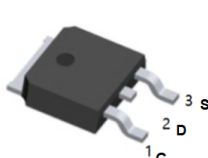
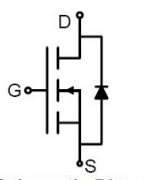


60V N-Channel Enhancement Mode Power MOSFET

50N06

<p>General Description</p> <p>The 50N06 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.</p> <p>Features</p> <ul style="list-style-type: none"> ● $V_{DS} = 60V, I_D = 50A$ ● $R_{DS(ON)}, 12m\Omega$ (Typ) @ $V_{GS} = 10V$ ● $R_{DS(ON)}, 16m\Omega$ (Typ) @ $V_{GS} = 4.5V$ ● Advanced Trench Technology ● Excellent $R_{DS(ON)}$ and Low Gate Charge ● Lead free product is acquired <p>Application</p> <ul style="list-style-type: none"> ● Load Switch ● PWM Application ● Power management 	 <p>TO-252(DPAK) top view</p>  <p>Schematic Diagram</p>
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Absolute Maximum Ratings(TA=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit	
Drain-Source Voltage	V_{DS}	60	V	
Gate-Source Voltage	V_{GS}	±20	V	
Drain Current-Continuous ^{Note3}	I_D	TC=25°C	50	A
		TC=100°C	33	A
Drain Current-Pulsed ^{Note 1}	I_{DM}	200	A	
Avalanche Energy ^{Note 4}	E_{AS}	64	mJ	
Maximum Power Dissipation	P_D	105	W	
Storage Temperature Range	T_{STG}	-55 to +150	°C	
Operating Junction Temperature Range	T_J	-55 to + 150	°C	

Thermal Resistance

Parameter	Symbol	Min.	Typ.	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	-	-	1.4	°C/W

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Electrical Characteristics(T_J=25°C unless otherwise noted)

OFF CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _{DS} =250uA	60	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =60V, V _{GS} =0V	-	-	1.0	uA
Gate-Body Leakage	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA

ON CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _{DS} =250uA	1.0	1.6	2.5	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _{DS} =30A	-	12	17	mΩ
		V _{GS} =4.5V, I _{DS} =20A	-	16	21	mΩ

DYNAMIC CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input Capacitance	C _{ISS}	V _{DS} =25V, V _{GS} = 0V, f=1MHz	-	2928	-	pF
Output Capacitance	C _{OSS}		-	141	-	
Reverse Transfer Capacitance	C _{rss}		-	120	-	

SWITCHING CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Turn-On Delay Time	T _{d(on)}	V _{GS} =10V, V _{DS} =30V, R _{GEN} =1.8Ω I _D =25A	-	7.5	-	ns
Rise Time	t _r		-	6.0	-	
Turn-Off Delay Time	T _{d(off)}		-	28.4	-	
Fall Time	t _f		-	5.5	-	
Total Gate Charge at 10V	Q _g	V _{DS} =30V, I _{DS} =25A, V _{GS} =10V	-	50	-	nC
Gate to Source Gate Charge	Q _{gs}		-	6	-	
Gate to Drain"Miller"Charge	Q _{gd}		-	15	-	

DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _{DS} =30A	-	-	1.2	V
Reverse Recovery Time	t _{rr}	T _J =25°C, I _F =25A di/dt=100A/us	-	29	-	nS
Reverse Recovery Charge	Q _{rr}		-	42	-	nC

Notes:

- 1: Repetitive rating, pulse width limited by maximum junction temperature.
- 2: Surface mounted on FR4 Board, t_s≤10sec.
- 3: Pulse width ≤ 300μs, duty cycle ≤ 2%.
- 4: EAS condition: L=0.5mH, V_{DD}=10V, V_G=10V, V_{GATE}=20V, Start T_J=25°C.

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Figure 1: Output Characteristics

