

## 30V N-Ch Power MOSFET

### Feature

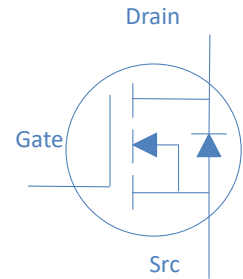
- ◇ Optimized for high speed switching, Logic Level
- ◇ Enhanced Body diode dv/dt capability
- ◇ Enhanced Avalanche Ruggedness
- ◇ 100% UIS Tested, 100% Rg Tested
- ◇ Lead Free, Halogen Free

### Application

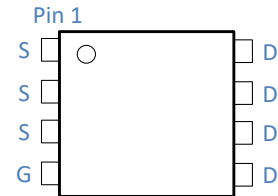
- ◇ Synchronous Rectification in SMPS
- ◇ Hard Switching and High Speed Circuit
- ◇ Power Tools
- ◇ UPS
- ◇ Motor Control

$V_{DS}$		30	V
$R_{DS(on),max}$	$V_{GS}=10V$	3.6	mΩ
$R_{DS(on),max}$	$V_{GS}=4.5V$	5.4	mΩ
$I_D$		70	A

DFN5x6



Part Number	Package	Marking
HTN036N03P	DFN5x6	TN036N03P



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

Parameter	Symbol	Conditions	Value	Unit
Continuous Drain Current (Silicon Limited)	$I_D$	$T_C=25^{\circ}C$	70	A
		$T_C=100^{\circ}C$	64	
Drain to Source Voltage	$V_{DS}$	-	30	V
Gate to Source Voltage	$V_{GS}$	-	$\pm 20$	V
Pulsed Drain Current	$I_{DM}$	-	70	A
Avalanche Energy, Single Pulse	$E_{AS}$	$L=0.1mH, T_C=25^{\circ}C$	54	mJ
Power Dissipation	$P_D$	$T_C=25^{\circ}C$	50	W
Operating and Storage Temperature	$T_J, T_{stg}$	-	-55 to 150	$^{\circ}C$

### Absolute Maximum Ratings

Parameter	Symbol	Max	Unit
Thermal Resistance Junction-Case	$R_{\theta JC}$	2.5	$^{\circ}C/W$
Thermal Resistance Junction-Ambient	$R_{\theta JA}$	50	$^{\circ}C/W$

**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	1.5	2	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{GS}=0V, V_{DS}=24V, T_j=25^\circ\text{C}$	-	-	1	$\mu A$
Gate to Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
Drain to Source on Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$	-	3	3.6	$m\Omega$
		$V_{GS}=4.5V, I_D=20A$	-	4.2	5.4	$m\Omega$
Transconductance	$g_{fs}$	$V_{DS}=10V, I_D=20A$	-	25.2	-	S
Gate Resistance	$R_G$	$V_{GS}=0V, V_{DS}$ Open, $f=1\text{MHz}$	-	2.0	-	$\Omega$

**Dynamic Characteristics**

Input Capacitance	$C_{iss}$	$V_{GS}=0V, V_{DS}=15V, f=1\text{MHz}$	-	2015	-	pF
Output Capacitance	$C_{oss}$		-	365	-	
Reverse Transfer Capacitance	$C_{rss}$		-	205	-	
Total Gate Charge (10V)	$Q_g (10V)$	$V_{DD}=15V, I_D=18A, V_{GS}=10V$	-	42	-	nC
Total Gate Charge (4.5V)	$Q_g (4.5V)$		-	21	-	
Gate to Source Charge	$Q_{gs}$		-	6	-	
Gate to Drain (Miller) Charge	$Q_{gd}$		-	9	-	
Turn on Delay Time	$t_{d(on)}$	$V_{DD}=15V, I_D=1A, V_{GS}=10V, R_G=6\Omega,$	-	15	-	ns
Rise time	$t_r$		-	20	-	
Turn off Delay Time	$t_{d(off)}$		-	72	-	
Fall Time	$t_f$		-	20	-	

**Reverse Diode Characteristics**

Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_F=15A$	-	0.7	1.1	V
Reverse Recovery Time	$t_{rr}$	$I_F=15A, di_F/dt=100A/\mu s$	-	15.0	-	ns
Reverse Recovery Charge	$Q_{rr}$		-	8.0	-	nC

