30V N-Ch Power MOSFET

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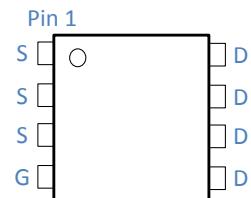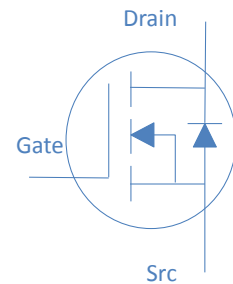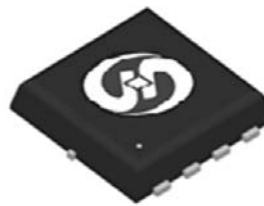◇ High Speed Power Switching, Logic Level
◇ Enhanced Avalanche Ruggedness
◇ 100% UIS Tested, 100% Rg Tested
◇ Lead Free, Halogen Free

V_{DS}		30	V
$R_{DS(on),typ}$	V_{GS}=10V	3.2	mΩ
$I_{D\ (Sillicon\ Limited)}$		32	A

Application
◇ Hard Switching and High Speed Circuit
◇ DC/DC in Telecoms and Inductrial

DFN3x3

Part Number	Package	Marking
HTM040N03	DFN3*3	TM040N03

Pin 1

S		D
S		D
S		D
G		D

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℃	32	A
		T_C=100℃	22	
Drain to Source Voltage	V_{DS}	-	30	V
Gate to Source Voltage	V_{GS}	-	±20	V
Pulsed Drain Current	I_{DM}	-	128	A
Avalanche Energy, Single Pulse	E_{AS}	L=0.1mH, T_C=25℃	51.2	mJ
Power Dissipation	P_D	T_C=25℃	21	W
Operating and Storage Temperature	T_J, T_{stg}	-	-55 to150	℃

Absolute Maximum Ratings

Parameter	Symbol	Max	Unit
Thermal Resistance Junction-Ambient	$R_{\theta JA}$	50	℃/W
Thermal Resistance Junction-Case	$R_{\theta JC}$	6	℃/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	30	-	-	V
Gate Threshold Voltage	V$_{GS(th)}$	V$_{GS}$=V$_{DS}$, I$_D$=250μA	1	1.5	3	
Zero Gate Voltage Drain Current	I$_{DSS}$	V$_{GS}$=0V, V$_{DS}$=24V, T$_j$=25℃	-	-	1	μA
		V$_{GS}$=0V, V$_{DS}$=20V, 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$_D$=16A	-	3.2	4	mΩ
		V$_{GS}$=4.5V, I$_D$=12A	-	4.9	6.6	
Transconductance	g$_{fs}$	V$_{DS}$=5V, I$_D$=16A	-	26	-	S
Gate Resistance	R$_G$	V$_{GS}$=15mV, V$_{DS}$ =0V, f=1MHz	-	2.4	-	Ω

Dynamic Characteristics

Parameter	Symbol	Conditions				Unit
Input Capacitance	C$_{iss}$	V$_{GS}$=0V, V$_{DS}$=15V, f=1MHz	-	2806	-	pF
Output Capacitance	C$_{oss}$		-	378	-	
Reverse Transfer Capacitance	C$_{rss}$		-	202	-	
Total Gate Charge	Q$_g$(10V)	V$_{DD}$=15V, I$_D$=16A, V$_{GS}$=10V	-	42	-	nC
	Q$_g$(4.5V)			21		
Gate to Source Charge	Q$_{gs}$		-	4.7	-	
Gate to Drain (Miller) Charge	Q$_{gd}$		-	9.3	-	
Turn on Delay Time	t$_{d(on)}$	V$_{DD}$=15V, I$_D$=1A, V$_{GS}$=10V, R$_G$=2.7Ω,	-	18	-	ns
Rise time	t$_r$		-	15	-	
Turn off Delay Time	t$_{d(off)}$		-	55	-	
Fall Time	t$_f$		-	20	-	

Reverse Diode Characteristics

Parameter	Symbol	Conditions				Unit
Diode Forward Voltage	V$_{SD}$	V$_{GS}$=0V, I$_F$=32A	-		1.3	V
Reverse Recovery Time	t$_{rr}$	I$_F$=32A, dI$_F$/dt=100A/μs	-	30	-	ns
Reverse Recovery Charge	Q$_{rr}$		-	10	-	nC

