

30V N-Ch Power MOSFET

Feature

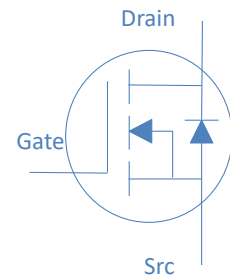
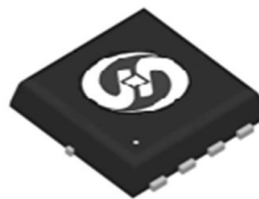
- ◇ High Speed Power Switching, Logic Level
- ◇ Enhanced Avalanche Ruggedness
- ◇ 100% UIS Tested, 100% Rg Tested
- ◇ Lead Free

V_{DS}		30	V
$R_{DS(on),typ}$	$V_{GS}=10V$	3.5	mΩ
$R_{DS(on),typ}$	$V_{GS}=4.5V$	4.5	mΩ
I_D		71	A

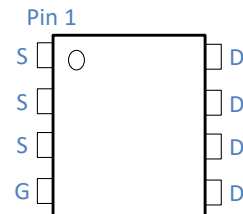
Application

- ◇ Hard Switching and High Speed Circuit
- ◇ DC/DC in Telecoms and Industrial

DFN3.3x3.3



Part Number	Package	Marking
HTM040N03P	DFN 3.3*3.3	TM040N03P



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

Parameter	Symbol	Conditions	Value	Unit
Continuous Drain Current	I_D	$T_C=25^{\circ}C$	71	A
		$T_C=100^{\circ}C$	51	
Drain to Source Voltage	V_{DS}	-	30	V
Gate to Source Voltage	V_{GS}	-	± 20	V
Pulsed Drain Current	I_{DM}	-	71	A
Avalanche Energy, Single Pulse	E_{AS}	$L=0.1mH, T_C=25^{\circ}C$	48	mJ
Power Dissipation	P_D	$T_C=25^{\circ}C$	42	W
Operating and Storage Temperature	T_J, T_{stg}	-	-55 to 150	$^{\circ}C$

Absolute Maximum Ratings

Parameter	Symbol	Max	Unit
Thermal Resistance Junction-Ambient	$R_{\theta JA}$	80	$^{\circ}C/W$
Thermal Resistance Junction-Case	$R_{\theta JC}$	3	$^{\circ}C/W$

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	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1.0	1.5	2.0	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS}=0V, V_{DS}=24V, T_j=25^\circ\text{C}$	-	-	1	μA
Gate to Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
Drain to Source on Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$	-	3.5	4	m Ω
		$V_{GS}=4.5V, I_D=10A$	-	4.5	6	
Transconductance	g_{fs}	$V_{DS}=5V, I_D=20A$	-	28	-	S
Gate Resistance	R_G	$V_{GS}=0V, V_{DS}$ Open, $f=1\text{MHz}$	-	1.0	-	Ω

Dynamic Characteristics

Input Capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=15V, f=1\text{MHz}$	-	2435	-	pF	
Output Capacitance	C_{oss}		-	308	-		
Reverse Transfer Capacitance	C_{rss}		-	259	-		
Total Gate Charge	$Q_g(10V)$	$V_{DD}=15V, I_D=20A, V_{GS}=10V$	-	62	-	nC	
	$Q_g(4.5V)$		-	33	-		
Gate to Source Charge	Q_{gs}		-	10.2	-		
Gate to Drain (Miller) Charge	Q_{gd}		-	16	-		
Turn on Delay Time	$t_{d(on)}$		-	10.3	-		ns
Rise time	t_r		$V_{DD}=15V, I_D=1A, V_{GS}=10V,$	-	17.6		
Turn off Delay Time	$t_{d(off)}$	$R_G=3\Omega,$	-	43.2	-		
Fall Time	t_f		-	31.7	-		

Reverse Diode Characteristics

Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_F=1A$	-	0.75	1.1	V
Reverse Recovery Time	t_{rr}	$V_R=15V, I_F=1A, d_{IF/dt}=100A/\mu s$	-	20	-	ns
Reverse Recovery Charge	Q_{rr}		-	12	-	nC

