability



### Absolute Maximum Ratings

$T_C = 25^\circ\text{C}$  unless otherwise noted

Symbol	Parameter	SLP25N10T	Units
$V_{DSS}$	Drain-Source Voltage	100	V
$I_D$	Drain Current - Continuous ( $T_C = 25^\circ\text{C}$ ) - Continuous ( $T_C = 100^\circ\text{C}$ )	25	A
		16	A
$I_{DM}$	Drain Current - Pulsed (Note 1)	100	A
$V_{GSS}$	Gate-Source Voltage	$\pm 20$	V
$E_{AS}$	Single Pulsed Avalanche Energy (Note 2)	39	mJ
$P_D$	Power Dissipation ( $T_C = 25^\circ\text{C}$ )	54	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case	2.78	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction to ambient	55	$^\circ\text{C}/\text{W}$
$T_J, T_{STG}$	Operating and Storage Temperature Range	-55 to +175	$^\circ\text{C}$
$T_L$	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	300	$^\circ\text{C}$

\* Drain current limited by maximum junction temperature.

## Package Marking

Part Number	Top Marking	Package	Packing Method	MOQ	QTY
SLP25N10T	SLP25N10T	T0-220C	Tube	1000	5000

## Electrical Characteristics

$T_C = 25^\circ\text{C}$  unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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### Off Characteristics

$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	100	--	--	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V}$	--	--	1.0	$\mu\text{A}$
$I_{GSSF}$	Gate-Body Leakage Current, Forward	$V_{GS} = 20\text{ V}, V_{DS} = 0\text{ V}$	--	--	100	nA
$I_{GSSR}$	Gate-Body Leakage Current, Reverse	$V_{GS} = -20\text{ V}, V_{DS} = 0\text{ V}$	--	--	-100	nA

### On Characteristics

$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	1.0	1.5	3.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = 10\text{ V}, I_D = 20\text{ A}$	--	40	50	$\text{m}\Omega$
		$V_{GS} = 4.5\text{ V}, I_D = 20\text{ A}$	--	45	55	$\text{m}\Omega$

### Dynamic Characteristics

$C_{iss}$	Input Capacitance	$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V},$ $f = 1.0\text{ MHz}$	--	2210	-	pF
$C_{oss}$	Output Capacitance		--	85.1	-	pF
$C_{riss}$	Reverse Transfer Capacitance		--	70	-	pF

### Switching Characteristics

$t_{d(on)}$	Turn-On Delay Time	$V_{GS} = 10\text{ V}, V_{DS} = 30\text{ V},$ $R_L = 1.8\text{ }\Omega, I_D = 10\text{ A}$ (Note 3)	--	10	--	ns
$t_r$	Turn-On Rise Time		--	19	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	42	--	ns
$t_f$	Turn-Off Fall Time		--	26	--	ns
$Q_g$	Total Gate Charge	$V_{DS} = 30\text{ V}, I_D = 10\text{ A},$ $V_{GS} = 10\text{ V}$ (Note 3)	--	41.9	--	nC
$Q_{gs}$	Gate-Source Charge		--	9.1	--	nC
$Q_{gd}$	Gate-Drain Charge		--	11.5	--	nC

### Drain-Source Diode Characteristics and Maximum Ratings

$I_S$	Maximum Continuous Drain-Source Diode Forward Current	--	--	25	A
$I_{SM}$	Maximum Pulsed Drain-Source Diode Forward Current	--	--	100	A
$V_{FSD}$	Drain to Source Diode Forward Voltage, $V_{GS} = 0\text{ V}, I_{SD} = 20\text{ A}, T_J = 25^\circ\text{C}$	--	-	1.2	V
$T_{rr}$	Reverse recovery time, $I_F = 10\text{ A}, D_{IF} / dt = 100\text{ A}/\mu\text{s}$			37	ns
$Q_{rr}$	Reverse recovery charge, $I_F = 10\text{ A}, D_{IF} / dt = 100\text{ A}/\mu\text{s}$			35.5	nC

#### Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition:  $T_J = 25^\circ\text{C}, V_{DD} = 30\text{ V}, V_G = 10\text{ V}, L = 0.5\text{ mH}, I_{AS} = 12.5\text{ A}$
3. Pulse Test: Pulse Widths  $\leq 300\text{ }\mu\text{s}$ , Duty Cycle  $\leq 0.5\%$

