

SLH65R039GTDI

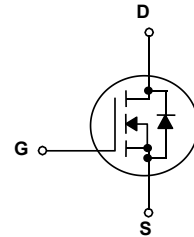
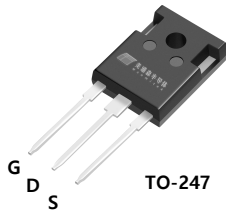
650V N-Channel Multi-EPI Super-JMOSFET

General Description

This Power MOSFET is produced using Msemitek's advanced Superjunction MOSFET technology. 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 switched mode power supplies.

Features

- 700V@ $T_j=150^{\circ}\text{C}$
- 76A,650V, $R_{DS(on)}=35\text{m}\Omega@V_{GS}=10\text{V}$
- Low gate charge(typ. $Q_g=159\text{nC}$)
- High ruggedness
- Ultra fast switching
- 100% avalanche tested
- Improved dv/dt capability



Absolute Maximum Ratings $T_C = 25^{\circ}\text{C}$ unless otherwise noted

Symbol	Parameter	SLH65R039GTDI	Units
V_{DS}	Drain-Source Voltage	650	V
I_D	Drain Current * - Continuous ($T_C = 25^{\circ}\text{C}$) - Continuous ($T_C = 100^{\circ}\text{C}$)	76	A
		45	A
I_{DM}	Drain Current * - Pulsed (Note 1)	195	A
V_{GS}	Gate-Source Voltage	± 30	V
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	2205	mJ
P_D	Power Dissipation ($T_C = 25^{\circ}\text{C}$) - Derate above 25°C	500	W
		4	W/ $^{\circ}\text{C}$
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	$^{\circ}\text{C}$
T_L	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	260	$^{\circ}\text{C}$

* Drain current limited by maximum junction temperature.

Thermal Characteristics

Symbol	Parameter	SLH65R039GTDI	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	0.25	$^{\circ}\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	40	$^{\circ}\text{C}/\text{W}$

Package Marking

Part Number	Top Marking	Package	Packing Method	MOQ	QTY
SLH65R039GTDI	SLH65R039GTDI	TO-247	Tube	450	2250

Electrical Characteristics

$T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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Off Characteristics

BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	650	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 650\text{ V}, V_{GS} = 0\text{ V}$	--	--	10	μA
I_{GSSF}	Gate-Body Leakage Current, Forward	$V_{GS} = 30\text{ V}, V_{DS} = 0\text{ V}$	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	$V_{GS} = -30\text{ V}, V_{DS} = 0\text{ V}$	-100	--	--	nA

On Characteristics

$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	3	--	5	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = 10\text{ V}, I_D = 32\text{ A}$	--	35	39	m Ω

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V}, f = 100\text{ KHz}$	--	7782	--	pF
C_{oss}	Output Capacitance		--	254	--	pF
C_{rss}	Reverse Transfer Capacitance		--	2.8	--	pF

Switching Characteristics

$t_{d(on)}$	Turn-On Delay Time	$V_{DS} = 400\text{ V}, I_D = 35\text{ A}, R_G = 4.7\ \Omega, V_{GS} = 10\text{ V}$ (Note3)	--	56	--	ns
t_r	Turn-On Rise Time		--	30	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	121	--	ns
t_f	Turn-Off Fall Time		--	8	--	ns
Q_g	Total Gate Charge	$V_{DS} = 400\text{ V}, I_D = 35\text{ A}, V_{GS} = 10\text{ V}$ (Note3)	--	159	--	nC
Q_{gs}	Gate-Source Charge		--	58	--	nC
Q_{gd}	Gate-Drain Charge		--	42	--	nC
R_G	Gate Resistance	$f = 1\text{ MHz}$	--	1	--	Ω

Drain-Source Diode Characteristics and Maximum Ratings

I_S	Maximum Continuous Drain-Source Diode Forward Current	--	--	76	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current	--	--	195	A
V_{SD}	Drain-Source Diode Forward Voltage	$V_{GS} = 0\text{ V}, I_S = 35\text{ A}$	--	--	1.2 V
t_{rr}	Reverse Recovery Time	$V_{DS} = 400\text{ V}, I_S = 35\text{ A}$	--	175	ns
Q_{rr}	Reverse Recovery Charge	$di_F / dt = 130\text{ A}/\mu\text{s}$	--	2.1	μC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition: $T_J = 25^\circ\text{C}, V_{DD} = 50\text{ V}, V_G = 10\text{ V}, L = 10\text{ mH}$,
3. Pulse Test: Pulse Width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 0.5\%$

