

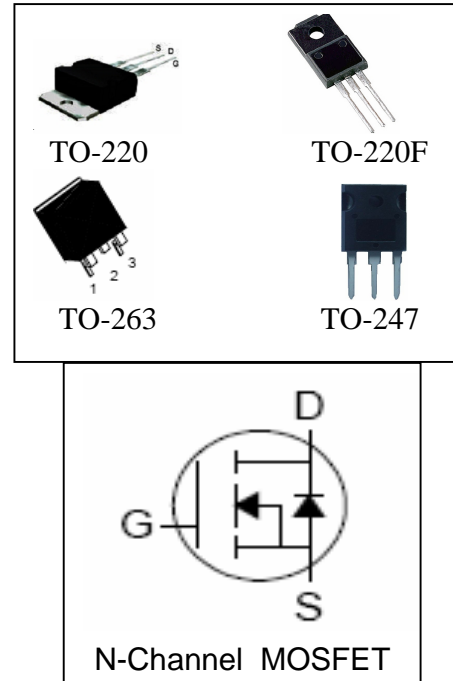
### Features

- 500V/11.5A,  
 $R_{DS(ON)} = 0.55\Omega$  (Typ.) @  $V_{GS} = 10V$
- Gate Charge Minimized
- Low  $C_{rss}$
- Extremely High  $dv/dt$  Capability
- 100% Avalanche Tested
- Lead Free and Green Available

