

30V P-Ch Power MOSFET

Feature

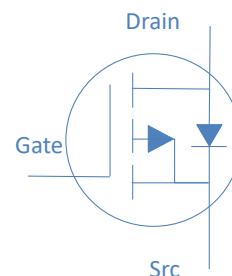
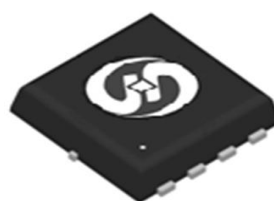
- ◇ High Speed Power Switching, Logic Level
- ◇ Enhanced Avalanche Ruggedness
- ◇ 100% UIS Tested, 100% Rg Tested
- ◇ Lead Free, Halogen Free

V_{DS}		-30	V
$R_{DS(on),typ}$	$V_{GS}=10V$	8.6	m Ω
$R_{DS(on),typ}$	$V_{GS}=4.5V$	11.5	m Ω
I_D (Silicon Limited)		-52	A

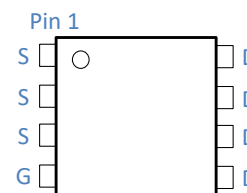
Application

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

DFN3x3



Part Number	Package	Marking
HTM105P03P	DFN3*3	TM105P03P



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

Parameter	Symbol	Conditions	Value	Unit
Continuous Drain Current (Silicon Limited)	I_D	$T_C=25^{\circ}C$	-52	A
		$T_C=70^{\circ}C$	-41	
Drain to Source Voltage	V_{DS}	-	-30	V
Gate to Source Voltage	V_{GS}	-	± 20	V
Pulsed Drain Current	I_{DM}	-	-70	A
Avalanche Energy, Single Pulse	E_{AS}	$L=0.1mH, T_C=25^{\circ}C$	61.25	mJ
Power Dissipation	P_D	$T_A=25^{\circ}C$	41.7	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	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-13A$	-	8.6	10.5	m Ω
		$V_{GS}=-4.5V, I_D=-9A$	-	11.5	15	
Transconductance	g_{fs}	$V_{DS}=-5V, I_D=-13A$	-	25	-	S
Gate Resistance	R_G	$V_{GS}=15mV, V_{DS}=0V, f=1MHz$	-	6.6	-	Ω

Dynamic Characteristics

Input Capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=-15V, f=1MHz$	-	2828	-	pF	
Output Capacitance	C_{oss}		-	343	-		
Reverse Transfer Capacitance	C_{rss}		-	291	-		
Total Gate Charge	$Q_g (10V)$	$V_{DD}=-25V, I_D=-13A, V_{GS}=-10V$	-	65	-	nC	
	$Q_g (4.5V)$		-	33	-		
Gate to Source Charge	Q_{gs}		-	8.7	-		
Gate to Drain (Miller) Charge	Q_{gd}		-	15	-		
Turn on Delay Time	$t_{d(on)}$		-	11.4	-		ns
Rise time	t_r		$V_{DD}=-15V, I_D=-1A, V_{GS}=-10V,$	-	24		
Turn off Delay Time	$t_{d(off)}$	$R_G=2.7\Omega,$	-	104	-		
Fall Time	t_f		-	56.8	-		

Reverse Diode Characteristics

Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_F=-3A$	-	-0.74	-1.1	V
Reverse Recovery Time	t_{rr}	$I_F=-20A, di_F/dt=100A/\mu s$	-	15.6	-	ns
Reverse Recovery Charge	Q_{rr}		-	7.9	-	nC