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

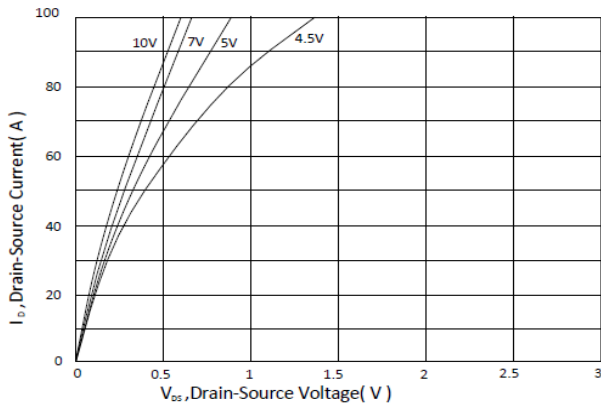Fig 1. Typical Output Characteristics

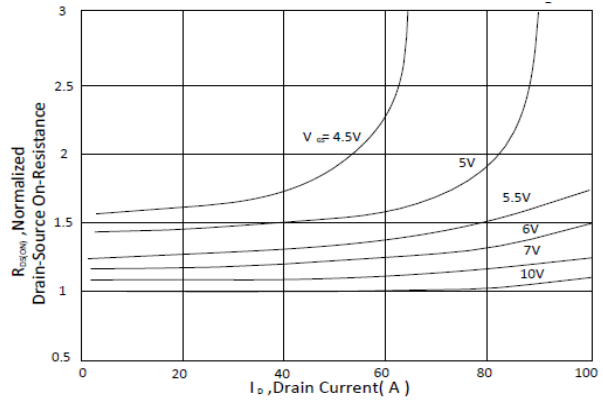Figure 2. On-Resistance vs. Gate-Source Voltage

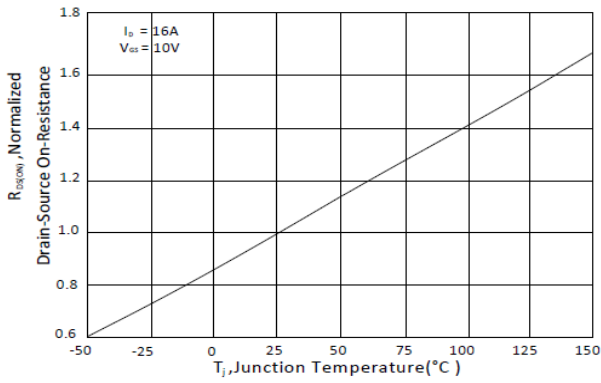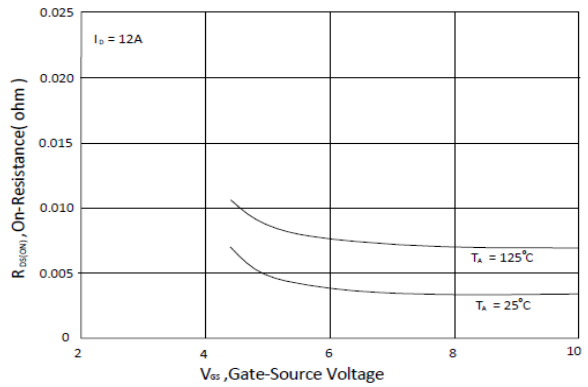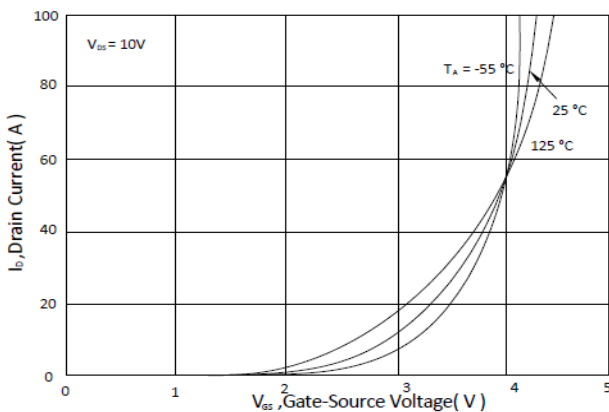| Figure 3. On-Resistance vs. Drain Current and Gate Voltage	Figure 4. Normalized On-Resistance vs. Junction Temperature

