60V P-Ch Power MOSFET

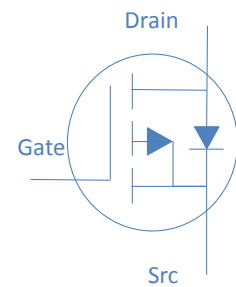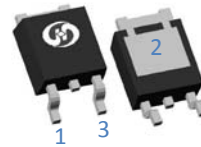| V_{DS}		-60	V
$R_{DS(on),typ}$	V_{GS}=-10V	12	mΩ
$R_{DS(on),typ}$	V_{GS}=-4.5V	15	mΩ
$I_{D\ (Sillicon\ Limited)}$		-40	A

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

TO-252

Part Number	Package	Marking
HTD150P06	TO-252	TD150P06

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

Parameter	Symbol	Conditions	Value	Unit
Continuous Drain Current (Silicon Limited)	I_D	T_C=25℃	-40	A
		T_C=100℃	-27	
Drain to Source Voltage	V_{DS}	-	-60	V
Gate to Source Voltage	V_{GS}	-	±20	V
Pulsed Drain Current	I_{DM}	-	-100	A
Avalanche Energy, Single Pulse	E_{AS}	L=0.1mH, T_C=25℃	80	mJ
Power Dissipation	P_D	T_C=25℃	50	W
Operating and Storage Temperature	T_J, T_{stg}	-	-55 to 150	℃

Absolute Maximum Ratings

Parameter	Symbol	Max	Unit
Thermal Resistance Junction-Ambient	$R_{\theta JA}$	50	℃/W
Thermal Resistance Junction-Case	$R_{\theta JC}$	2.5	℃/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	-60	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D=250μA	-1.0	-2.0	-3.0	
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS}=0V, V_{DS}=-48V, T_j=25℃	-	-	-1	μA
		V_{GS}=0V, V_{DS}=-40V, T_j=125℃	-	-	-25	
Gate to Source Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
Drain to Source on Resistance	$R_{DS(on)}$	V_{GS}=-10V, I_D=-20A	-	12	15	mΩ
		V_{GS}=-4.5V, I_D=-10A	-	15	22	
Transconductance	g_{fs}	V_{DS}=-5V, I_D=-20A	-	36	-	S
Gate Resistance	R_G	V_{GS}=15mV, V_{DS}=0V, f=1MHz	-	3.5	-	Ω

Dynamic Characteristics

Parameter	Symbol	Conditions				Unit
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=-30V, f=1MHz	-	6478	-	pF
Output Capacitance	C_{oss}		-	353	-	
Reverse Transfer Capacitance	C_{rss}		-	328	-	
Total Gate Charge	Q_g(10V)	V_{DD}=-30V, I_D=-20A, V_{GS}=-10V	-	111.0	-	nC
Gate to Source Charge	Q_{gs}		-	24.7	-	
Gate to Drain (Miller) Charge	Q_{gd}		-	15.6	-	
Turn on Delay Time	$t_{d(on)}$	V_{DD}=-10V, I_D=-1A, V_{GS}=-10V, R_G=6Ω,	-	20	-	ns
Rise time	t_r		-	25	-	
Turn off Delay Time	$t_{d(off)}$		-	70	-	
Fall Time	t_f		-	30	-	

Reverse Diode Characteristics

Parameter	Symbol	Conditions				Unit
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_F=-40A	-		1.3	V
Reverse Recovery Time	t_{rr}	I_F=-20A, dI_F/dt=100A/μs	-	50	-	ns
Reverse Recovery Charge	Q_{rr}		-	80	-	nC