### Applications

- High efficiency SMPS
- Lighting
- Off-Line Adaptors

### Pin Description



### Absolute Maximum Ratings

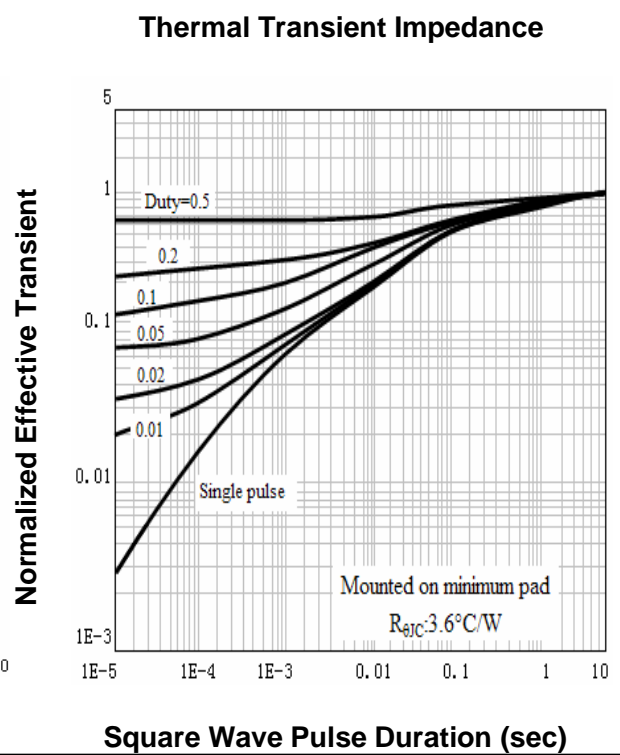
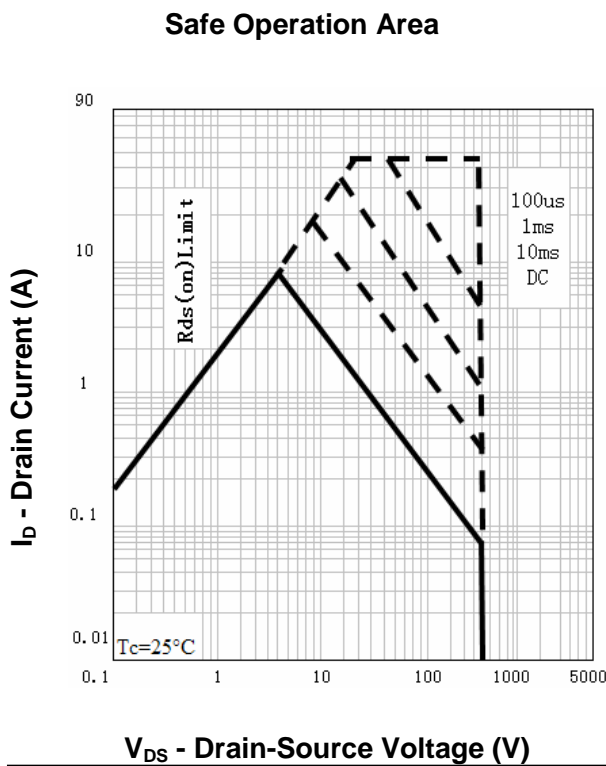
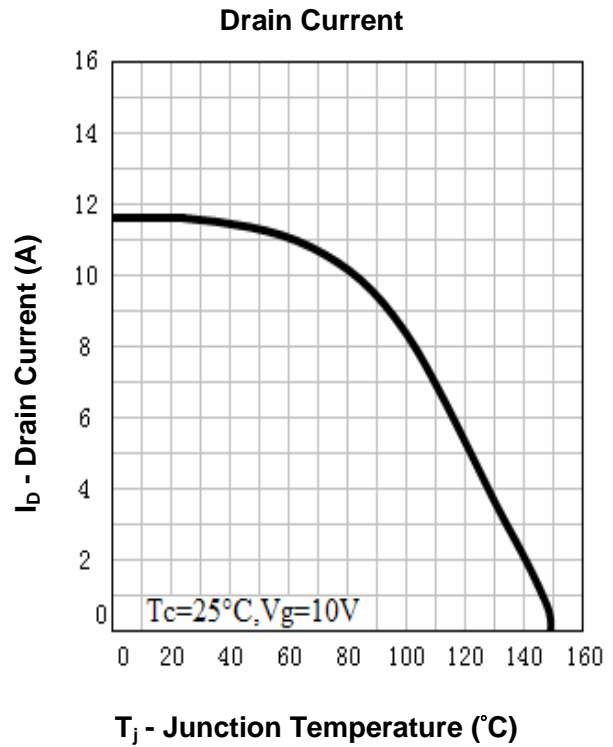
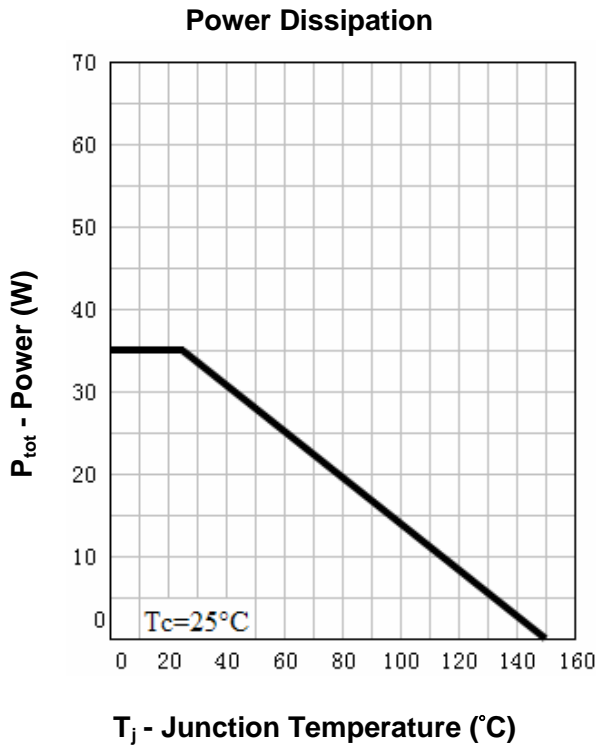
Symbol	Parameter	Rating	Unit
<b>Common Ratings</b> ( $T_C = 25^\circ C$ Unless Otherwise Noted)			
$V_{DSS}$	Drain-Source Voltage	500	V
$V_{GSS}$	Gate-Source Voltage	$\pm 30$	
$T_J$	Maximum Junction Temperature	150	$^\circ C$
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$
$I_S$	Diode Continuous Forward Current	$T_C = 25^\circ C$ 11.5	A
<b>Mounted on Large Heat Sink</b>			
$I_{DP}$	300 $\mu s$ Pulse Drain Current Tested	$T_C = 25^\circ C$ 44 <sup>①</sup>	A
$I_D$	Continuous Drain Current ( $V_{GS} = 10V$ )	$T_C = 25^\circ C$ 11.5 <sup>①</sup>	A
		$T_C = 100^\circ C$ 8.1 <sup>①</sup>	
$P_D$	Maximum Power Dissipation	$T_C = 25^\circ C$ 35	W
		$T_C = 100^\circ C$ 14	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	3.6	$^\circ C/W$
<b>Drain-Source Avalanche Ratings</b>			
$E_{AS}$ <sup>②</sup>	Avalanche Energy, Single Pulsed	320	mJ

