

DATASHEET

N-Channel Enhancement Mode Power MOSFET

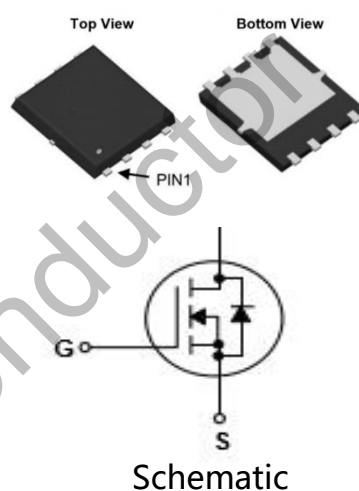
Description

This Power MOSFET is produced using advanced SGT technology. This advanced technology has been especially tailored to minimize conduction loss, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.

Features

- $V_{DS}=40V$, $I_D=145A$
- $R_{DS(ON) TYP} = 1.6m\Omega @V_{GS}=10V$
- Very Low On-resistance $R_{DS(ON)}$
- Low C_{rss}
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

PDFN5*6-8L



Applications

- PWM Application
- Load Switch
- Power Management

100% UIS TESTED!

100% ΔV_{ds} TESTED!



Package Marking and Ordering Information

Device	Marking	Package	Packing	Reel size	Reel (pcs)	Per Carton (pcs)
145N04		PDFN5*6	Reel	13inch	5000	60000

DATASHEET

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Absolute Maximum Ratings

Parameter		Symbol	Value	Unit
Drain-source Voltage		V_{DS}	40	V
Gate-source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_C=25^{\circ}\text{C}$	I_D	145	A
	$T_C=100^{\circ}\text{C}$		105	
Pulsed Drain Current($T_C=25^{\circ}\text{C}$, T_p Limited By T_{jmax}) ^(note1)		I_{DM}	430	A
Maximum Power Dissipation($T_C=25^{\circ}\text{C}$)		P_D	100	W
Avalanche energy , single Pulse($L=0.5\text{mH}$) ^(note2)		E_{AS}	120	mJ
Peak Diode Recovery dv/dt ^(note3)		dv/dt	4.3	V/ns
Thermal Resistance Junction to Case		$R_{\theta JC}$	1.36	$^{\circ}\text{C/W}$
Operating Junction And Storage Temperature		T_j, T_{stg}	-55 To 150	$^{\circ}\text{C}$
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds		T_L	300	$^{\circ}\text{C}$

* Drain current limited by maximum junction temperature.

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition: $T_J=25^{\circ}\text{C}$, $V_{DD}=32\text{V}$, $V_G=10\text{V}$, $R_G=25\ \Omega$, $L=0.5\text{mH}$,
3. Pulse Test: Pulse Width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 0.5\%$

DATASHEET

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Electrical Characteristic (TC=25°C unless otherwise noted)