### N- Channel Typical Characteristics

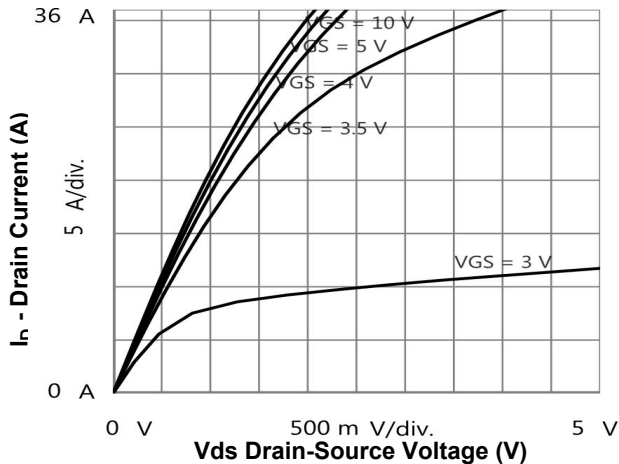


Figure 1. On-Region Characteristics

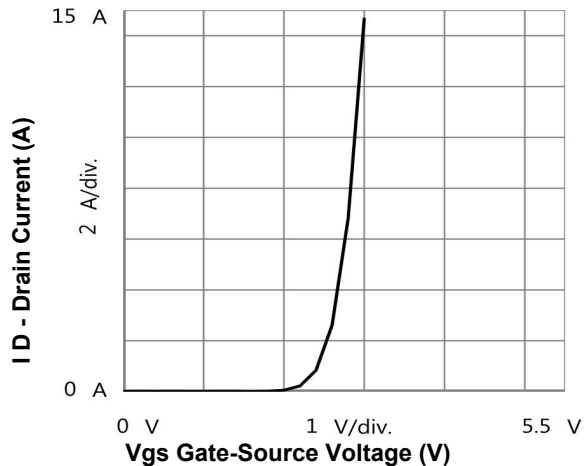


Figure 2. Transfer Characteristics

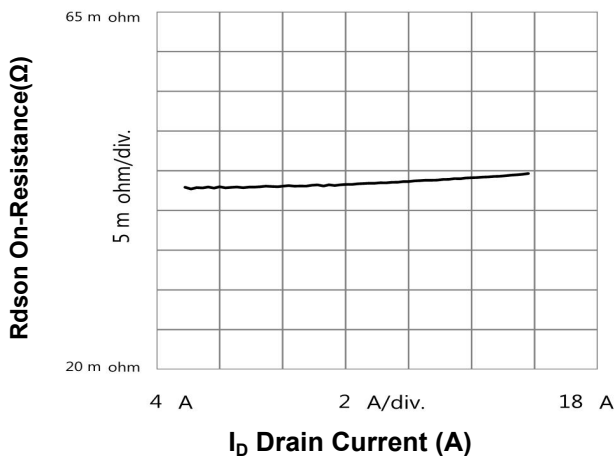


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

