

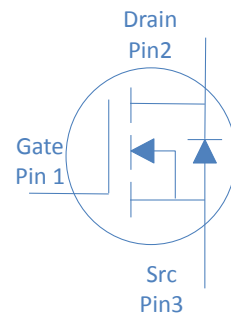
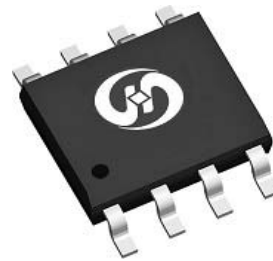
30V N-Ch Power MOSFET
Feature

- ◇ High Speed Power Switching, logic level
- ◇ Enhanced Body diode dv/dt capability
- ◇ Enhanced Avalanche Ruggedness
- ◇ 100% UIS Tested, 100% Rg Tested
- ◇ Lead Free

Application

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

V_{DS}		30	V
$R_{DS(on),typ}$	$V_{GS}=10V$	3.9	m Ω
$R_{DS(on),typ}$	$V_{GS}=4.5V$	7.1	m Ω
I_D		20	A

SOIC-8


Part Number	Package	Marking
HTS050N03	SOIC-8	TS050N03

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

Parameter	Symbol	Conditions	Value	Unit
Continuous Drain Current (Silicon Limited)	I_D	$T_A=25^{\circ}C$	20	A
		$T_A=100^{\circ}C$	13	
Drain to Source Voltage	V_{DS}	-	30	V
Gate to Source Voltage	V_{GS}	-	± 20	V
Pulsed Drain Current	I_{DM}	-	80	A
Avalanche Energy, Single Pulse	E_{AS}	$L=0.3mH, T_C=25^{\circ}C$	20	mJ
Power Dissipation	P_D	$T_A=25^{\circ}C$	2.5	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	$R_{\theta JC}$	25	$^{\circ}C/W$
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	3	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS}=0V, V_{DS}=20V, T_j=25^\circ\text{C}$	-	-	1	μA
		$V_{GS}=0V, V_{DS}=24V, T_j=125^\circ\text{C}$	-	-	25	
Gate to Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
Drain to Source on Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$	-	3.9	5	m Ω
		$V_{GS}=4.5V, I_D=15A$	-	7.1	9	
Transconductance	g_{fs}	$V_{DS}=5V, I_D=20A$	-	28	-	S
Gate Resistance	R_G	$V_{GS}=0V, V_{DS}$ Open, $f=1\text{MHz}$	-	1.3	-	Ω

Dynamic Characteristics

Input Capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=15V, f=1\text{MHz}$	-	2935	-	pF
Output Capacitance	C_{oss}		-	217	-	
Reverse Transfer Capacitance	C_{rss}		-	142	-	
Total Gate Charge (10V)	$Q_g(10V)$	$V_{DD}=15V, I_D=20A, V_{GS}=10V$	-	52	-	nC
Total Gate Charge (4.5V)	$Q_g(4.5V)$		-	32	-	
Gate to Source Charge	Q_{gs}		-	5.7	-	
Gate to Drain (Miller) Charge	Q_{gd}		-	7.2	-	
Turn on Delay Time	$t_{d(on)}$	$V_{DD}=15V, I_D=1A, V_{GS}=10V, R_G=2.7\Omega,$	-	25	-	ns
Rise time	t_r		-	20	-	
Turn off Delay Time	$t_{d(off)}$		-	70	-	
Fall Time	t_f		-	20	-	

Reverse Diode Characteristics

Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_F=10A$	-		1.2	V
Reverse Recovery Time	t_{rr}	$I_F=10A, di_F/dt=100A/\mu s$	-	35	-	ns
Reverse Recovery Charge	Q_{rr}		-	15	-	nC