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

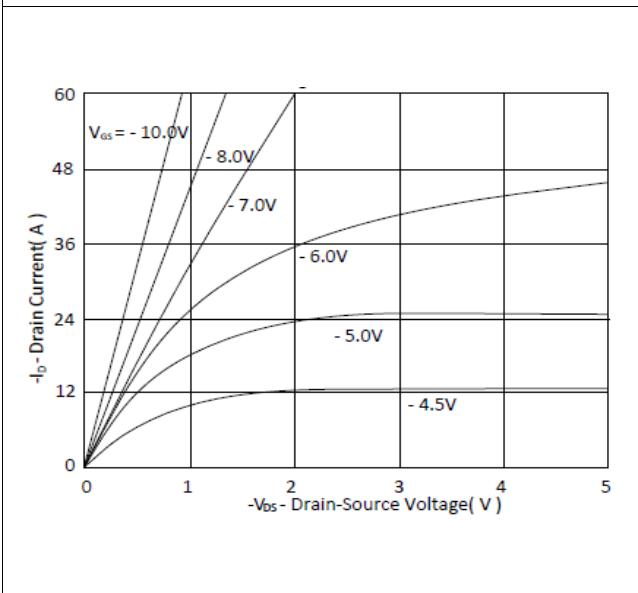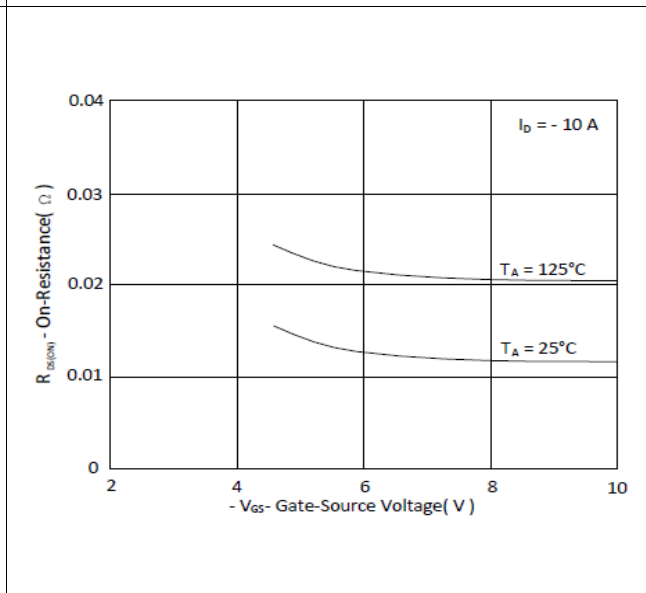Fig 1. Typical Output Characteristics

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

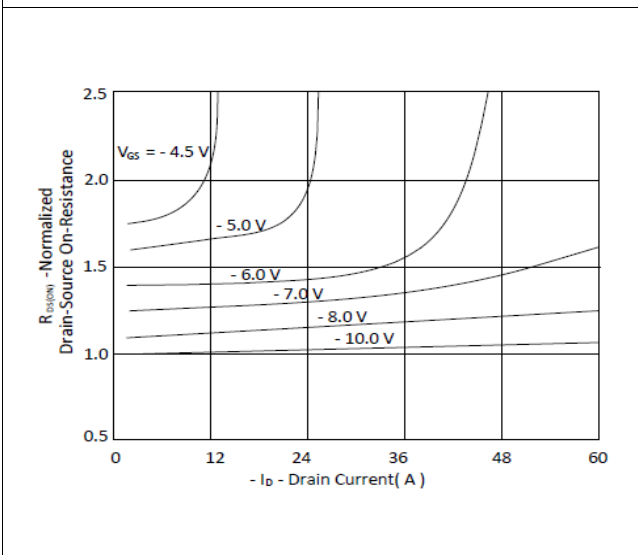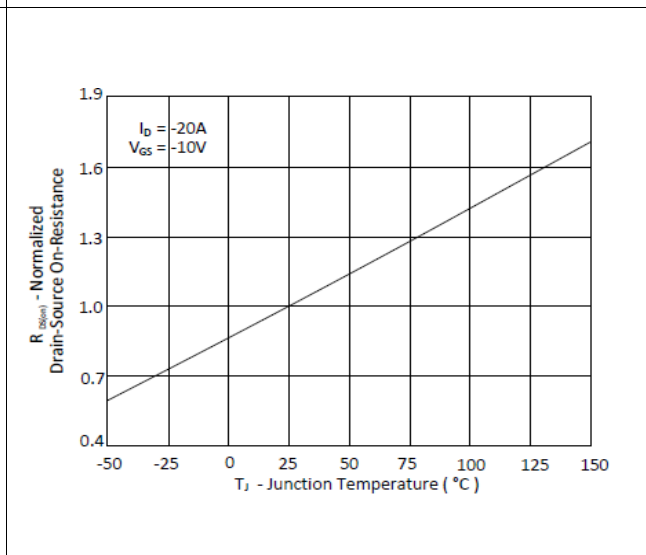| Figure 3. On-Resistance vs. Drain Current and Gate Voltage	Figure 4. Normalized On-Resistance vs. Junction Temperature

