SOT-89 Plastic-Encapsulate MOSFETS

Features

- V_{DS}=-40V
- I_D=-6A
- $R_{DS(on)}$@V_{GS}=-10V ＜ 40mΩ
- $R_{DS(on)}$@V_{GS}=-4.5V ＜ 58mΩ
- Avalanche energy tested
- Fast Switching Speedze
- Improved dv/dt capability, high ruggedness

Drain-source Voltage
-40 V
Drain Current
-6 Ampere

Applications

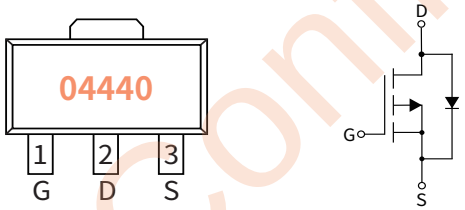
- Battery protection
- Load switch
- Power management

SOT-89

Mechanical Data

- Case: SOT-89
  Molding compound meets UL 94V-0 flammability rating, RoHS-compliant,halogen-free
- Terminals: Solder plated, solderable per MIL-STD-750,Method 2026

Function Diagram



Ordering Information

PACKAGE	PACKAGE CODE	UNIT WEIGHT(g)	REEL(pcs)	BOX(pcs)	CARTON(pcs)	DELIVERY MODE
SOT-89	R1	0.045	1000	8000	48000	7''

Maximum Ratings (Ta=25°C Unless otherwise specified)

PARAMETER	SYMBOL	UNIT	VALUE
Drain-source Voltage	V_{DS}	V	-40
Gate-source Voltage	V_{GS}	V	±20
Drain Current	I_D	A	-6
Pulsed Drain Current [1]	I_{DM}	A	-24
Total Power Dissipation	P_D	W	2.5
Junction temperature	T_J	°C	-55 ~+150
Storage temperature	T_{stg}	°C	-55 ~+150
Thermal Resistance Junction-to-Ambient	$R_{\theta JA}$	°C / W	50

Static Parameter Characteristics (Tj=25°C Unless otherwise specified)

PARAMETER	SYMBOL	Condition	UNIT	Min	Typ	Max
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}= 0V, I_D=-250μA	V	-40	—	—
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-40V, V_{GS}=0V	μA	—	—	-1.0
Gate-Body Leakage Current	I_{GSS}	V_{GS}= ±20V, V_{DS}=0V	nA	—	—	±100
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}= V_{GS}, I_D=-250μA	V	-1.0	-1.7	-2.5
Static Drain-Source On-Resistance (2)	$R_{DS(ON)}$	V_{GS}= -10V, I_D=-6A	mΩ	—	32	40
		V_{GS}= -4.5V, I_D=-5A		—	42	58

Dynamic Parameters

PARAMETER	SYMBOL	Condition	UNIT	Min	Typ	Max
Input Capacitance	C_{iss}	V_{DS}=-20V, V_{GS}=0V, f=1MHZ	pF	—	1250	—
Output Capacitance	C_{oss}			—	98	—
Reverse Transfer Capacitance	C_{rss}			—	80	—

Switching Parameters

PARAMETER	SYMBOL	Condition	UNIT	Min	Typ	Max
Turn-on Delay Time	$t_{D(on)}$	V_{GS}=-10V, V_{DD}=-20V, I_D=-5A ,R_{GEN}=3Ω	nS	—	5	—
Turn-on Rise Time	t_r		nS	—	2	—
Turn-off Delay Time	$t_{D(off)}$		nS	—	51	—
Turn-off fall Time	t_f		nS	—	29	—
Total Gate Charge	Q_g	V_{DS}=-20V, I_D=-5A V_{GS}=-10V	nC	—	23	—
Gate-Source Charge	Q_{gs}		nC	—	4	—
Gate-Drain Charge	Q_{gd}		nC	—	4	—

Drian-Source Diode Characteristics

PARAMETER	SYMBOL	Condition	UNIT	Min	Typ	Max
Diode Forward Voltage	V_{SD}	I_S=-2.5A, V_{GS}=0V	V	—	—	1.2
Maximum Body-Diode Continuous Current	I_S	—	A	—	—	6

Note :
(1)Repetitive Rating: Pulse width limited by maximum junction temperature.
(2)Pulse Test: Pulse Width ⩽ 300μs, Duty Cycle ⩽ 2%.

