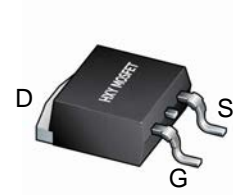




## Description

The HSTB55NF06LT4 uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.



TO-263  
(D2PAK)

## General Features

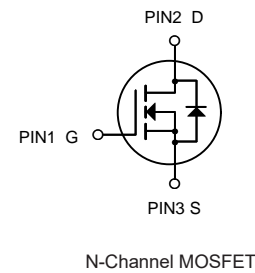
$V_{DS} = 55V$   $I_D = 49A$

$R_{DS(ON)} < 13m\Omega @ V_{GS}=10V$

## Application

Switching application

Power Management for Inverter Systems.



## Package Marking and Ordering Information

Product ID	Pack	Brand	Units/Tube)
HSTB55NF06LT4	TO-263(D2PAK)	HXY MOSFET	50

## Absolute Maximum Ratings ( $T_C=25^\circ C$ unless otherwise noted)

Symbol	Parameter	Limit	Unit
$V_{DS}$	Drain-Source Voltage	55	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Drain Current-Continuous	49	A
$I_D(100^\circ C)$	Drain Current-Continuous( $T_C=100^\circ C$ )	35	A
$I_{DM}$	Pulsed Drain Current	160	A
$P_D$	Maximum Power Dissipation	94	W
$E_{AR}$	Repetitive Avalanche Energy	9.4	mJ
$T_J, T_{STG}$	Operating Junction and Storage Temperature Range	-55 To 175	$^\circ C$
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case <sup>(Note 2)</sup>	1.5	$^\circ C/W$



### Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
V <sub>(BR)DSS</sub>	Drain-to-Source Breakdown Voltage	55	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA
ΔV <sub>(BR)DSS/ΔT<sub>J</sub></sub>	Breakdown Voltage Temp. Coefficient	—	0.058	—	V/°C	Reference to 25°C, I <sub>D</sub> = 1mA
R <sub>DS(on)</sub>	Static Drain-to-Source On-Resistance	—	10	13	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 25A □□
V <sub>GS(th)</sub>	Gate Threshold Voltage	2.0	—	4.0	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
g <sub>fs</sub>	Forward Transconductance	19	—	—	S	V <sub>DS</sub> = 25V, I <sub>D</sub> = 25A
I <sub>DSS</sub>	Drain-to-Source Leakage Current	—	—	25	μA	V <sub>DS</sub> = 55V, V <sub>GS</sub> = 0V
		—	—	250		V <sub>DS</sub> = 44V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 150°C
I <sub>GSS</sub>	Gate-to-Source Forward Leakage	—	—	100	nA	V <sub>GS</sub> = 20V
	Gate-to-Source Reverse Leakage	—	—	-100		V <sub>GS</sub> = -20V
Q <sub>g</sub>	Total Gate Charge	—	—	63	nC	I <sub>D</sub> = 25A
Q <sub>gs</sub>	Gate-to-Source Charge	—	—	14		V <sub>DS</sub> = 44V
Q <sub>gd</sub>	Gate-to-Drain ("Miller") Charge	—	—	23		V <sub>GS</sub> = 10V, See Fig. 6 and 13
t <sub>d(on)</sub>	Turn-On Delay Time	—	12	—	ns	V <sub>DD</sub> = 28V
t <sub>r</sub>	Rise Time	—	60	—		I <sub>D</sub> = 25A
t <sub>d(off)</sub>	Turn-Off Delay Time	—	44	—		R <sub>G</sub> = 12Ω
t <sub>f</sub>	Fall Time	—	45	—		V <sub>GS</sub> = 10V, See Fig. 10
L <sub>S</sub>	Internal Source Inductance	—	7.5	—	nH	Between lead, and center of die contact
C <sub>iSS</sub>	Input Capacitance	—	1470	—	pF	V <sub>GS</sub> = 0V
C <sub>oss</sub>	Output Capacitance	—	360	—		V <sub>DS</sub> = 25V
C <sub>rSS</sub>	Reverse Transfer Capacitance	—	88	—		f = 1.0MHz, See Fig. 5
E <sub>AS</sub>	Single Pulse Avalanche Energy	—	530 <sup>③</sup>	150 <sup>⑥</sup>		mJ

### Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I <sub>S</sub>	Continuous Source Current (Body Diode)	—	—	49	A	MOSFET symbol showing the integral reverse p-n junction diode.
I <sub>SM</sub>	Pulsed Source Current (Body Diode)	—	—	160		
V <sub>SD</sub>	Diode Forward Voltage	—	—	1.3	V	T <sub>J</sub> = 25°C, I <sub>S</sub> = 25A, V <sub>GS</sub> = 0V
t <sub>rr</sub>	Reverse Recovery Time	—	63	95	ns	T <sub>J</sub> = 25°C, I <sub>F</sub> = 25A
Q <sub>rr</sub>	Reverse Recovery Charge	—	170	260	nC	di/dt = 100A/μs
t <sub>on</sub>	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by L <sub>S</sub> +L <sub>D</sub> )				

#### Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 11)
- ② Starting T<sub>J</sub> = 25°C, L = 0.48mH  
R<sub>G</sub> = 25Ω, I<sub>AS</sub> = 25A. (See Figure 12)
- ③ I<sub>SD</sub> ≤ 25A, di/dt ≤ 230A/μs, V<sub>DD</sub> ≤ V<sub>(BR)DSS</sub>,  
T<sub>J</sub> ≤ 175°C
- ④ Pulse width ≤ 400μs; duty cycle ≤ 2%.
- ⑤ This is a typical value at device destruction and represents operation outside rated limits.
- ⑥ This is a calculated value limited to T<sub>J</sub> = 175°C .

\*\* When mounted on 1" square PCB (FR-4 or G-10 Material ).

For recommended footprint and soldering techniques refer to application note #AN-994.

