

## 30V P-Ch Power MOSFET

### Feature

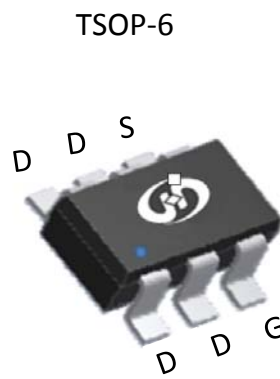
- ◇ High Speed Power Switching, Logic Level
- ◇ Enhanced Avalanche Ruggedness
- ◇ Lead Free, Halogen Free

### Application

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

$V_{DS}$		-30	V
$R_{DS(on),typ}$	$V_{GS}=10V$	42	m $\Omega$
$R_{DS(on),typ}$	$V_{GS}=4.5V$	66	m $\Omega$
$I_D$ (Silicon Limited)		-5	A

Part Number	Package	Marking
HTO500P03	TSOP-6	23



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

Parameter	Symbol	Conditions	Value	Unit
Continuous Drain Current (Silicon Limited)	$I_D$	$T_C=25^\circ\text{C}$	-5	A
		$T_C=70^\circ\text{C}$	-4.2	
Drain to Source Voltage	$V_{DS}$	-	-30	V
Gate to Source Voltage	$V_{GS}$	-	$\pm 20$	V
Pulsed Drain Current	$I_{DM}$	-	-20	A
Power Dissipation	$P_D$	$T_C=25^\circ\text{C}$	1	W
Operating and Storage Temperature	$T_J, T_{stg}$	-	-55 to 150	$^\circ\text{C}$

### Absolute Maximum Ratings

Parameter	Symbol	Max	Unit
Thermal Resistance Junction-Ambient	$R_{\theta JA}$	100	$^\circ\text{C/W}$

**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	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-30	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1.0	-1.5	-3.0	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{GS}=0V, V_{DS}=-24V, T_j=25^\circ\text{C}$	-	-	-1	$\mu A$
		$V_{GS}=0V, V_{DS}=-20V, T_j=125^\circ\text{C}$	-	-	-10	
Gate to Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
Drain to Source on Resistance	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-5A$	-	42	50	m $\Omega$
		$V_{GS}=-4.5V, I_D=-4A$	-	66	85	
Transconductance	$g_{fs}$	$V_{DS}=-5V, I_D=-5A$	-	9	-	S

**Dynamic Characteristics**

Input Capacitance	$C_{iss}$	$V_{GS}=0V, V_{DS}=-15V, f=1\text{MHz}$	-	820	-	pF
Output Capacitance	$C_{oss}$		-	122	-	
Reverse Transfer Capacitance	$C_{rss}$		-	97	-	
Total Gate Charge	$Q_g(10V)$	$V_{DD}=-15V, I_D=-5A, V_{GS}=-10V$	-	9.0	-	nC
Gate to Source Charge	$Q_{gs}$		-	2.2	-	
Gate to Drain (Miller) Charge	$Q_{gd}$		-	2.5	-	
Turn on Delay Time	$t_{d(on)}$	$V_{DD}=-15V, I_D=-1A, V_{GS}=-10V, R_G=6\Omega,$	-	12	-	ns
Rise time	$t_r$		-	16	-	
Turn off Delay Time	$t_{d(off)}$		-	34	-	
Fall Time	$t_f$		-	20	-	

**Reverse Diode Characteristics**

Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_F=-3A$	-		-1.2	V
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Fig 1. Typical Output Characteristics