Ratings And Characteristics Curves (Ta=25°C Unless otherwise specified)

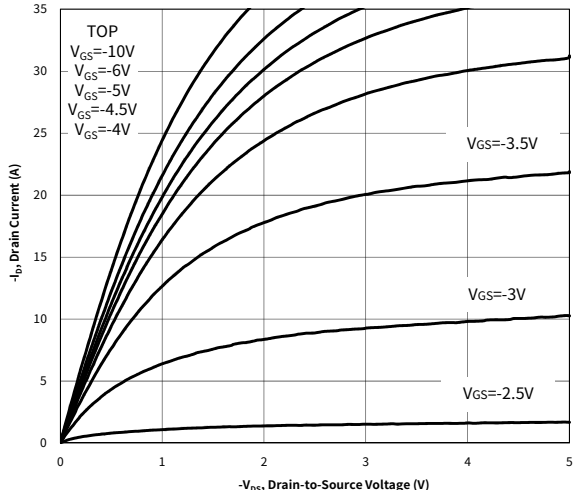


Fig.1 Output Characteristics

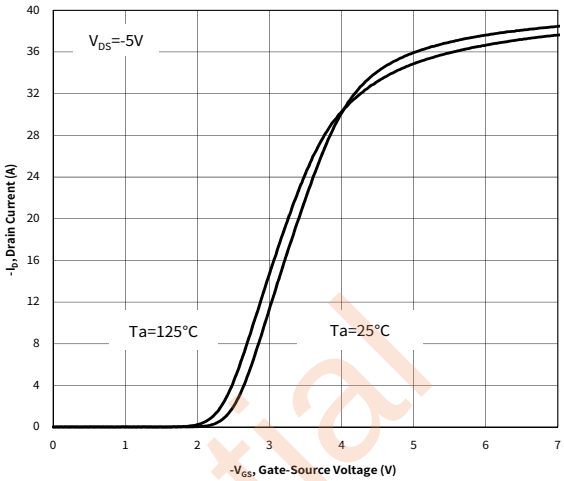


Fig.2 Transfer Characteristics

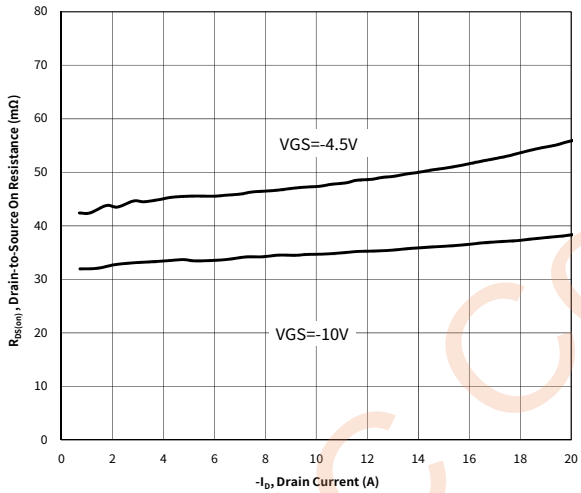


Fig.3 On-Resistance vs. Drain Current and Gate Voltage

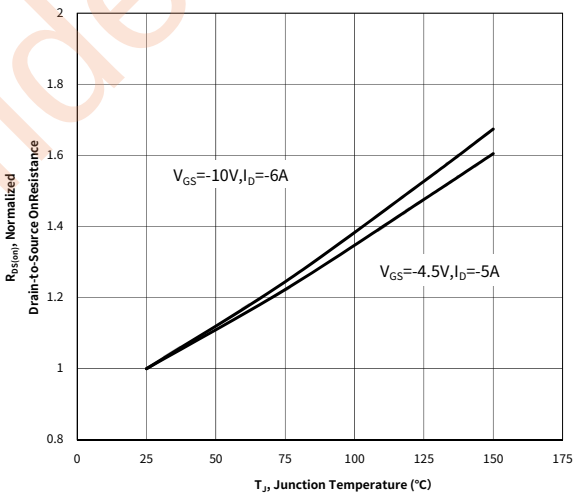


Fig.4 On-Resistance vs. Junction Temperature

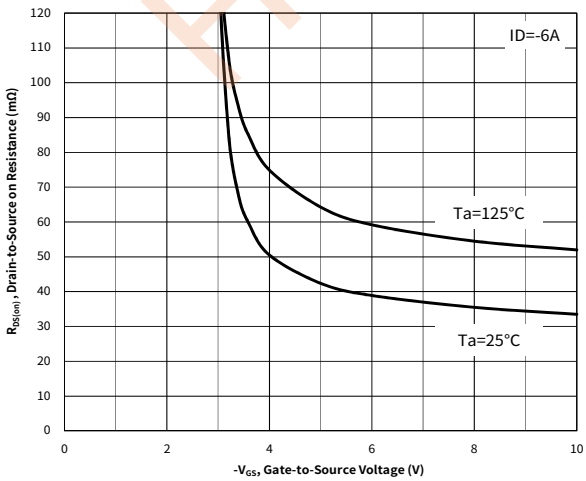


Fig.5 On-Resistance vs. Gate to Source Voltage

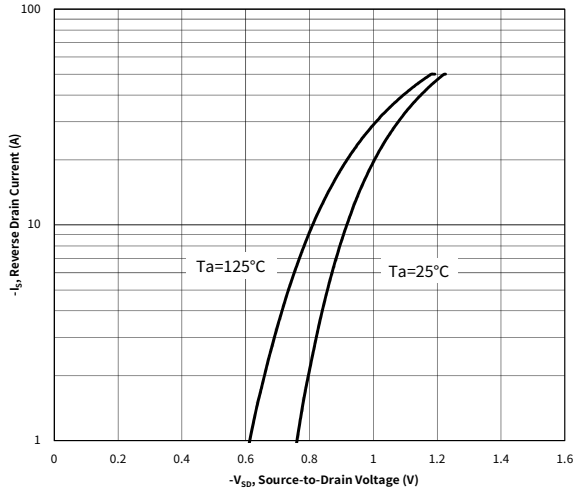


Fig.6 Typical Body-Diode Forward Characteristics

Ratings And Characteristics Curves (Ta=25°C Unless otherwise specified)

