

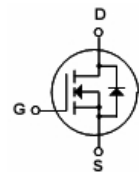
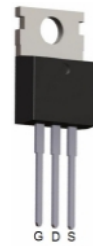
TS840

8A,500V,0.850Ohm N-Channel Power Mosfet

DRAWING

Features

- ◆ 8A,500V, $R_{DS(ON)}=0.85\Omega@V_{GS}=10V$
- ◆ Single Pulse Avalanche Energy Rated
- ◆ SOA is power Dissipation Limited
- ◆ Nanosecond Switching Speeds
- ◆ Linear Transfer Characteristics
- ◆ High input Impedance
- ◆ Related Literature



General Description

- ◆ Package:TO-220C
- ◆ This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency switch mode power supply.

Absolute Maximum Ratings

Symbol	Parameter	Spec	Units
V_{DSS}	Drain-Source Voltage (Note 1)	500	V
V_{DGR}	Drain to Gate Voltage ($R_{GS}=20k\Omega f$) (Note 1)	500	V
I_D	Drain Current -Continuous($T_c=25^\circ C$)	8	A
	-Continuous($T_c=100^\circ C$)	5.1	A
I_{DM}	Drain Current -Pulsed (Note 3)	32	A
V_{GSS}	Gate-Source Voltage	± 20	V
P_D	Maximum Power Dissipation	125	W
	Linear Derating Factor	1.0	W/ $^\circ C$
E_{AS}	Single Pulsed Avalanche Energy Rating (Note 4)	510	mJ
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	$^\circ C$
T_L	Maximum lead temperature for soldering purpose Leads at 0.063in (1.6mm) from Case for 10s	300	$^\circ C$
T_{pkg}	Package Body for 10s	260	$^\circ C$

Thermal Characteristics

Symbol	Parameter	Typ	Max	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	-	1.0	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	-	62.5	$^\circ C/W$

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

Off Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	500	—	—	V
BV _{DSS/TJ}	Breakdown Voltage Temperature Coefficient	ID=250uA, Referenced to 25°C	—	0.06	—	V/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =500V, V _{GS} =0V	—	—	250	uA
		V _{DS} =400V, Tc=125°C	—	—	10	uA
I _{GSSF}	Gate-Body Leakage Current, Forward	V _{GS} =20V, V _{DS} =0V	—	—	100	nA
I _{GSSR}	Gate-Body Leakage Current, Reverse	V _{GS} =-20V, V _{DS} =0V	—	—	-100	nA
IDON	On-state Drain Current (Note 2)	V _{DS} >IDON8RDSON MAX V _{GS} =10V	8.0			A

On Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
V _{GSTH}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250uA	2	—	4	V
R _{DSON}	Static Drain-Source On-Resistance (Note 2)	V _{GS} =10V, I _D =4.4A	—	0.8	0.85	Ω
G _{fs}	Forward Transconductance (Note 2)	V _{DS} >50v, I _D =4.4A	4.9	7.4		S

Dynamic Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
C _{JSS}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, f=1.0MHz	—	1225		pF
C _{OSS}	Output Capacitance		—	200		pF
C _{rss}	Reverse Transfer Capacitance		—	85		pF

Switching Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
t _{don}	Turn-On Delay Time	V _{DD} =250V I _D =8A R _G =9.1Ω, R _L = 30Ω	—	15	21	ns
t _r	Turn-On Rise Time		—	21	35	ns
t _{doff}	Turn-Off Delay Time		—	50	74	ns
t _f	Turn-Off Fall Time		—	20	30	ns
Q _g	Total Gate Charge	V _{DS} =400V	—	42	63	nc
Q _{gs}	Gate-Source Charge	I _D =8A	—	7	—	nc
Q _{gd}	Gate-Drain Charge	V _{GS} =10V	—	22	—	nc

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
I _S	Maximum Continuous Drain-source diode forward current		—	—	8	A
I _{sm}	pulsed drain-source diode forward current (Note 3)		—	—	32	A
V _{sd}	Drain-source diode forward Voltage (Note 2)	V _{GS} =0V, I _S =5.0A	—	—	2.0	V
T _{rr}	Reverse Recovery Time	V _{GS} =0V, I _S =5.0A	210	475	970	ns
Q _{rr}	Reverse Recovery charge	dif/dt=100A/us	2.0	4.6	8.2	uc

Parameter	Symbol	Test Conditions		Min	Typ	Max	Units
Internal Drain Inductance	L_D	Measured from the Contact Screw on tab to center of die	Modified mosfet symbol showing the internal devices inductances		3.5		nH
		Measured from the Drain lead,6mm from package to center of die			4.5		nH
Internal Source Inductance	L_S	Measured from the source lead,6mm from header to source bonding pad				7.5	

NOTES:

1. $T_J = 25^\circ\text{C}$ to 125°C .
2. Pulse Test: Pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
3. Repetitive Rating: Pulse width limited by Max junction temperature. See Transient Thermal Impedance curve (Figure 3).
4. $V_{DD} = 50\text{V}$, starting $T_J = 25^\circ\text{C}$, $L = 14\text{mH}$, $R_G = 25\Omega$, peak IAS = 8A.