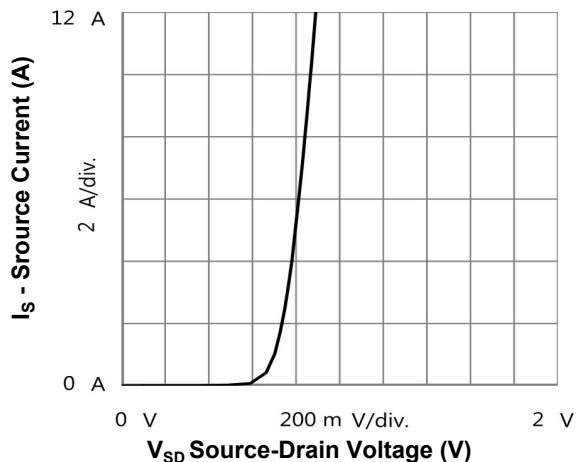


Figure 4. Source Current vs Source-Drain Voltage

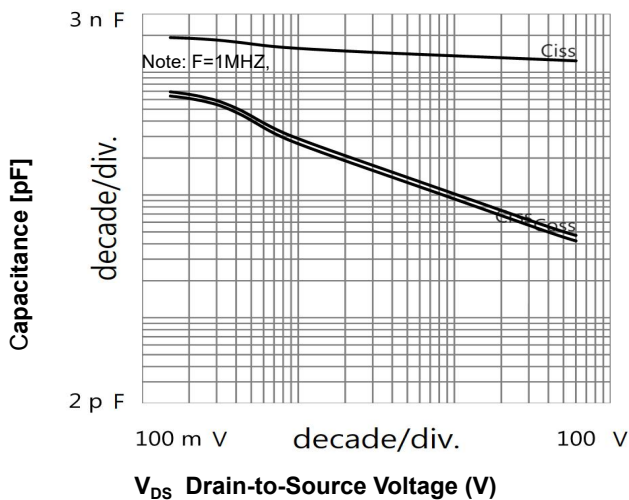


Figure 5.1 Capacitance Characteristics

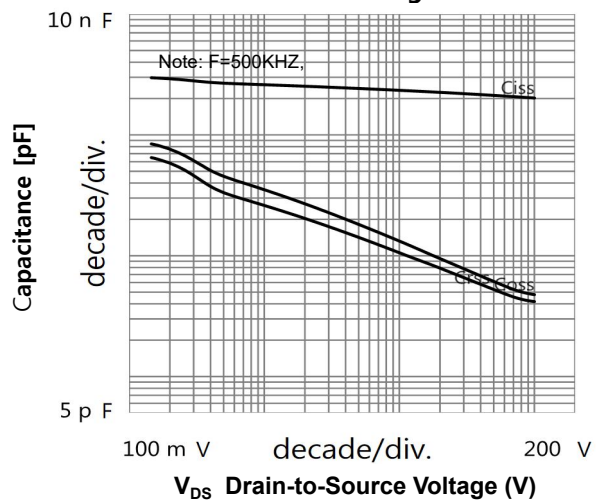
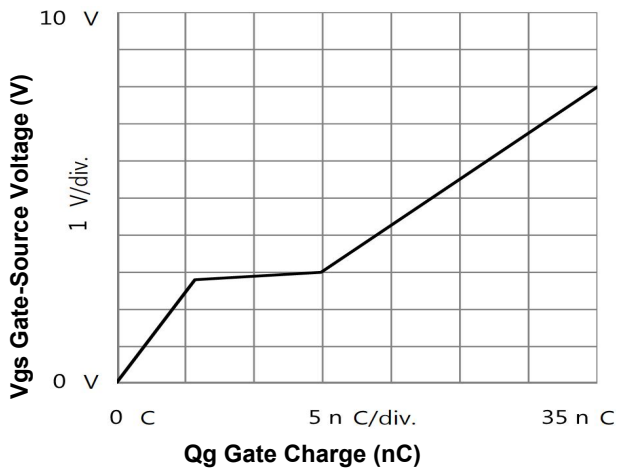
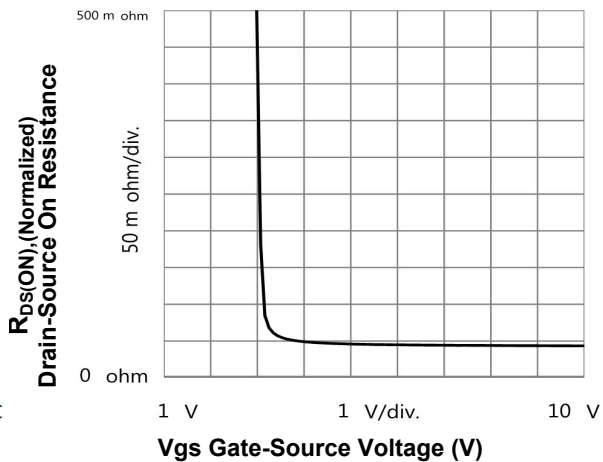


