

MSKSEMI

SEMICONDUCTOR



ESD



TVS



TSS



MOV



GDT



PLED

Product data sheet

Description

The STU417S 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.

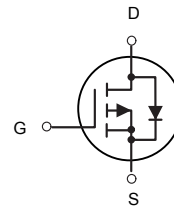


TO-252

General Features

$V_{DS} = -40V$ $I_D = -40A$

$R_{DS(ON)} < 21\ m\Omega @ V_{GS}=10V$



P-Channel MOSFET

Application

Battery protection

Load switch

Uninterruptible power supply

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

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	-40	V
VGS	Gate-Source Voltage	± 20	V
$I_D @ T_C=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	-40	A
$I_D @ T_C=100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	-25	A
IDM	Pulsed Drain Current ²	-144	A
$P_D @ T_C=25^\circ C$	Total Power Dissipation ⁴	30	W
TSTG	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$
$R_{\theta JA}$	Thermal Resistance Junction-ambient ¹	62	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	2.5	$^\circ C/W$

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250 μA	-40	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =-40V	---	---	-1	μA
I_{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0A	---	---	±100	nA
On Characteristics						
V_{GS(th)}	GATE-Source Threshold Voltage	V _{GS} =V _{DS} , I _D =-250 μA	-1.1	-1.7	-2.5	V
R_{DS(on)}	Drain-Source On Resistance	V _{GS} =-10V, I _D =-20A	---	15	21	mΩ
		V _{GS} =-4.5V, I _D =-15A	---	21	32	
G_{FS}	Forward Transconductance	V _{DS} =-5V, I _D =-5A	15	---	---	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V _{DS} =-20V, V _{GS} =0V, f=1MHz	---	2050	---	pF
C_{oss}	Output Capacitance		---	260	---	
C_{rss}	Reverse Transfer Capacitance		---	150	---	
Switching Characteristics						
t_{d(on)}	Turn-On Delay Time	V _{DS} =-20V, R _L =1.6 Ω R _{GEN} =3 Ω, V _{GS} =-10V	---	10	---	ns
t_r	Rise Time		---	24	---	ns
t_{d(off)}	Turn-Off Delay Time		---	40	---	ns
t_f	Fall Time		---	9	---	ns
Q_g	Total Gate Charge	V _{GS} =-10V, V _{DS} =-20V, I _D =-8A	---	45	---	nC
Q_{gs}	Gate-Source Charge		---	6	---	nC
Q_{gd}	Gate-Drain "Miller" Charge		---	11	---	nC
Drain-Source Diode Characteristics						
V_{SD}	Source-Drain Diode Forward Voltage	V _{GS} =0V, I _S =-10A,	---	---	-1.2	V
I_{SD}	Source-Drain Current(Body Diode)		---	---	-36	A

Notes:

