20V P-Ch Power MOSFET

V_{DS}		-20	V
$R_{DS(on),typ}$	V_{GS}=4.5V	37	mΩ
$R_{DS(on),typ}$	V_{GS}=2.5V	55	mΩ
$R_{DS(on),typ}$	V_{GS}=1.8V	65	mΩ
$I_{D\,(Sillicon\,Limited)}$		-4	A

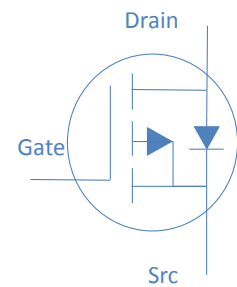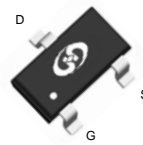## Feature

◇ High Speed Power Switching, Logic Level
◇ Enhanced Avalanche Ruggedness
◇ Lead Free, Halogen Free

Application

◇ Load Switches
◇ Hard Switching and High Speed Circuit
◇ BLDC Motor

SOT-23

Part Number	Package	Marking
HTJ440P02	SOT-23	20

Absolute Maximum Ratings at T_j=25℃ (unless otherwise specified)

Parameter	Symbol	Conditions	Value	Unit
Continuous Drain Current (Silicon Limited)	I_D	T_A=25℃	-4	A
		T_A=70℃	-3	
Drain to Source Voltage	V_{DS}	-	-20	V
Gate to Source Voltage	V_{GS}	-	±12	V
Pulsed Drain Current	I_{DM}	-	-16	A
Power Dissipation	P_D	T_A=25℃	1.25	W
Operating and Storage Temperature	T_J, T_{stg}	-	-55 to150	℃

Absolute Maximum Ratings

Parameter	Symbol	Max	Unit
Thermal Resistance Junction-Ambient	$R_{\theta JA}$	100	℃/W
Thermal Resistance Junction-Lead	$R_{\theta JL}$	55	℃/W

Electrical Characteristics at T_j=25℃ (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=-250μA	-20	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D=-250μA	-0.3	-0.75	-1.0	
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS}=0V, V_{DS}=-16V, T_j=25℃	-	-	-1	μA
		V_{GS}=0V, V_{DS}=-16V, T_j=125℃	-	-	-10	
Gate to Source Leakage Current	I_{GSS}	V_{GS}=±12V, V_{DS}=0V	-	-	±100	nA
Drain to Source on Resistance	$R_{DS(on)}$	V_{GS}=-4.5V, I_D=-4A	-	37	44	mΩ
		V_{GS}=-2.5V, I_D=-3A		55	70	
		V_{GS}=-1.8V, I_D=-1A	-	65	90	
Transconductance	g_{fs}	V_{DS}=-5V, I_D=-4A	-	14	-	S

Dynamic Characteristics

Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=-10V, f=1MHz	-	679	-	pF
Output Capacitance	C_{oss}		-	124	-	
Reverse Transfer Capacitance	C_{rss}		-	106	-	
Total Gate Charge	Q_g	V_{DD}=-10V, I_D=-4A, V_{GS}=-4.5V	-	12.8	-	nC
Gate to Source Charge	Q_{gs}		-	2.2	-	
Gate to Drain (Miller) Charge	Q_{gd}		-	4.1	-	
Turn on Delay Time	$t_{d(on)}$	V_{DD}=-10V, I_D=-1A, V_{GS}=-4.5V, R_G=6Ω,	-	10	-	ns
Rise time	t_r		-	18	-	
Turn off Delay Time	$t_{d(off)}$		-	32	-	
Fall Time	t_f		-	22	-	