Fig 1. Typical Output Characteristics

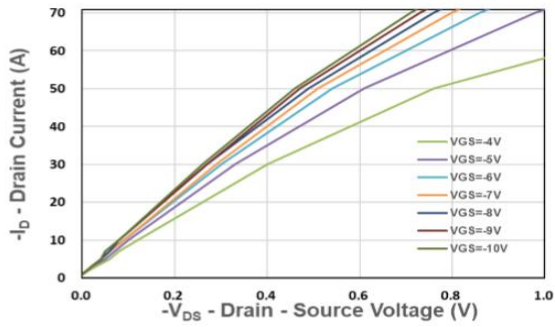


Figure 2. On-Resistance vs. Gate-Source Voltage

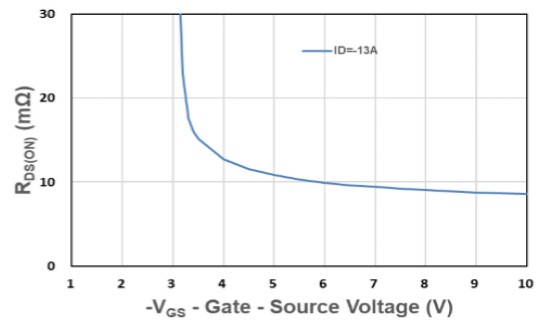


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

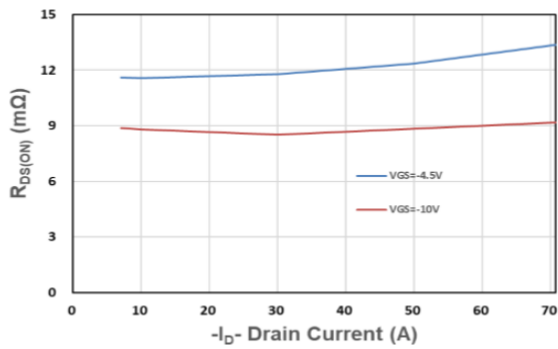


Figure 4. Normalized On-Resistance vs. Junction Temperature

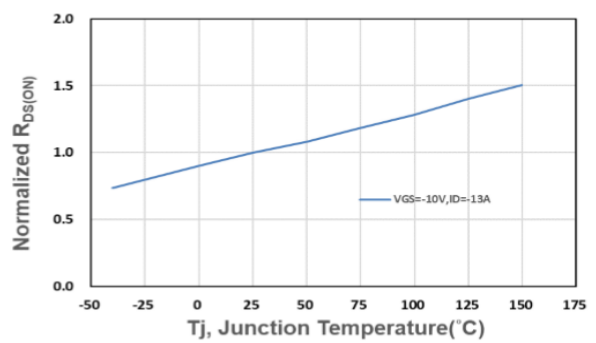