Figure 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
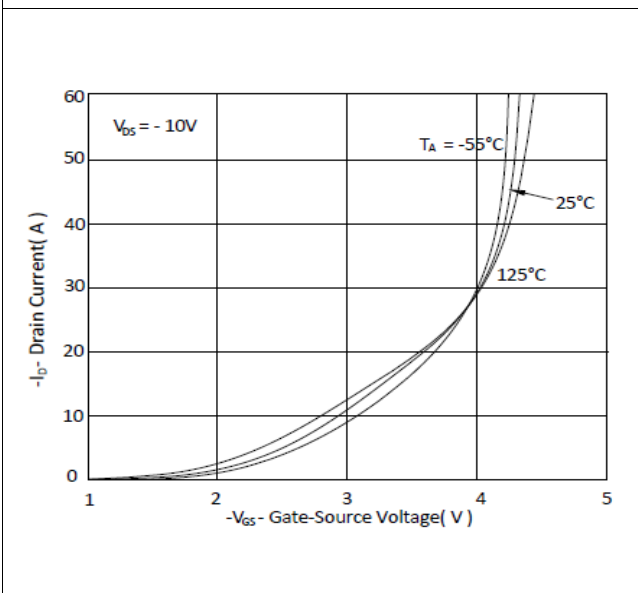
Figure 5. Typical Transfer Characteristics

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
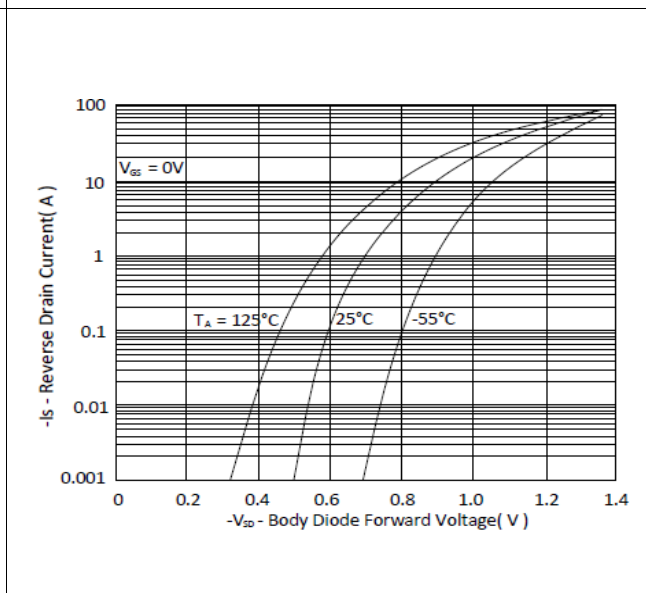
Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage
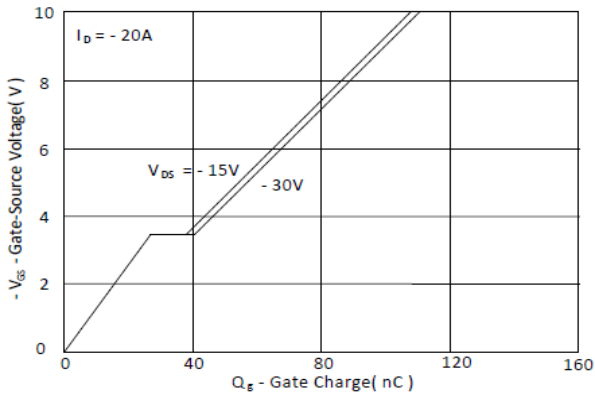
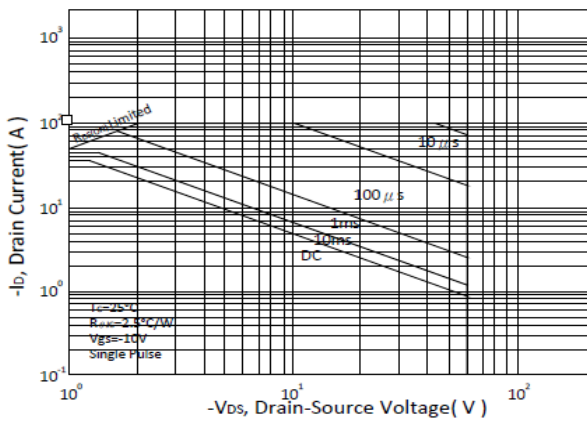Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