Reverse Diode Characteristics

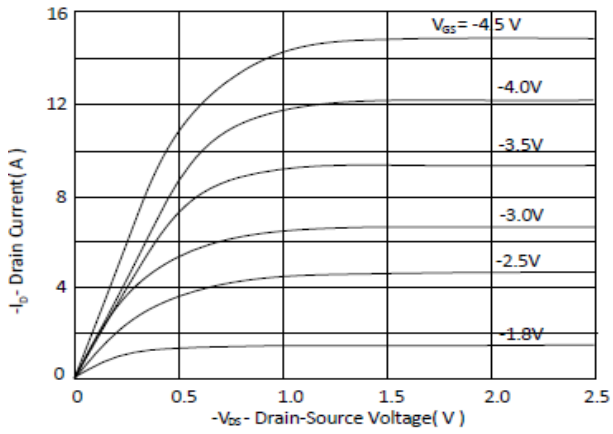|						
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_F=-3A	-		-1.2	V

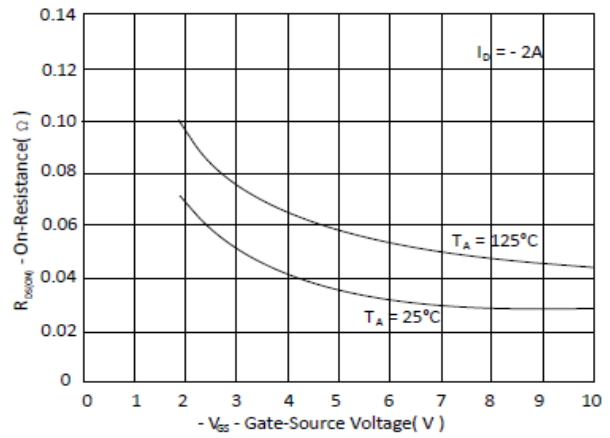| Fig 1. Typical Output Characteristics	Figure 2. On-Resistance vs. Gate-Source Voltage

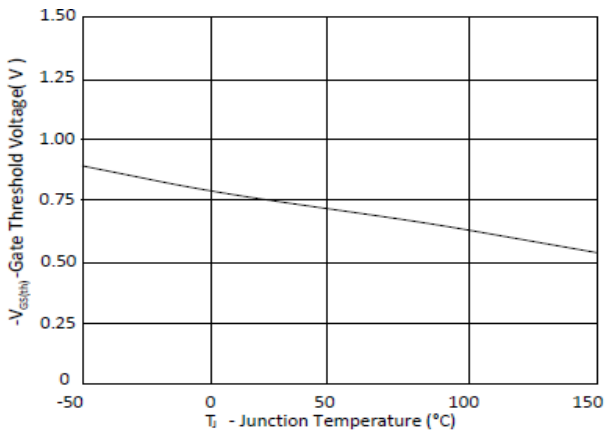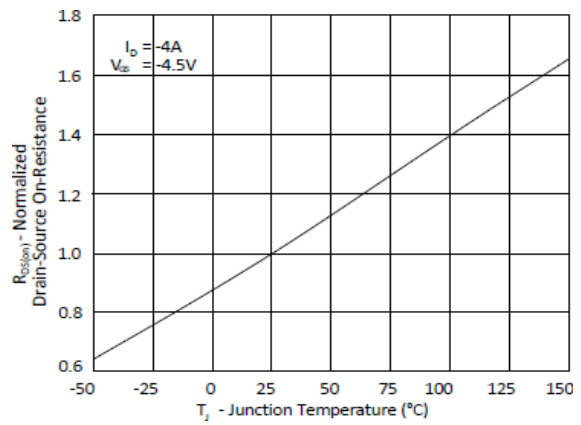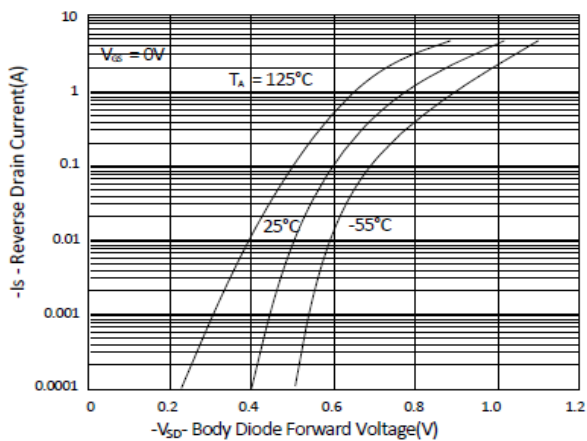| Figure 3.Gate Threshold Voltage v.s. Junction Temperature	Figure 4. Normalized On-Resistance vs. Junction Temperature