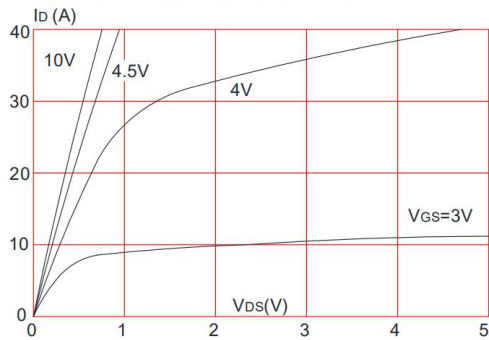


Figure 2: Typical Transfer Characteristics

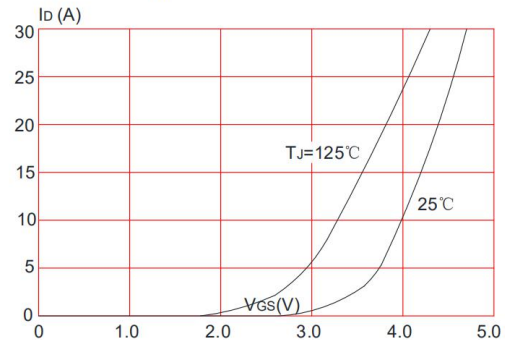


Figure 3: On-resistance vs. Drain Current

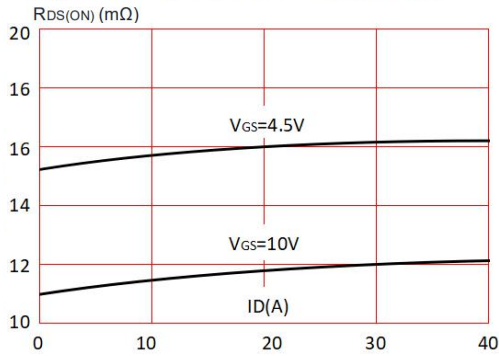


Figure 4: Body Diode Characteristics

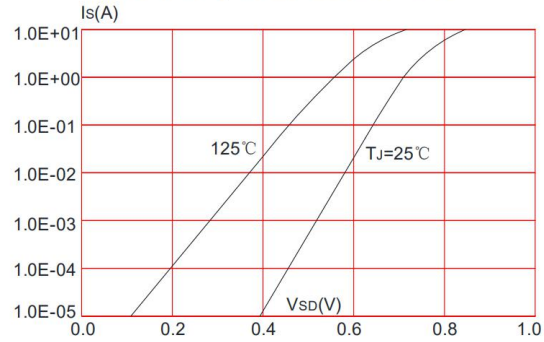


Figure 5: Gate Charge Characteristics

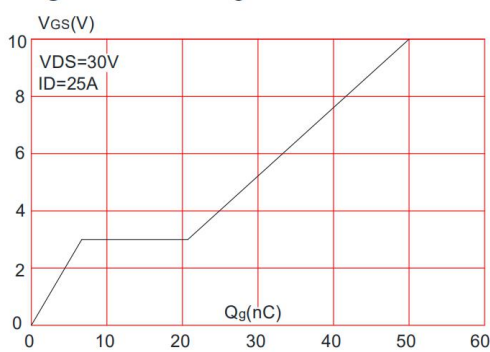
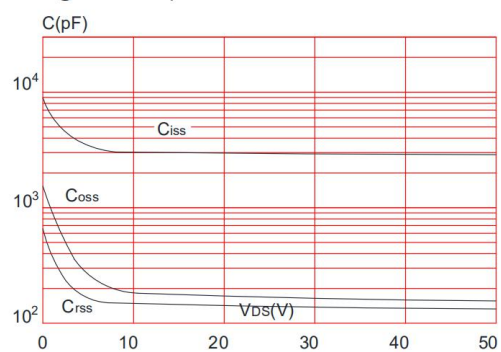


Figure 6: Capacitance Characteristics



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Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