Figure 5.2 Capacitance Characteristics

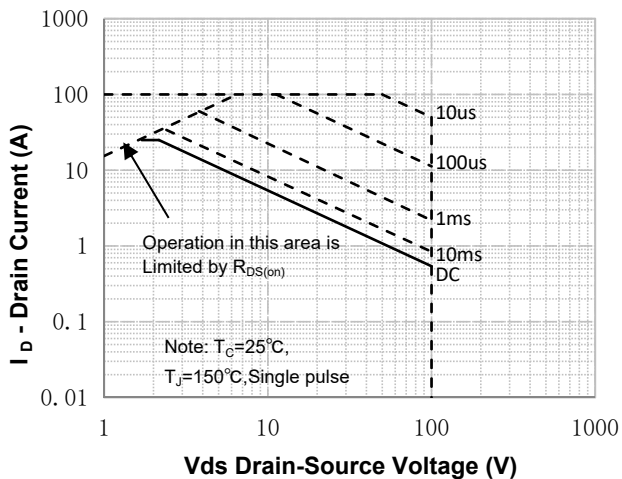
**N- Channel Typical Characteristics** (Continued)



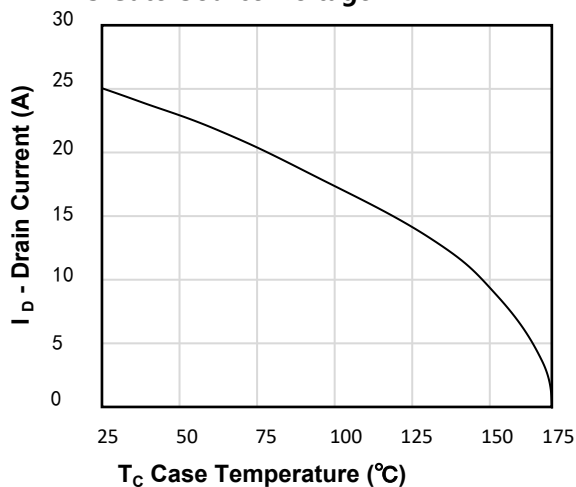
**Figure 6. Gate Charge Characteristics**



**Figure 7. On-Resistance Variation vs Gate-Source Voltage**

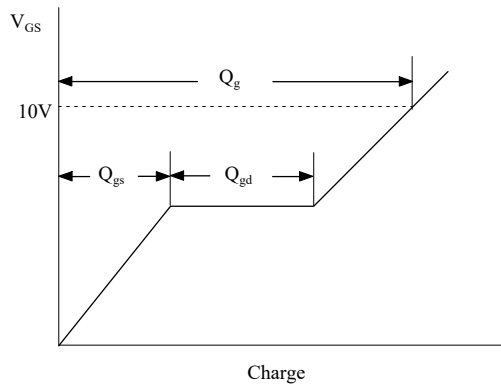
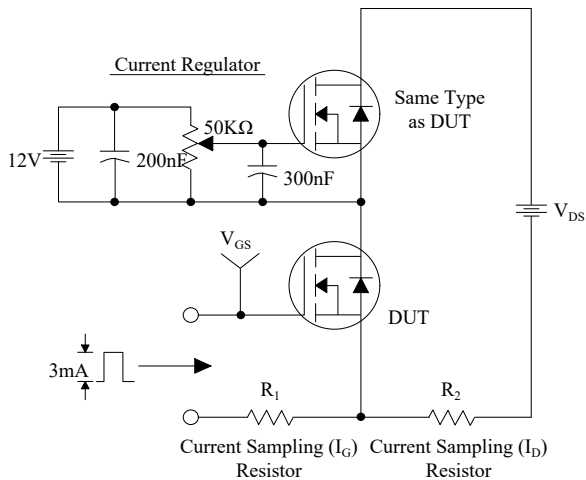


**Figure 8. Maximum Safe Operating Area**

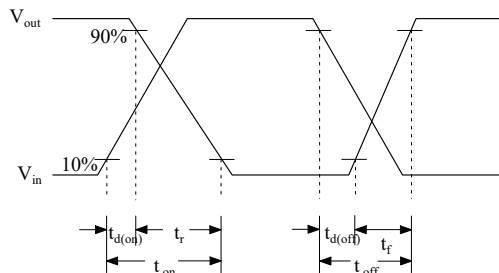
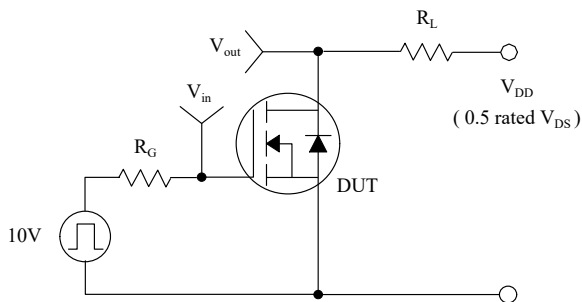