Typical Characteristics

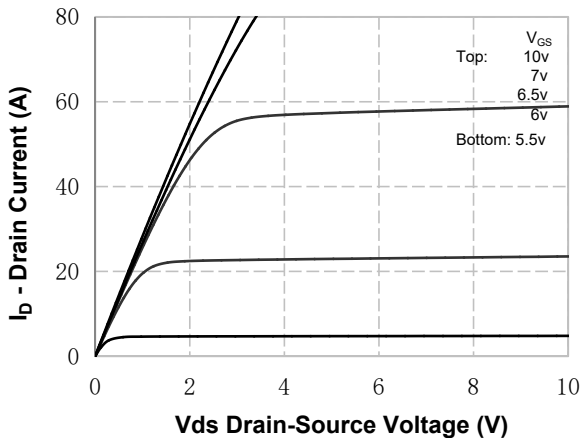


Figure 1. On-Region Characteristics

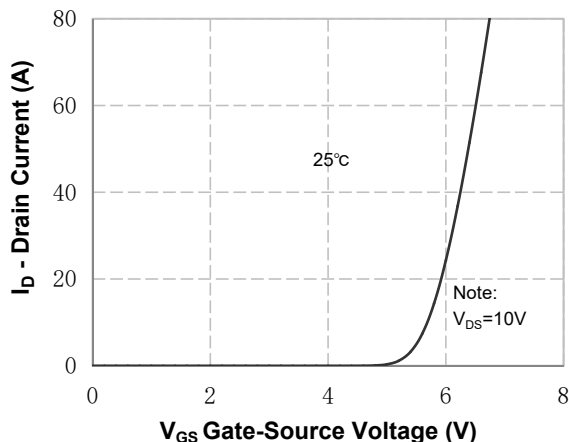


Figure 2. Transfer Characteristics

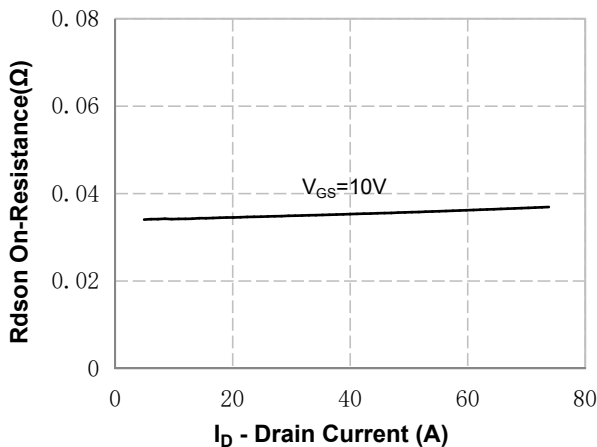


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

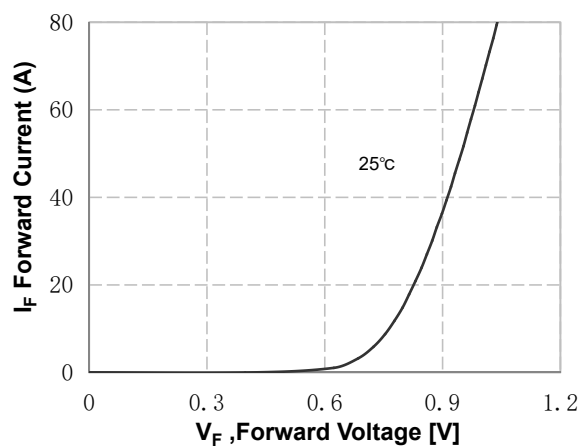


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

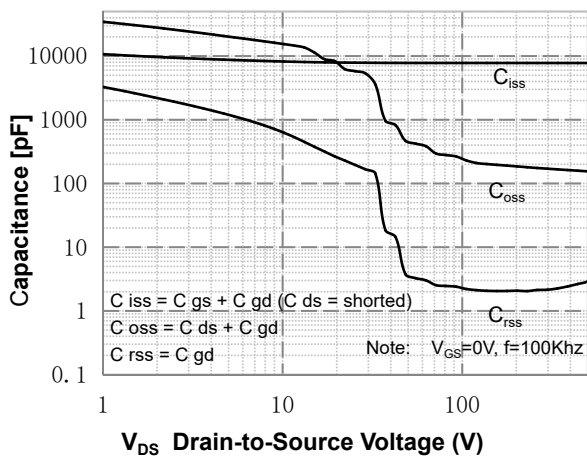


Figure 5. Capacitance Characteristics

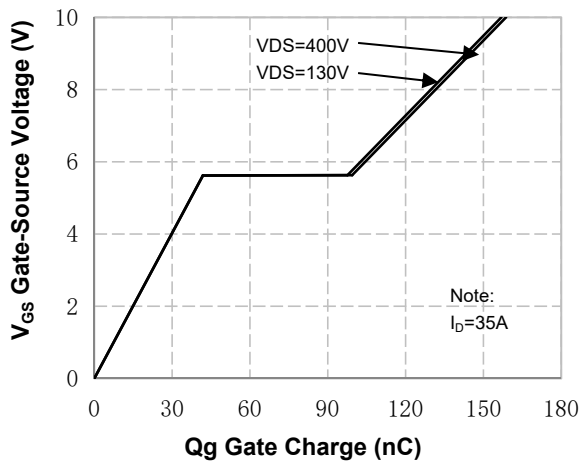


Figure 6. Gate Charge Characteristics

Typical Characteristics (Continued)

