

## General Description

The FDA2906AH uses advanced Trench technology and design to provide excellent  $R_{DS(ON)}$  with low gate charge.

This device is suitable for use in PWM, load switching and general purpose applications.

### Features

N-Channel, 5V Logic Level Control

Enhancement Mode

Very low on-resistance  $R_{DS(on)}$  @  $V_{GS}=10V$

100% Avalanche Tested

Pb-free lead plating; ROHS compliant



$V_{DS}$	60	V
$R_{DS(on)MAX}@V_{GS}=10V$	5.5	mΩ
$I_D$	130	A

## Applications

Power switching application

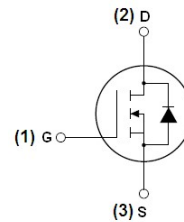
Hard Switched and High Frequency Circuits

Uninterruptible Power Supply

Isolated DC/DC Converters in Telecom and Industrial



TO-3P-3L Top view



Schematic diagram

## Package Marking And Ordering Information

Part ID	Package Type	Marking	Tape and Reel information
FDA2906AH	TO-3P	FDA2906A	30pcs/Tube

## Maximum ratings, at $T_j=25^{\circ}C$ , unless otherwise specified

Symbol	Parameter	Rating	Unit
$V_{(BR)DSS}$	Drain –Source breakdown voltage	60	V
$I_S$	Diode continuous forward current	$T_c=25^{\circ}C$ 130	A
$I_D$	Continuous drain current @ $V_{GS}=10V$	$T_c=25^{\circ}C$ 130	A
$I_{DM}$	Pulse drain current tested①	$T_c=25^{\circ}C$ 300	A
$E_{AS}$	Avalanche energy, single pulsed②	700	mJ
$P_D$	Maximum power dissipation	$T_c=25^{\circ}C$ 200	W
$V_{GS}$	Gate-Source voltage	±25	V
$T_{STG} T_J$	Storage and operating temperature range	-55 to 175	$^{\circ}C$

## Thermal Characteristic

Symbol	Parameter	Typical	Unit
$R_{QJC}$	Thermal Resistance-Junction to Case	0.65	$^{\circ}\text{C}/\text{W}$
$R_{QJA}$	Thermal Resistance-Junction to Ambient	51	$^{\circ}\text{C}/\text{W}$