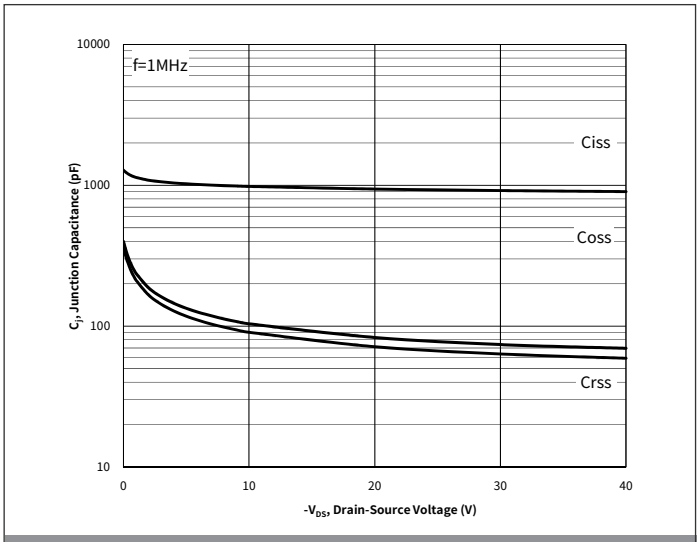


Fig.7 Capacitance Characteristics

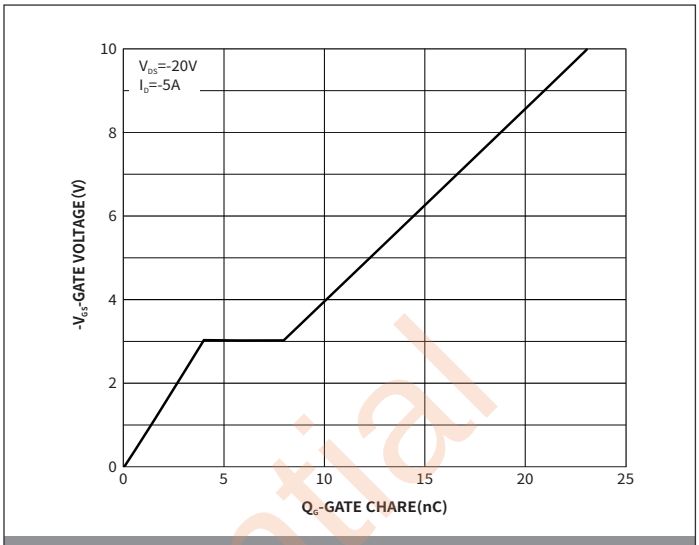


Fig.8 Gate Charge

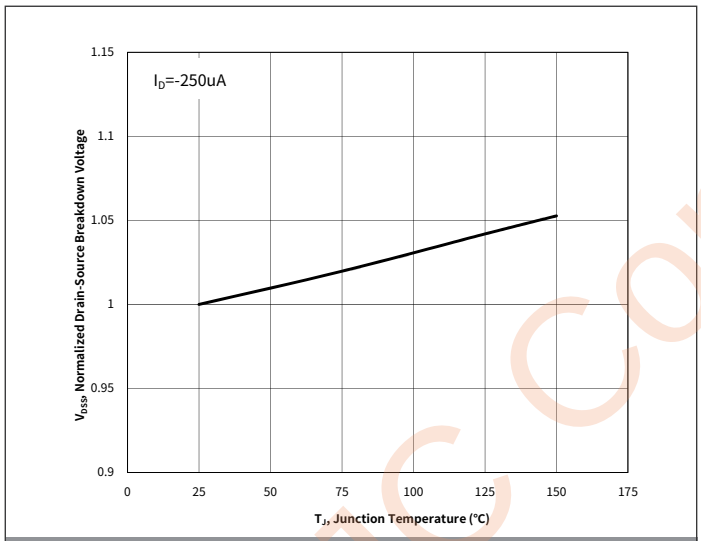


Fig.9 V(BR)DSS vs.Junction Temperature