Fig 1. Typical Output Characteristics

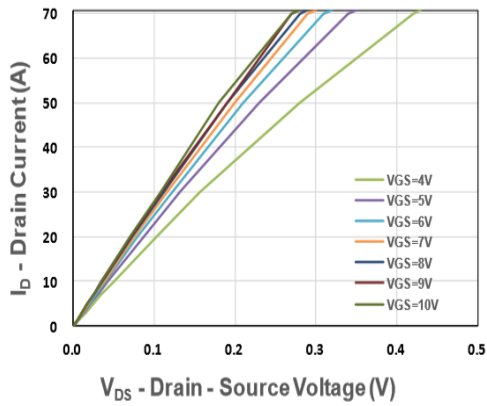


Figure 2. On-Resistance vs. Gate-Source Voltage

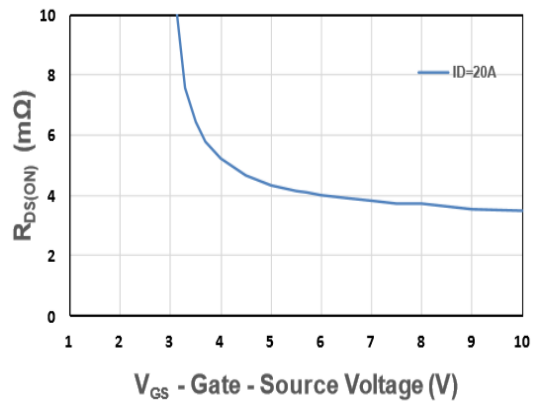


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

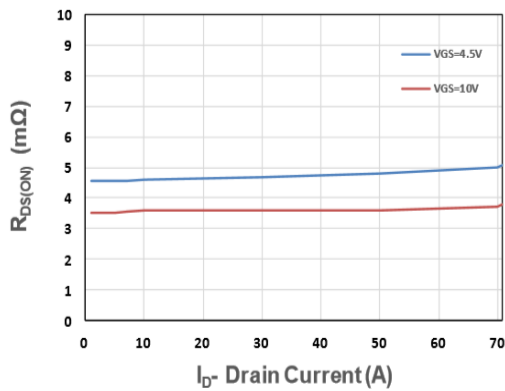


Figure 4. Normalized On-Resistance vs. Junction Temperature

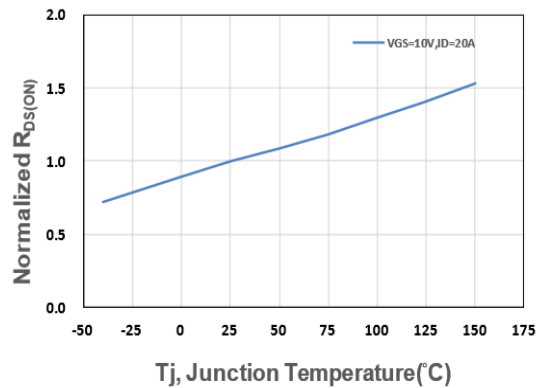