Fig 1. Typical Output Characteristics

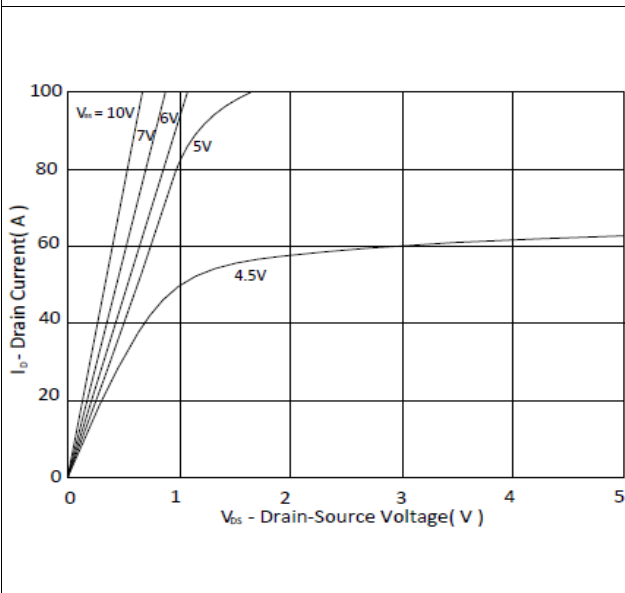


Figure 2. On-Resistance vs. Gate-Source Voltage

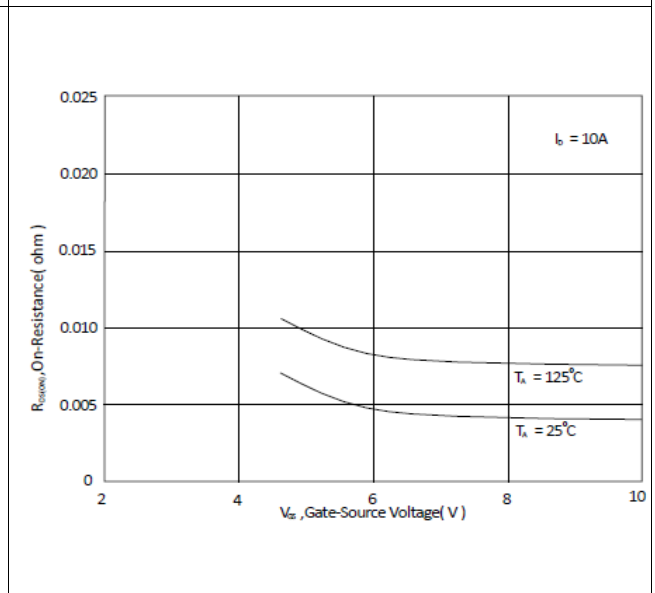


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

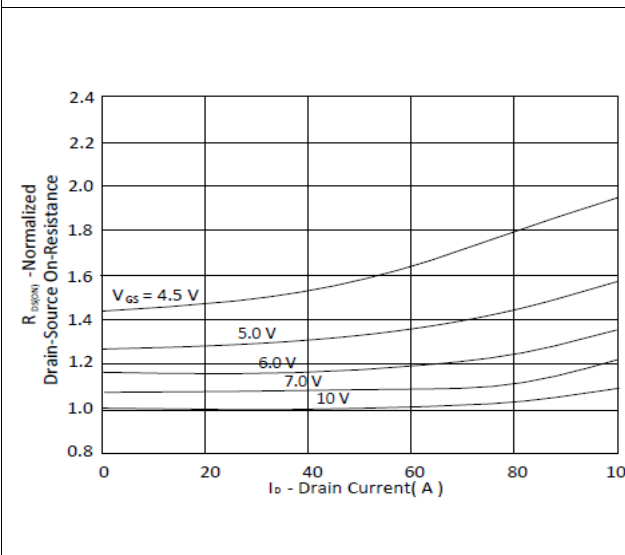