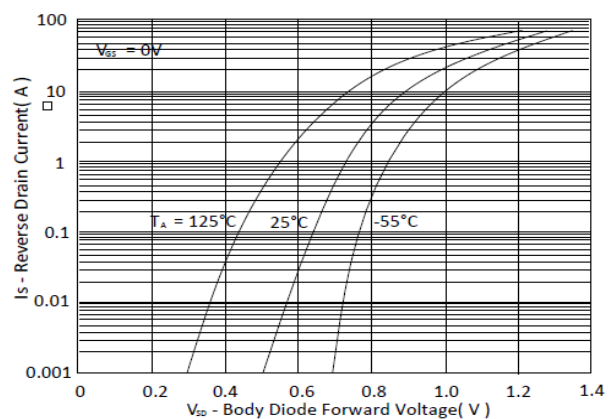| Figure 5. Typical Transfer Characteristics	Figure 6. Typical Source-Drain Diode Forward Voltage

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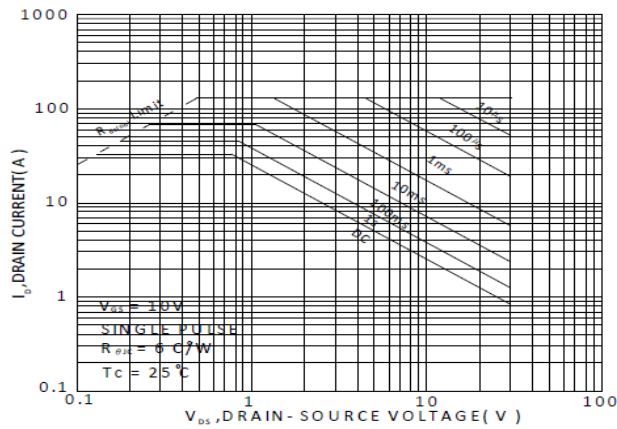| Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage	Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