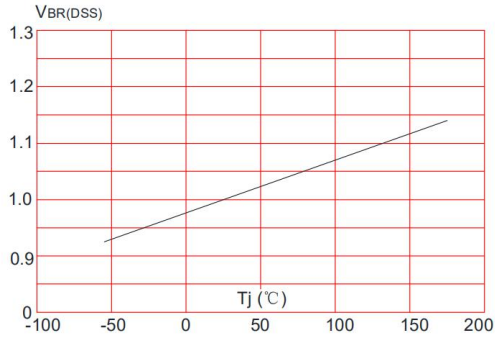


Figure 8: Normalized on Resistance vs. Junction Temperature

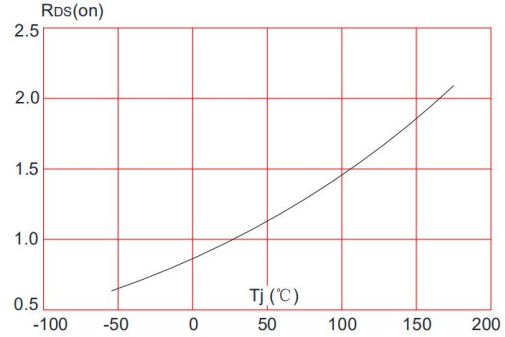


Figure 9: Maximum Safe Operating Area

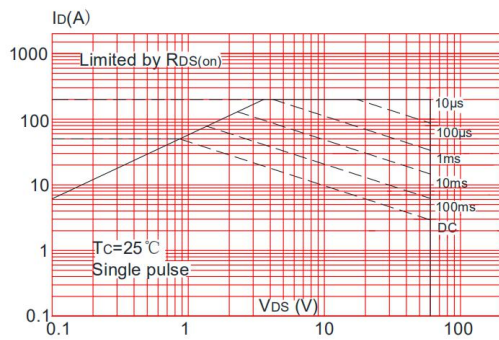


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

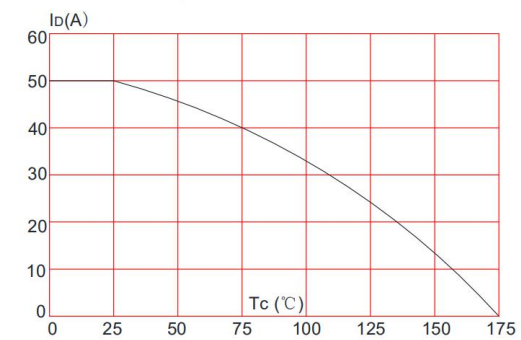
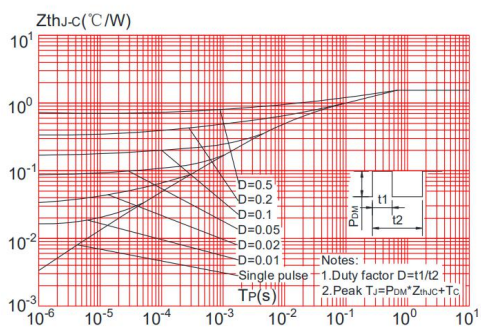


