

200V N-Ch Power MOSFET

Features:

- ◇ High Speed Power Smooth Switching
- ◇ Enhanced Body diode dv/dt capability
- ◇ Enhanced Avalanche Ruggedness
- ◇ 100% UIS Tested, 100% Rg Tested
- ◇ Lead Free

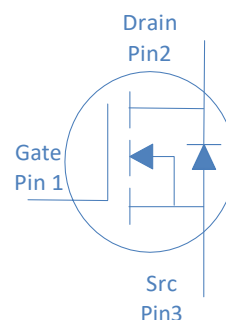
Application:

- ◇ Synchronous Rectification in SMPS
- ◇ Hard Switching and High Speed Circuit
- ◇ Power Tools
- ◇ UPS
- ◇ Motor Control

Part Number	Package	Marking
KWG3P056N20S	TO-3P	G3P056N20S

V_{DS}	200	V
$R_{DS(on),max}$	4.7	mΩ
I_D (Silicon Limited)	219	A

TO-3P



Absolute Maximum Ratings at $T_J=25^\circ\text{C}$ (unless otherwise specified)

Parameter	Symbol	Conditions	Value	Unit
Continuous Drain Current(Silicon Limited)	I_D	$T_C=25^\circ\text{C}$	219	A
		$T_C=100^\circ\text{C}$	155	
Continuous Drain Current(Package Limited)	I_D	$T_C=25^\circ\text{C}$	140	
Drain to Source Voltage	V_{DS}	-	200	V
Gate to Source Voltage	V_{GS}	-	± 20	V
Pulsed Drain Current	I_{DM}	-	740	A
Avalanche Energy, Single Pulse	E_{AS}	$L=0.4\text{mH}$, $T_C=25^\circ\text{C}$	720	mJ
Power Dissipation	P_D	$T_C=25^\circ\text{C}$	600	W
Operating and Storage Temperature	T_J , T_{stg}	-	-55 to 175	$^\circ\text{C}$

Absolute Maximum Ratings

Parameter	Symbol	Max	Unit
Thermal Resistance Junction-Case	$R_{\theta JC}$	0.25	$^\circ\text{C/W}$
Thermal Resistance Junction-Ambient	$R_{\theta JA}$	40	$^\circ\text{C/W}$

Electrical Characteristics at $T_j=25^{\circ}\text{C}$ (unless otherwise specified)

Static Characteristics

Parameter	Symbol	Conditions	Value			Unit
			min	typ	max	
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	200	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	2	3	4	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS}=0V, V_{DS}=160V, T_j=25^{\circ}\text{C}$	-	-	1	μA
		$V_{GS}=0V, V_{DS}=160V, T_j=100^{\circ}\text{C}$	-	-	100	
Gate to Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
Drain to Source on Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$	-	4.7	5.6	m Ω
Transconductance	g_{fs}	$V_{DS}=5V, I_D=20A$	-	90	-	S
Gate Resistance	R_G	$V_{GS}=0V, V_{DS}$ Open, $f=1\text{MHz}$	-	2.0	-	Ω

Dynamic Characteristics

Input Capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=100V, f=1\text{MHz}$	-	9940	-	pF
Output Capacitance	C_{oss}		-	840	-	
Reverse Transfer Capacitance	C_{rss}		-	15	-	
Total Gate Charge	Q_g	$V_{DD}=100V, I_D=20A, V_{GS}=10V$	-	112	-	nC
Gate to Source Charge	Q_{gs}		-	36	-	
Gate to Drain (Miller) Charge	Q_{gd}		-	10	-	
Turn on Delay Time	$t_{d(on)}$	$V_{DD}=100V, I_D=20A, V_{GS}=10V, R_G=10\Omega,$	-	32	-	ns
Rise time	t_r		-	44	-	
Turn off Delay Time	$t_{d(off)}$		-	76	-	
Fall Time	t_f		-	20	-	

Reverse Diode Characteristics

Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_F=20A$	-	0.9	-	V
Reverse Recovery Time	t_{rr}	$V_R=100V, I_F=20A, dI_F/dt=100A/\mu s$	-	280	-	ns
Reverse Recovery Charge	Q_{rr}		-	1260	-	nC