**Electrical Characteristics** ( $T_C=25^\circ\text{C}$  Unless Otherwise Noted)

Symbol	Parameter	Test Condition	RU5H11P			Unit
			Min.	Typ.	Max.	
<b>Static Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=250\mu A$	500			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=500V, V_{GS}=0V$ $T_J=85^\circ\text{C}$			1	$\mu A$
					30	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	3		5	V
$I_{GSS}$	Gate Leakage Current	$V_{GS}=\pm 30V, V_{DS}=0V$			$\pm 100$	nA
$R_{DS(ON)}^{(3)}$	Drain-Source On-state Resistance	$V_{GS}=10V, I_{DS}=6A$		0.55	0.7	$\Omega$
<b>Diode Characteristics</b>						
$V_{SD}^{(3)}$	Diode Forward Voltage	$I_{SD}=10A, V_{GS}=0V$			1.3	V
$t_{rr}$	Reverse Recovery Time	$I_{SD}=10A, dI_{SD}/dt=100A/\mu s$		270		ns
$Q_{rr}$	Reverse Recovery Charge			2.1		$\mu C$
<b>Dynamic Characteristics</b> <sup>(4)</sup>						
$R_G$	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$		4.9		$\Omega$
$C_{iss}$	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=250V,$ Frequency=1.0MHz		1070		pF
$C_{oss}$	Output Capacitance			153		
$C_{rss}$	Reverse Transfer Capacitance			17		
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=250V, R_L=25\Omega,$ $I_{DS}=10A, V_{GEN}=10V,$ $R_G=10\Omega$		19		ns
$t_r$	Turn-on Rise Time			45		
$t_{d(OFF)}$	Turn-off Delay Time			51		
$t_f$	Turn-off Fall Time			38		
<b>Gate Charge Characteristics</b> <sup>(4)</sup>						
$Q_g$	Total Gate Charge	$V_{DS}=400V, V_{GS}=10V,$ $I_{DS}=10A$		31		nC
$Q_{gs}$	Gate-Source Charge			7		
$Q_{gd}$	Gate-Drain Charge			9		

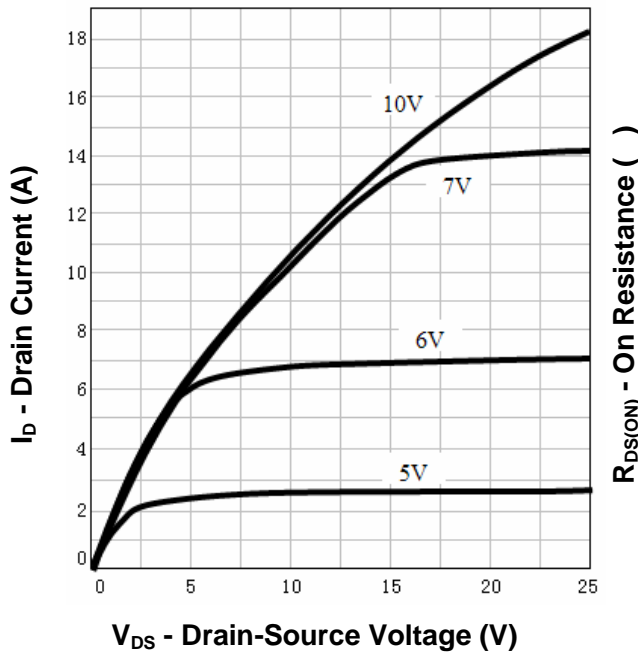
- Notes: ① Current limited by maximum junction temperature.  
 ② Limited by  $T_{Jmax}, I_{AS}=8A, V_{DD}=100V, R_G=50\Omega$ , Starting  $T_J=25^\circ\text{C}$ .  
 ③ Pulse test; Pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .  
 ④ Guaranteed by design, not subject to production testing.