Typical Characteristics

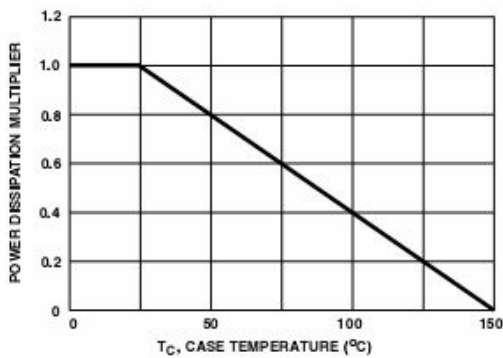


FIGURE 1. NORMALIZED POWER DISSIPATION vs CASE TEMPERATURE

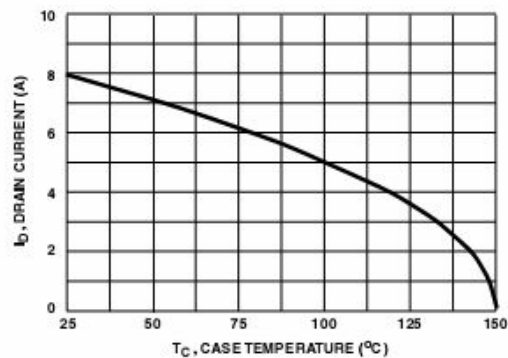


FIGURE 2. MAXIMUM CONTINUOUS DRAIN CURRENT vs CASE TEMPERATURE

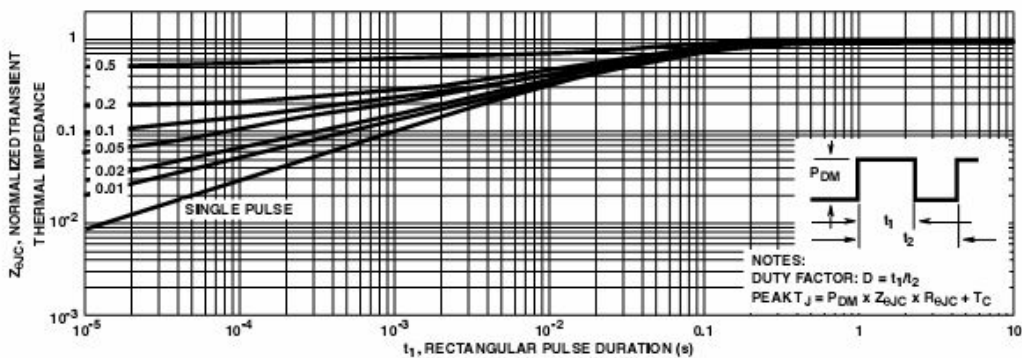


FIGURE 3. NORMALIZED MAXIMUM TRANSIENT THERMAL IMPEDANCE

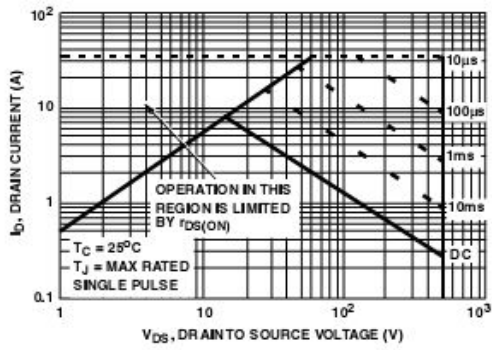


FIGURE 4. FORWARD BIAS SAFE OPERATING AREA

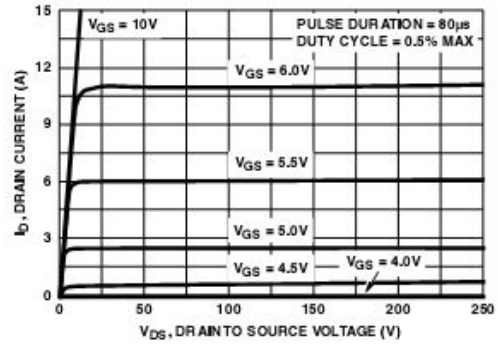


FIGURE 5. OUTPUT CHARACTERISTICS

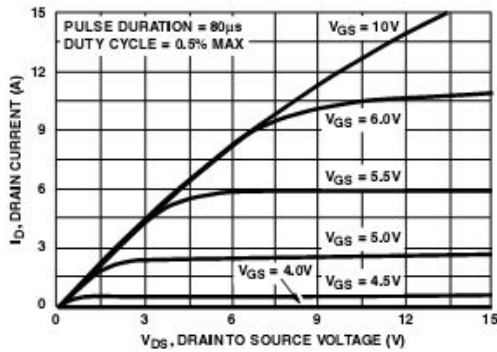


FIGURE 6. SATURATION CHARACTERISTICS

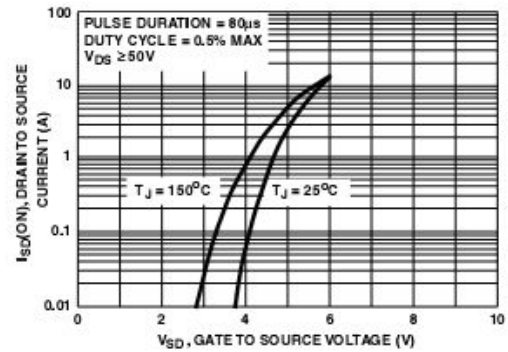