Fig 1. Typical Output Characteristics

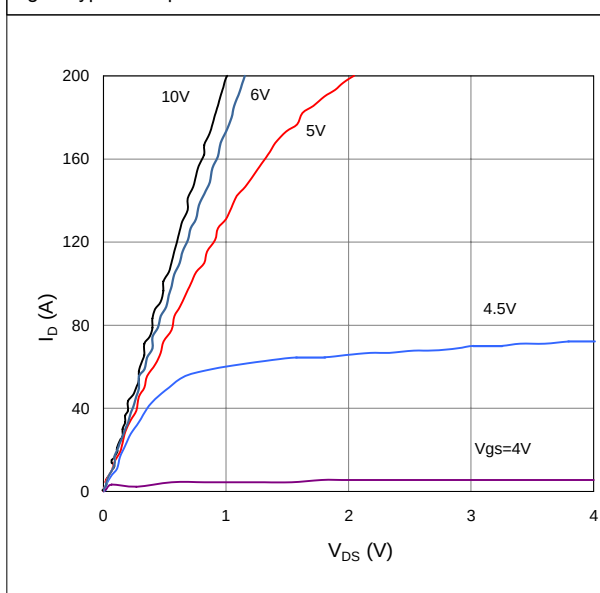


Figure 2. On-Resistance vs. Gate-Source Voltage

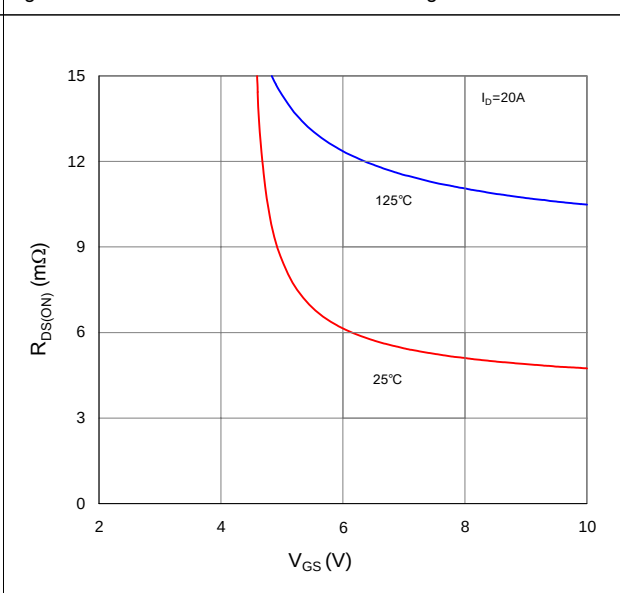


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

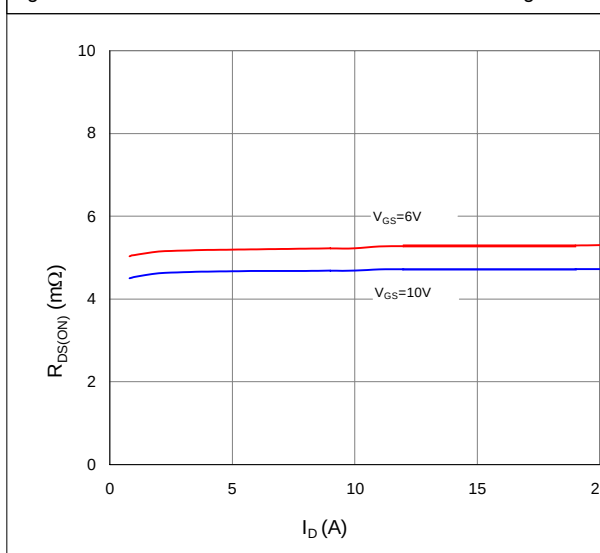