**Typical Characteristics**

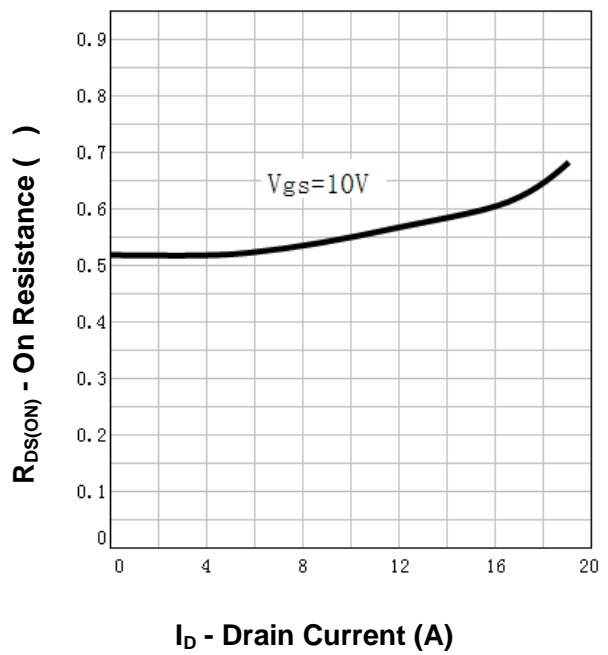


**Typical Characteristics**

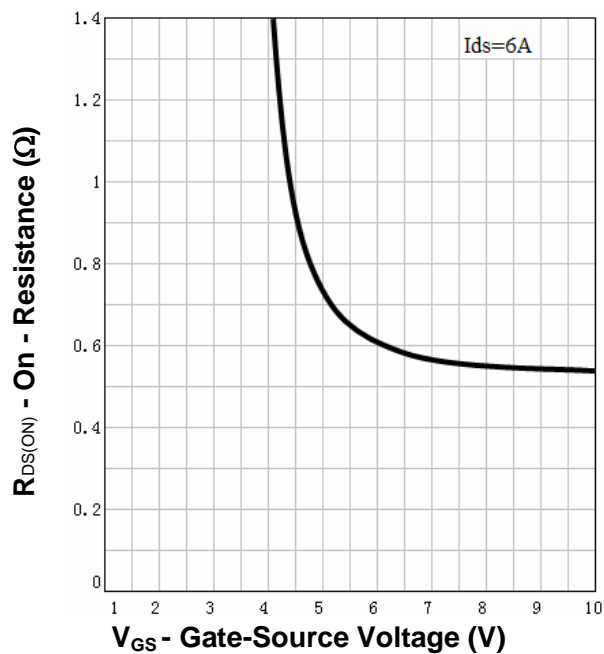
**Output Characteristics**



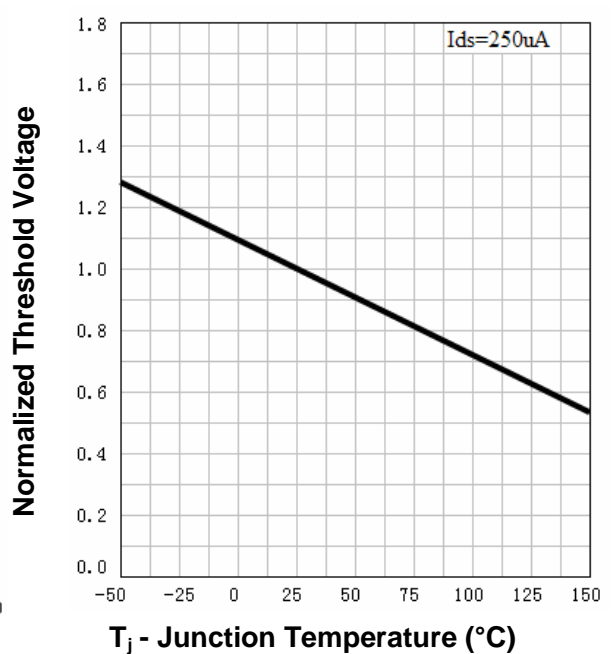
**Drain-Source On Resistance**



**Drain-Source On Resistance**

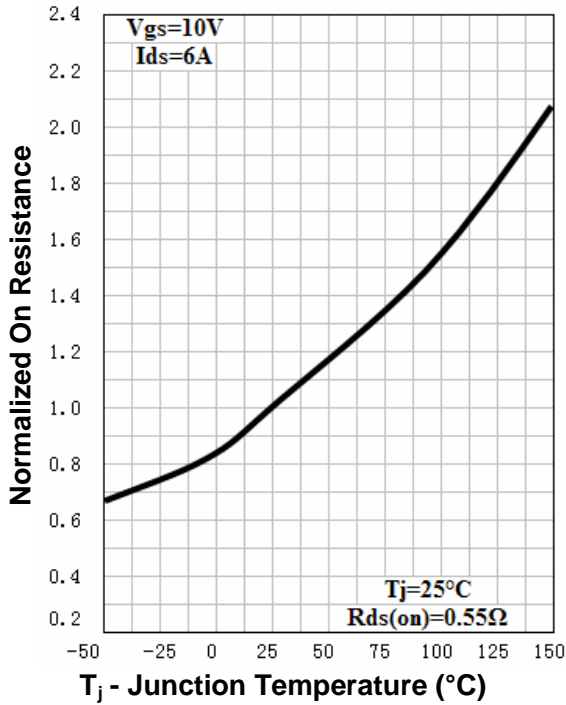


**Gate Threshold Voltage**

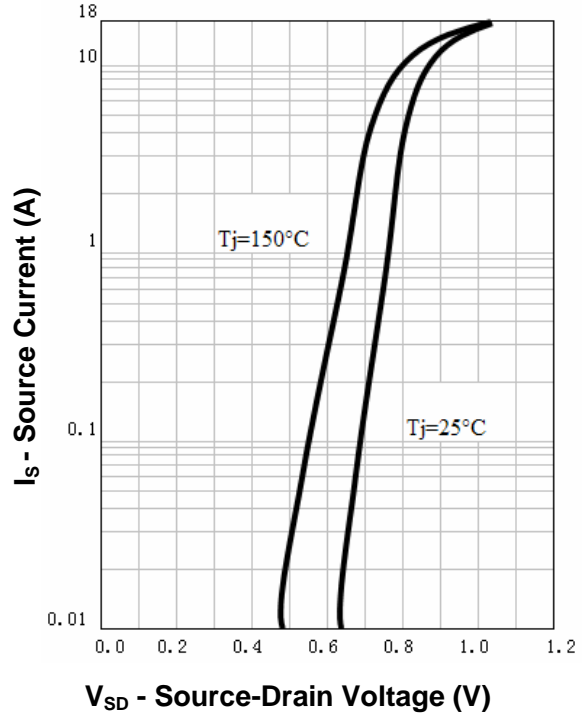


**Typical Characteristics**

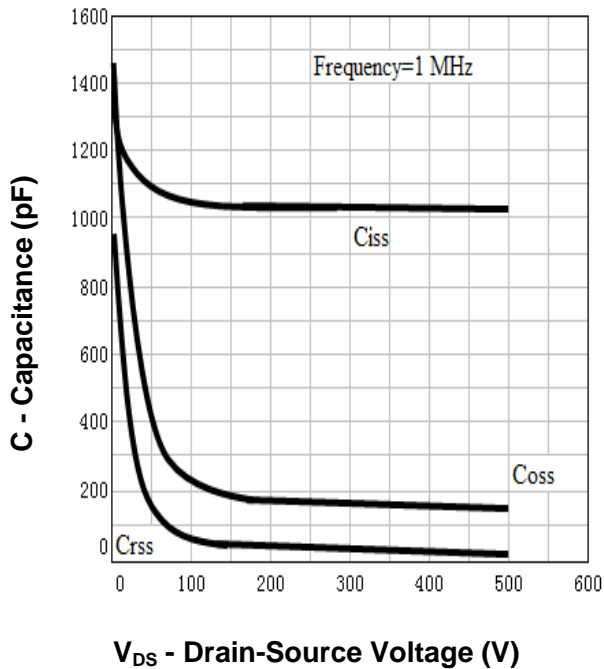
**Drain-Source On Resistance**



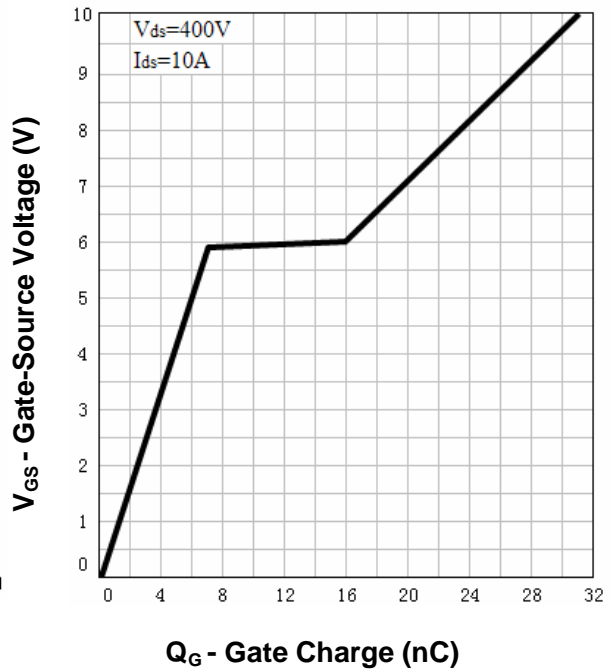
**Source-Drain Diode Forward**



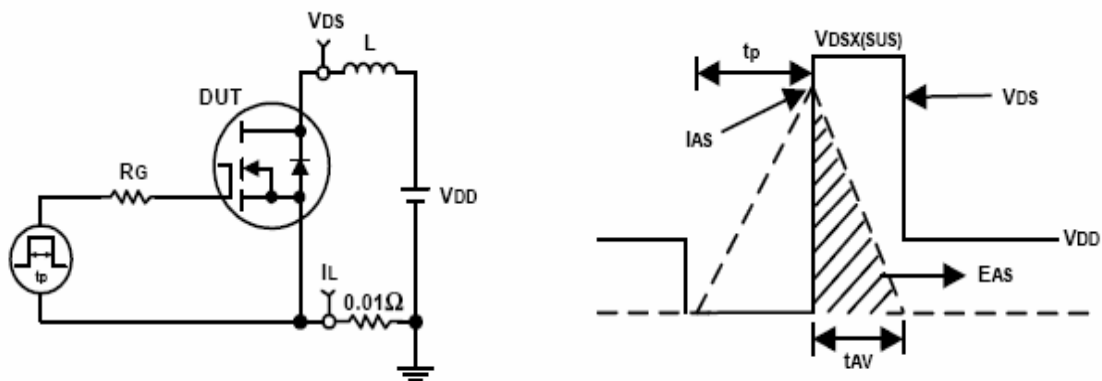