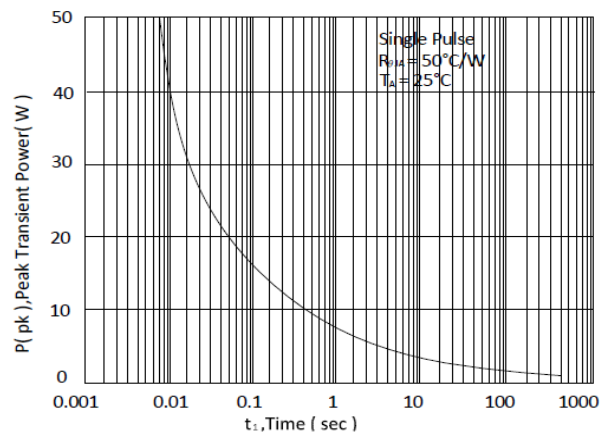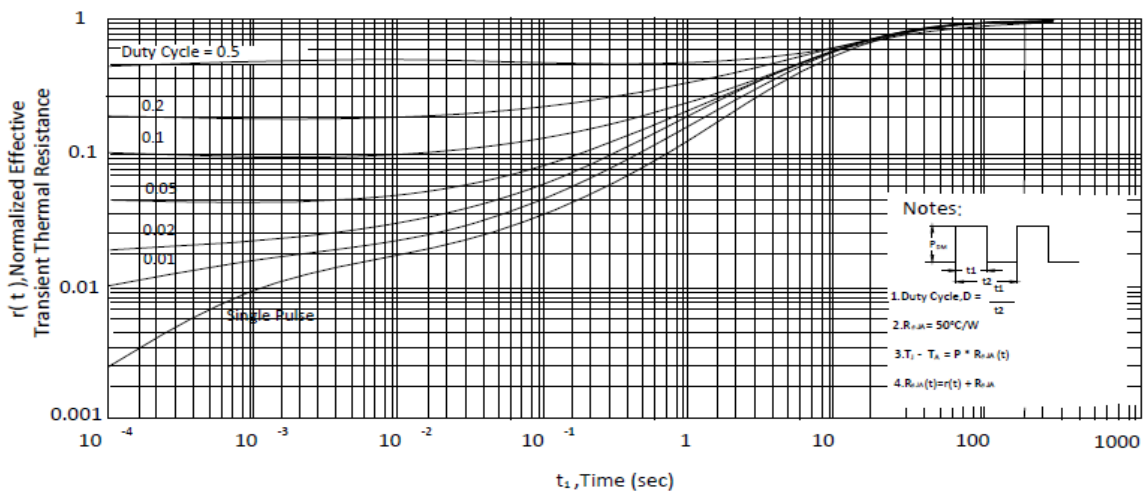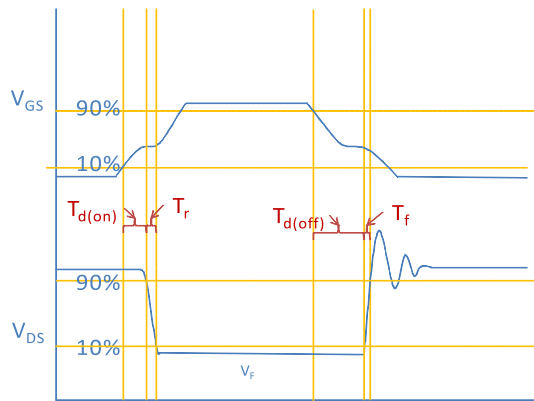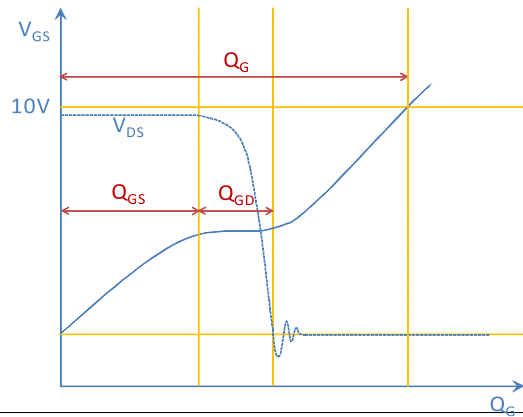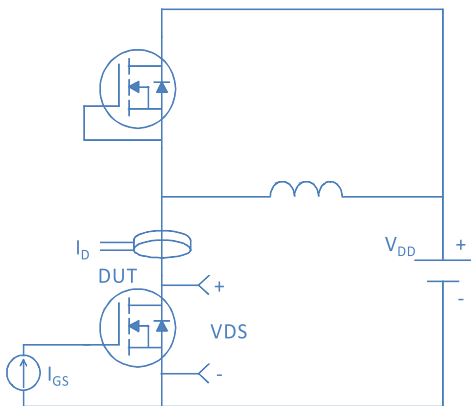| Figure 9. Maximum Safe Operating Area	Figure 10. Single Pulse Maximum Power Dissipation

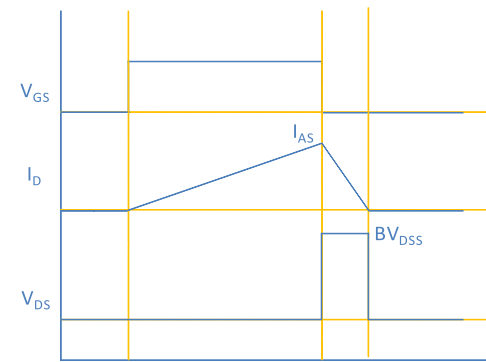Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Ambient
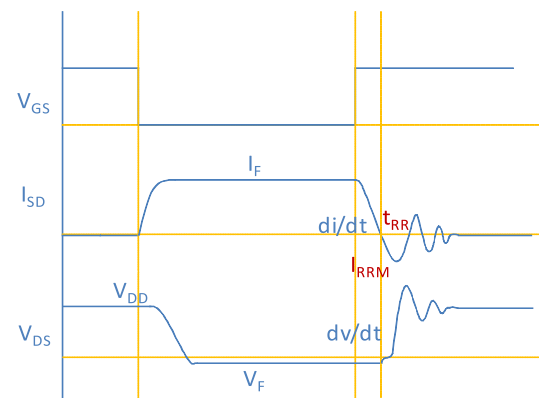
Inductive switching Test