**Figure 9. Maximum Drain Current vs Case Temperature**

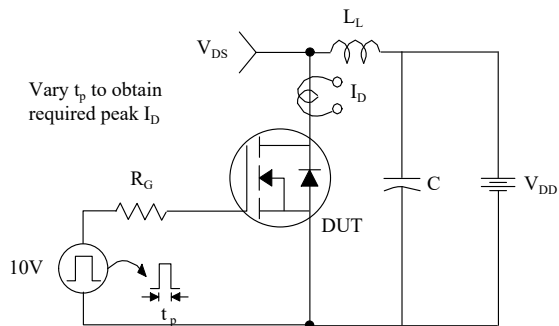
### Gate Charge Test Circuit & Waveform



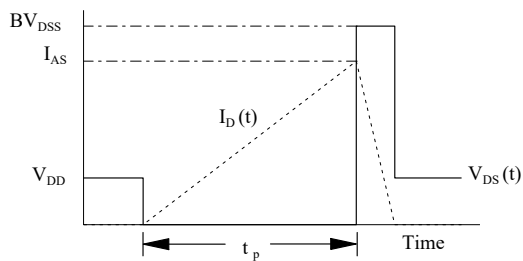
### Resistive Switching Test Circuit & Waveforms



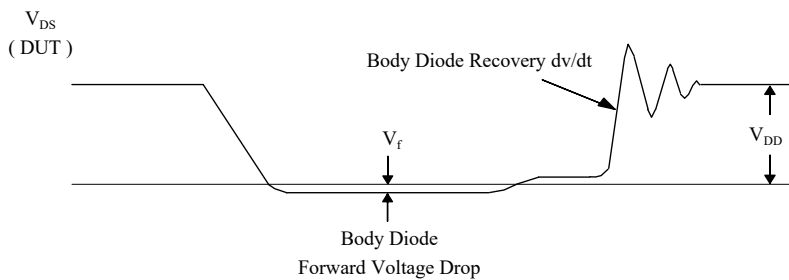
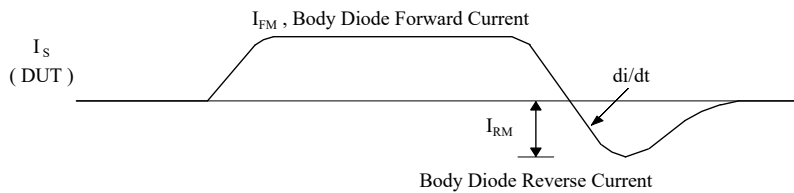
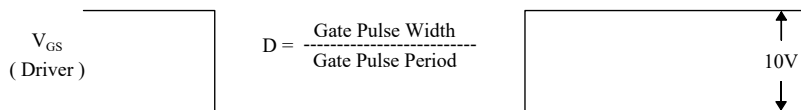
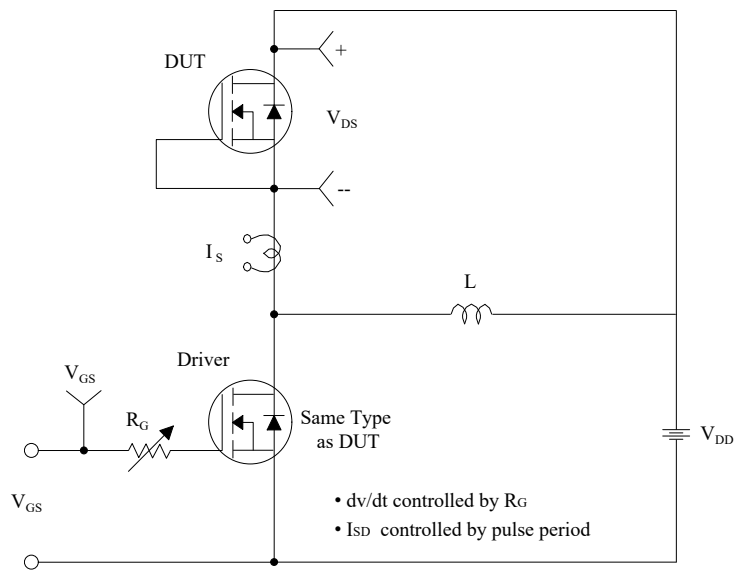
### Unclamped Inductive Switching Test Circuit & Waveforms