Figure 4. Normalized On-Resistance vs. Junction Temperature

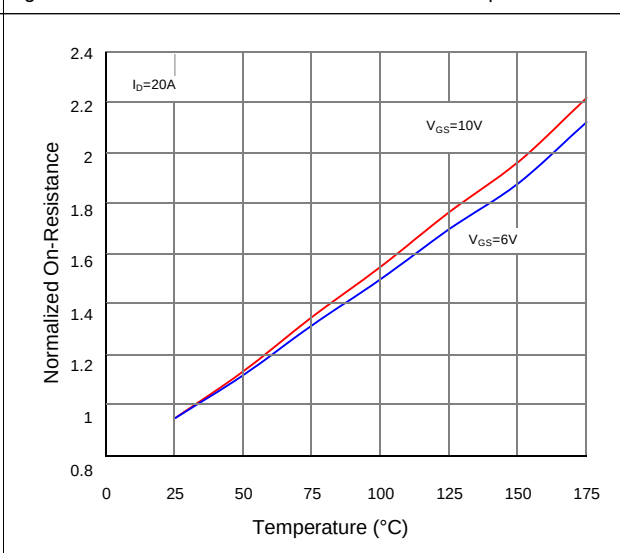


Figure 5. Typical Transfer Characteristics

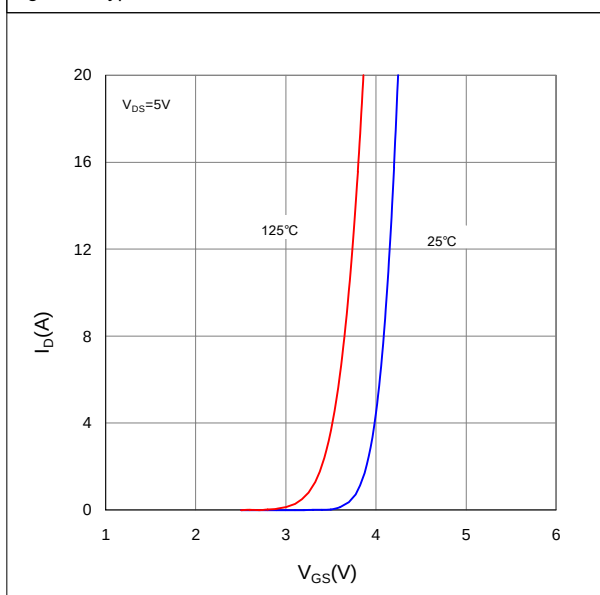


Figure 6. Typical Source-Drain Diode Forward Voltage