Figure 5. Typical Source-Drain Diode Forward Voltage

Ver 1.0　　　　　　　　　　　　　　　　　　　　Feb. 2018

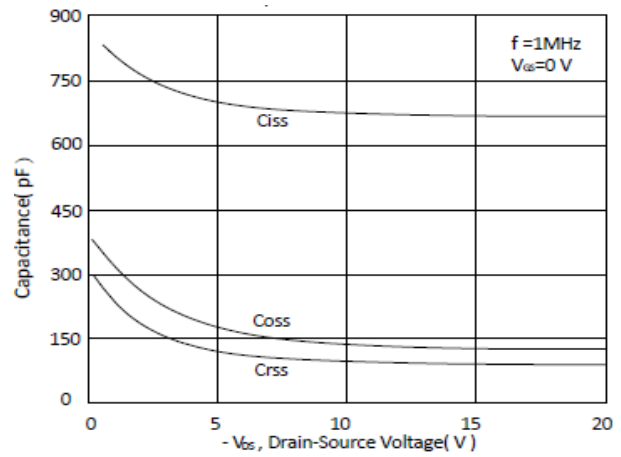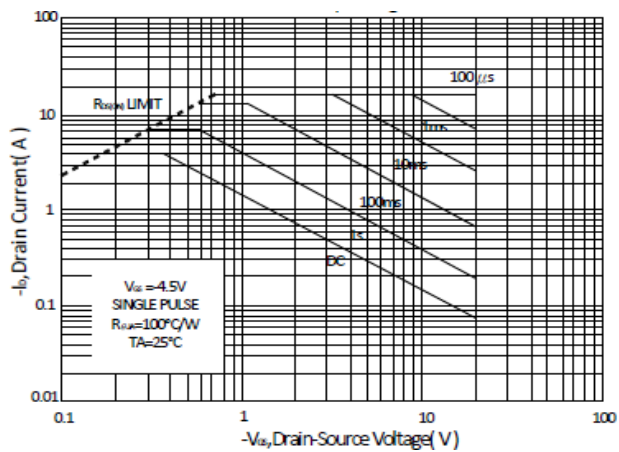| Figure 6. Typical Gate-Charge vs. Gate-to-Source Voltage	Figure 7. Typical Capacitance vs. Drain-to-Source Voltage
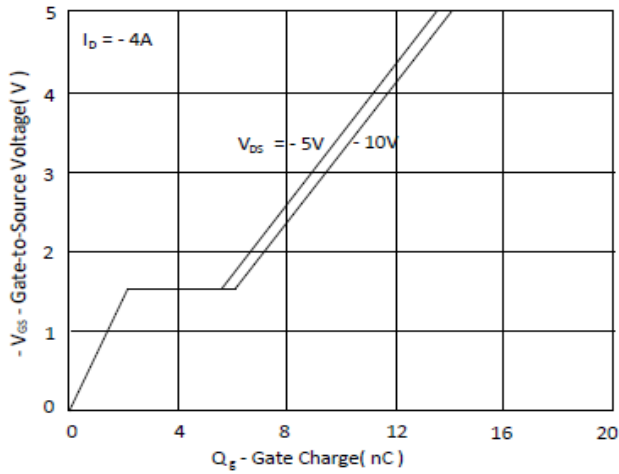
Figure 8. Maximum Safe Operating Area