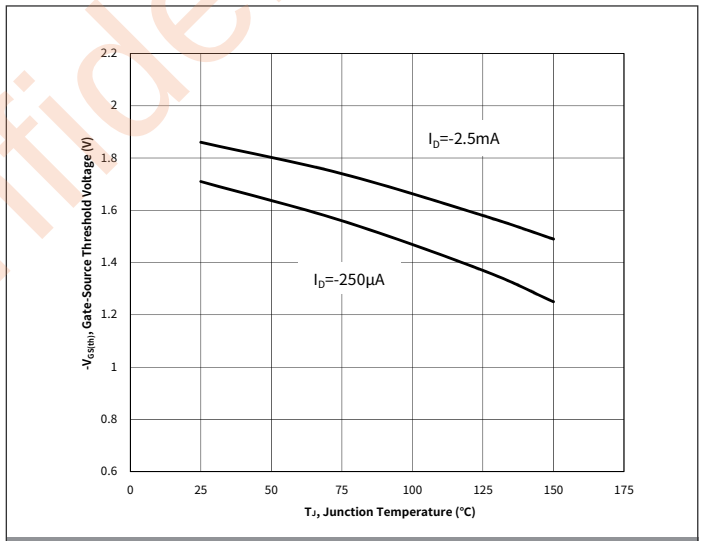


Fig.10 Gate Thresold Variation vs. Tj

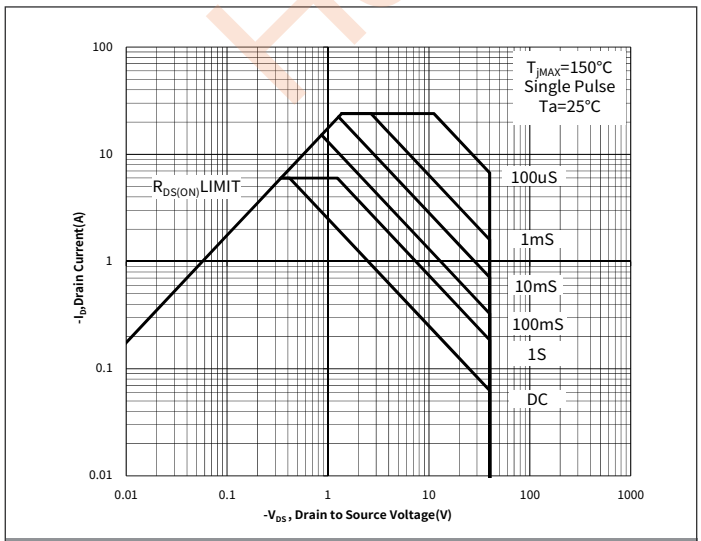


Fig.11 Safe Operation Area

Ratings And Characteristics Curves (Ta=25°C Unless otherwise specified)