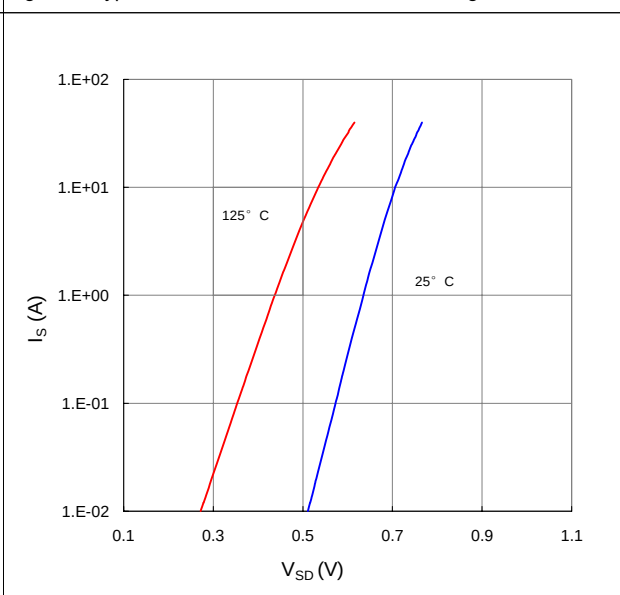


Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage

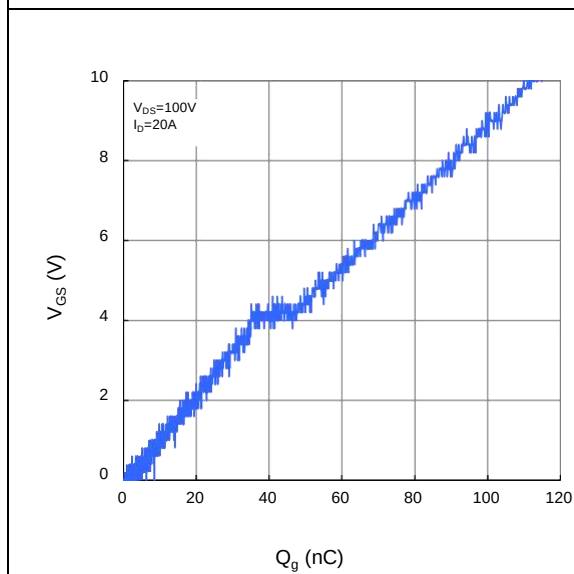


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

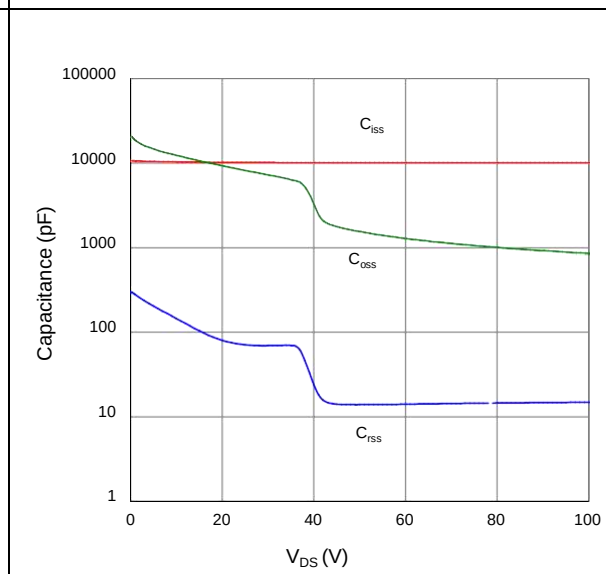