Figure 4. Normalized On-Resistance vs. Junction Temperature

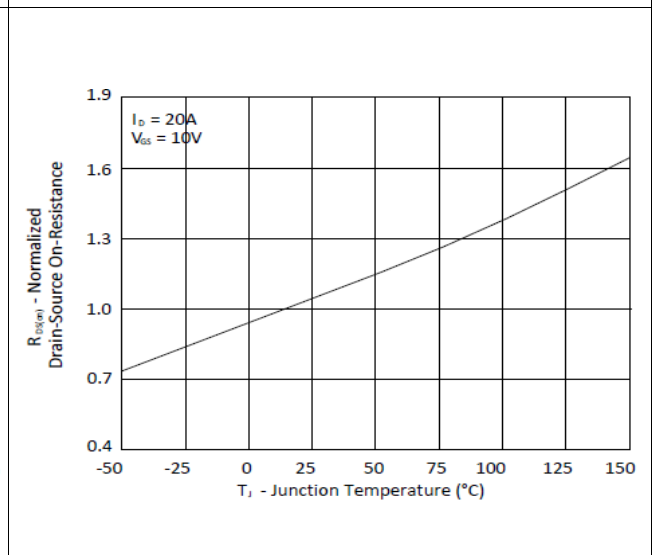


Figure 5. Typical Transfer Characteristics

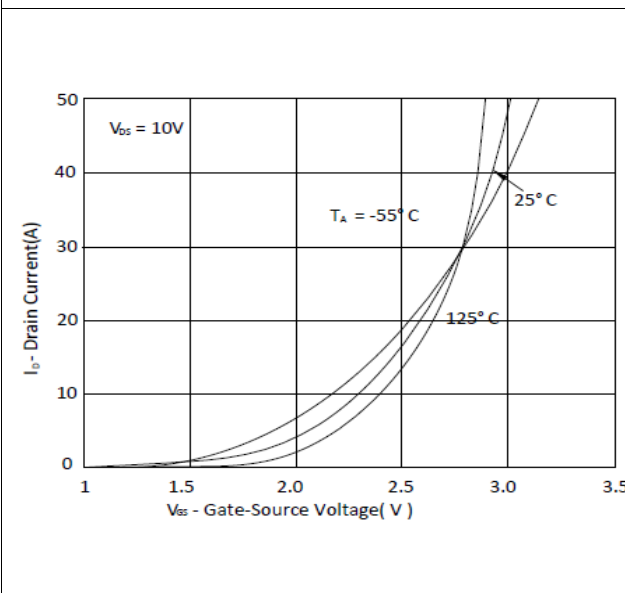


Figure 6. Typical Source-Drain Diode Forward Voltage