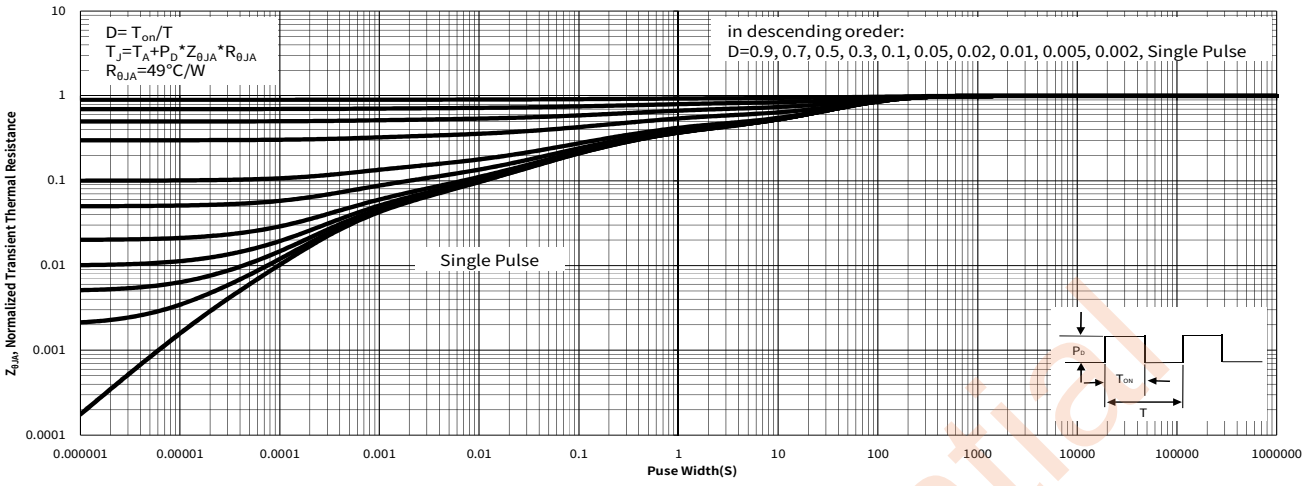
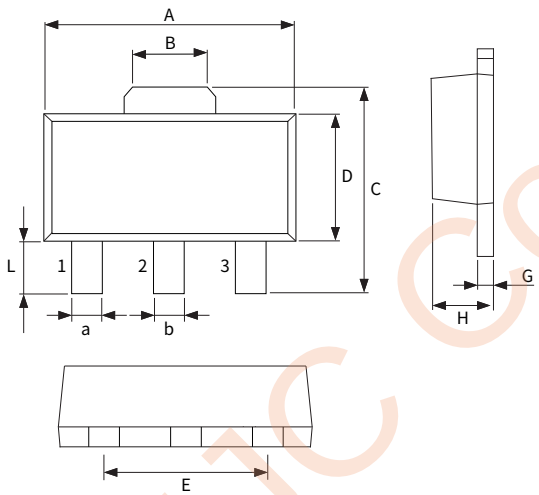


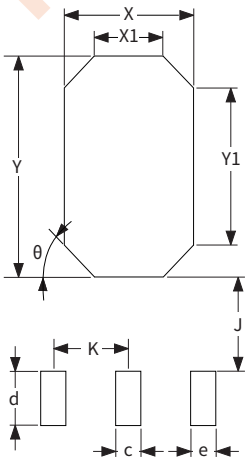
Fig.12 Normalized Maximum Transient Thermal Impedance

Package Outline Dimensions (SOT-89)