Figure 5. Normalized Threshold Voltage vs. Junction Temperature

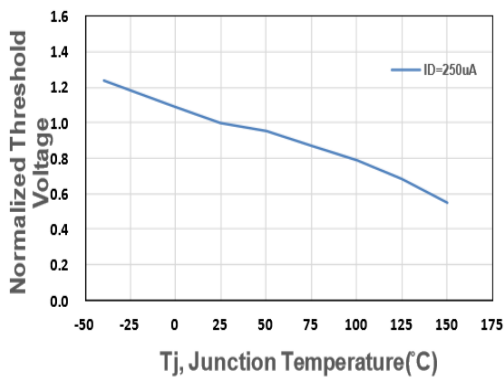


Figure 6. Typical Source-Drain Diode Forward Voltage

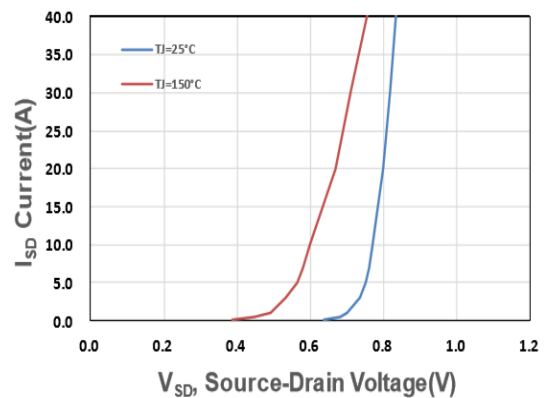


Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage

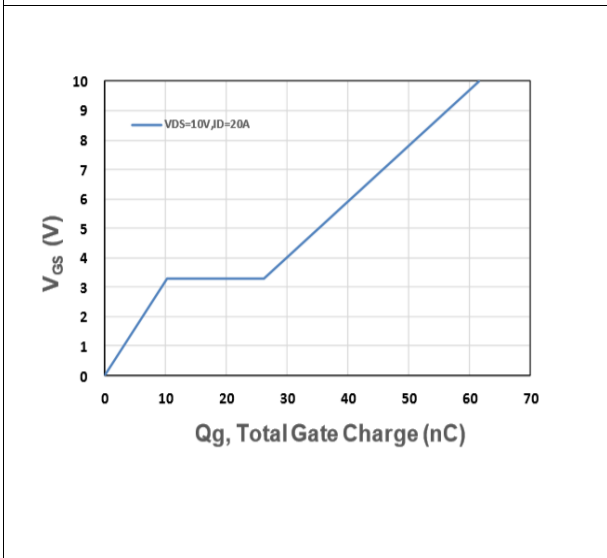


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