## Typical Characteristics

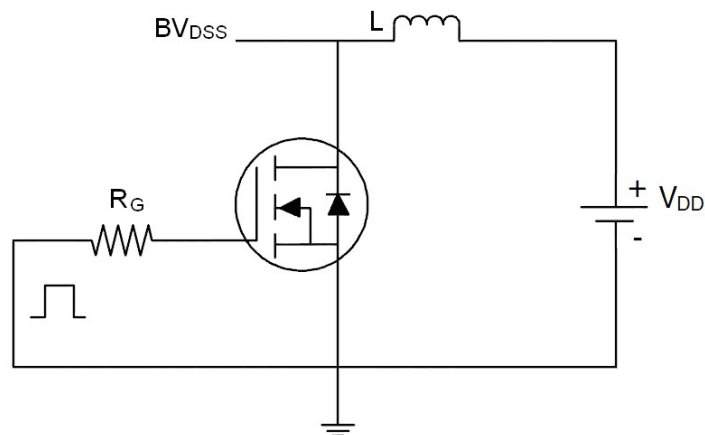
Symbol	Parameter	Condition	Min	Type	Max	Unit
<b>Static Electrical Characteristics @<math>T_j=25^{\circ}\text{C}</math> ( unless otherwise stated)</b>						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu\text{A}$	60			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=48V, V_{GS}=0V$			1	$\mu\text{A}$
	Zero Gate Voltage Drain Current( $T_j=125^{\circ}\text{C}$ )	$V_{DS}=48V, V_{GS}=0V$			100	$\mu\text{A}$
$I_{GSS}$	Gate-Body Leakage Current	$V_{GS}=\pm 25V, V_{DS}=0V$			$\pm 100$	nA
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	2		4	V
$R_{DS(ON)}$	Drain-Source On-State Resistance <sup>③</sup>	$V_{GS}=10V, I_D=60A$		5.5	6.5	m $\Omega$
<b>Dynamic Electrical Characteristics @<math>T_j=25^{\circ}\text{C}</math> ( unless otherwise stated )</b>						
$C_{iss}$	Input Capacitance	$V_{DS}=48V,$		3000		PF
$C_{oss}$	Output Capacitance	$V_{GS}=0V,$		430		PF
$C_{rss}$	Reverse Transfer Capacitance	$F=1\text{MHz}$		240		PF
$R_g$	Gate Resistance	$F=1\text{MHz}$		2.1		$\Omega$
$Q_g$	Total Gate Charge	$V_{DS}=30V,$		106		nC
$Q_{gs}$	Gate-Source Charge	$I_D=40A,$		20		nC
$Q_{gd}$	Gate-Drain Charge	$V_{GS}=10V$		35		nC
<b>Switching Characteristics</b>						
$t_{d(on)}$	Turn-on Delay time	$V_{DD}=30V$		34		nS
$t_r$	Turn-on Rise time	$I_D=1A$		30		nS
$t_{d(off)}$	Turn-off Delay time	$R_G=6\Omega$		124		nS
$t_f$	Turn-off Fall time	$V_{GS}=10V$		64		nS
<b>Source-Drain Diode Characteristics</b>						
$V_{SD}$	Forward on voltage	$I_{SD}=20A, V_{GS}=0V$			1.2	V
$t_{rr}$	Reverse Recovery Time	$T_j=25^{\circ}\text{C}, I_{SD}=40A$		74		nS
$Q_{rr}$	Reverse Recovery Charge	$V_{GS}=0V, di/dt=500A/\mu\text{s}$		140		nC

Note:

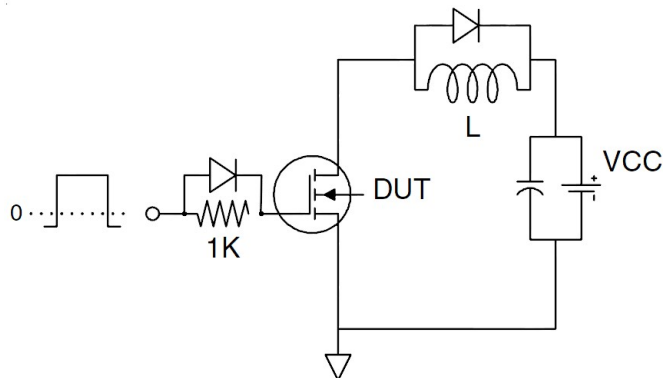
- ① Repetitive rating; pulse width limited by max, junction temperature.
- ② Limited by  $T_{jmax}$ , starting  $T_j=25^{\circ}\text{C}$ ,  $L=0.5\text{mH}$ ,  $R_G=25\Omega$ ,  $I_{AS}=20A$ ,  $V_{GS}=10V$ , Part not recommended for use above this value
- ③ Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$