1.Repetitive Rating: Pulse width limited by maximum junction temperature

Typical Characteristics

Figure1. Power Dissipation

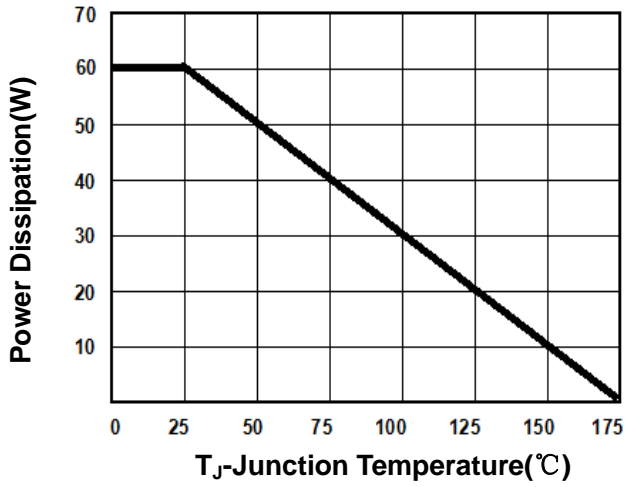


Figure2. Drain Current

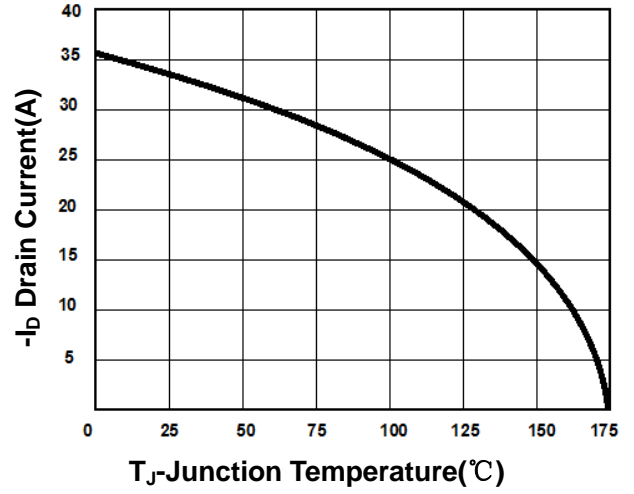


Figure3. Output Characteristics

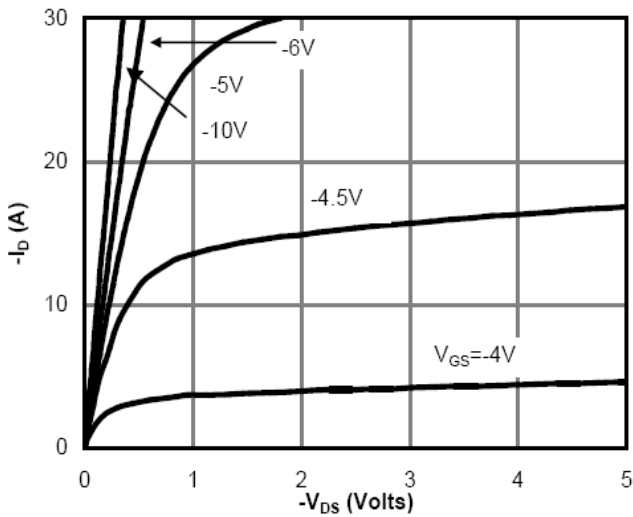


Figure4. Transfer Characteristics

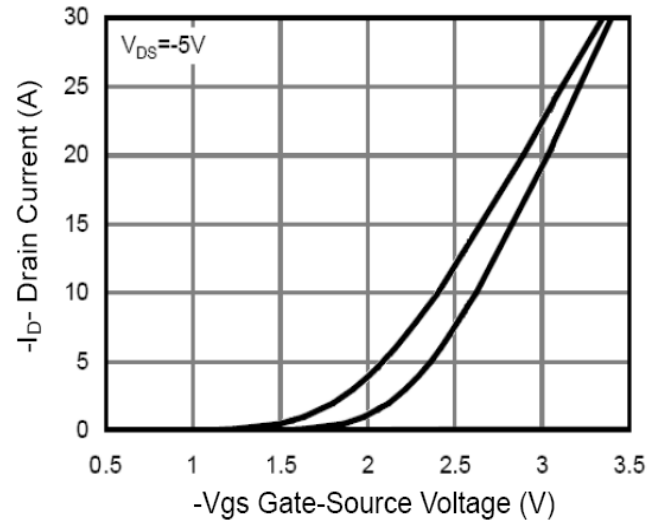


Figure5. Capacitance

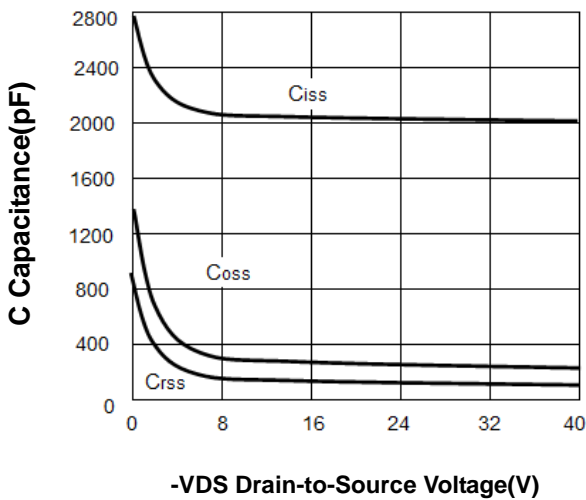