Figure 9. Maximum Safe Operating Area

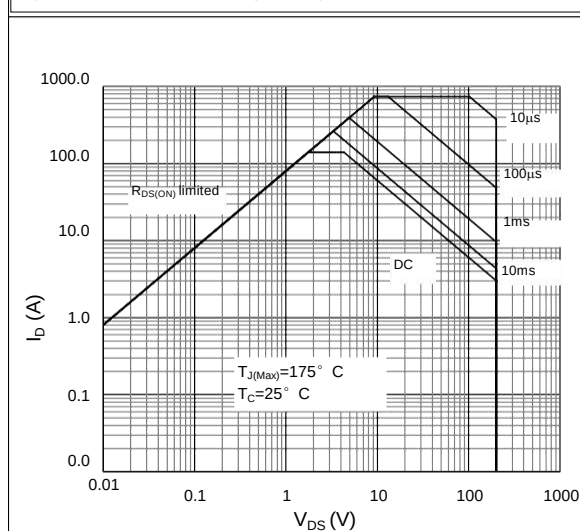


Figure 10. Maximum Drain Current vs. Case Temperature

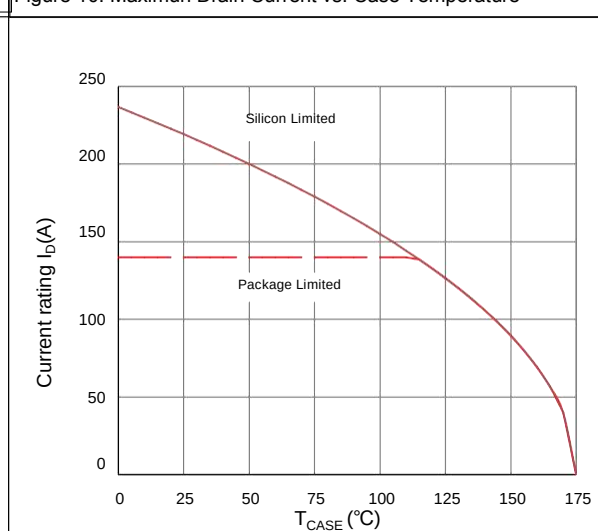
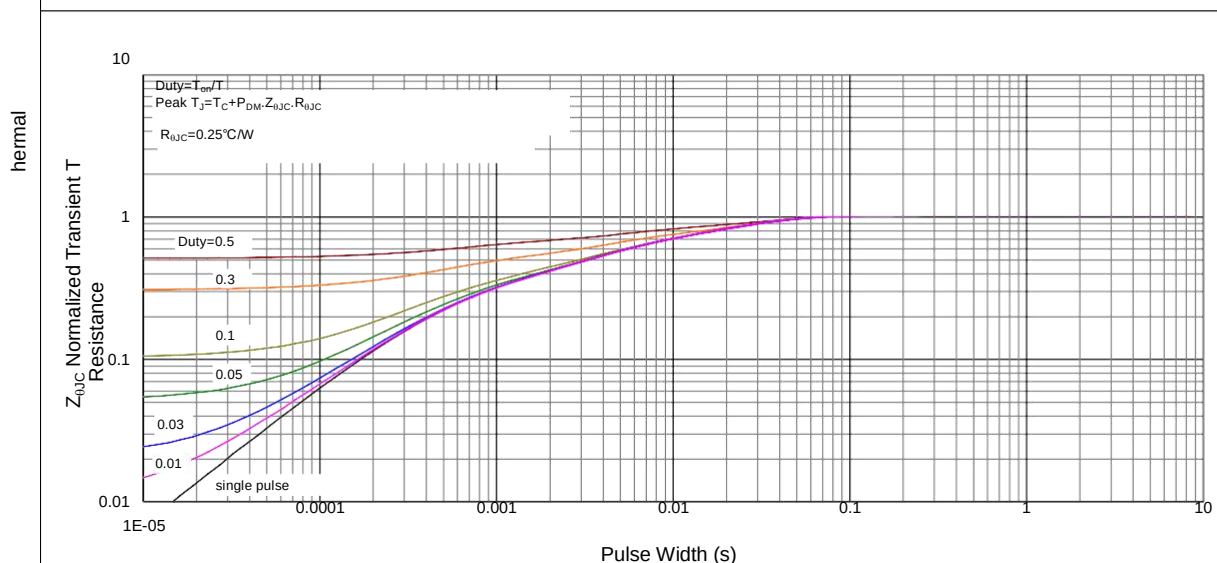
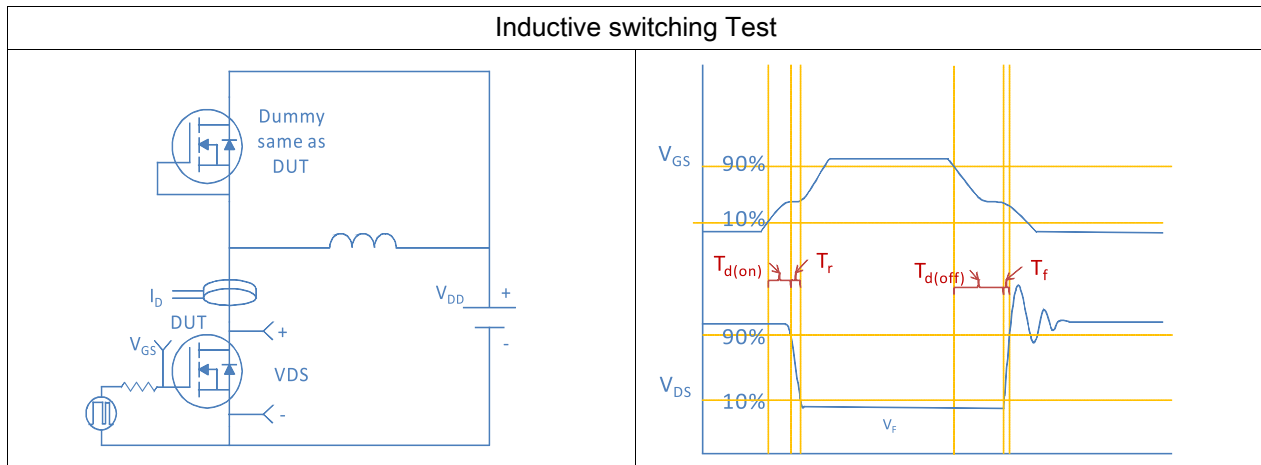