Figure 5. Normalized Threshold Voltage vs. Junction Temperature

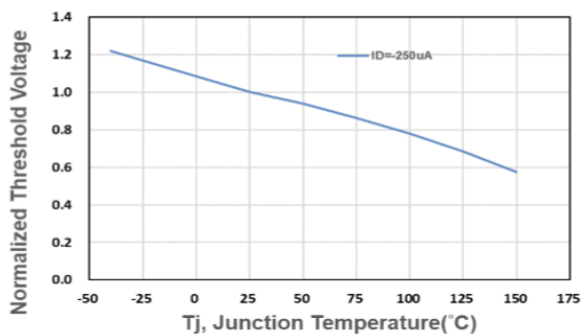


Figure 6. Typical Source-Drain Diode Forward Voltage

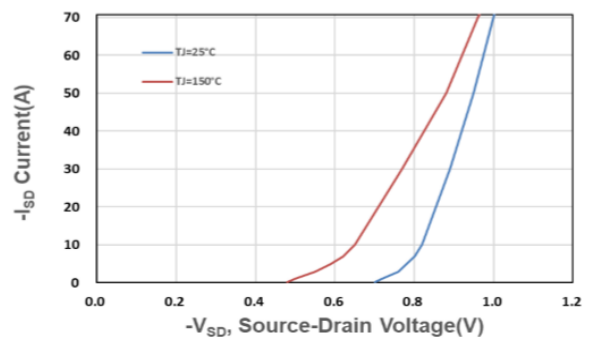


Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage

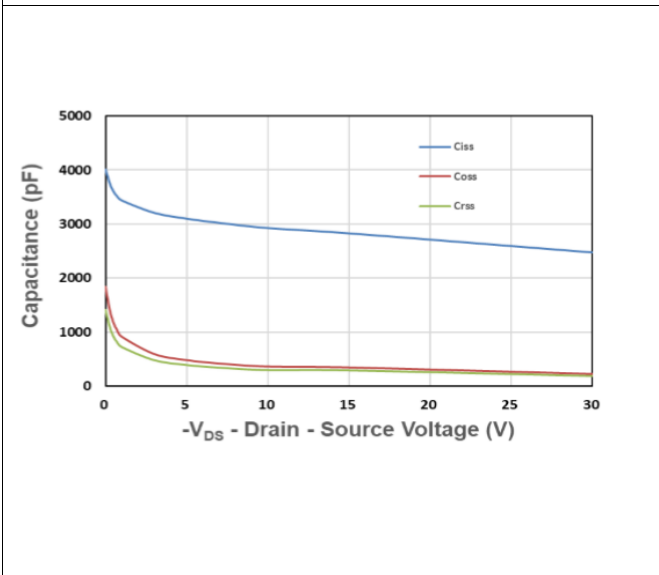


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

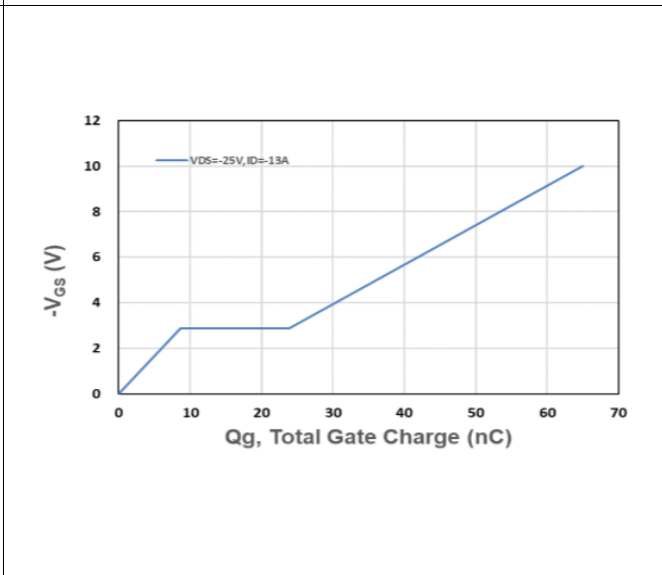


Figure 9. Maximum Safe Operating Area