Parameter	Symbol	Value			Unit	Test Condition
		Min.	Typ.	Max.		
Off Characteristic						
Drain-source breakdown voltage	BV _{DSS}	40	-	-	V	V _{GS} =0V, I _D =250μA
Zero gate voltage drain current	I _{DSS}	-	-	1	μA	V _{DS} =40V, V _{GS} =0V
		-	-	100	μA	V _{DS} =40V, TC =125℃
Gate-source leakage current	I _{GSS}	-	-	±100	nA	V _{GS} =±20V, V _{DS} =0V
On Characteristics						
Gate threshold voltage	V _{GS(th)}	2	3	4	V	V _{DS} =V _{GS} , I _D =250μA
Drain-source on-state resistance	R _{DS(on)}	-	1.6	2.0	mΩ	V _{GS} =10V, I _D =20A
Dynamic Characteristic						
Input Capacitance	C _{iss}	-	2889	-	PF	V _{GS} =0V, V _{DS} =30V, f=1.0MHz
Output Capacitance	C _{oss}	-	950	-		
Reverse Transfer Capacitance	C _{rss}	-	39	-		
Switching Characteristics						
Turn-on delay time	t _{d(on)}	-	11	-	nS	V _{GS} =10V , V _{DS} =30V, I _D =30A, R _G =25Ω
Turn-on Rise time	t _r	-	38	-		
Turn-off delay time	t _{d(off)}	-	26	-		
Turn-off Fall time	t _f	-	17	-		
Gate Total Charge	Q _G	-	63	-	nC	V _{GS} =10V, V _{DS} =30V, I _D =30A
Gate-Source Charge	Q _{gS}	-	25	-		
Gate-Drain Charge	Q _{gd}	-	11	-		
Drain-Source Diode Characteristics						
Body Diode Forward Voltage	V _{SD}	-	-	1.2	V	V _{GS} =0V, I _{SD} =20A, T _J = 25℃
Body Diode Forward Current	I _S	-	-	65	A	-
Body Diode Reverse Recovery Time	T _{rr}	-	70	-	ns	T _J =25℃ , I _{SD} =20A, V _{GS} =0V, d _i /d _t =100A/μs
Body Diode Reverse Recovery Charge	Q _{rr}	-	76	-	nC	