Fig 1. Typical Output Characteristics

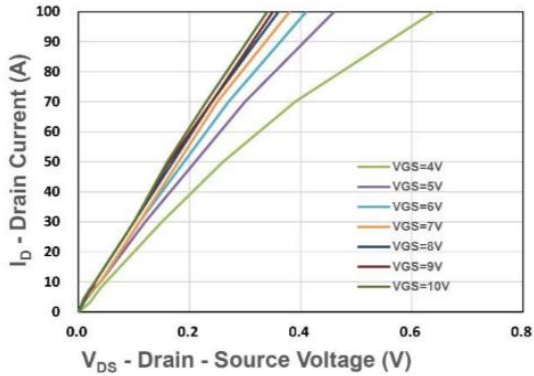


Figure 2. On-Resistance vs. Gate-Source Voltage

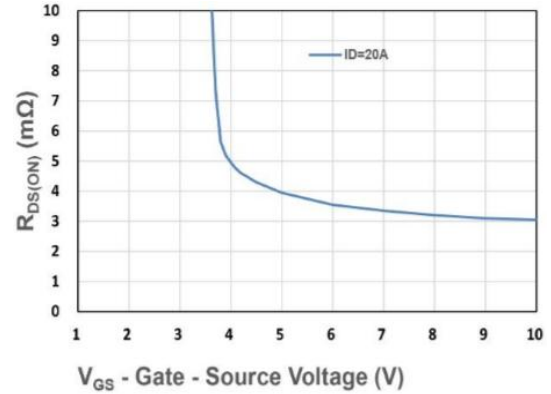


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

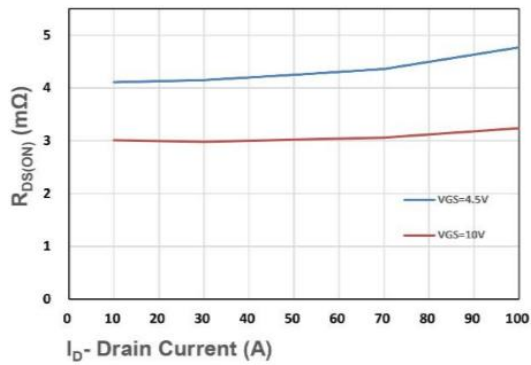


Figure 4. Normalized On-Resistance vs. Junction Temperature

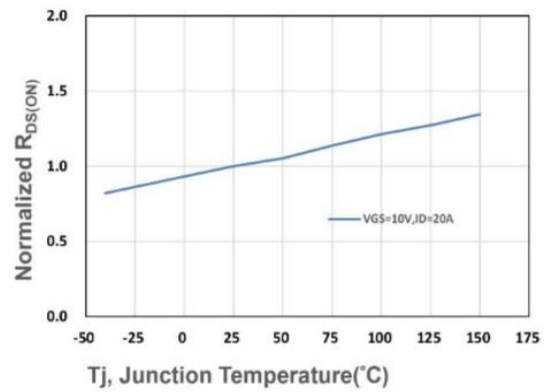