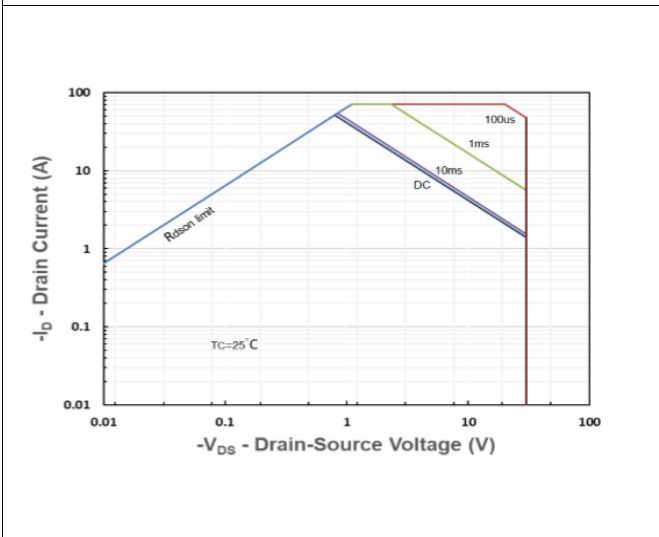


Figure 10. Single Pulse Maximum Power Dissipation

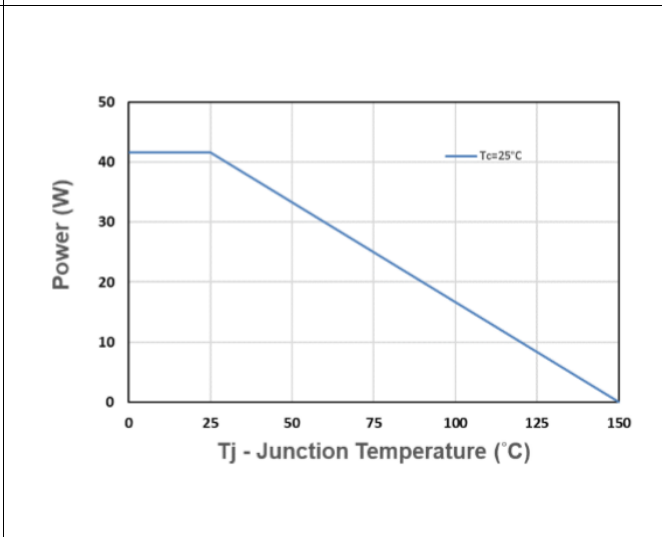
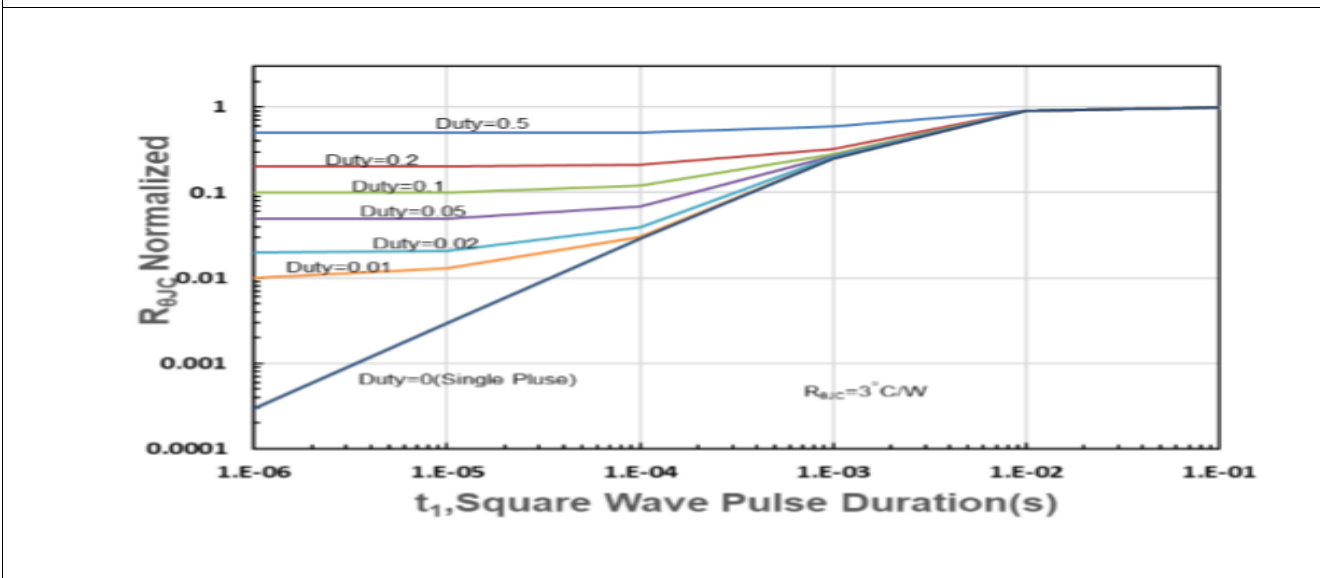
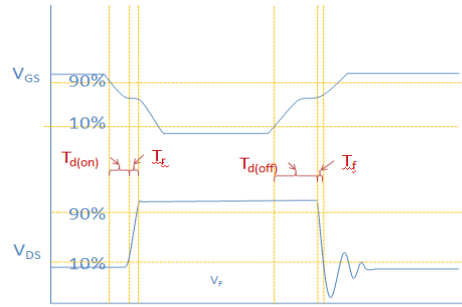
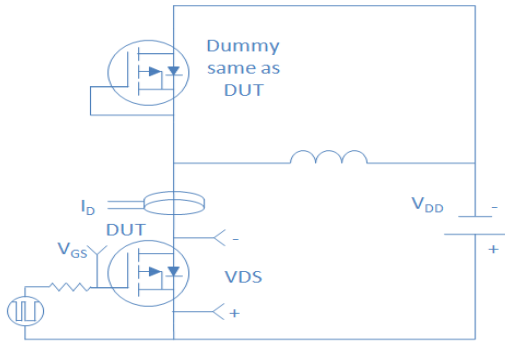


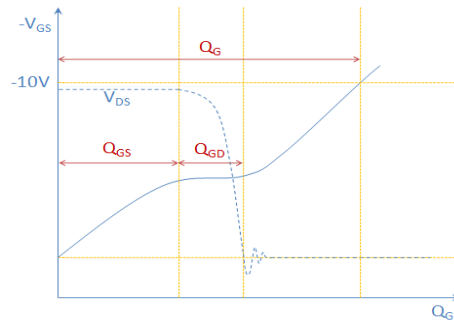
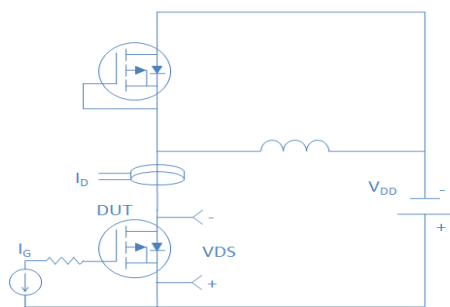
Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Ambient