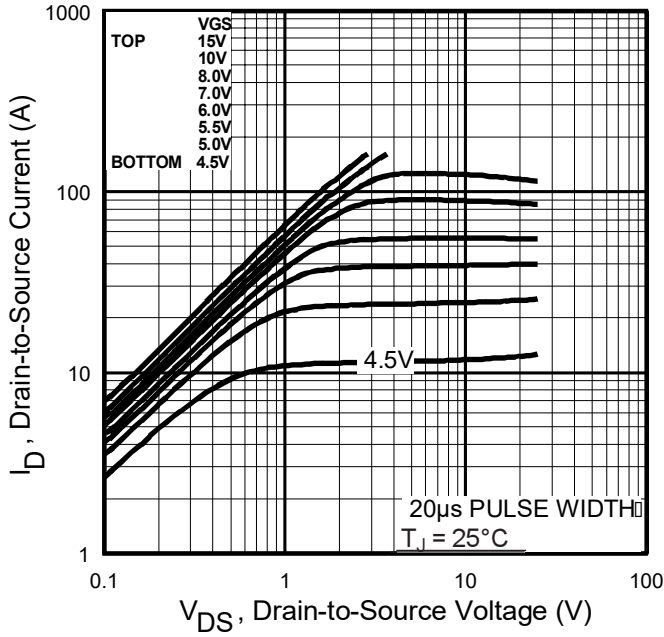


Fig 1. Typical Output Characteristics

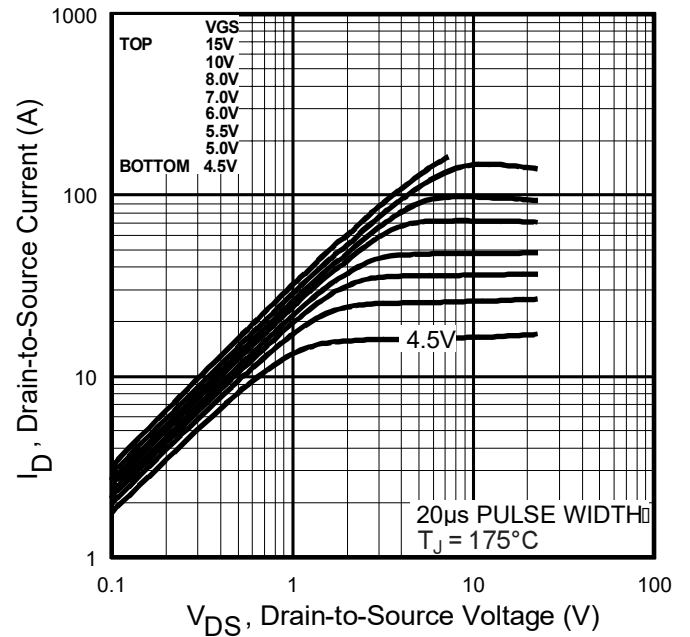


Fig 2. Typical Output Characteristics

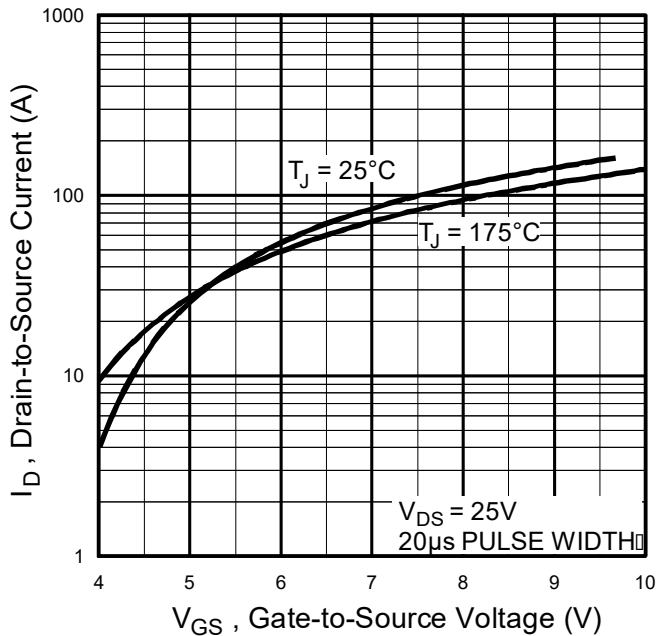


Fig 3. Typical Transfer Characteristics

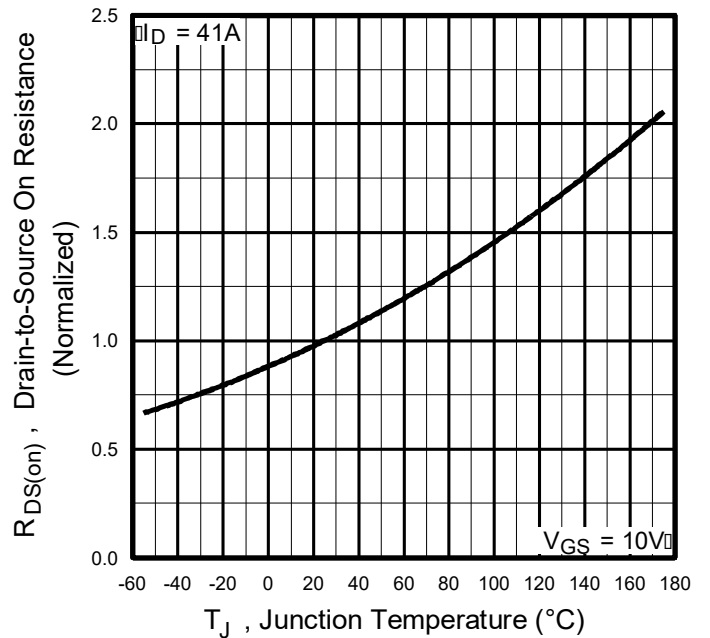