Gate Charge Test

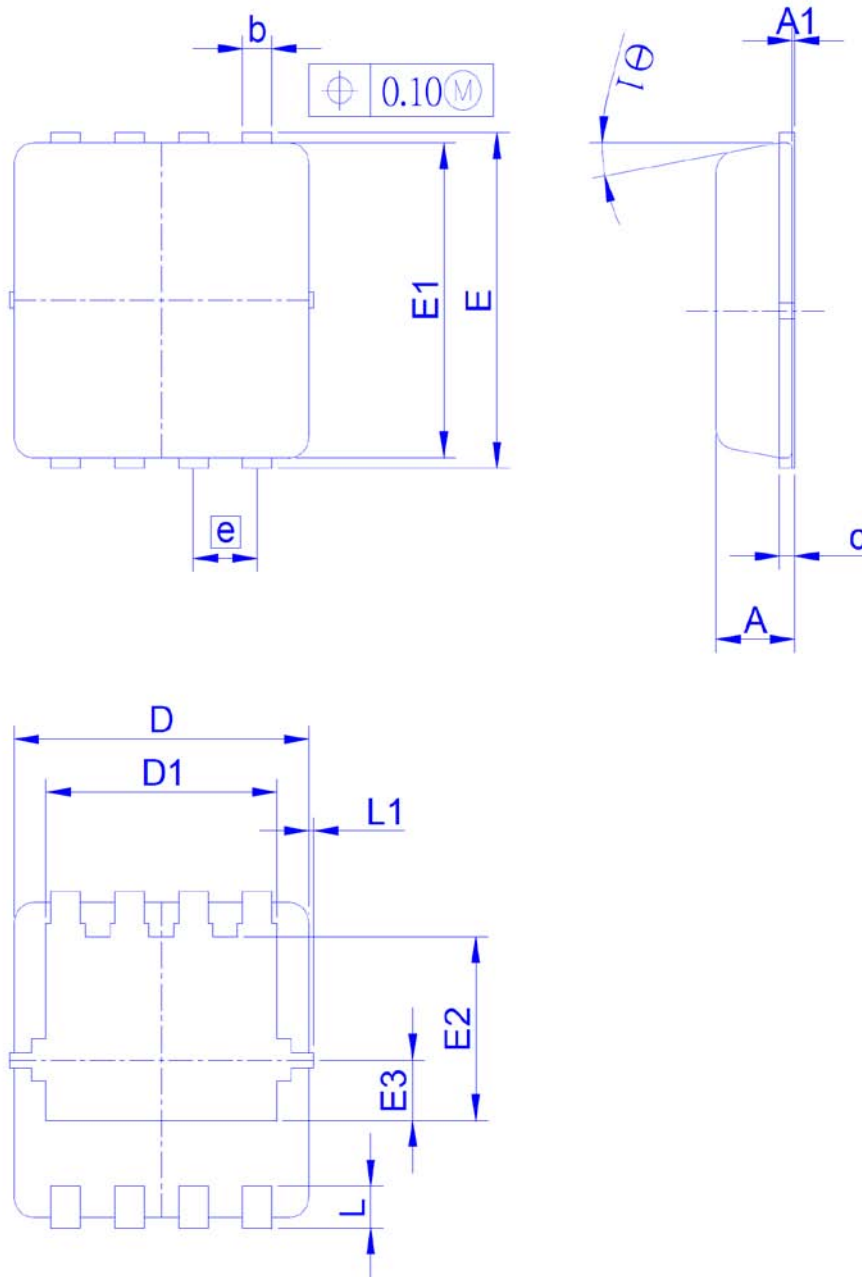## Uclamped Inductive Switching (UIS) Test

Diode Recovery Test

Package Outline

DFN3x3_P, 8leads

Dimension in mm

Dimension	A	A1	b	c	D	D1	E	E1	E2	E3	e	L	L1	Θ1
Min.	0.70	0	0.24	0.10	2.95	2.25	3.15	2.95	1.65			0.30		0°
Typ.	0.80		0.30	0.152	3.00	2.35	3.20	3.00	1.75	0.575	0.65	0.40	0.13	10°
Max.	0.90	0.05	0.37	0.25	3.15	2.45	3.40	3.15	1.96			0.50		12°