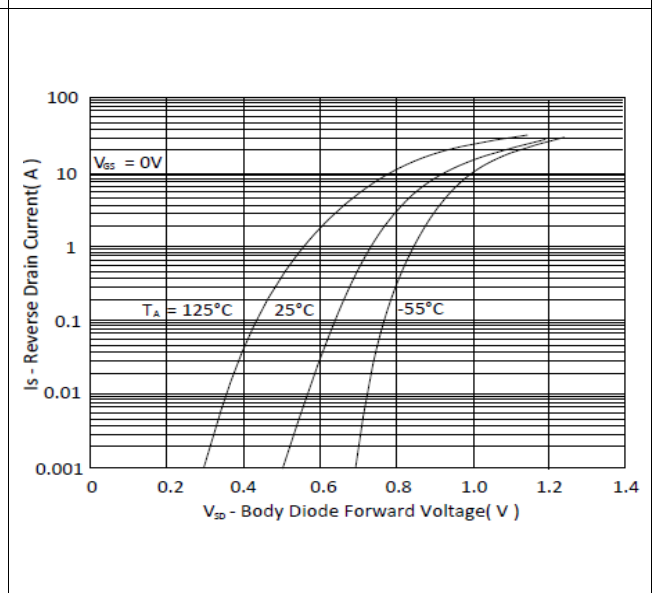


Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage

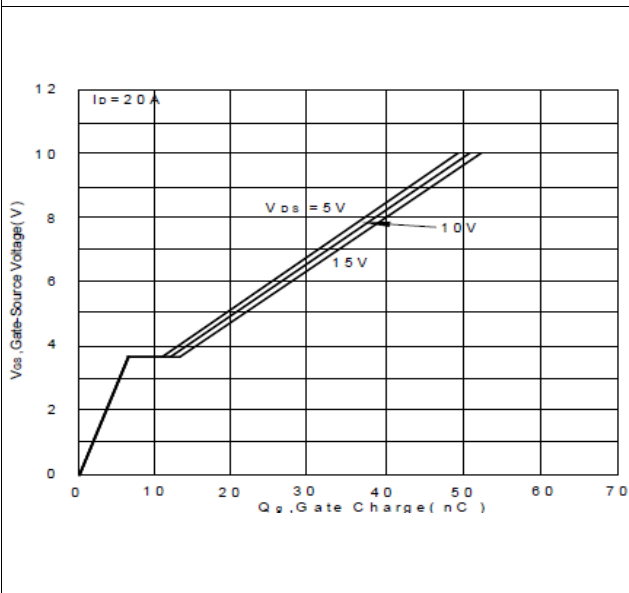


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

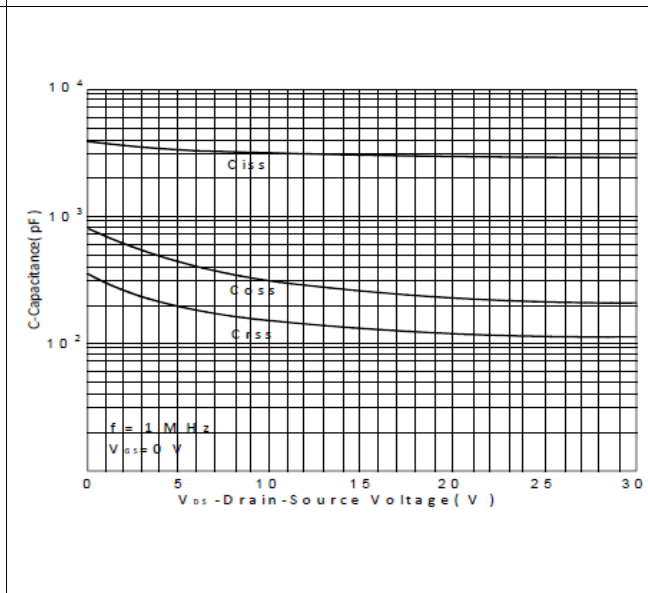