Fig 4. Normalized On-Resistance Vs. Temperature

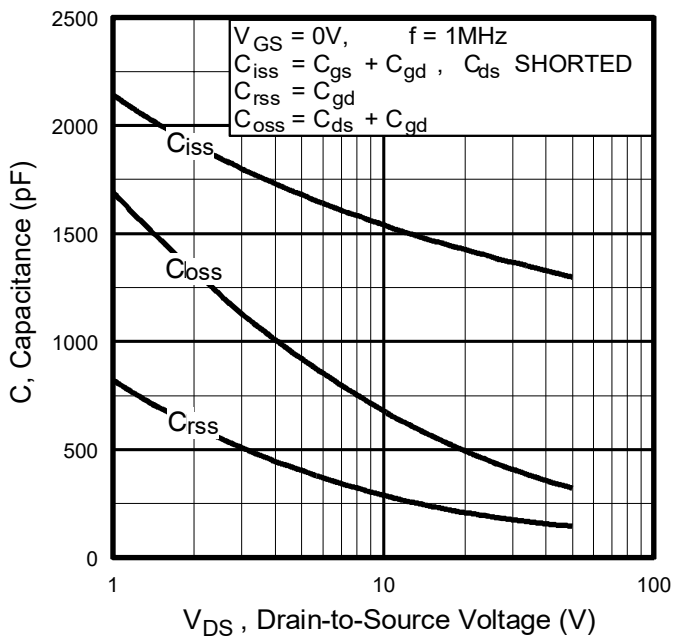


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

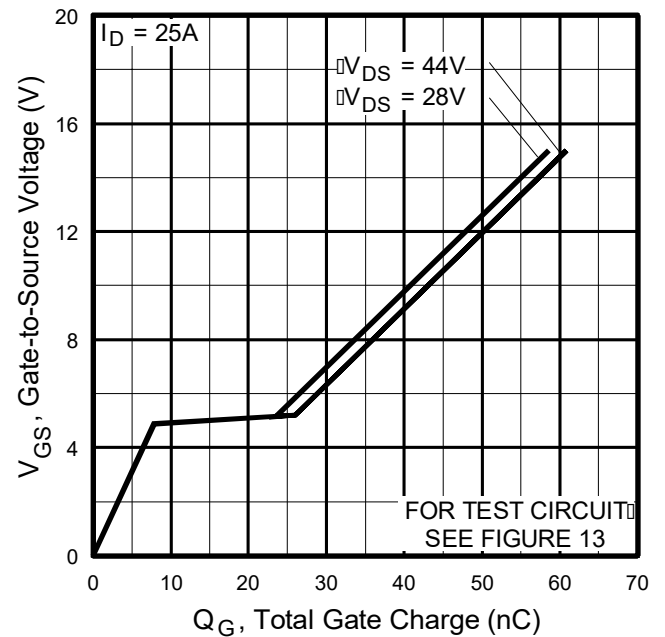


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

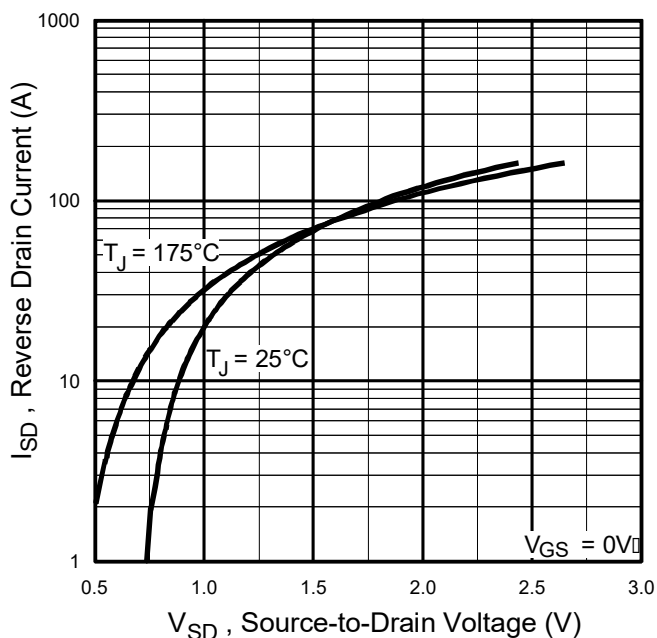


Fig 7. Typical Source-Drain Diode Forward Voltage