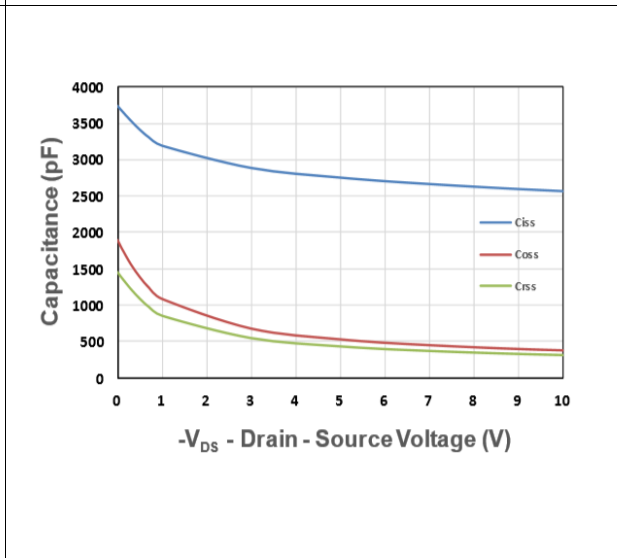


Figure 9. Maximum Safe Operating Area

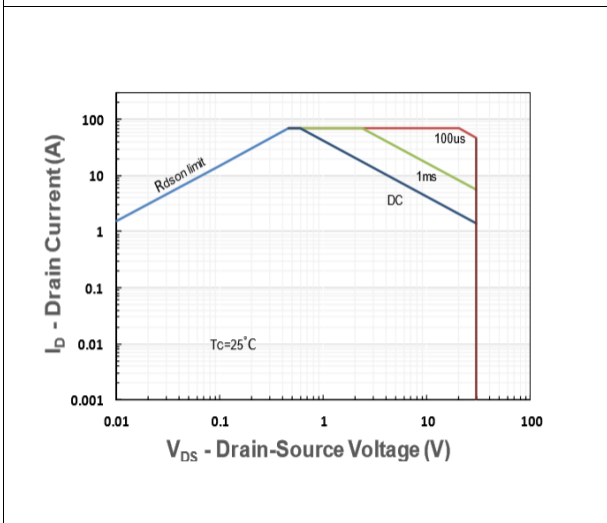


Figure 10. Maximum Drain Current vs. Case Temperature

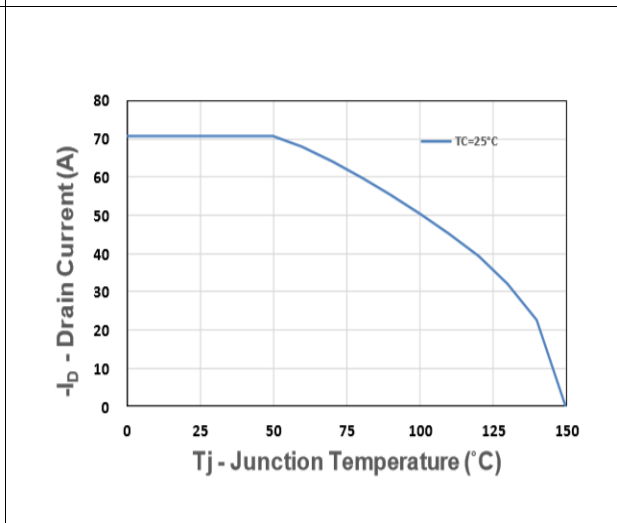
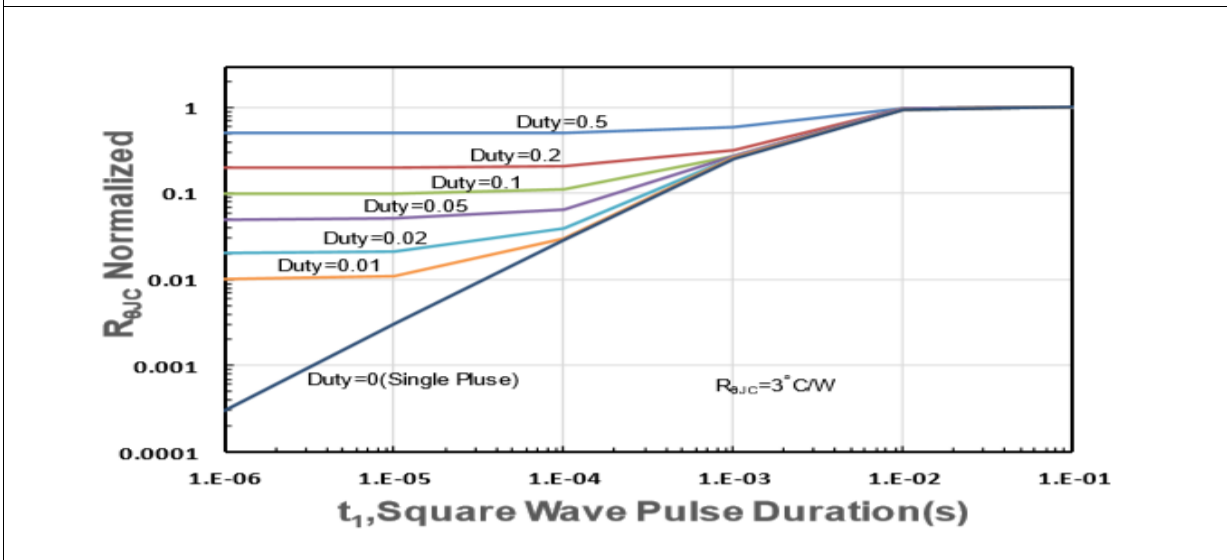
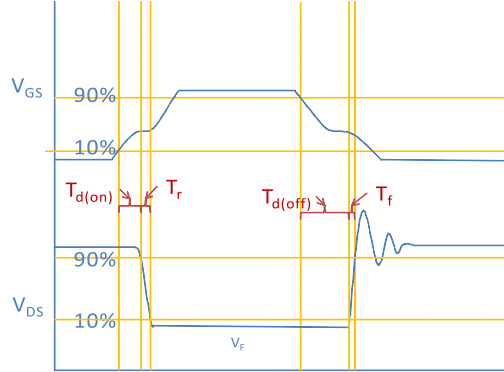
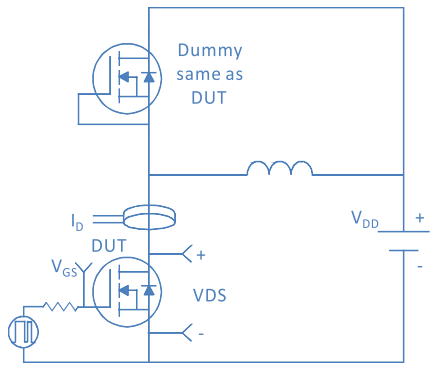