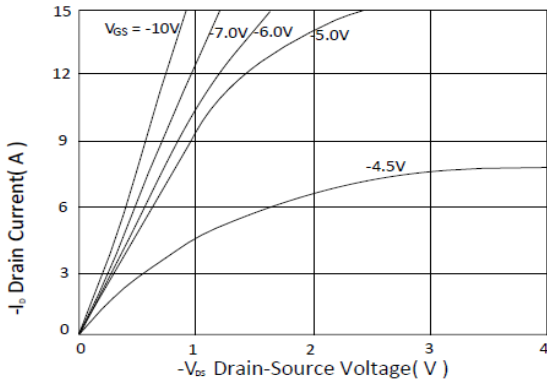


Figure 2. On-Resistance vs. Gate-Source Voltage

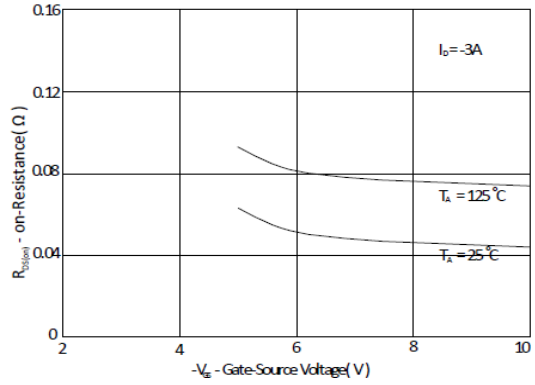


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

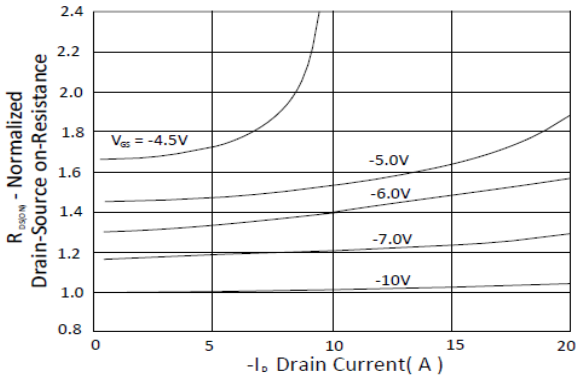


Figure 4. Normalized On-Resistance vs. Junction Temperature

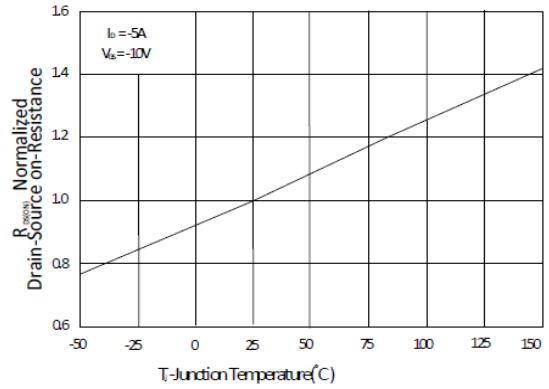


Figure 5. Typical Transfer Characteristics

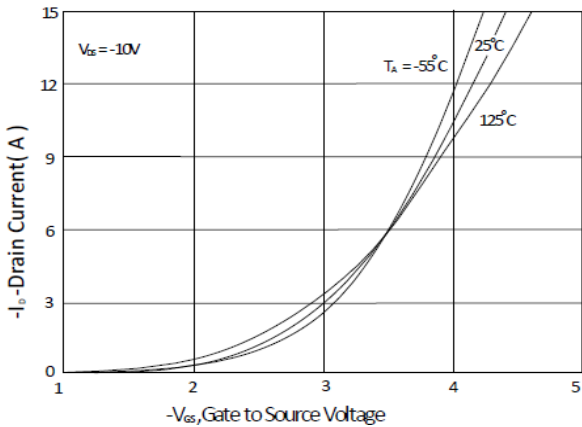


Figure 6. Typical Source-Drain Diode Forward Voltage

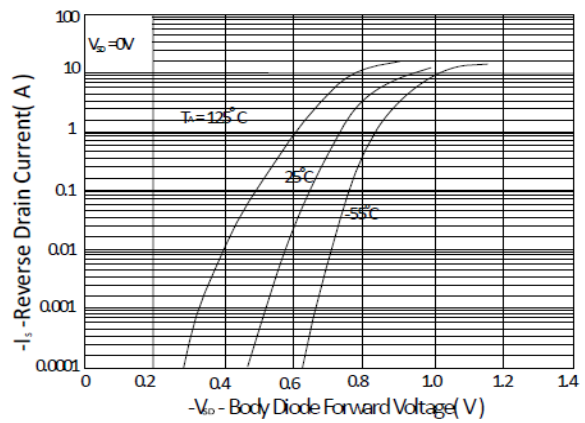


Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage

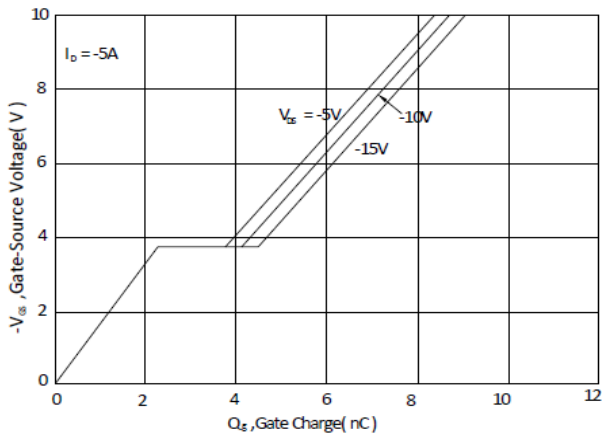


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

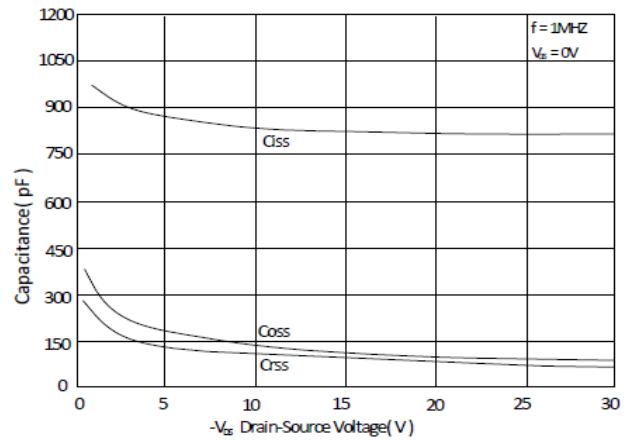


Figure 9. Maximum Safe Operating Area

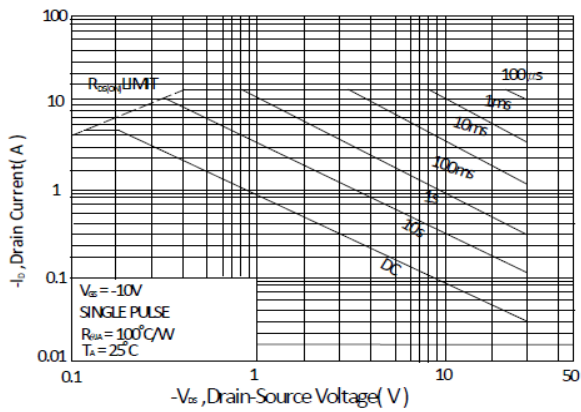


Figure 10. Single Pulse Maximum Power Dissipation

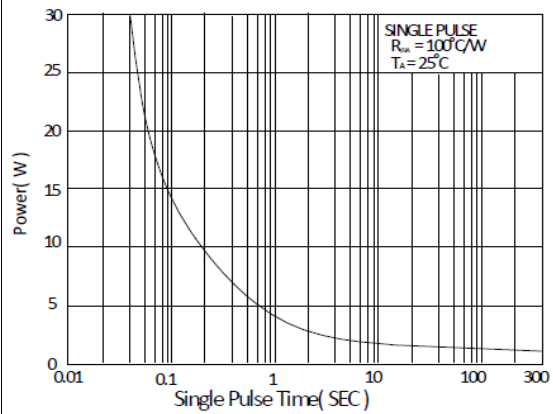
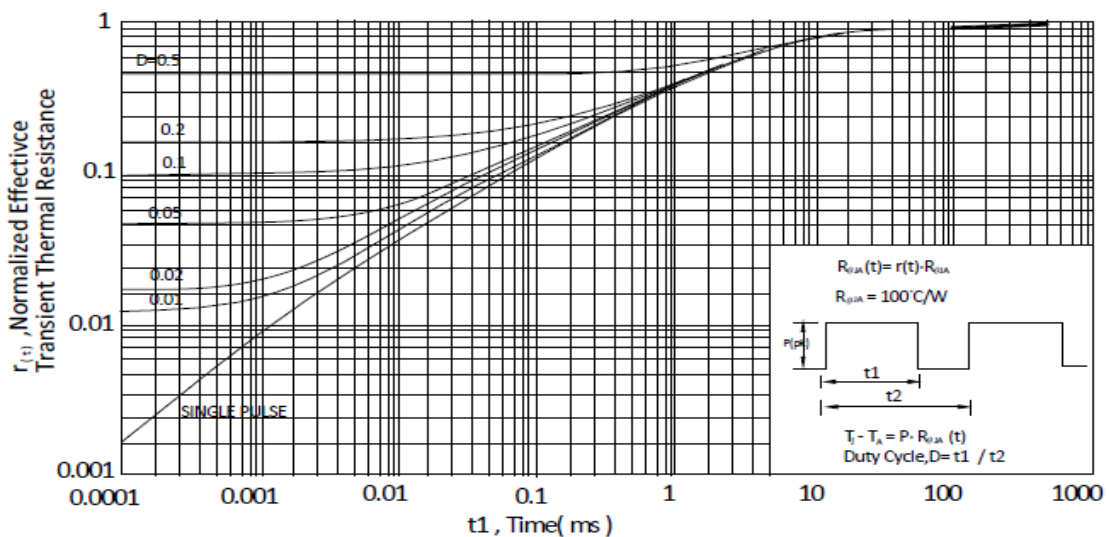
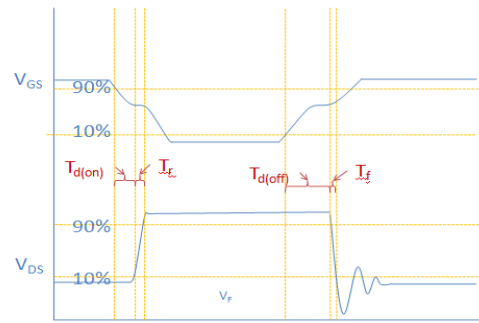
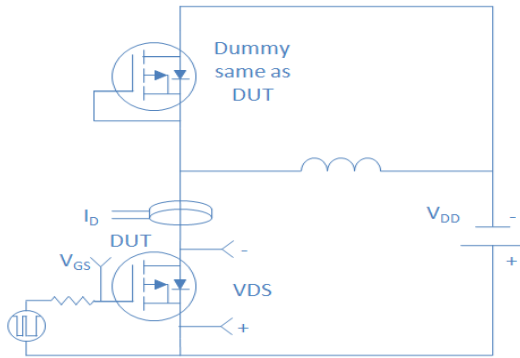