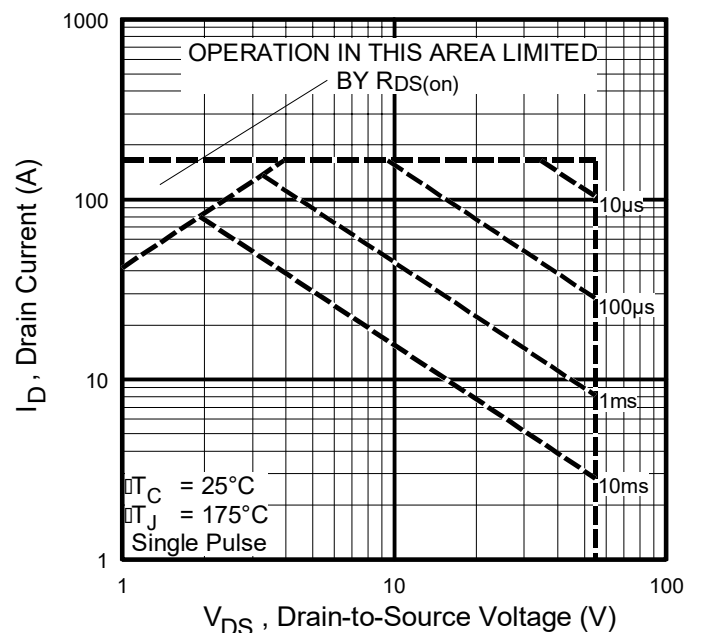


Fig 8. Maximum Safe Operating Area

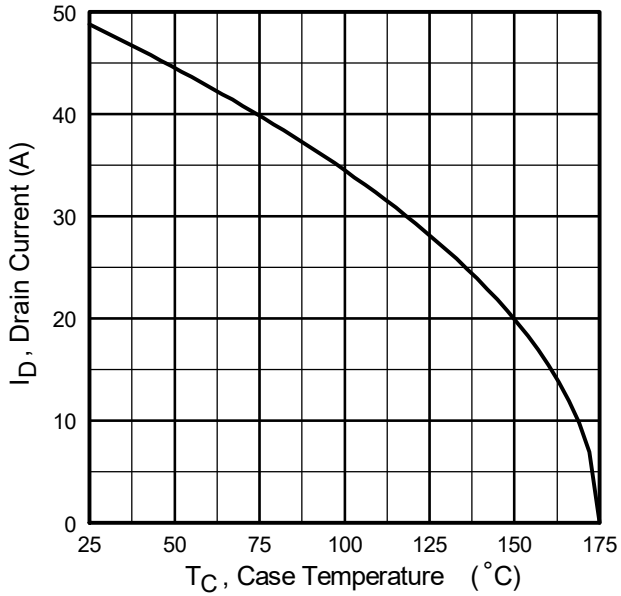


Fig 9. Maximum Drain Current Vs. Case Temperature

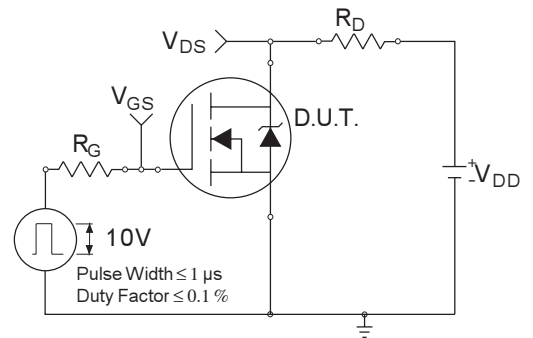


Fig 10a. Switching Time Test Circuit

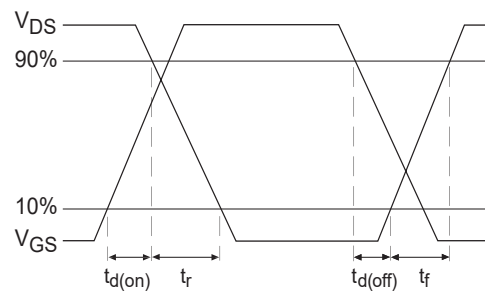