DATASHEET

N-Channel Enhancement Mode Power MOSFET

Typical Operating Characteristics

Figure 1: Power Dissipation

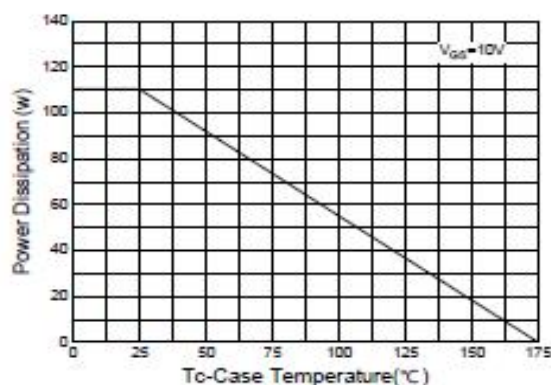


Figure 2: Drain Current

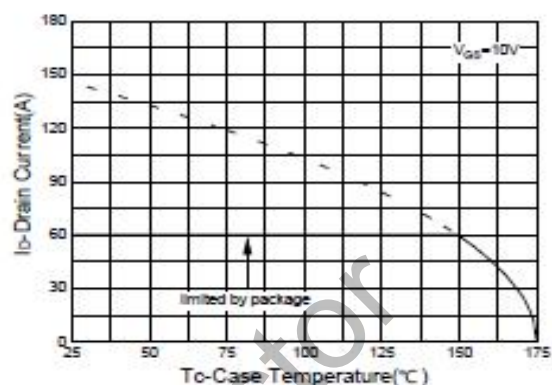


Figure 3: Safe Operation Area

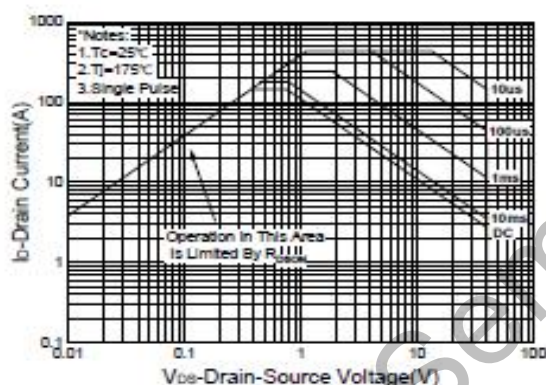


Figure 4: Thermal Transient Impedance

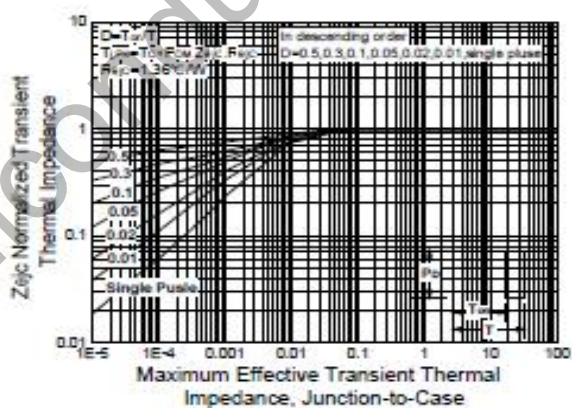


Figure 5: Output Characteristics

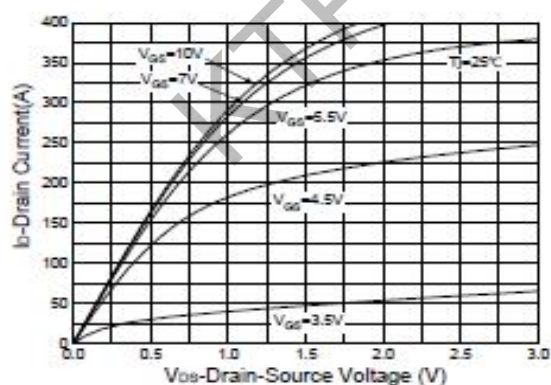
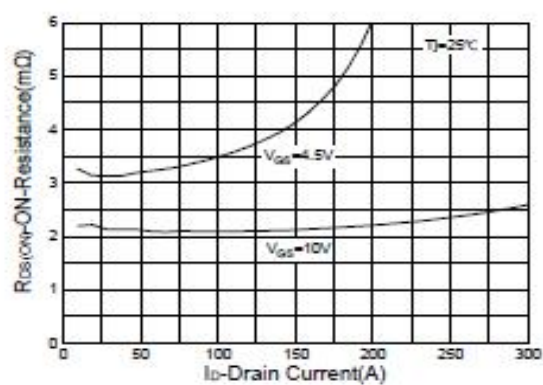


Figure 6: Drain-Source On Resistance



DATASHEET

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Typical Operating Characteristics(Cont.)