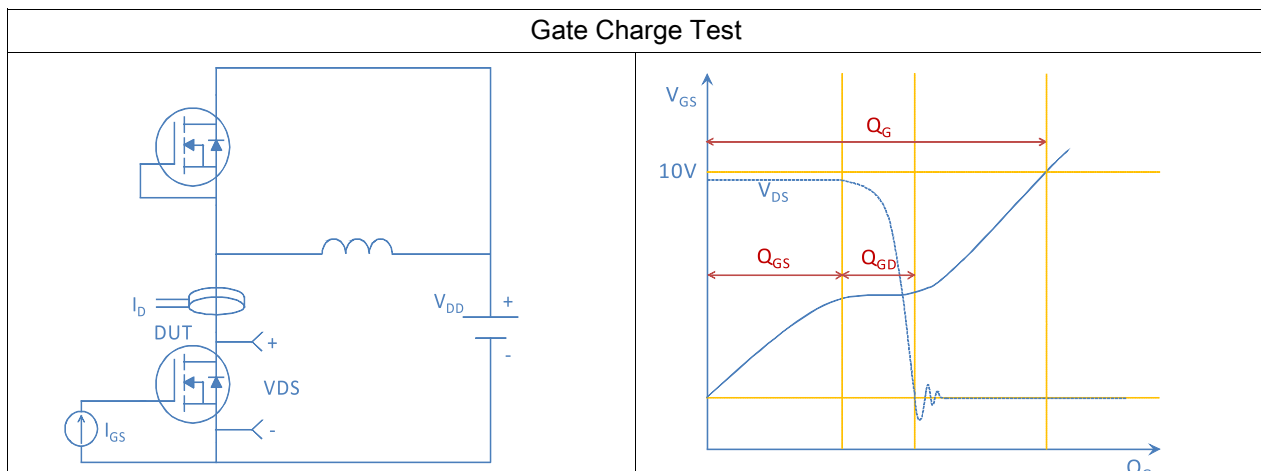
Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Case