**Capacitance**



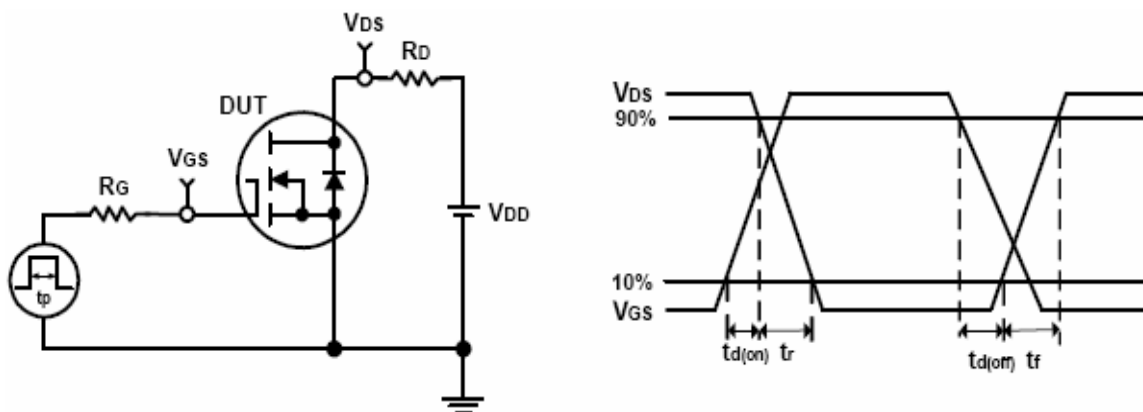
**Gate Charge**



### Avalanche Test Circuit and Waveforms



### Switching Time Test Circuit and Waveforms



**Ordering and Marking Information****RU5H11****Package (Available)**

P: TO-220F

**Operating Temperature Range**

C : -55 to 175 °C

**Assembly Material**

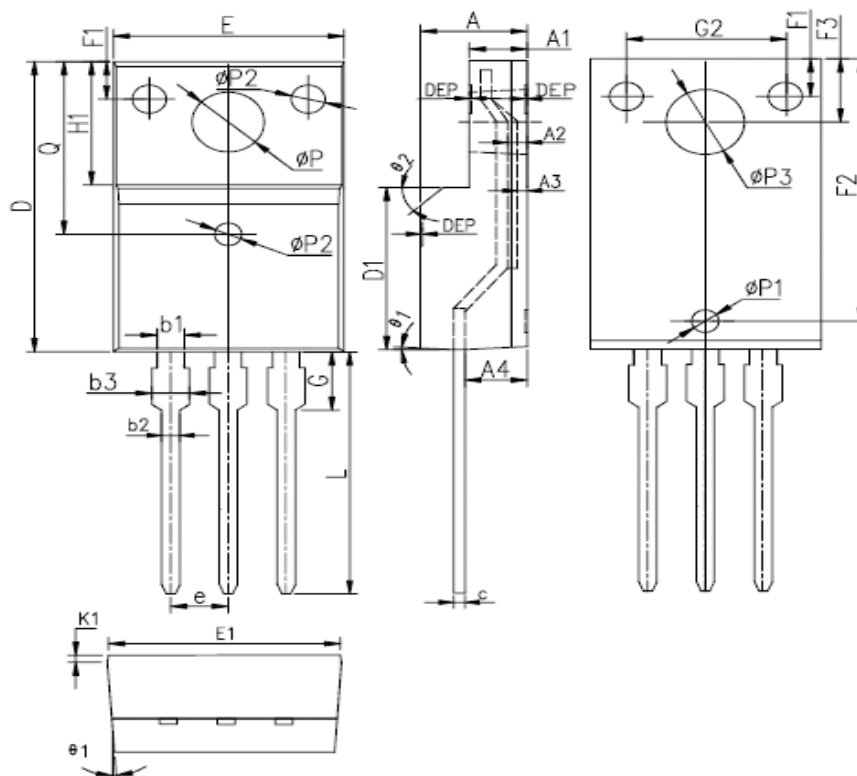
G : Green &amp; Lead Free

**Packaging**

T : TUBE

**Package Information**

**TO-220F-3L**



SYMBOL	MM			INCH			SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX		MIN	NOM	MAX	MIN	NOM	MAX
