N-Channel 30 V (D-S) MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (mΩ)(Typ.)	I_D (A)[a]	Q_g (Typ.)
30	0.27 at V_{GS} = 10 V	410	280 nC
	0.39 at V_{GS} = 4.5 V		

FEATURES

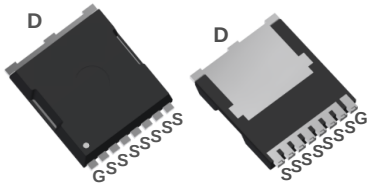
- DT-Trench Power MOSFET
- Very low on-resistance
- Excellent gate charge x $R_{DS\ (on)}$ product(FOM)

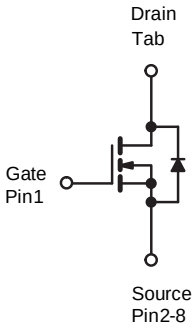
RoHS COMPLIANT

APPLICATIONS

- DC-DC Converter
- Ideal for high-frequency switching and synchronous rectification

TOLL Pin Configuration





ABSOLUTE MAXIMUM RATINGS (T_C = 25 °C, unless otherwise noted)				
PARAMETER		**SYMBOL**	**LIMIT**	**UNIT**
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current (T_J = 150 °C)[a]	T_C = 25 °C	I_D	410	A
	T_C = 100 °C		275	
Pulsed Drain Current[b]		I_{DM}	1640	
Single Avalanche Energy		E_{AS}	1439	mJ
Maximum Power Dissipation[c]	T_C = 25 °C	P_D	219	W
	T_C = 100 °C		87.6	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to +150	°C
Soldering Recommendations (Peak Temperature)			260	

THERMAL RESISTANCE RATINGS			
PARAMETER	**SYMBOL**	**MAX**	**UNIT**
Junction-to-Ambient (PCB Mount)[d]	R_{thJA}	55	°C/W
Junction-to-Case (Drain)	R_{thJC}	0.6	

Notes

a. Calculated continuous current based on maximum allowablejunction temperature.
b. Repetitive rating; pulse width limited by max. junction temperature.
c. Pd is based on max. junction temperature, using junction-case thermal resistance.
d. The value of $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper,in a still air environment with Ta=25 °C.

SPECIFICATIONS (T_C = 25 °C, unless otherwise noted)						
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{GS} = 0 V, I_D = 250 µA	30	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	1.0	-	2.5	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V	-	-	± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 30 V, V_{GS} = 0 V	-	-	1	µA
		V_{DS} = 30 V, V_{GS} = 0 V, T_J = 150 °C	-	-	100	
On-State Drain Current [a]	$I_{D(on)}$	V_{DS} ≥ 10 V, V_{GS} = 10 V	410	-	-	A
Drain-Source On-State Resistance [a]	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 30 A	-	0.27	0.35	mΩ
		V_{GS} = 4.5 V, I_D = 30 A	-	0.39	0.50	
Forward Transconductance [a]	g_{fs}	V_{DS} = 5 V, I_D = 30 A	-	230	-	S
Dynamic [b]						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 15 V, f = 0.1 MHz	-	22300	-	pF
Output Capacitance	C_{oss}		-	12530	-	
Reverse Transfer Capacitance	C_{rss}		-	168	-	
Total Gate Charge [c]	Q_g	V_{DS} = 15 V, V_{GS} = 10 V, I_D = 30 A	-	280	-	nC
Gate-Source Charge [c]	Q_{gs}		-	72	-	
Gate-Drain Charge [c]	Q_{gd}		-	18	-	
Gate Resistance	R_g	f = 1 MHz	-	1.9	-	Ω
Turn-On Delay Time [c]	$t_{d(on)}$	V_{DD} = 15 V, I_D = 30 A, R_g = 1.6 Ω, V_{GS} = 10 V	-	30	-	ns
Rise Time [c]	t_r		-	36	-	
Turn-Off Delay Time [c]	$t_{d(off)}$		-	169	-	
Fall Time [c]	t_f		-	70	-	
Drain-Source Body Diode Ratings and Characteristics [b] (T_C = 25 °C)						
Continuous Source-Drain Diode Current	I_S	T_C = 25 °C	-	-	410	A
Pulsed Current	I_{SM}		-	-	1640	A
Forward Voltage [a]	V_{SD}	I_F = 30 A, V_{GS} = 0 V	-	-	1.2	V
Reverse Recovery Time	t_{rr}	I_F = 30 A, di/dt = 100 A/µs	-	25	-	ns
Reverse Recovery Charge	Q_{rr}		-	170	-	nC

Notes

a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

TYPICAL CHARACTERISTICS (25 C, unless otherwise noted)