Figure 5. Normalized Threshold Voltage VS Junction Temperature

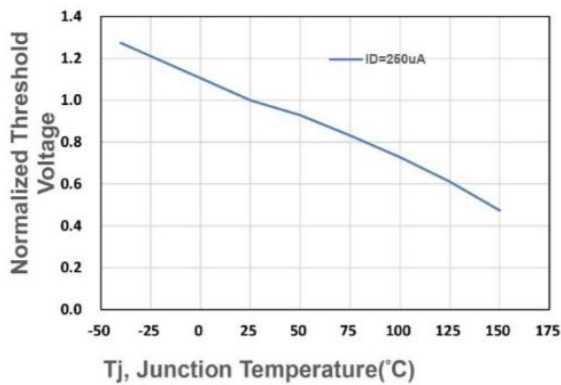


Figure 6. Typical Source-Drain Diode Forward Voltage

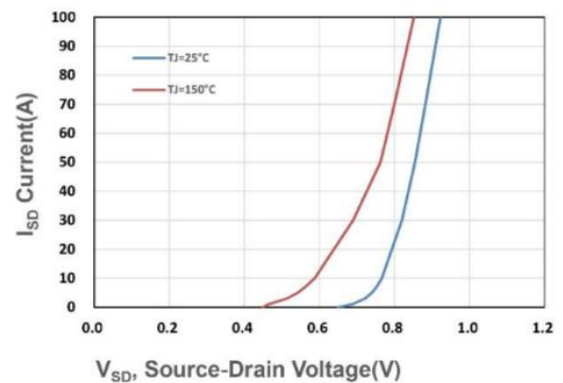


Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage

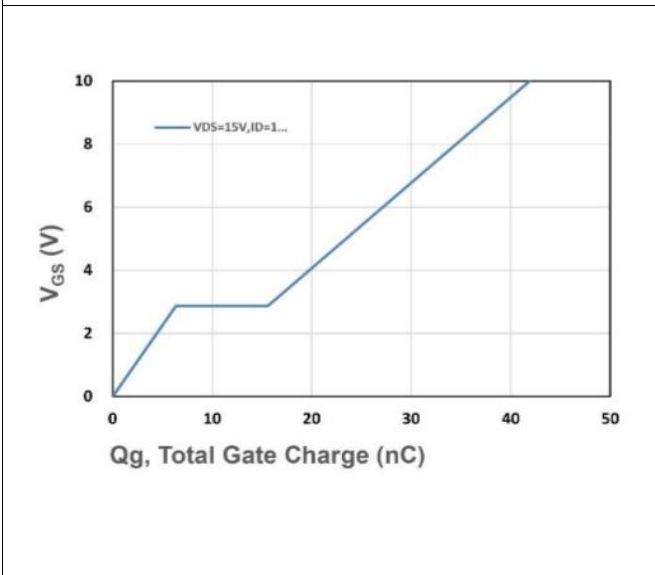


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