FIGURE 7. TRANSFER CHARACTERISTICS

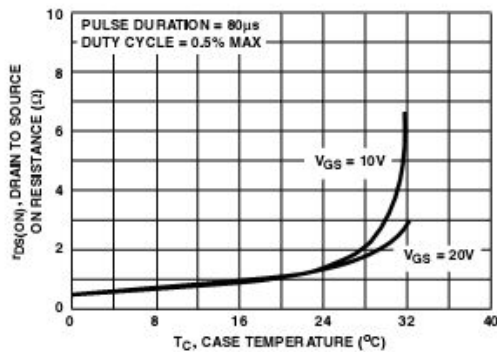


FIGURE 8. DRAIN TO SOURCE ON RESISTANCE vs VOLTAGE AND DRAIN CURRENT

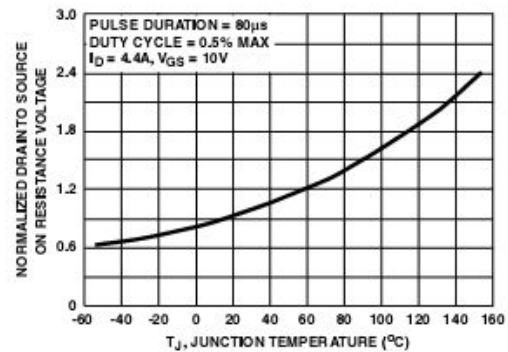


FIGURE 9. NORMALIZED DRAIN TO SOURCE ON RESISTANCE vs JUNCTION TEMPERATURE

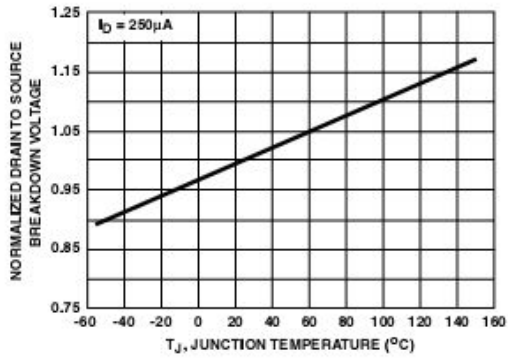


FIGURE 10. NORMALIZED DRAIN TO SOURCE BREAKDOWN VOLTAGE vs JUNCTION TEMPERATURE

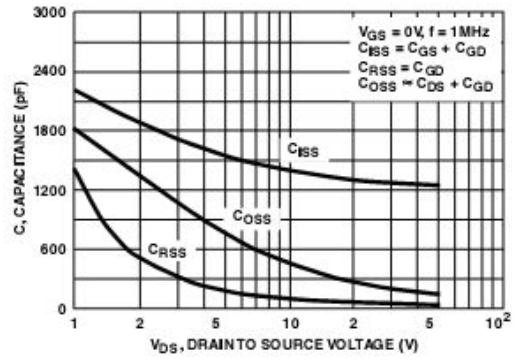


FIGURE 11. CAPACITANCE vs DRAIN TO SOURCE VOLTAGE

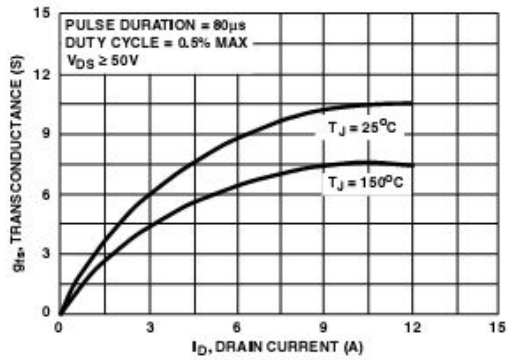


FIGURE 12. TRANSCONDUCTANCE vs DRAIN CURRENT

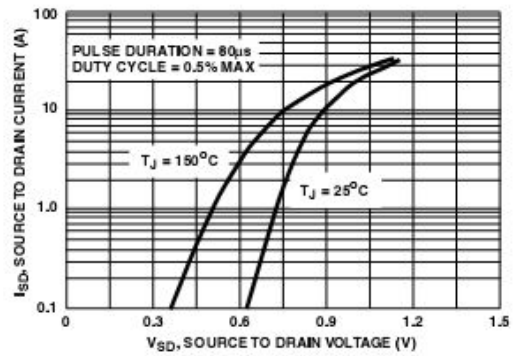


FIGURE 13. SOURCE TO DRAIN DIODE VOLTAGE