Figure6. R_{DS(ON)} vs Junction Temperature

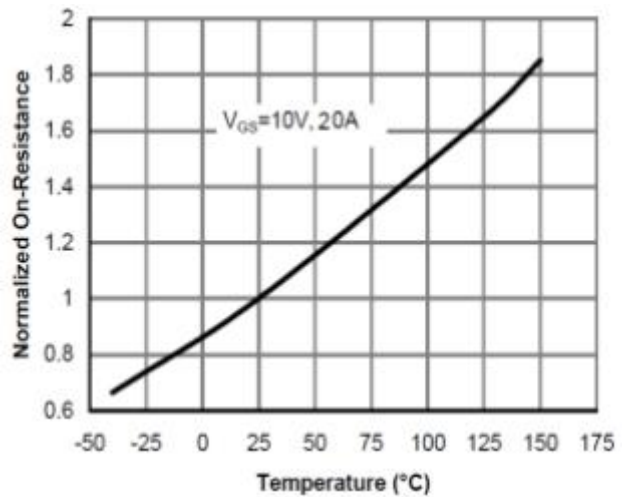


Figure7. $V_{GS(th)}$ vs Junction Temperature

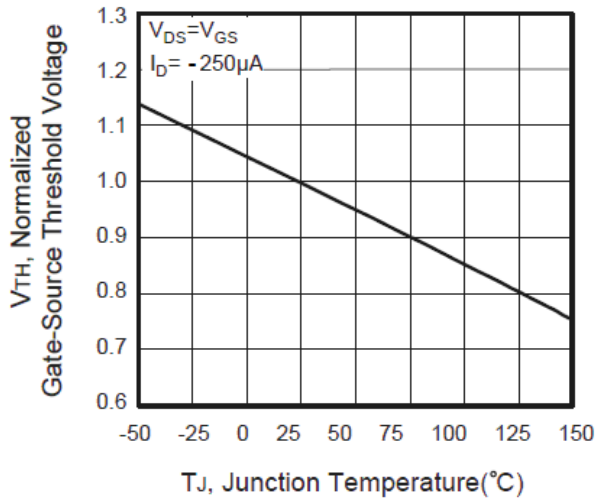


Figure8. Gate Charge Waveforms

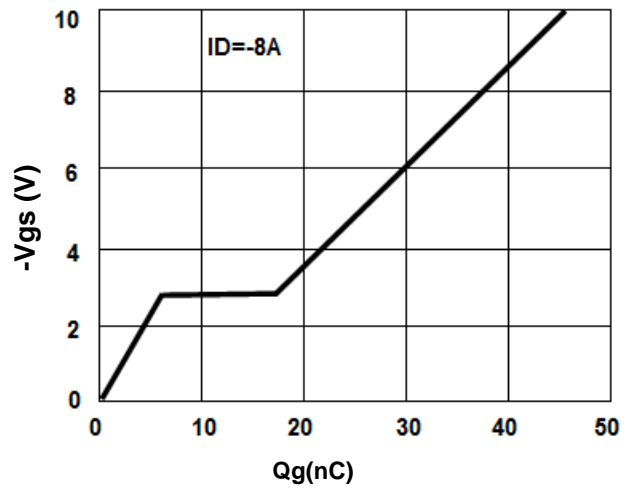
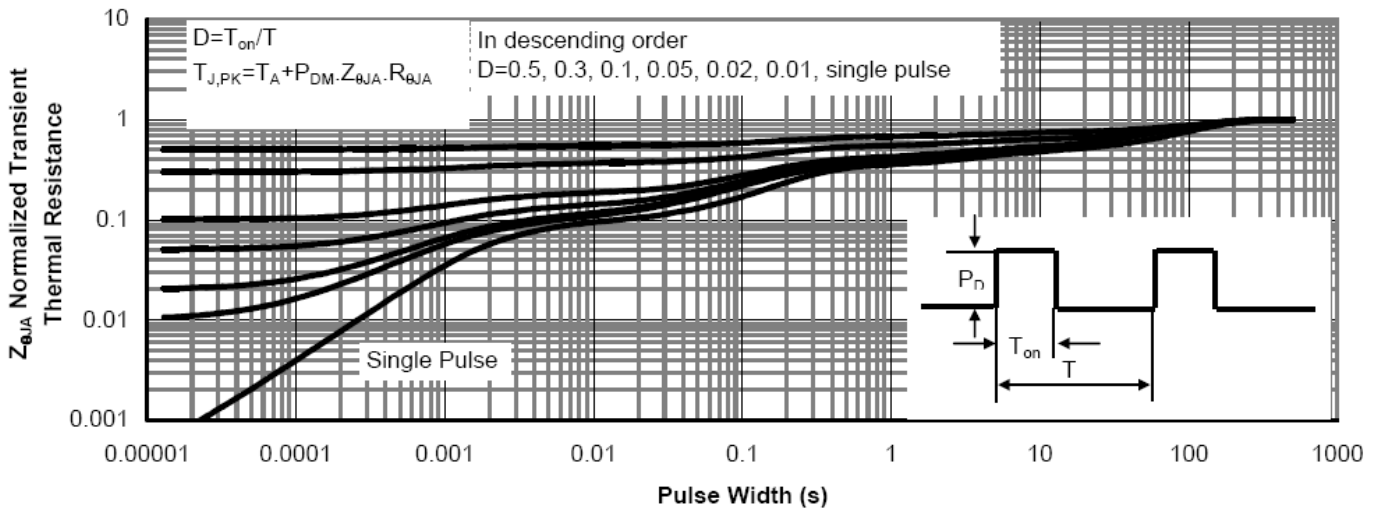
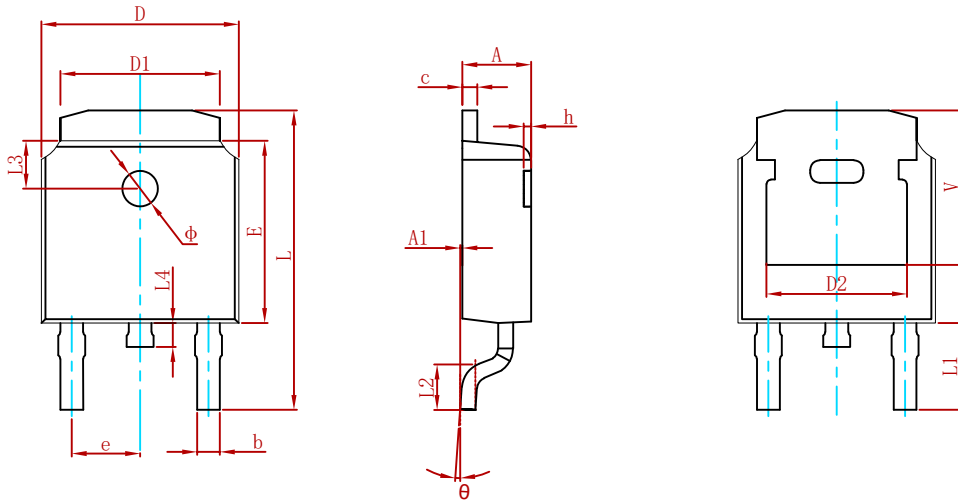


Figure9. Normalized Maximum Transient Thermal Impedance

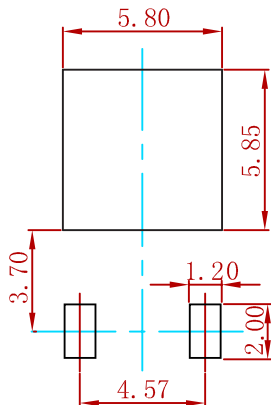


PACKAGE MECHANICAL DATA



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.635	0.770	0.025	0.030
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.712	10.312	0.382	0.406
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.250 REF.		0.207 REF.	

Suggested Pad Layout



- Note:
1. Controlling dimension: in millimeters.
 2. General tolerance: ± 0.05mm.
 3. The pad layout is for reference purposes only.

REEL SPECIFICATION

P/N	PKG	QTY
STU417S	TO-252	2500

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