## Test circuit

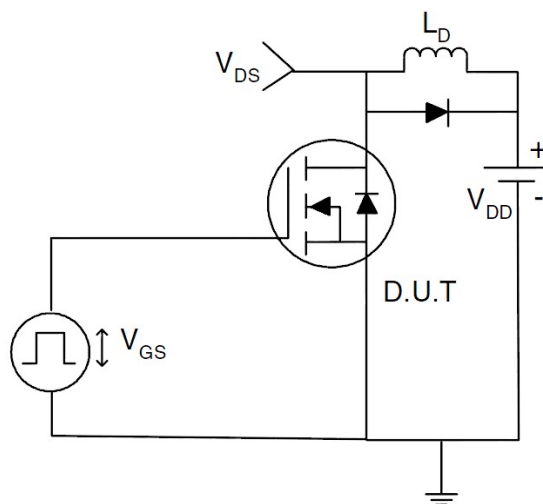
### (1) $E_{AS}$ test circuits



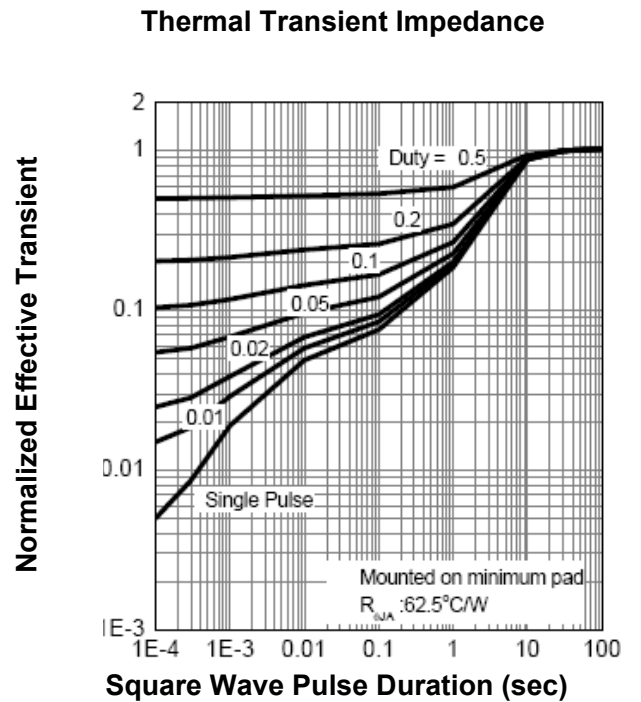