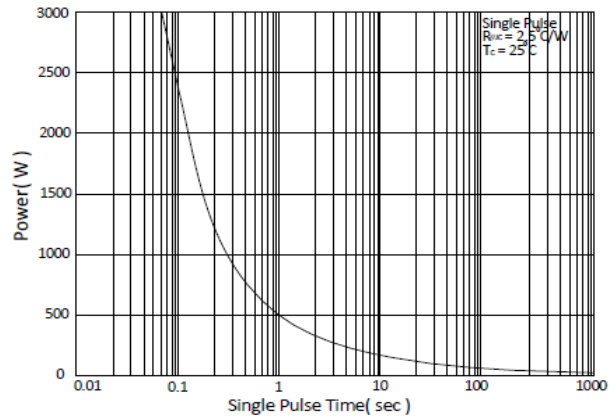| Figure 9. Maximum Safe Operating Area	Figure 10. Single Pulse Maximum Power Dissipation
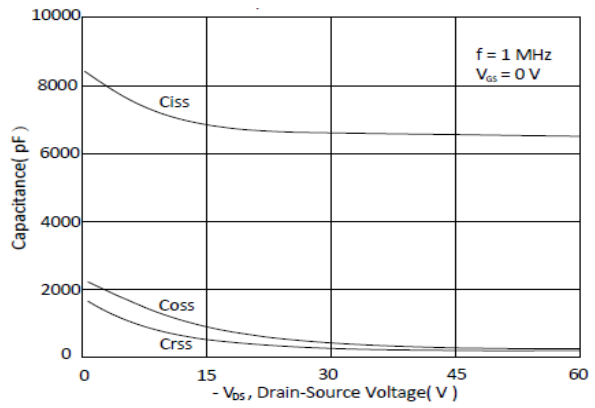
Figure 9. Maximum Safe Operating Area
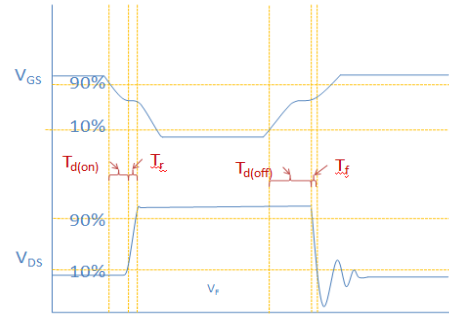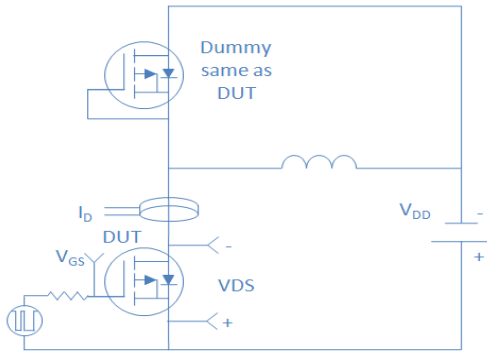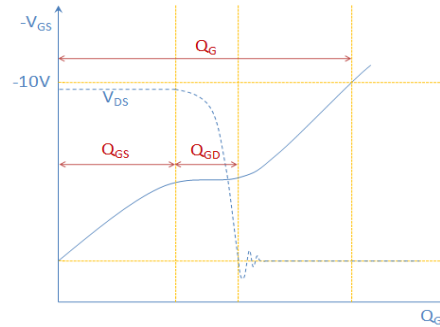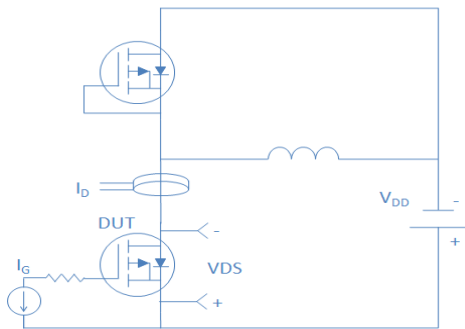

Figure 10. Single Pulse Maximum Power Dissipation

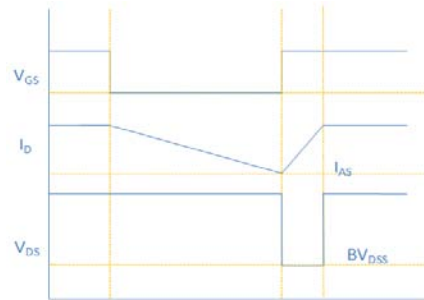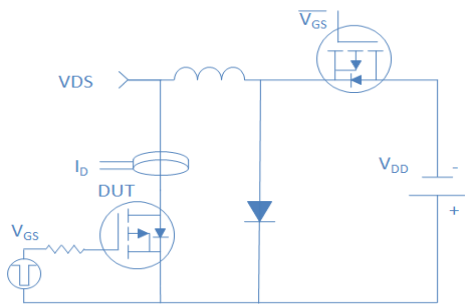Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Ambient