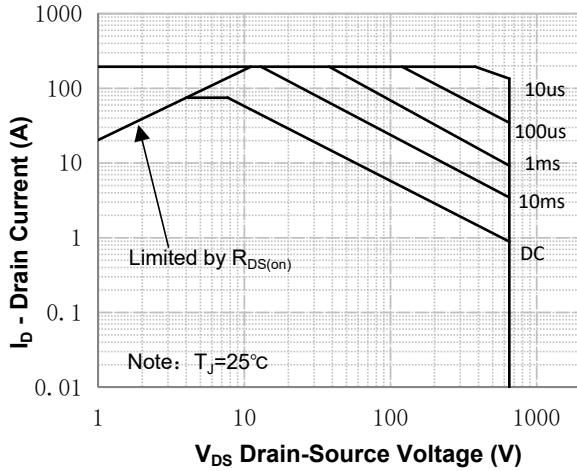


Figure 7. Maximum Safe Operating Area

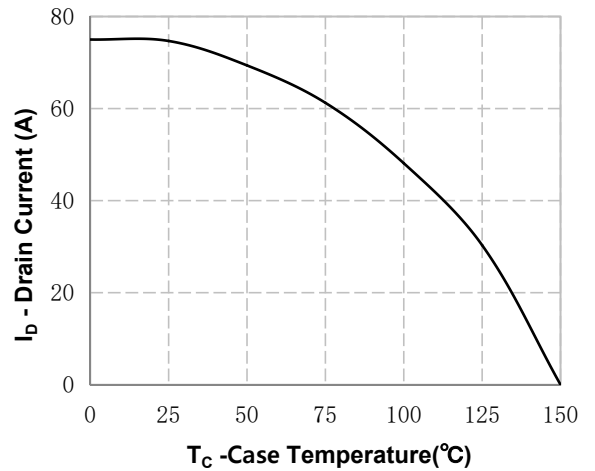


Figure 8. Maximum Drain Current vs Case Temperature

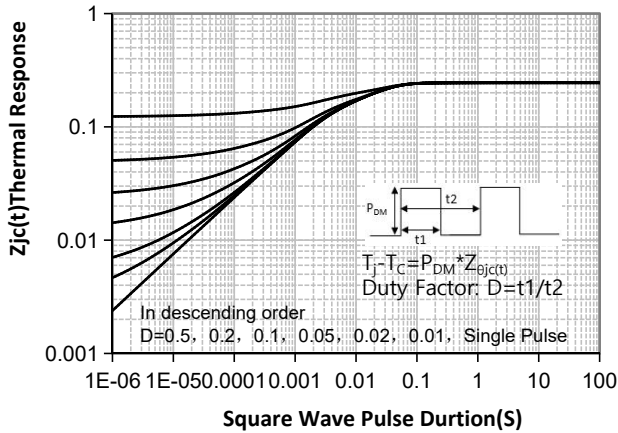
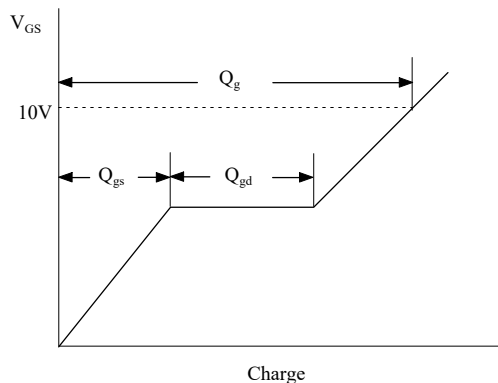
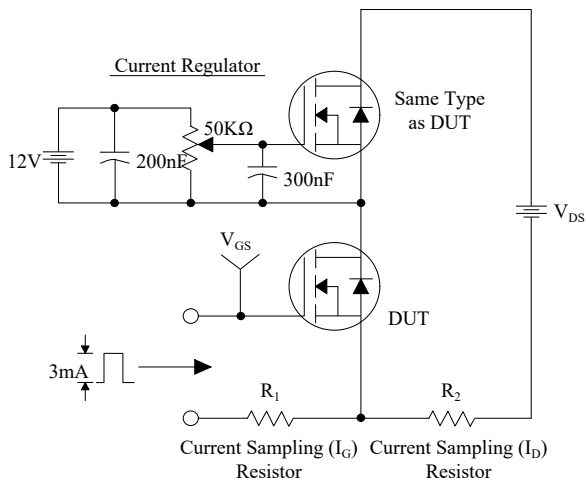