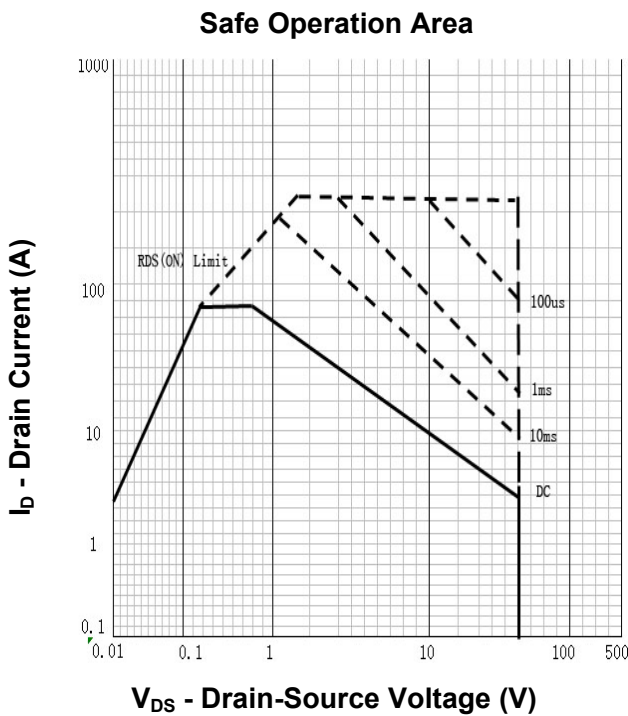
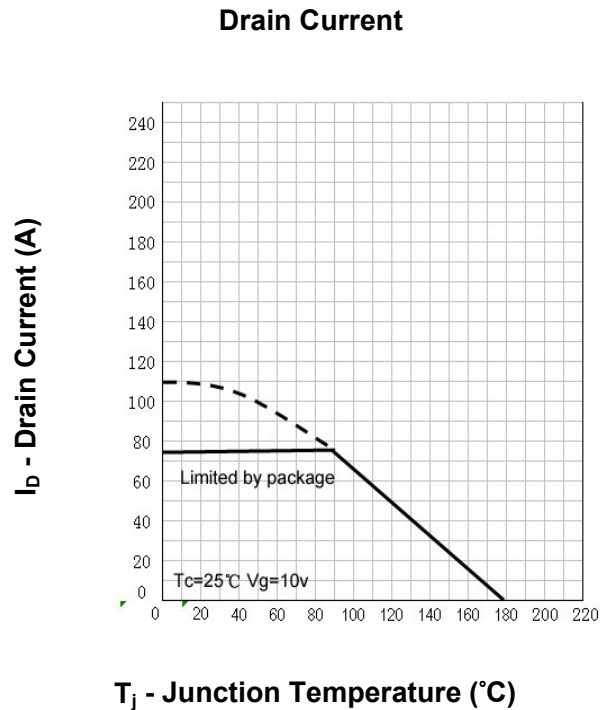
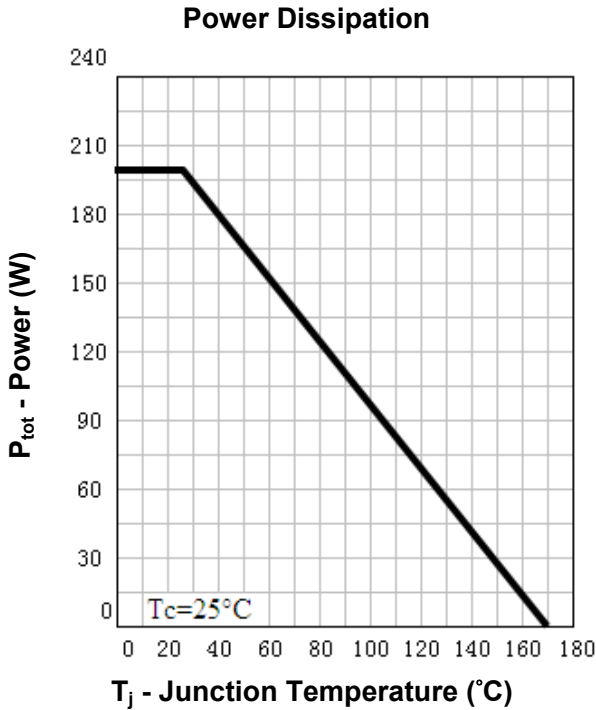
### (2) Gate charge test circuit