Figure 9. Maximum Safe Operating Area

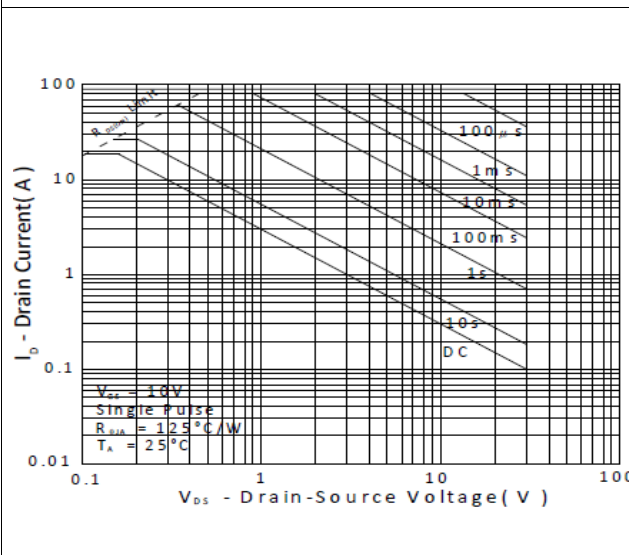


Figure 10. Single Pulse Maximum Power Dissipation

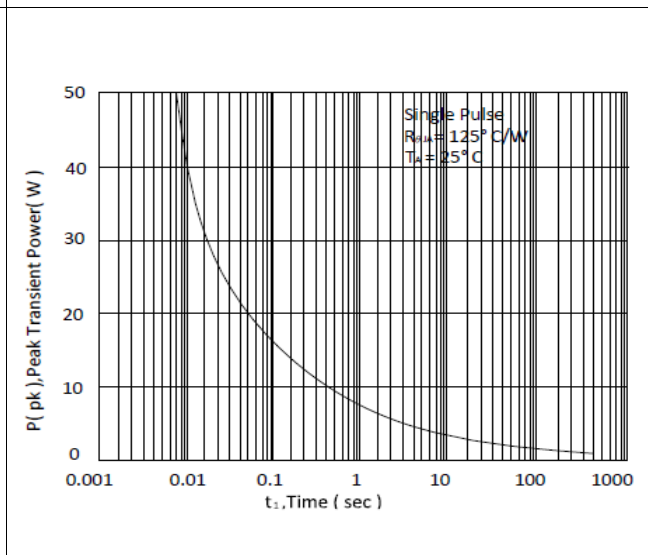
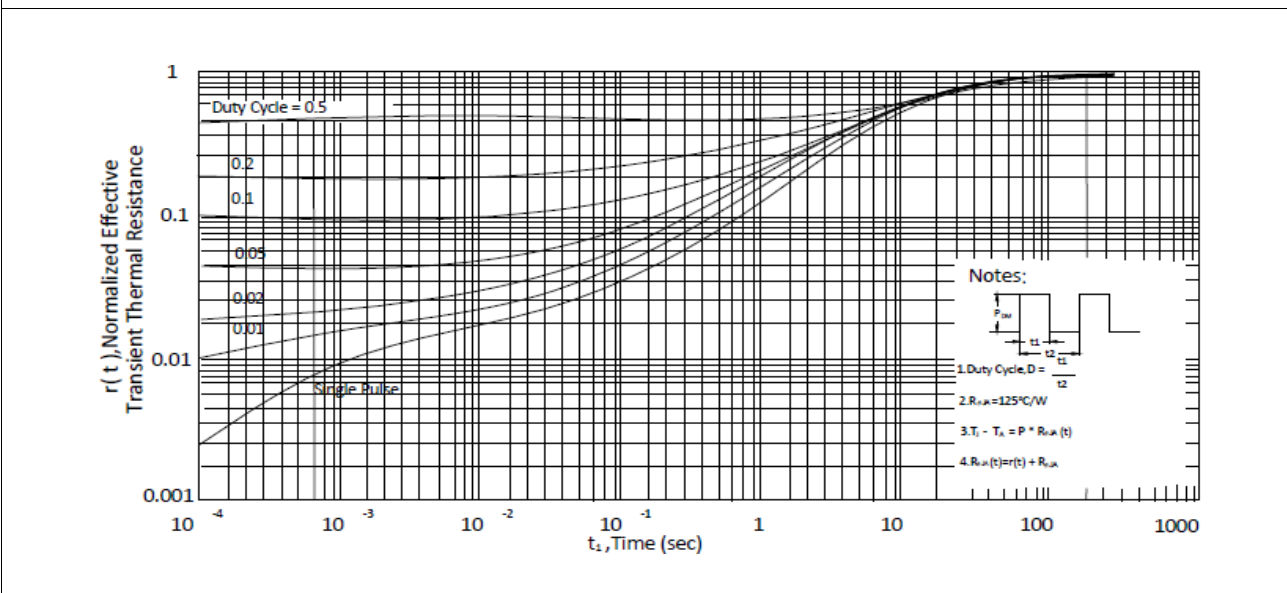
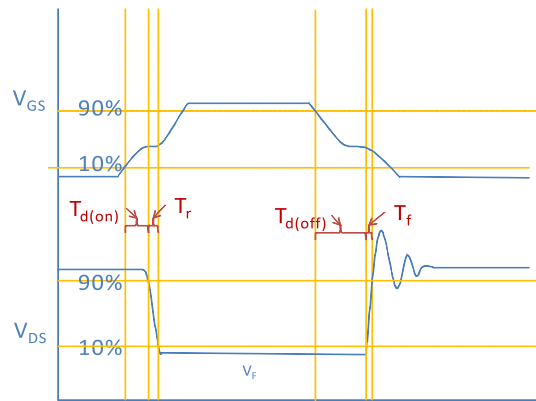