Figure 7: On-Resistance vs. Temperature

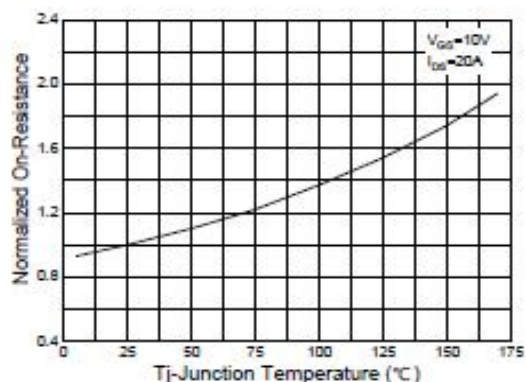


Figure 8: Source-Drain Diode Forward

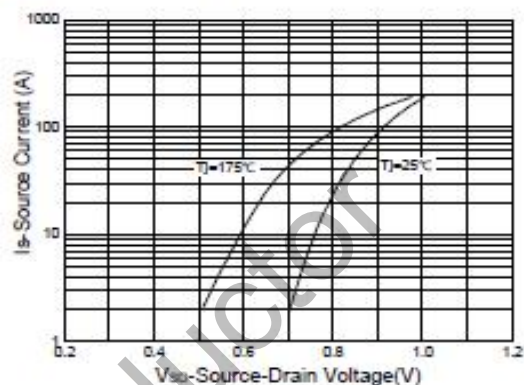


Figure 9: Capacitance Characteristics

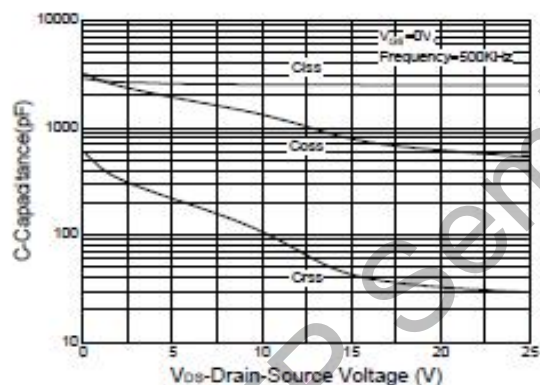
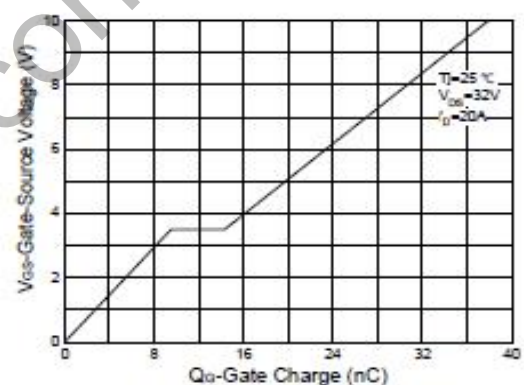


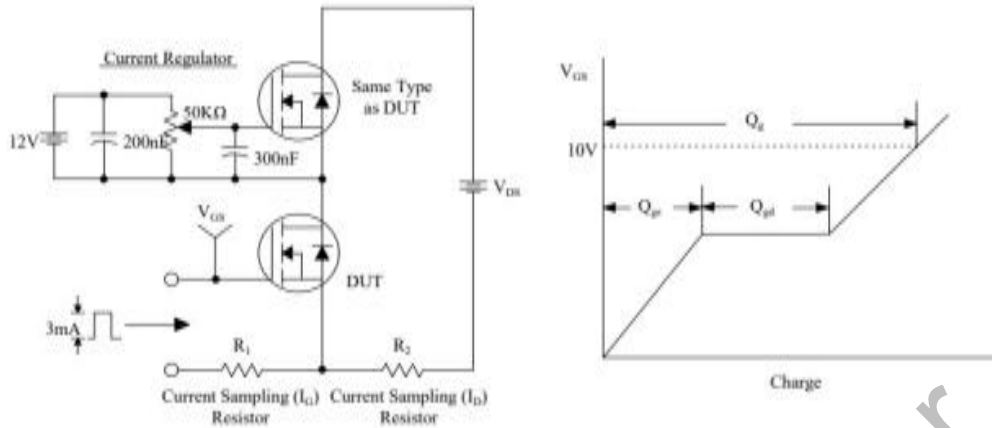
Figure 10: Gate Charge Characteristics



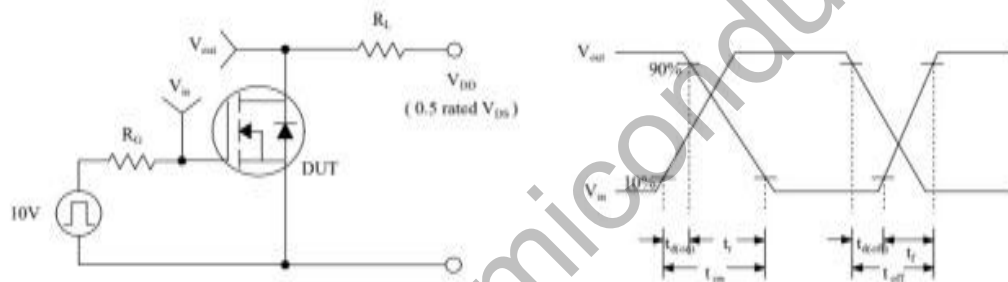
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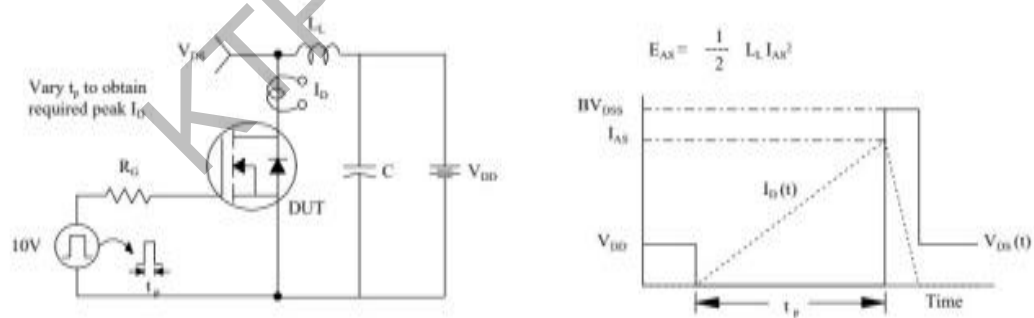
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