Fig 10b. Switching Time Waveforms

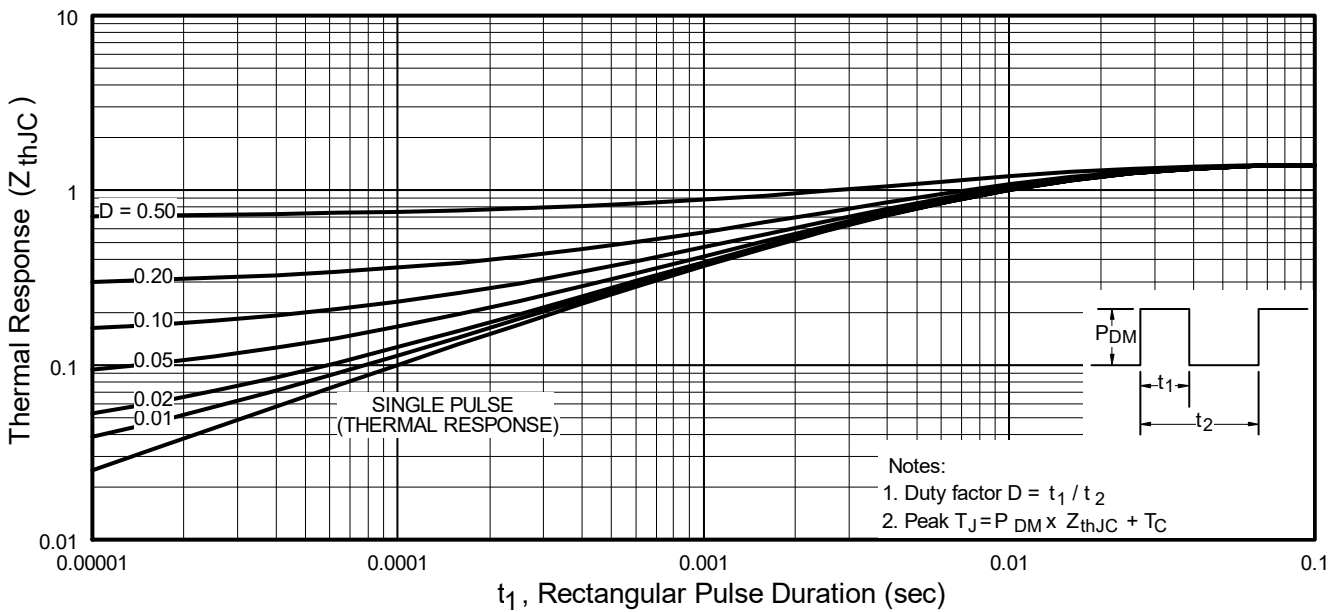


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

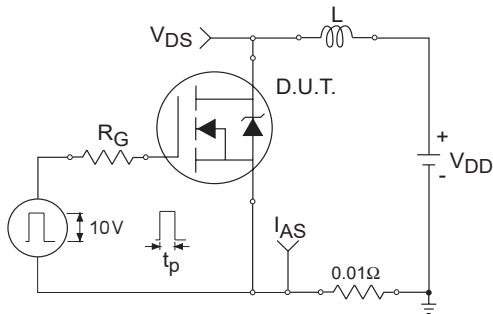


Fig 12a. Unclamped Inductive Test Circuit

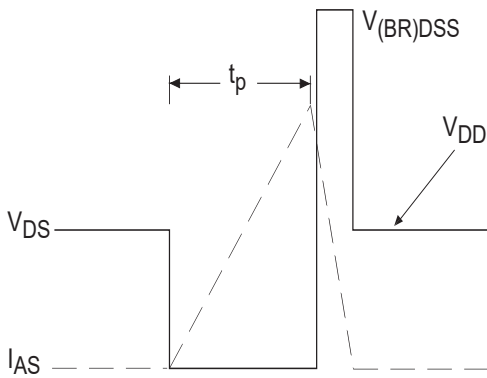


Fig 12b. Unclamped Inductive Waveforms