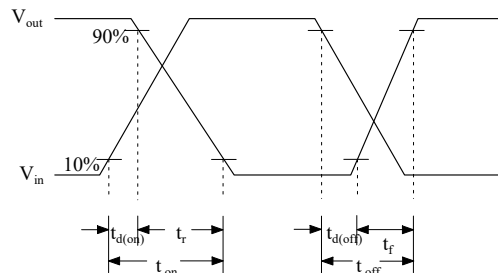
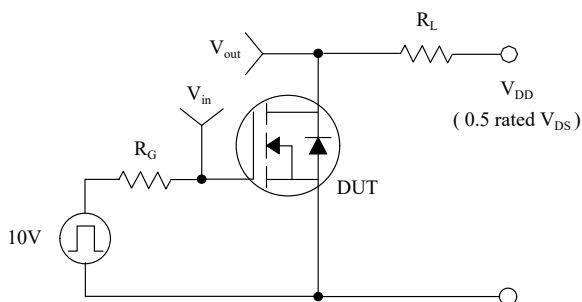


Figure 9. Transient Thermal Response Curve

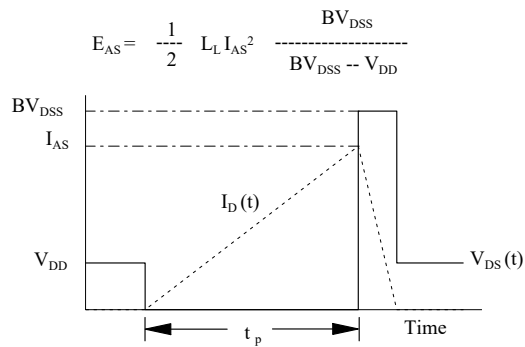
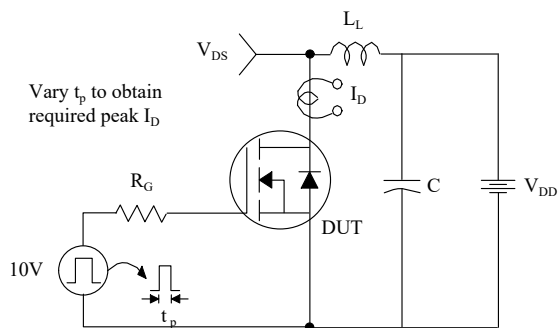
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