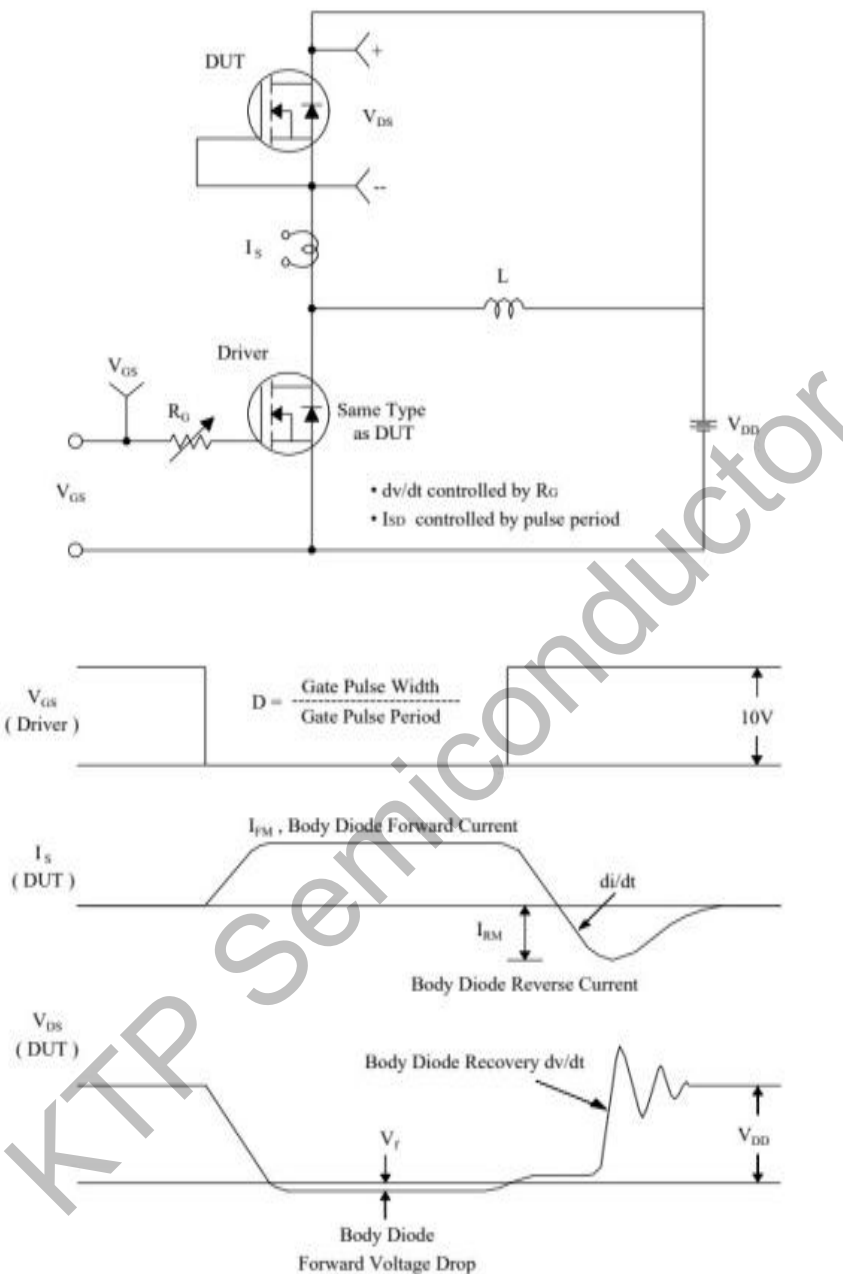
Unclamped Inductive Switching Test Circuit & Waveforms