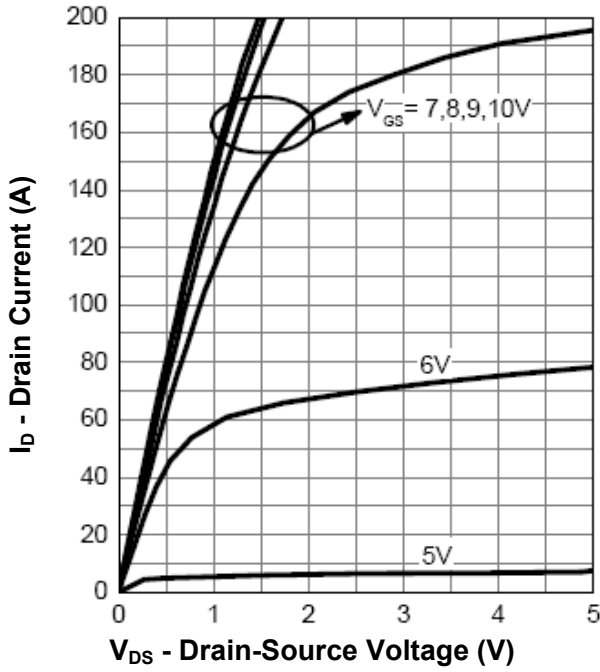
### (3) Switch time test circuit



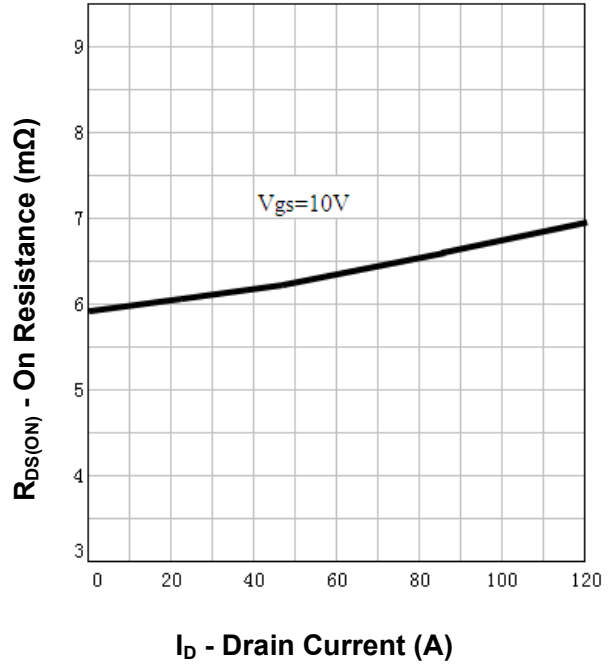
**Typical Characteristics**



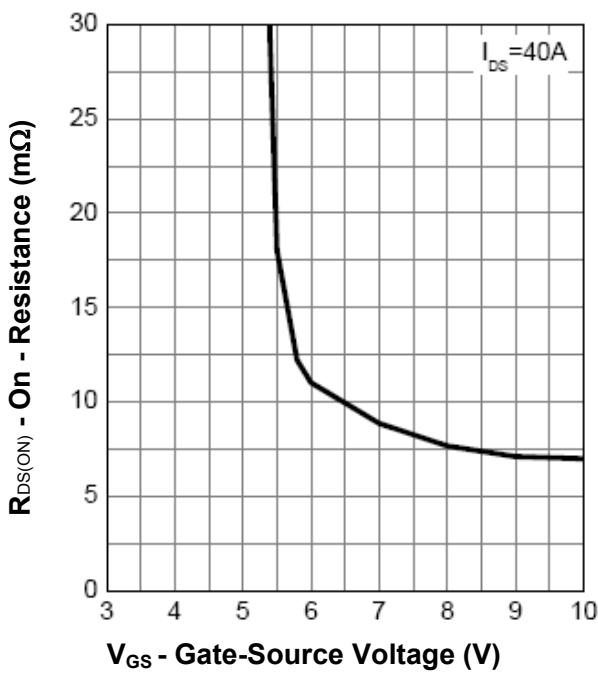
Output Characteristics



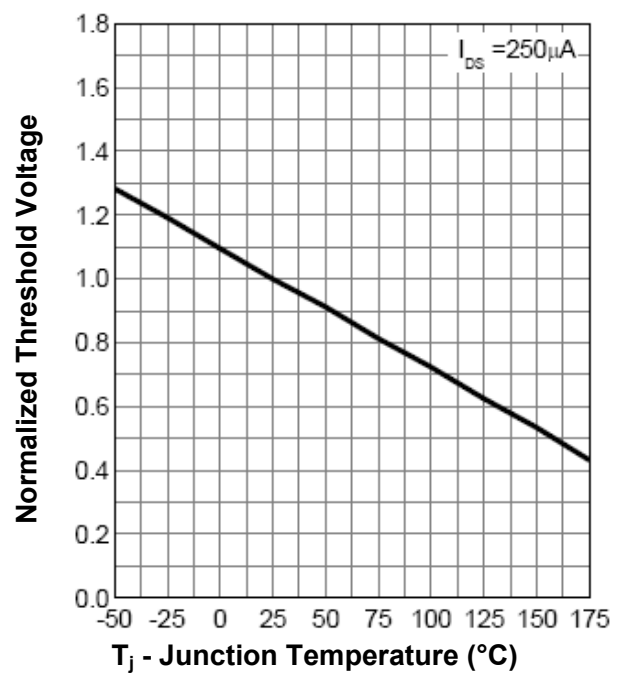
Drain-Source On Resistance



Drain-Source On Resistance

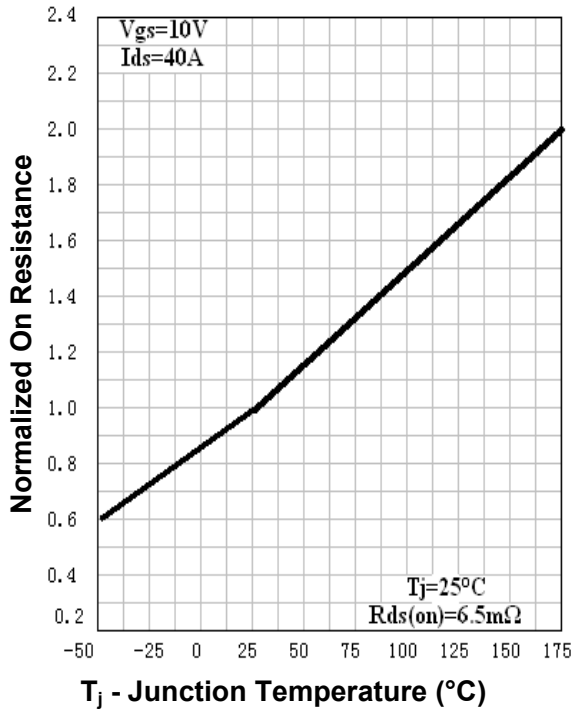


Gate Threshold Voltage

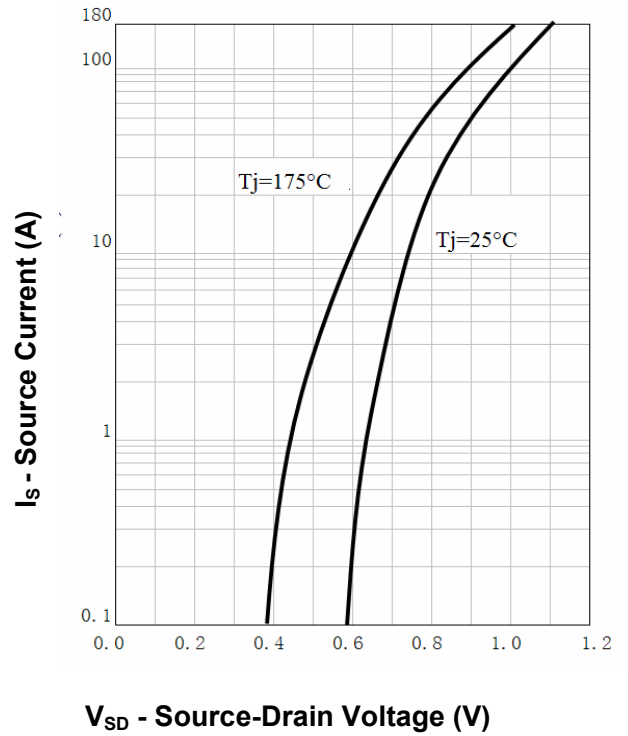