Figure 9. Maximun Drain Current vs. Case Temperature
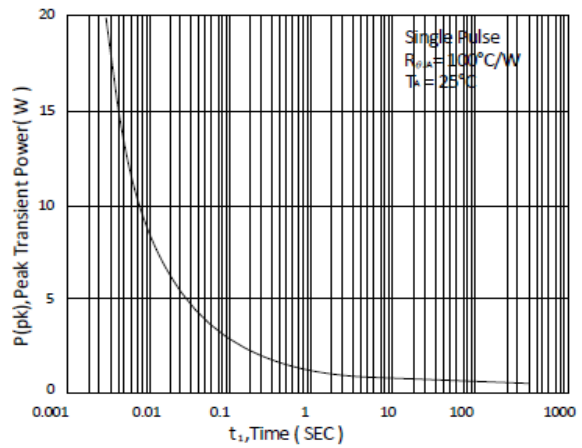
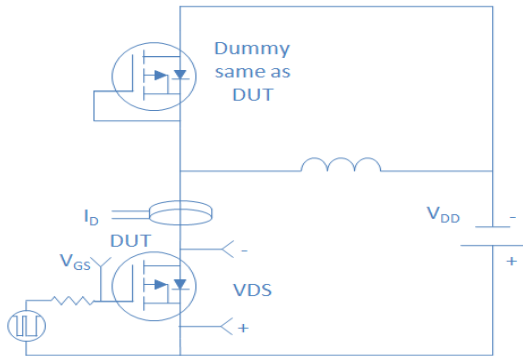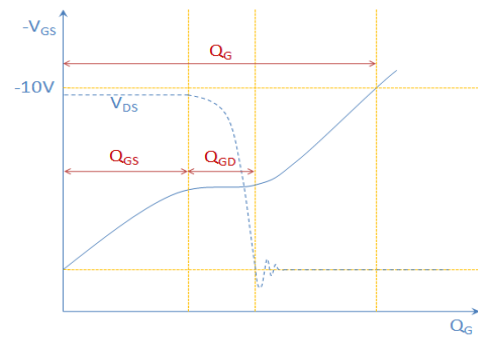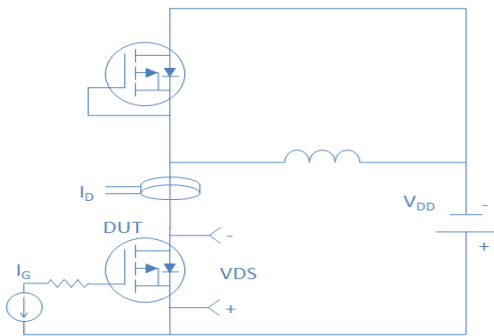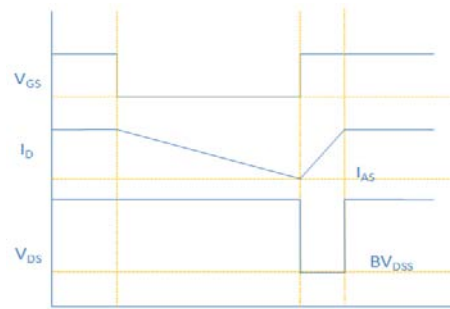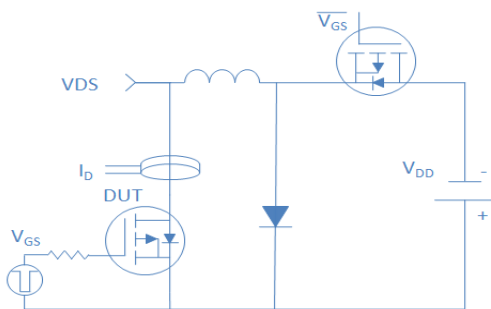Figure 10. Normalized Maximum Transient Thermal Impedance, Junction-to-Ambient
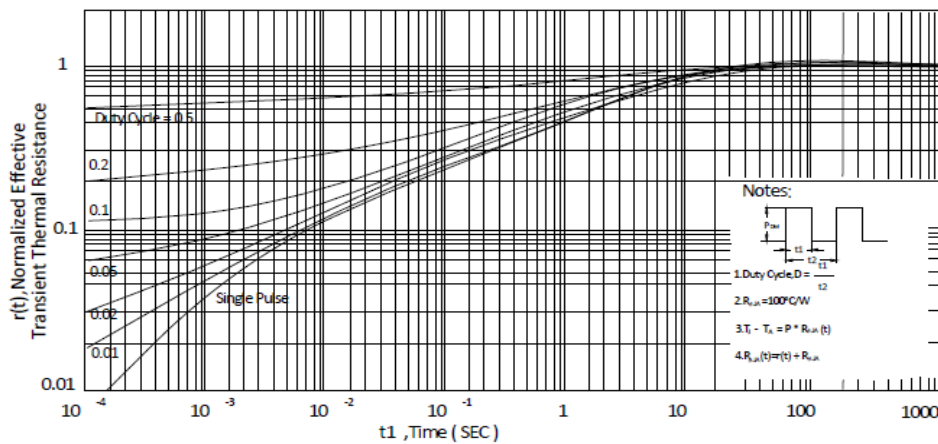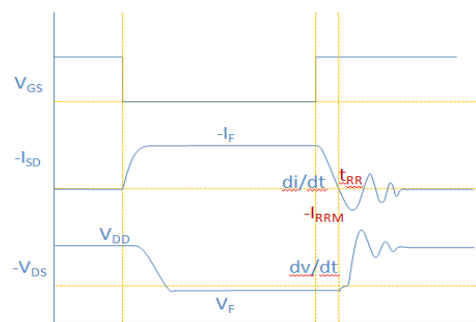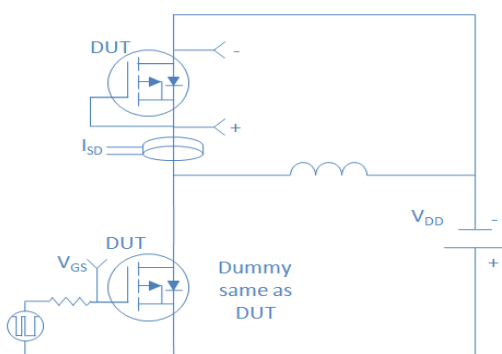