E	9.96	10.16	10.36	0.392	0.400	0.408	$\phi p3$	-	3.450	-	-	0.136	-
A	4.50	4.70	4.90	0.177	0.185	0.193	$\theta 1$	5°	7°	9°	5°	7°	9°
A1	2.34	2.54	2.74	0.092	0.100	0.108	$\theta 2$	-	45°	-	-	45°	-
A2	0.95	1.05	1.15	0.037	0.041	0.045	DEP	0.05	0.10	0.15	0.002	0.004	0.006
A3	0.42	0.52	0.62	0.017	0.020	0.024	F1	1.90	2.00	2.10	0.075	0.079	0.083
A4	2.65	2.75	2.85	0.104	0.108	0.112	F2	13.61	13.81	14.01	0.536	0.544	0.552
c	-	0.50	-	-	0.020	-	F3	3.20	3.30	3.40	0.126	0.130	0.134
D	15.67	15.87	16.07	0.617	0.625	0.633	G	3.25	3.45	3.65	0.128	0.136	0.144
Q	8.80	9.00	9.20	0.346	0.354	0.362	G1	5.90	6.00	6.10	0.232	0.236	0.240
H1	6.48	6.68	6.88	0.255	0.263	0.271	G2	6.90	7.00	7.10	0.272	0.276	0.280
e	2.54BSC			0.1BSC			b1	1.17	1.20	1.24	0.046	0.047	0.048
$\phi p$	-	3.183	-	-	0.125	-	b2	0.77	0.8	0.85	0.030	0.031	0.033
L	12.78	12.98	13.18	0.503	0.511	0.519	b3	1.10	1.30	1.50	0.043	0.051	0.059
D1	8.99	9.19	9.39	0.354	0.362	0.370	E1	9.8	10.00	10.20	0.386	0.394	0.412
$\phi p1$	1.40	1.50	1.60	0.055	0.059	0.063	K1	0.75	0.8	0.85	0.030	0.031	0.033
$\phi p2$	1.15	1.20	1.25	0.045	0.047	0.049							

ALL DIMENSIONS REFER TO JEDEC STANDARD  
DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS



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