**Typical Characteristics**

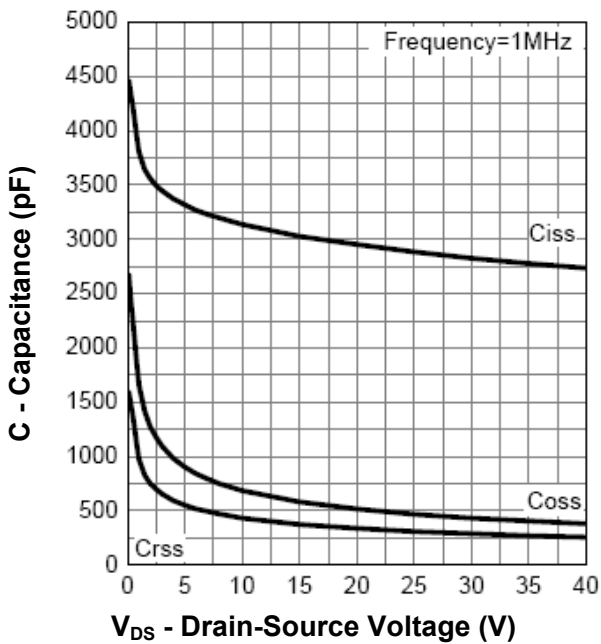
**Drain-Source On Resistance**



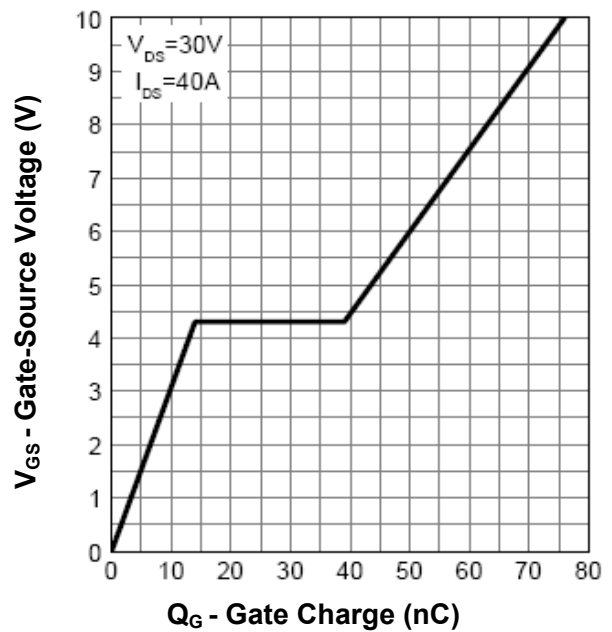
**Source-Drain Diode Forward**



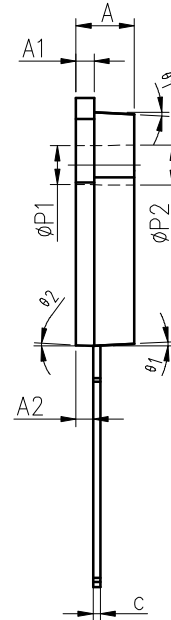
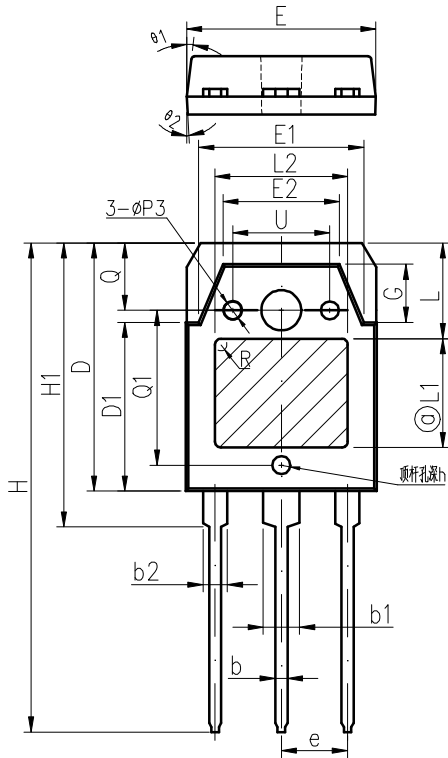
**Capacitance**



**Gate Charge**



## TO-3P-3L



### COMMON DIMENSIONS

SYMBOL	mm		
	MIN	NOM	MAX
A	4.60	4.80	5.00
A1	1.40	1.50	1.60
A2	1.33	1.38	1.43
b	0.80	1.00	1.20
b1	2.80	3.00	3.20
b2	1.80	2.00	2.20
c	0.50	0.60	0.70
D	19.75	19.90	20.05
D1	13.70	13.90	14.10
D2		12.90	REF
E	15.40	15.60	15.80
E1	13.40	13.60	13.80
E2	9.40	9.60	9.80
e		5.45	TYP
G	4.60	4.80	5.00
H	40.30	40.50	40.70
H1	23.20	23.40	23.60
h	0.05	0.10	0.15
L		7.40	TYP
L1		9.00	TYP
L2		11.00	TYP
L3		1.00	REF
P	6.90	7.00	7.10
P1		3.20	REF
P2		3.50	REF
P3	1.40	1.50	1.60
R		0.50	REF
Q		5.00	REF
Q1	12.56	12.76	12.96
U	7.8	8	8.2
$\theta$ 1	5°	7°	9°
$\theta$ 2	1°	3°	5°
$\theta$ 3		60°	REF