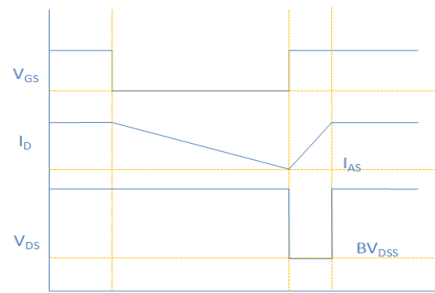
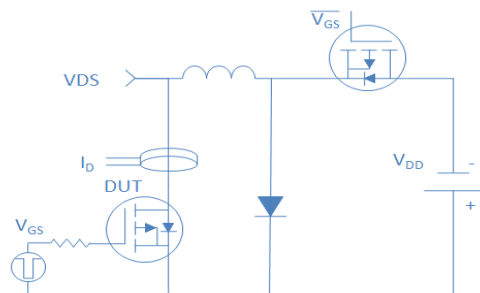
Inductive switching Test



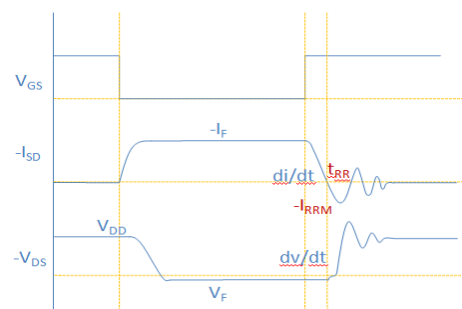
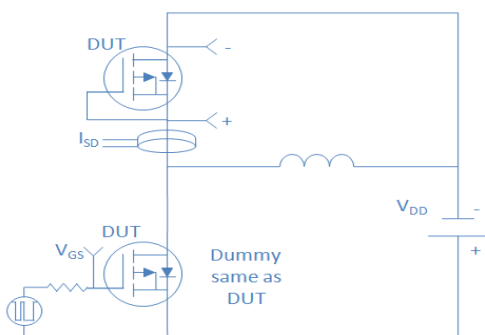
Gate Charge Test

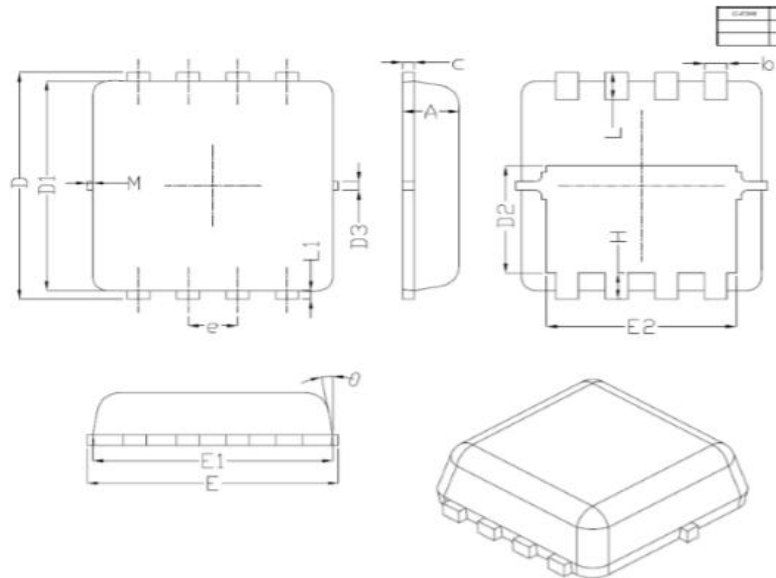


Uclamped Inductive Switching (UIS) Test



Diode Recovery Test



Package Outline
DFN3*3_P, 8 Leads


SYMBOL	DIMENSIONAL REQMTS		
	MIN	NOM	MAX
A	0.70	0.75	0.80
b	0.25	0.30	0.35
c	0.10	0.15	0.25
D	3.25	3.35	3.45
D1	3.00	3.10	3.20
D2	1.48	1.58	1.68
D3	---	0.13	---
E	3.20	3.30	3.40
E1	3.00	3.15	3.20
E2	2.39	2.49	2.59
e	0.65BSC		
H	0.30	0.39	0.50
L	0.30	0.40	0.50
L1	---	0.13	---
θ	---	10°	12°
M	*	*	0.15
* Not specified			