※Note :
1. $R_{\theta JC}(t)$=2.5°C/W Max.
2. Duty Cycle, D=t_1/ t_2
3. T_{JM} - T_C=P_{DM}*$R_{\theta JC}(t)$
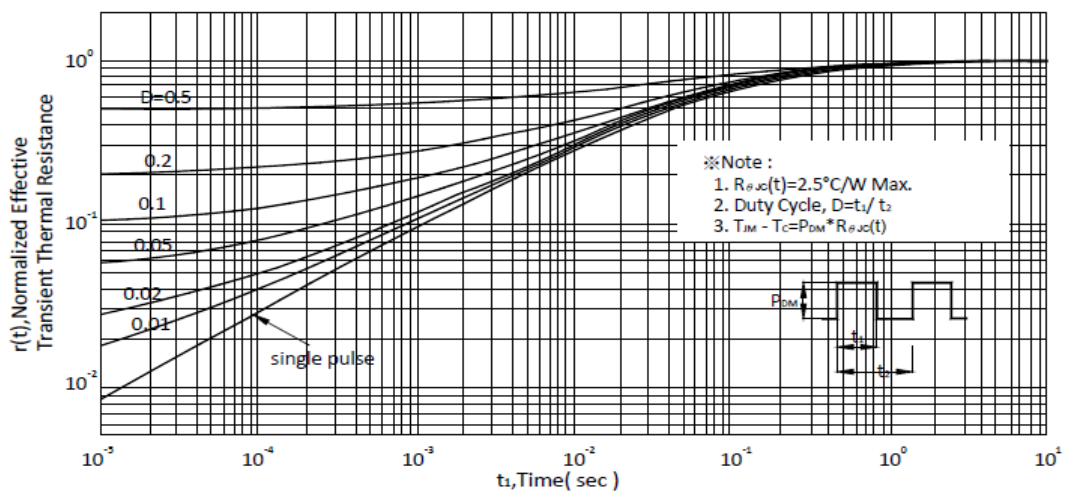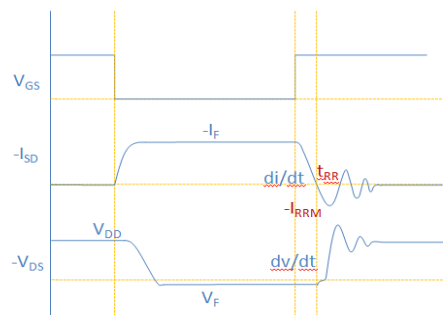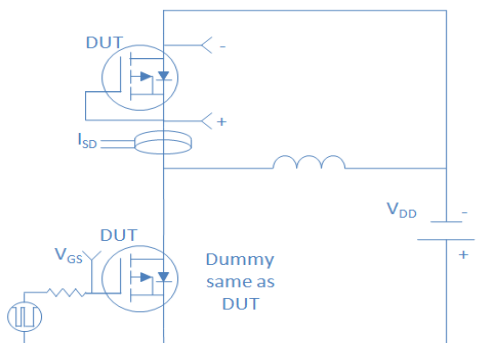
Inductive switching Test

Gate Charge Test

Uclamped Inductive Switching (UIS) Test

Diode Recovery Test

Package Outline

TO-252, 3leads
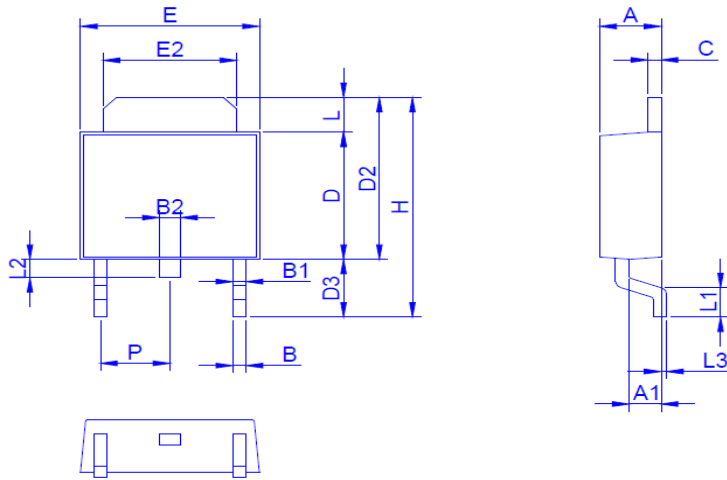
Dimension	A	A1	B	B1	B2	C	D	D2	D3	E	E2	H	L	L1	L2	L3	P
Min.	2.10	0.95	0.30	0.40	0.60	0.40	5.30	6.70	2.20	6.40	4.80	9.20	0.89	0.90	0.50	0.00	2.10
Max.	2.50	1.30	0.85	0.94	1.00	0.60	6.20	7.30	3.00	6.70	5.45	10.15	1.70	1.65	1.10	0.30	2.50