Inductive switching Test
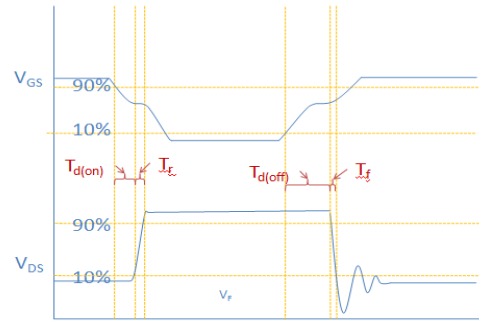
Gate Charge Test

Uclamped Inductive Switching (UIS) Test

Diode Recovery Test

Package Outline

SOT-23, 3leads
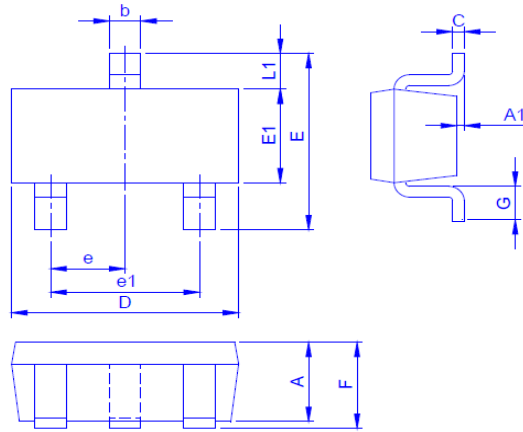
Dimension in mm

Dimension	A	A1	A2	b	C	D	E	E1	e	e1	F	G	L1
Min.	0.7	0		0.35	0.1	2.8	2.6	1.5	0.9		0.8	0.3	0.55
Typ.						2.9	2.8	1.6	0.95	1.9			
Max.	1.12	0.1		0.5	0.2	3	3	1.7	1		1.2	0.6	0.65