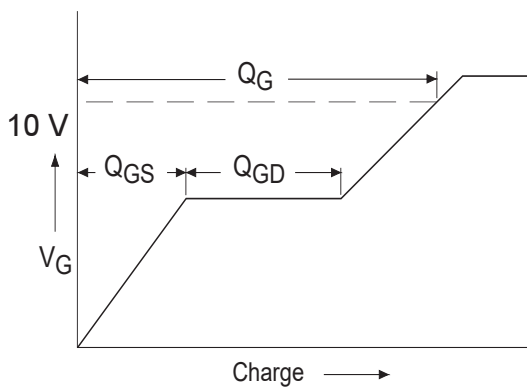


Fig 13a. Basic Gate Charge Waveform

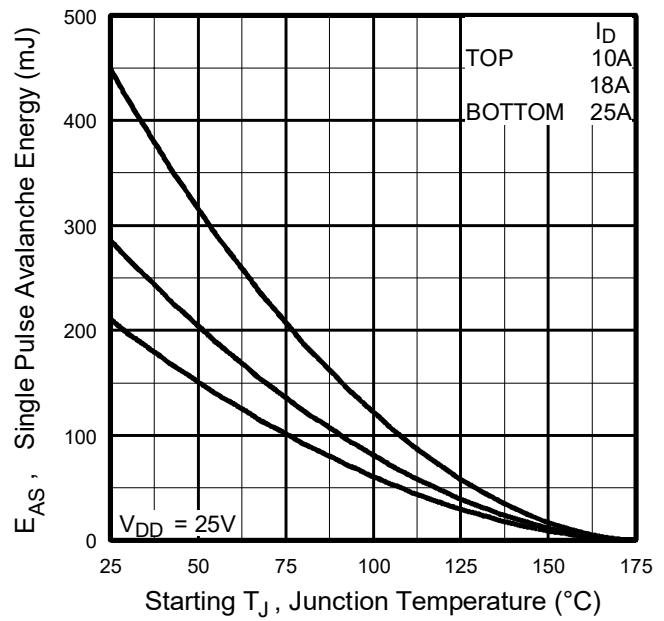


Fig 12c. Maximum Avalanche Energy Vs. Drain Current

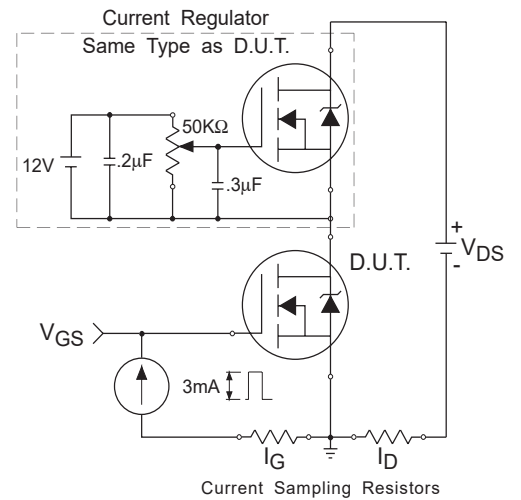
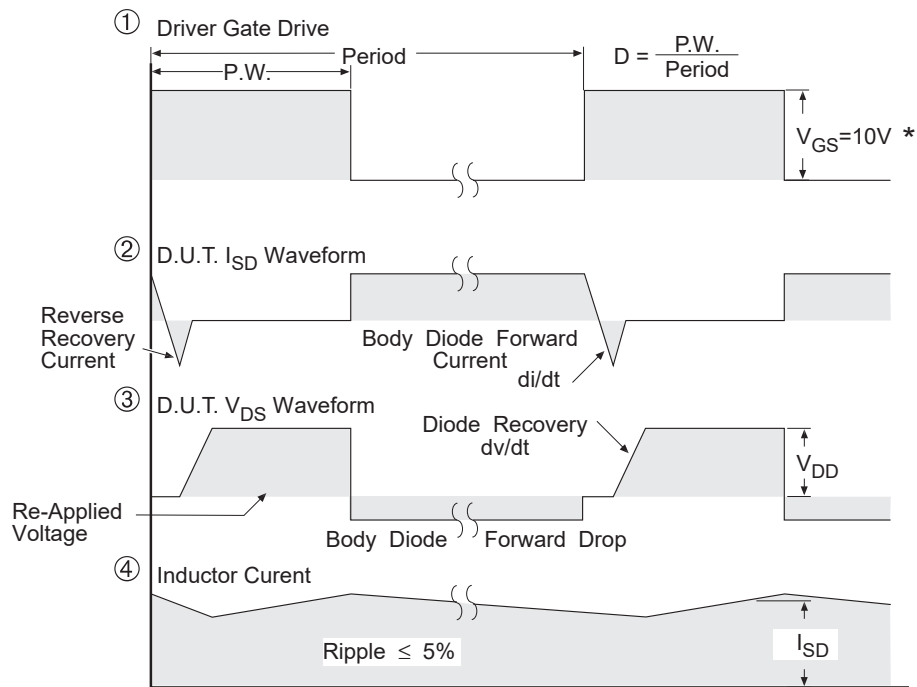
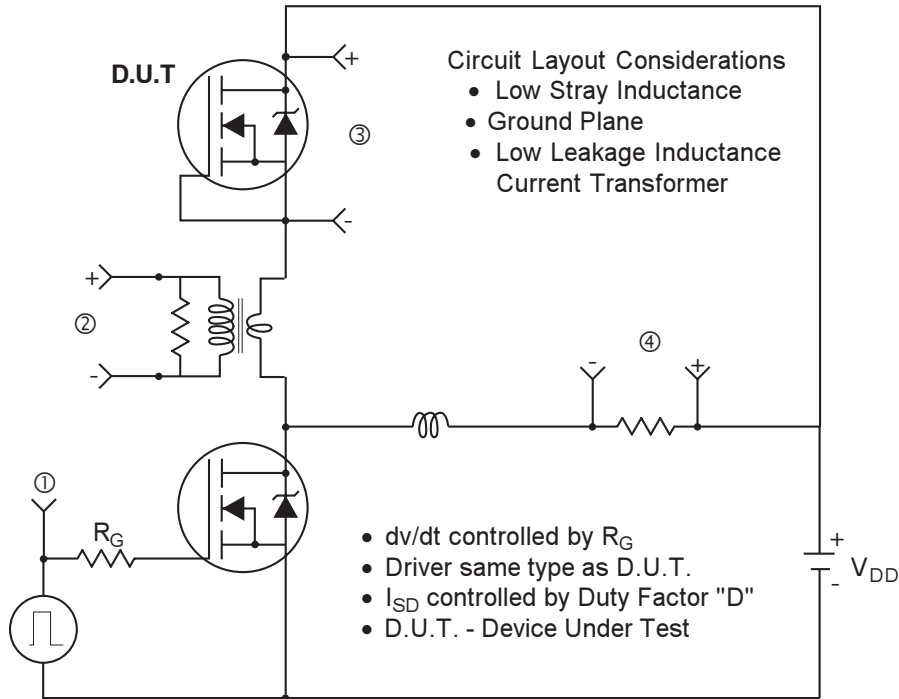