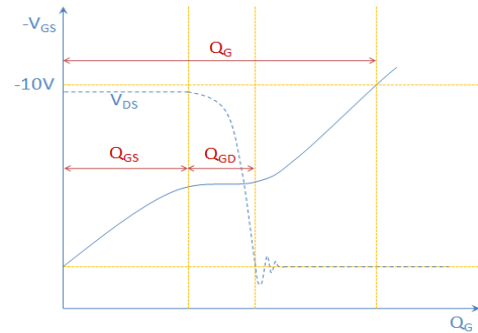
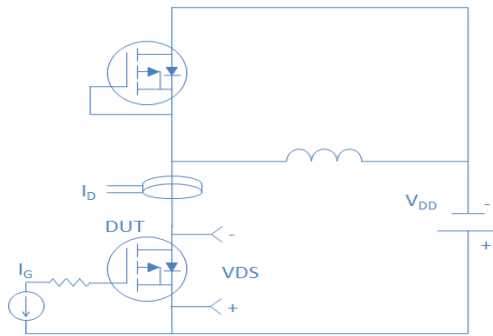
Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Ambient



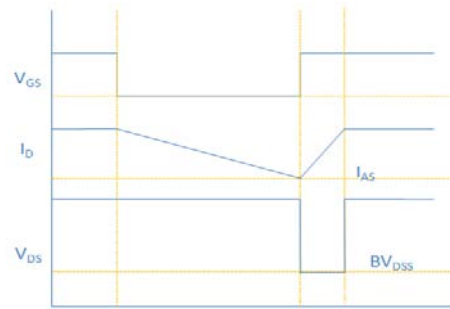
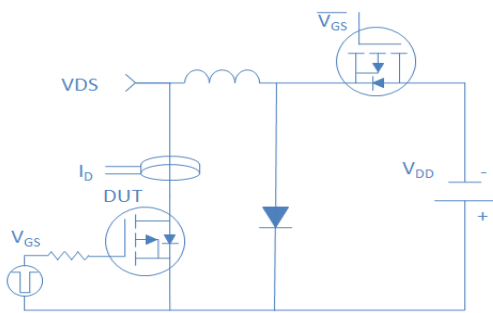
Inductive switching Test



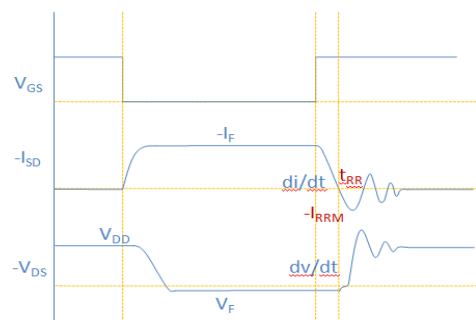
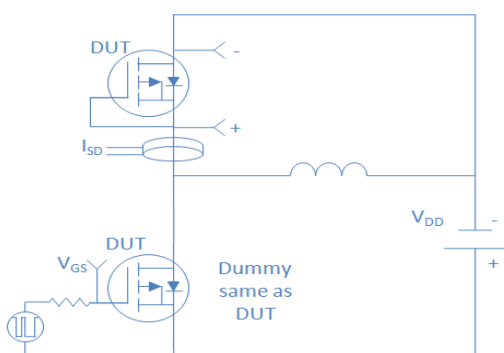
Gate Charge Test



Uclamped Inductive Switching (UIS) Test

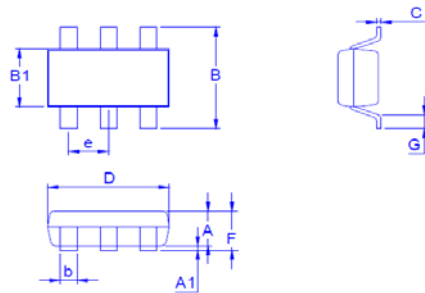


Diode Recovery Test



Package Outline

TSOP-6, 6leads



Dimension in mm

Dimension	A	A1	B	B1	b	C	D	e	F	G
Min.	0.85	0	2.50	1.50	0.30	0.08	2.70		0.85	0.20
Typ.	0.95		2.80	1.60	0.40		2.90	0.95		
Max.	1.25	0.15	3.10	1.70	0.50	0.20	3.10		1.40	0.60