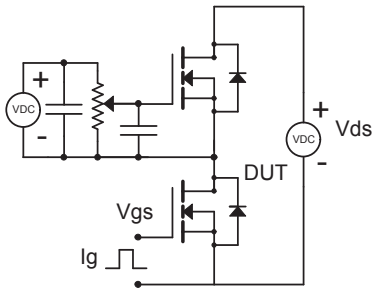
Symbol	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.4	4.6	0.176	0.184
B	1.6	1.8	0.064	0.072
C	3.9	4.1	0.156	0.164
D	2.4	2.6	0.096	0.104
E	2.9	3.1	0.116	0.124
a	0.41	0.43	0.0164	0.018
b	0.35	0.45	0.014	0.018
L	0.95	1.05	0.037	0.041
G	0.3	0.5	0.012	0.020
H	1.4	1.5	0.055	0.059

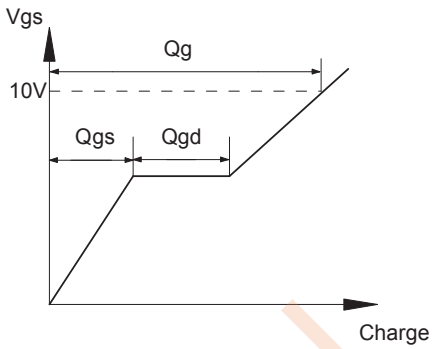
Suggested Pad Layout



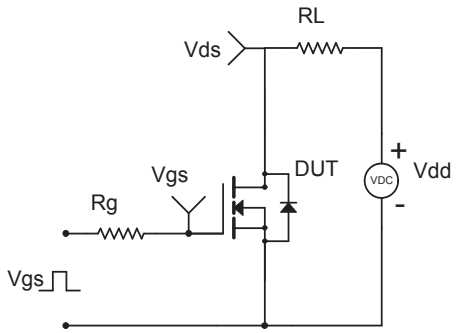
Symbol	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
c	0.80	1.00	0.032	0.04
d	1.30	1.50	0.052	0.060
e	0.70	0.90	0.028	0.036
J	1.80	2.00	0.072	0.080
K	1.40	1.60	0.056	0.064
X	2.50	2.70	0.100	0.108
X1	1.30	1.50	0.052	0.060
Y	4.30	4.50	0.172	0.180
Y1	3.10	3.30	0.124	0.132
θ	-	45°	-	45°

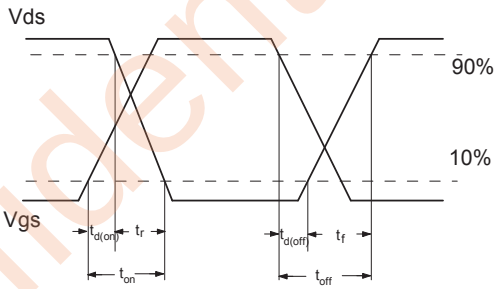
1.Gate Charge Test Circuit & Waveforms



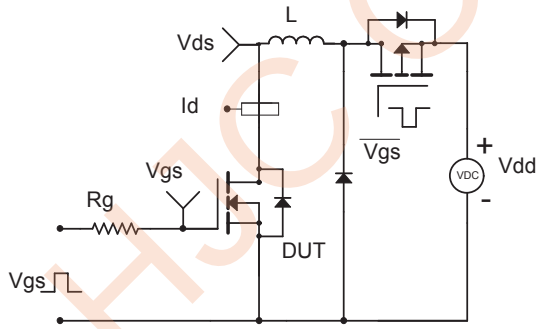


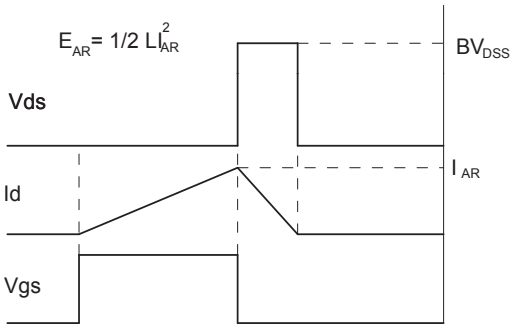
2. Resistive Switching Test Circuit & Waveforms





3.Unclamped Inductive Switching (UIS) Test Circuit & Waveforms





4.Diode Recovery Test Circuit & Waveforms