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



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Test Circuit

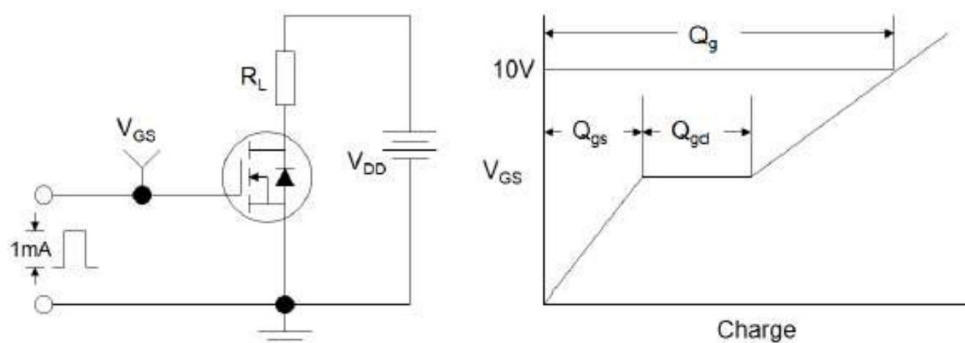


Figure1: Gate Charge Test Circuit & Waveform

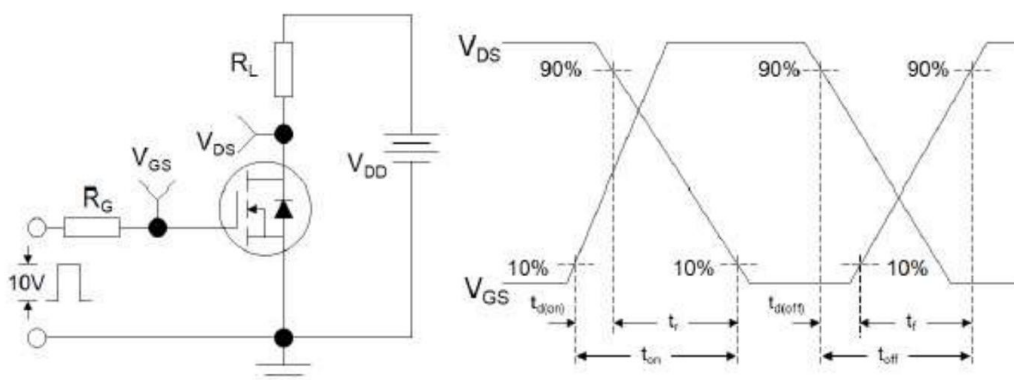


Figure 2: Resistive Switching Test Circuit & Waveforms

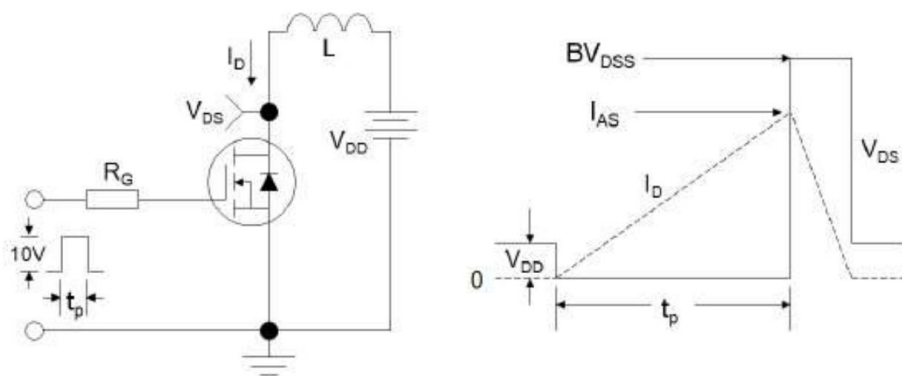
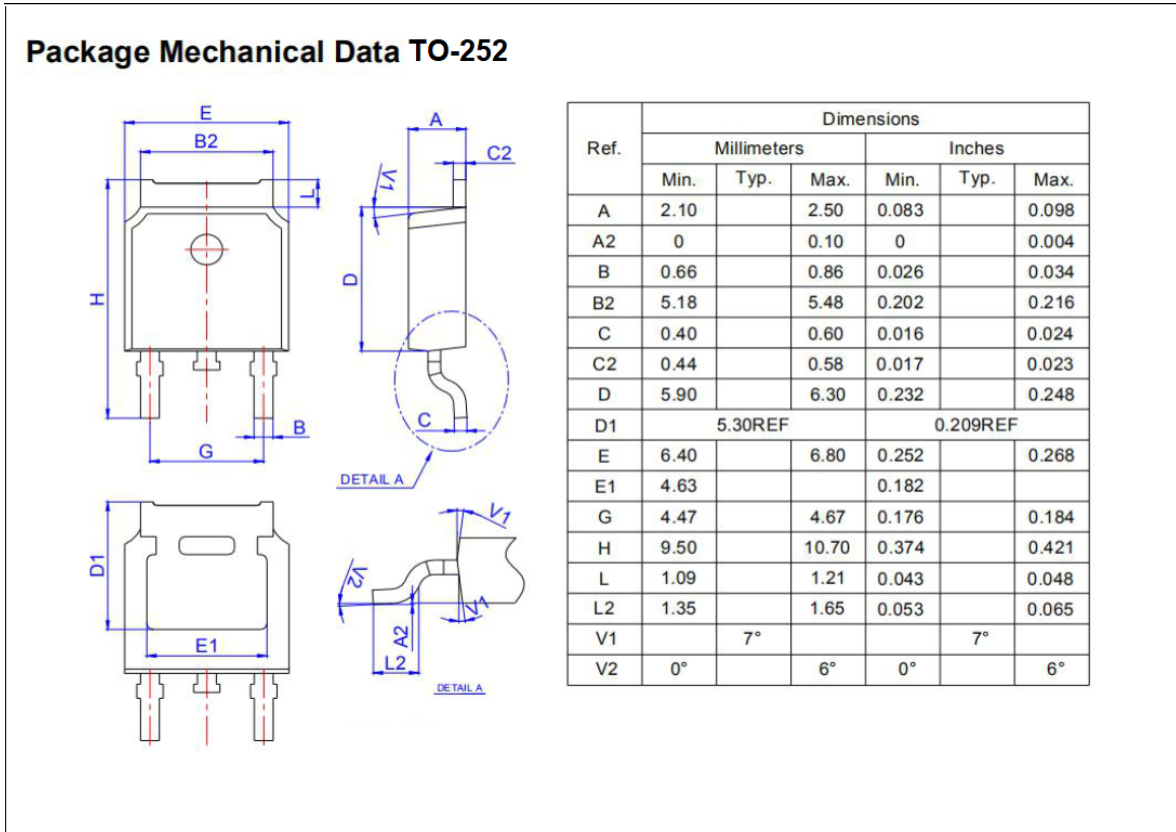


Figure 3: Unclamped Inductive Switching Test Circuit & Waveforms

60V N-Channel Enhancement Mode Power MOSFET



Ordering information

Order code	Package	Baseqty	Delivery mode
UMW 50N06	TO-252	2500	Tape and reel