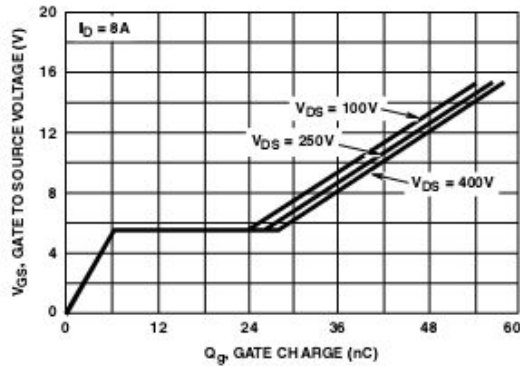


FIGURE 14. GATE TO SOURCE VOLTAGE vs GATE CHARGE

Test circuits and waveforms

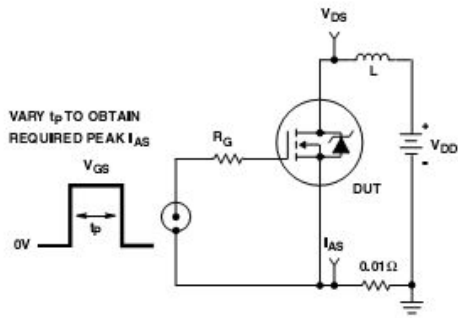


FIGURE 15. UNCLAMPED ENERGY TEST CIRCUIT

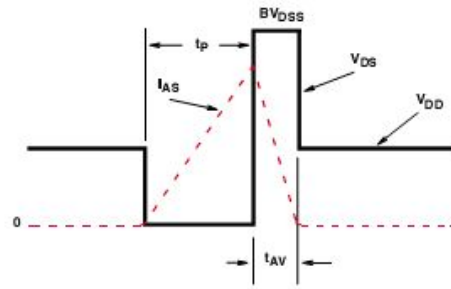


FIGURE 16. UNCLAMPED ENERGY WAVEFORMS

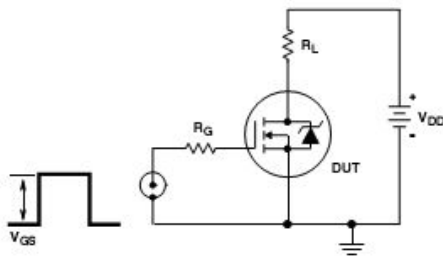


FIGURE 17. SWITCHING TIME TEST CIRCUIT

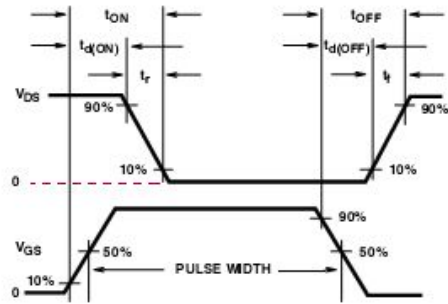


FIGURE 18. RESISTIVE SWITCHING WAVEFORMS

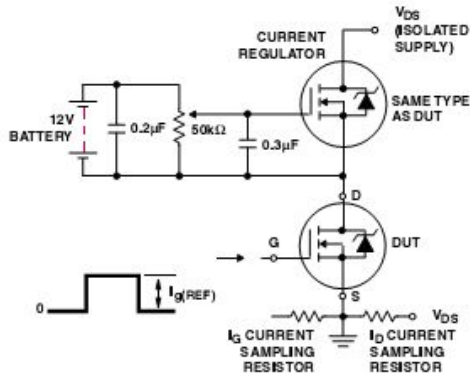


FIGURE 19. GATE CHARGE TEST CIRCUIT

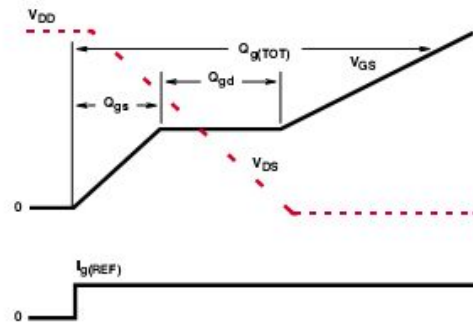


FIGURE 20. GATE CHARGE WAVEFORMS

Mechanical Dimensions