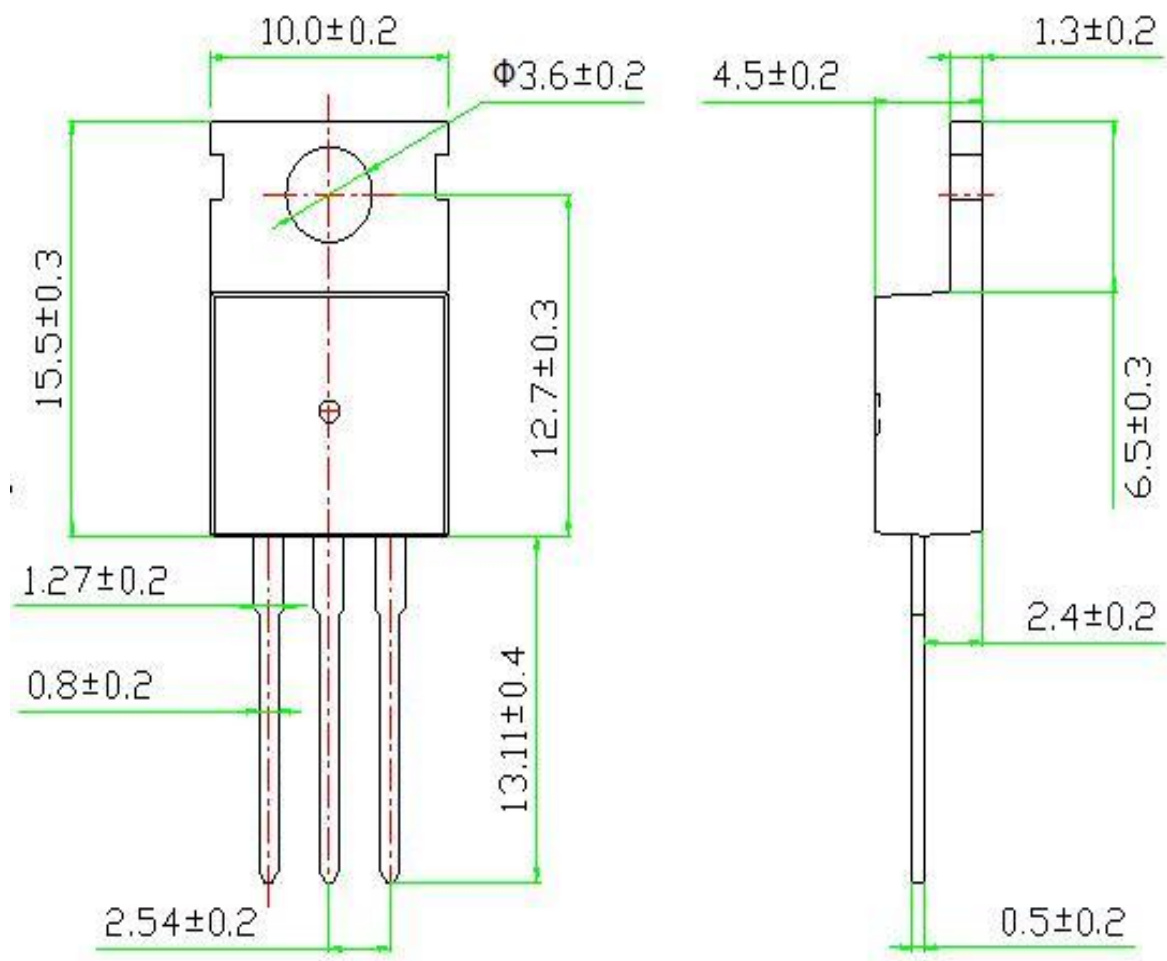
$$E_{AS} = \frac{1}{2} L_L I_{AS}^2$$



## Peak Diode Recovery dv/dt Test Circuit & Waveforms



TO-220C OUTLINE



NOTE:

- 1The plastic package is not marked as smooth surfaceRa=0.1;Subglossy surfaceRa=0.8
- 2.Undeclared tolerance  $\pm 0.25$ ,Unmarked filletRmax=0.25

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