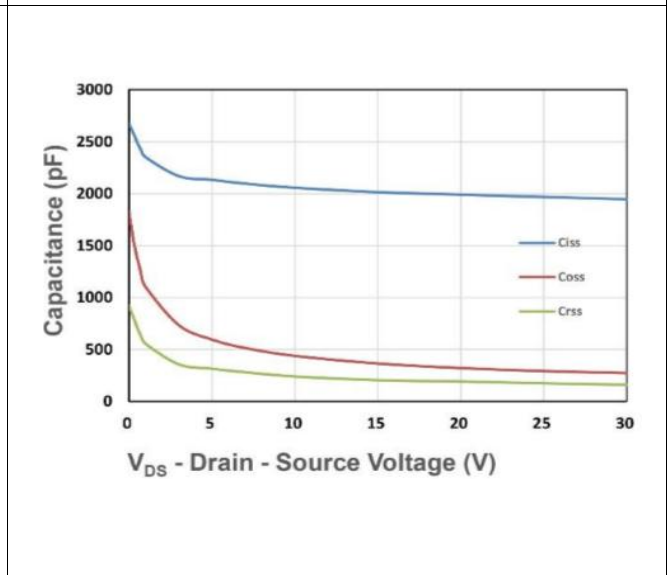


Figure 9. Maximum Safe Operating Area

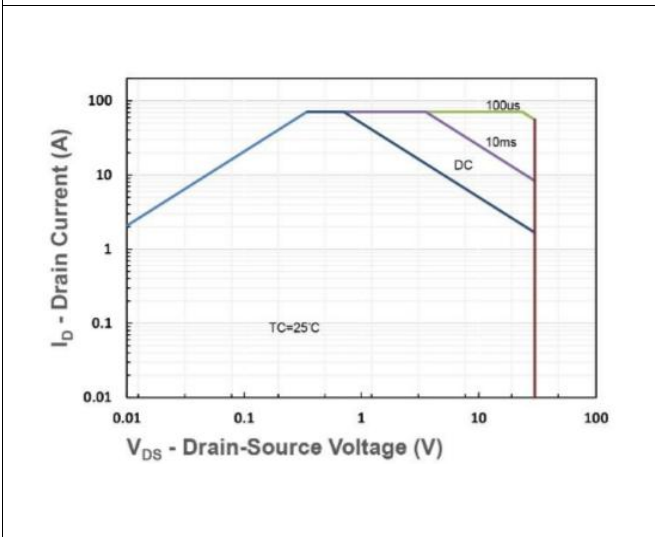


Figure 10. Maximum Drain Current vs. Case Temperature

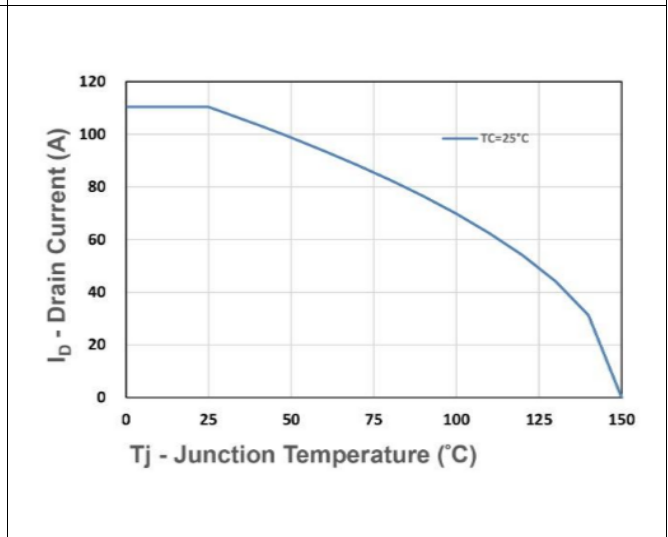
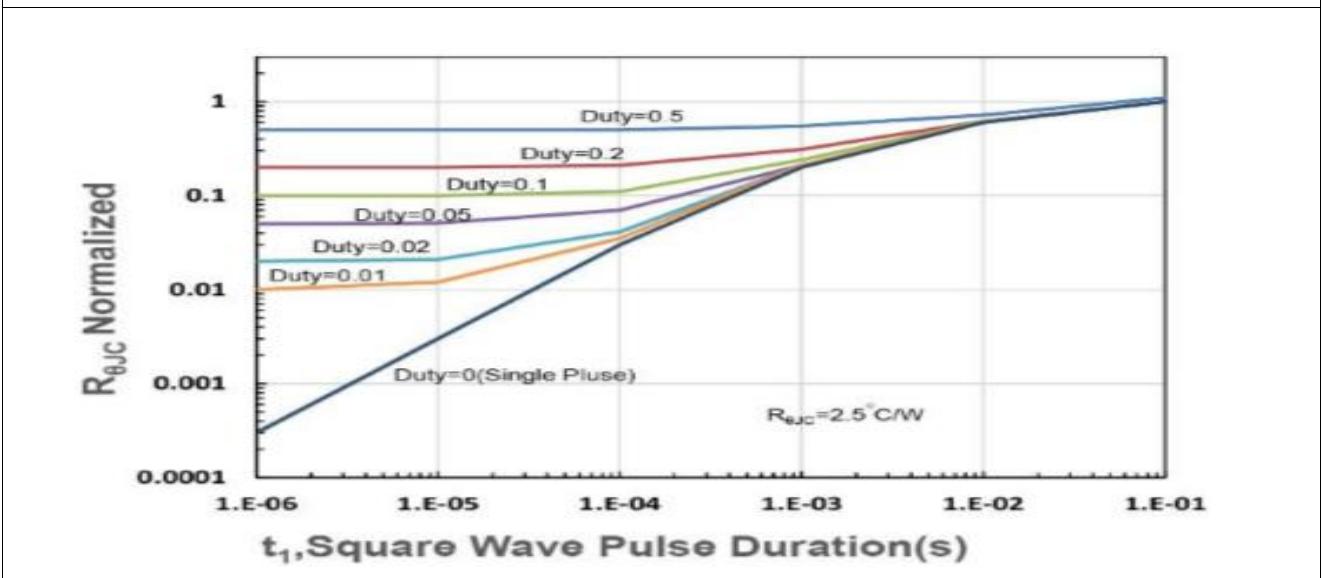
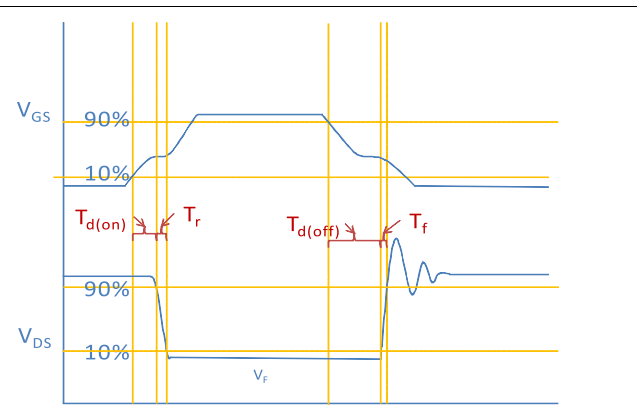
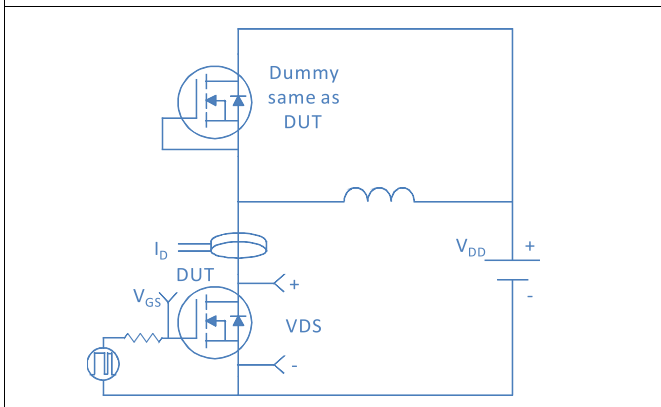