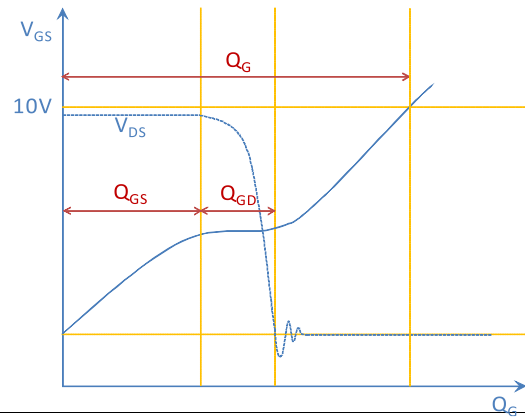
Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Case



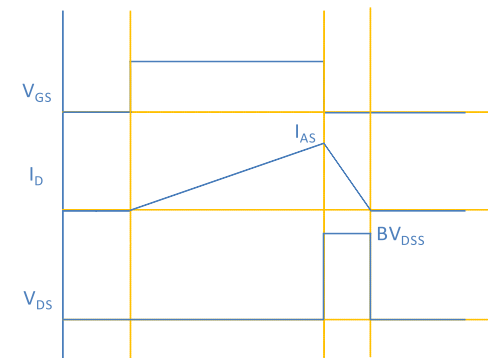
Inductive switching Test



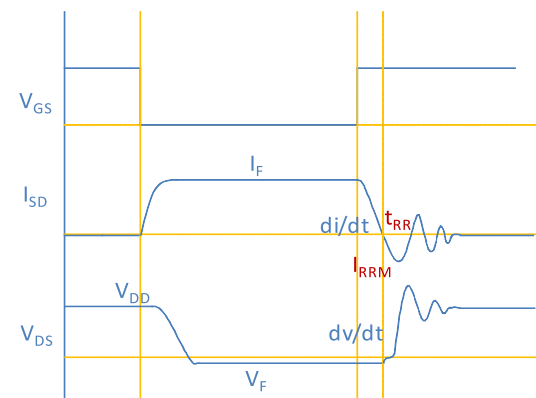
Gate Charge Test



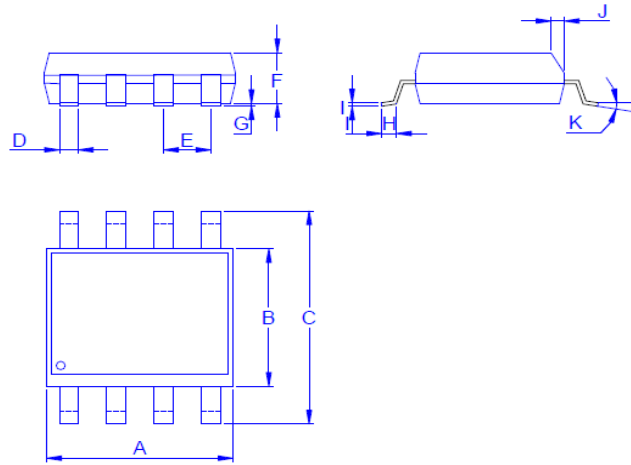
Uclamped Inductive Switching (UIS) Test



Diode Recovery Test



SOIC-8, 8 leads



Dimension in mm

Dimension	A	B	C	D	E	F	G	H	I	J	K
Min.	4.70	3.70	5.80	0.33		1.20	0.08	0.40	0.19	0.25	0°
Typ.					1.27						
Max.	5.10	4.10	6.20	0.51		1.62	0.28	0.83	0.26	0.50	8°