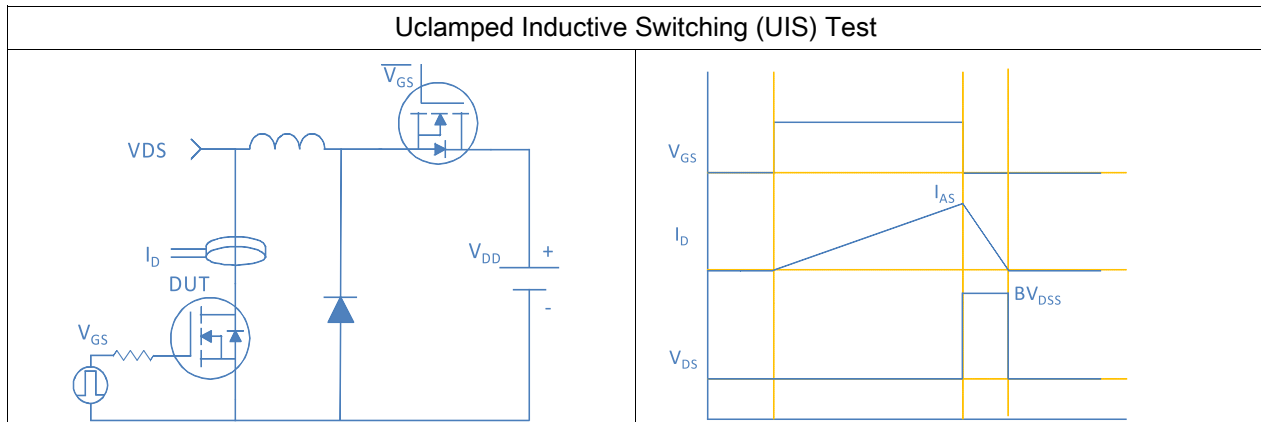
Inductive switching Test



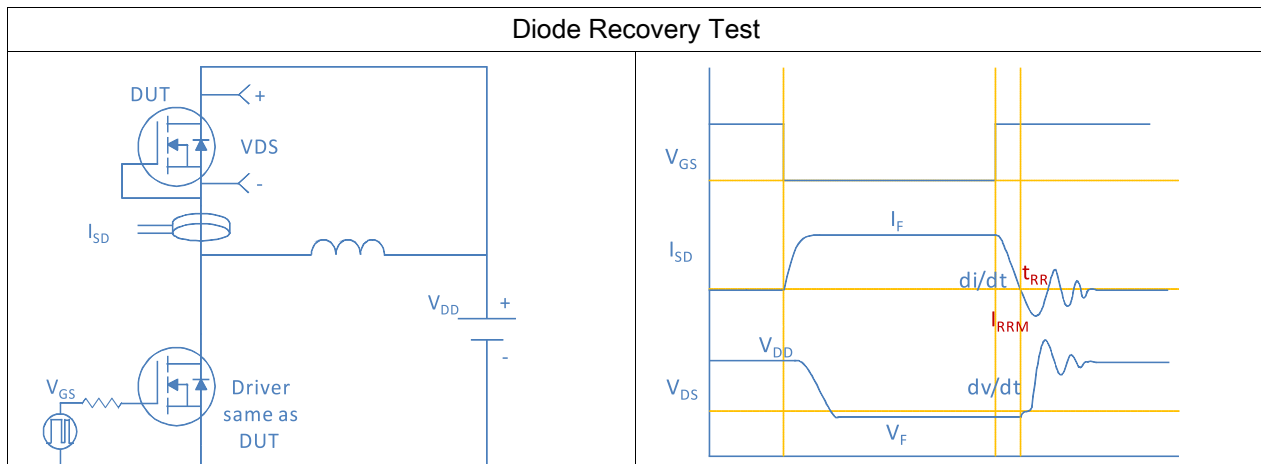
Gate Charge Test



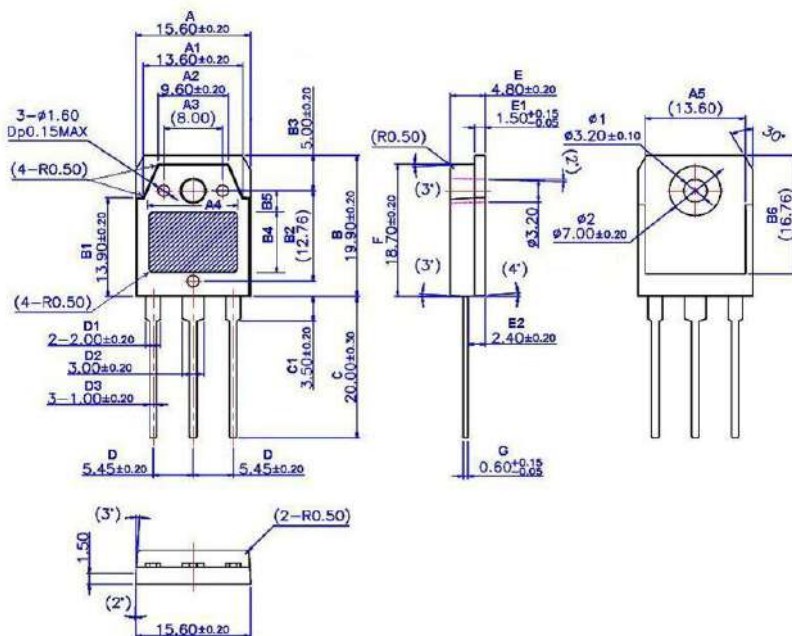
Uclamped Inductive Switching (UIS) Test



Diode Recovery Test



TO-3P, 3 leads



(单位: mm)

符号	尺寸		符号	尺寸		符号	尺寸		符号	尺寸	
	Min	Max		Min	Max		Min	Max		Min	Max
A	15.40	15.80	B1	13.70	14.10	C1	3.30	3.70	E2	2.20	2.60
A1	13.40	13.80	B2	(12.76)		D	5.25	5.65	F	18.50	18.90
A2	9.40	9.80	B3	4.80	5.20	D1	1.80	2.20	G	0.55	0.75
A3	(8.00)		B4	(8.50)		D2	2.80	3.20	Φ1	3.10	3.30
A4	(12.00)		B5	(3.00)		D3	0.80	1.20	Φ2	6.80	7.20
A5	(13.60)		B6	(16.76)		E	4.60	5.00			
B	19.70	20.10	C	19.70	20.30	E1	1.45	1.65			