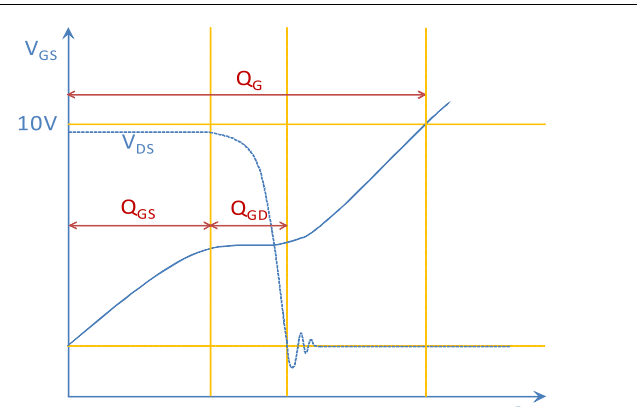
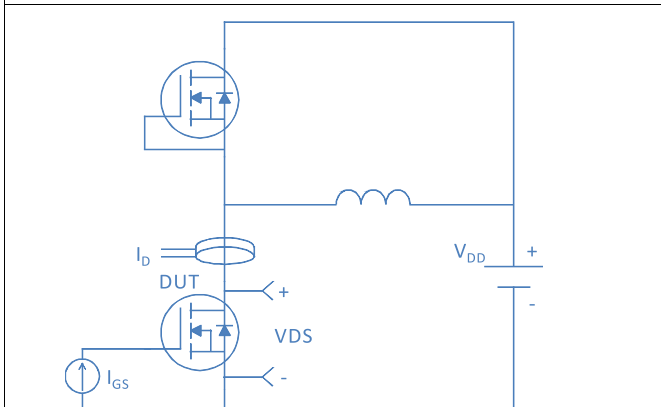
Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Case



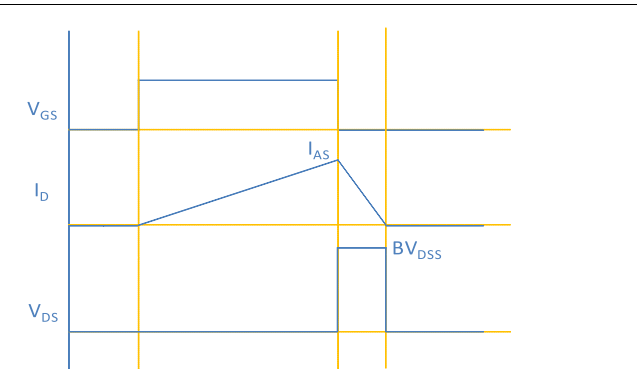
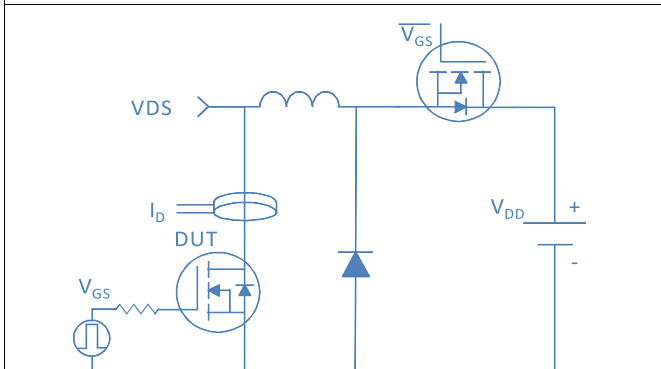
Inductive switching Test



Gate Charge Test



Unclamped Inductive Switching (UIS) Test



Diode Recovery Test