Fig 13b. Gate Charge Test Circuit

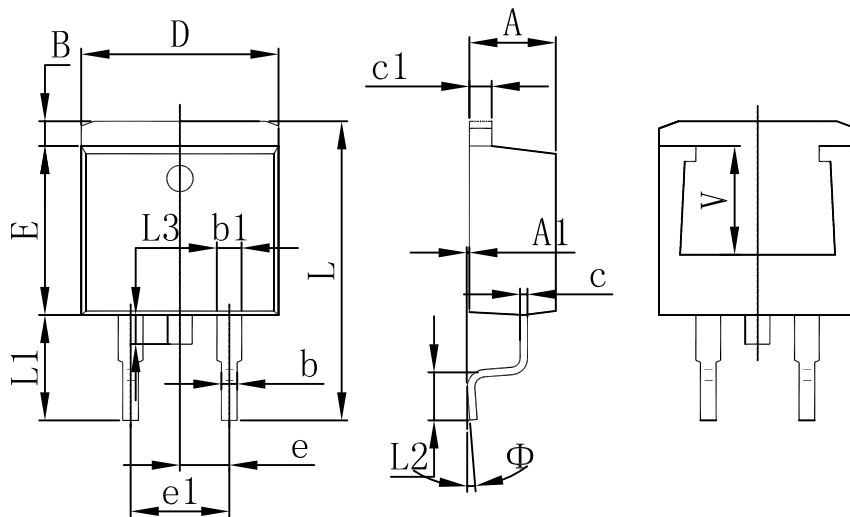


\*  $V_{GS} = 5V$  for Logic Level Devices

**Fig 14. For N-Channel HEXFETS**



**TO-263(DPAK)Package Outline Dimensions**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.470	4.670	0.176	0.184
A1	0.000	0.150	0.000	0.006
B	1.120	1.420	0.044	0.056
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
L	14.940	15.500	0.588	0.610
L1	4.950	5.450	0.195	0.215
L2	2.340	2.740	0.092	0.108
L3	1.300	1.700	0.051	0.067
Φ	0°	8°	0°	8°
V	5.600 REF.		0.220REF.	





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