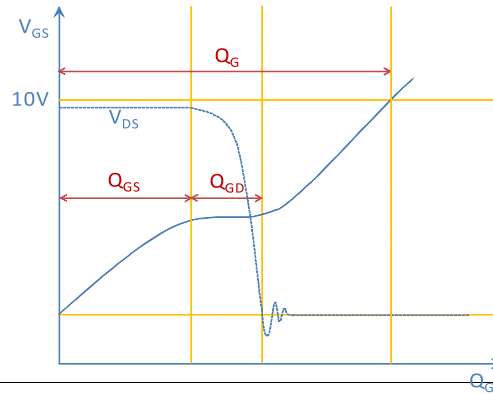
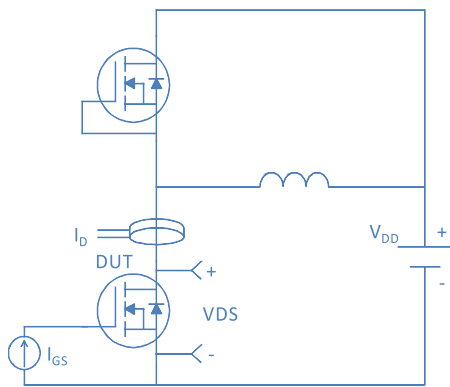
Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Ambient



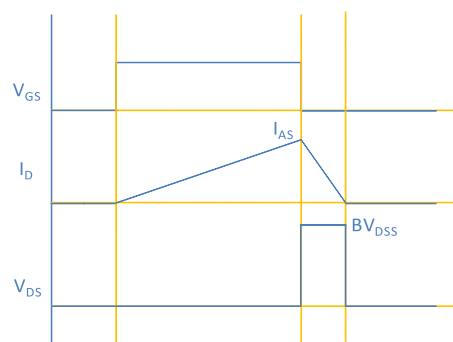
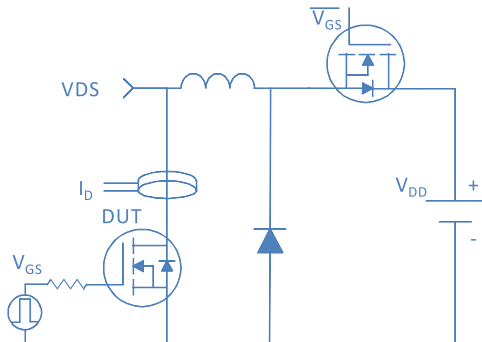
Inductive switching Test



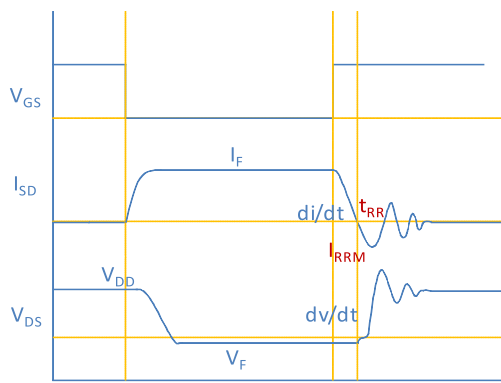
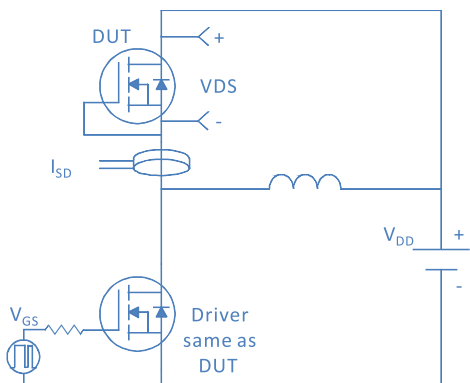
Gate Charge Test



Uclamped Inductive Switching (UIS) Test

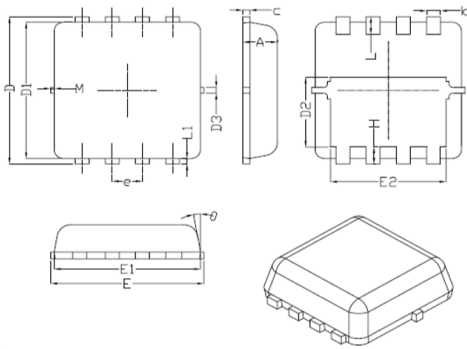


Diode Recovery Test



Package Outline

DFN3.3*3.3_P, 8 Leads



COMMON DIMENSIONS		
UNITS: MILLIMETERS		
SYMBOL	MIN	MAX
A	0.70	0.80
b	0.25	0.35
c	0.10	0.25
D	3.25	3.45
D1	3.00	3.20
D2	1.48	1.68
D3	—	0.13
E	3.20	3.40
E1	3.00	3.20
E2	2.39	2.59
e	0.65 BSC	
H	0.30	0.50
L	0.30	0.50
L1	—	0.13
θ	—	12°
M	—	0.15