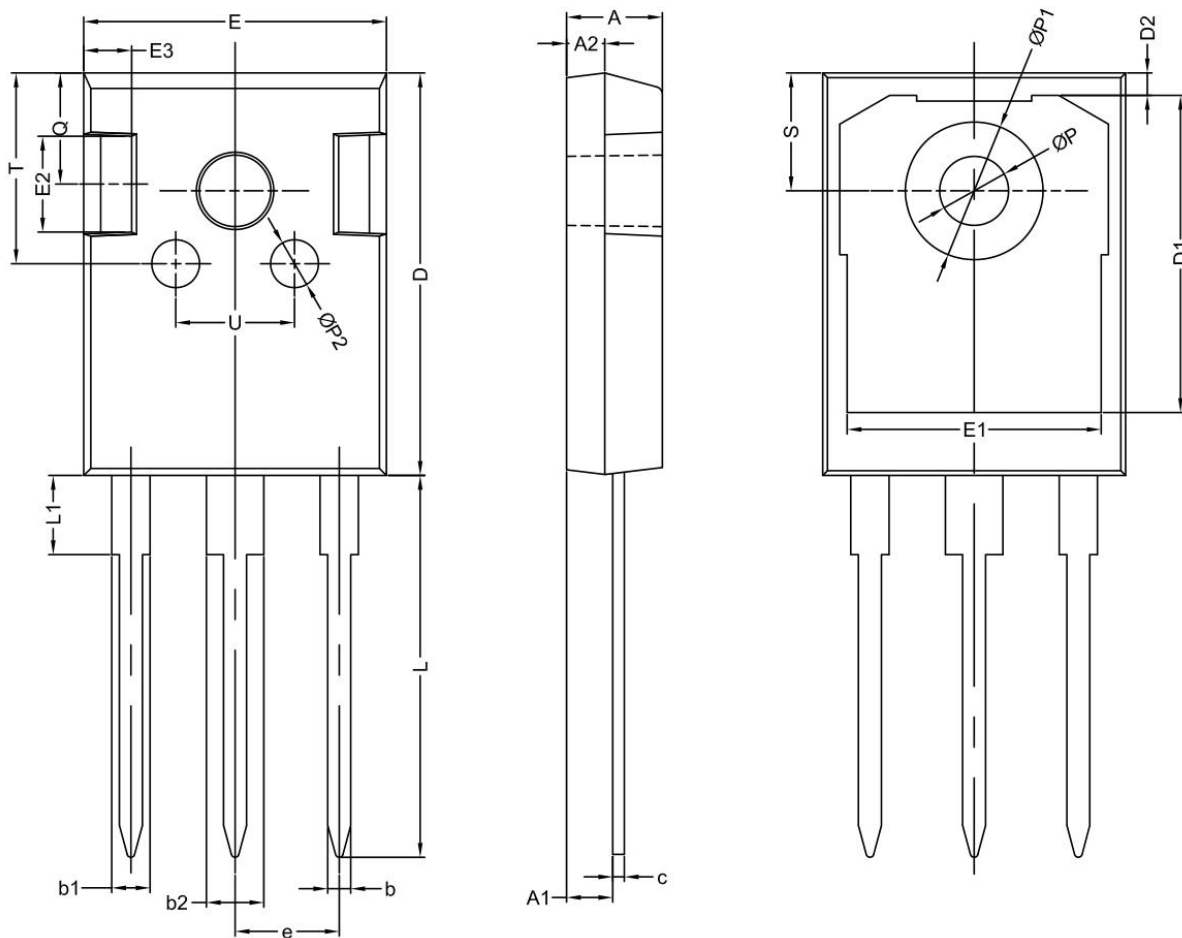
Unclamped Inductive Switching Test Circuit & Waveforms



Peak Diode Recovery dv/dt Test Circuit & Waveforms



TO-247 OUTLINE



SYMBOL	Mechanical Dimensions/mm			SYMBOL	Mechanical Dimensions/mm			SYMBOL	Mechanical Dimensions/mm		
	MIN	NOM	MAX						MIN	NOM	MAX
A	4.80	5.00	5.20	D	20.80	21.00	21.20	L1	-	4.13	-
A1	2.21	2.41	2.61	D1	-	16.55	-	Ø P	3.5	3.6	3.7
A2	1.90	2.00	2.10	E	15.60	15.80	16.0	Ø P1	-	-	7.40
b	1.10	1.20	1.35	E1		13.3		Ø P2	-	2.50	-
b1	-	2.00	-	E2		5.0		Q	-	5.8	-
b2	-	3.00	-	e	5.44			S	6.05	6.15	6.25
c	0.55	0.60	0.75	L	19.42	19.92	20.42	T	-	10.0	-

NOTE:

- 1.The plastic package is not marked as smooth surfaceRa=0.1;Subglossy surfaceRa=0.8
- 2.Undeclared tolerance ± 0.25,Unmarked filletRmax=0.25

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