DATASHEET

N-Channel Enhancement Mode Power MOSFET

Peak Diode Recovery dv/dt Test Circuit & Waveforms

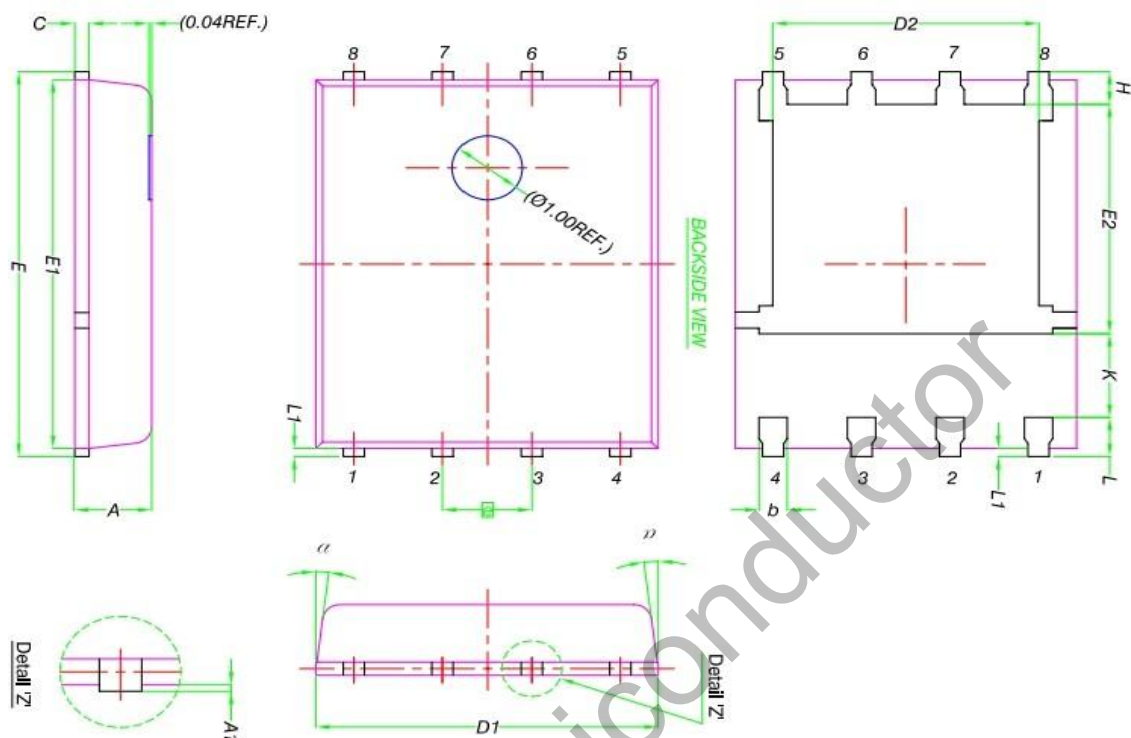


DATASHEET

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Package Information

PDFN5*6-8L



DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
A1	0	-	0.05
b	0.33	0.41	0.51
C	0.20	0.25	0.30
D1	4.80	4.90	5.00
D2	3.61	3.81	3.96
E	5.90	6.00	6.10
E1	5.70	5.75	5.80
E2	3.38	3.58	3.78
e	1.27 BSC		
H	0.41	0.51	0.61
K	1.10	-	-
L	0.51	0.61	0.71
L1	0.06	0.13	0.20
α	0°	-	12°