Fig 1: Output Characteristics

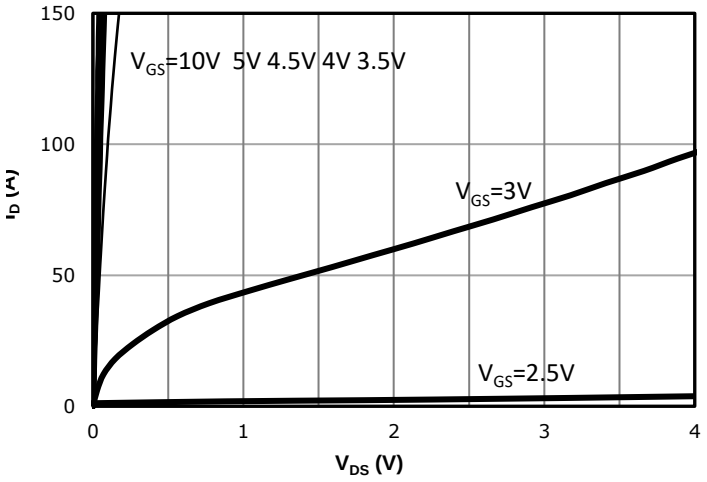


Fig 2: Transfer Characteristics

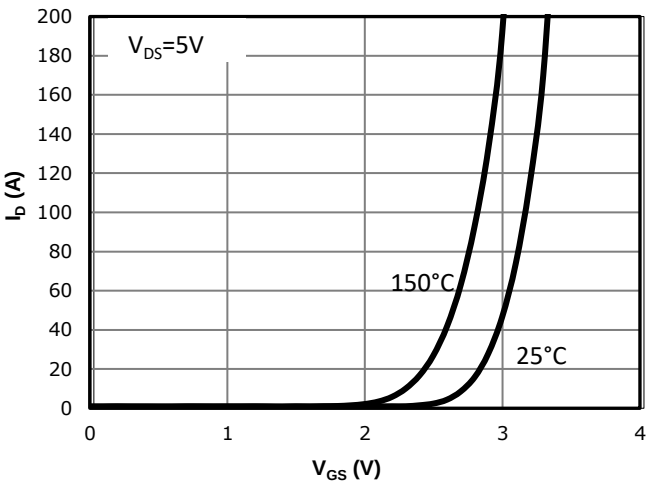


Fig 3: Rds(on) vs Drain Current and Gate Voltage

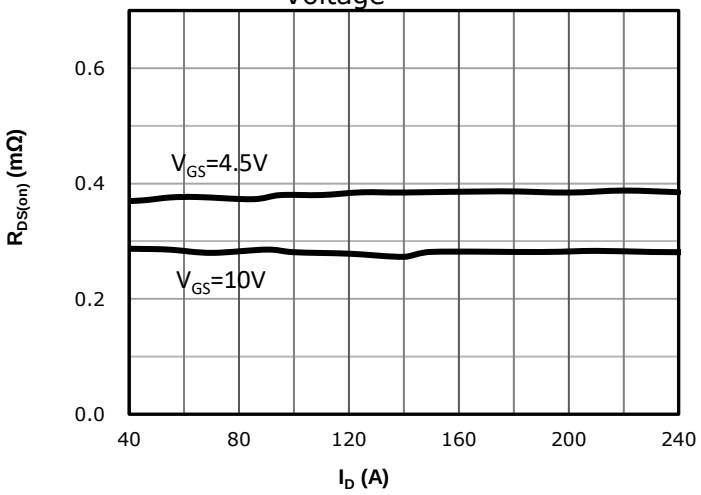


Fig 4: Rds(on) vs Gate Voltage

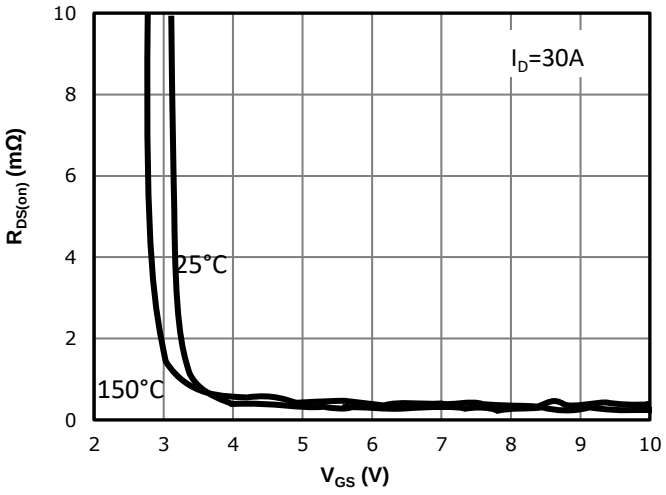


Fig 5: Rds(on) vs. Temperature

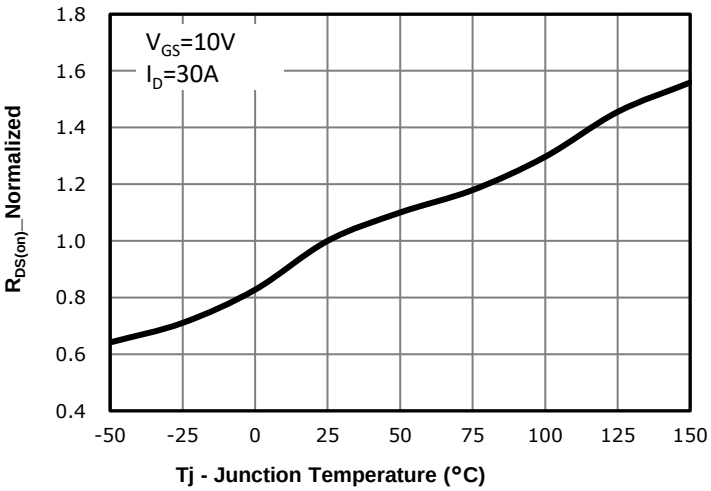
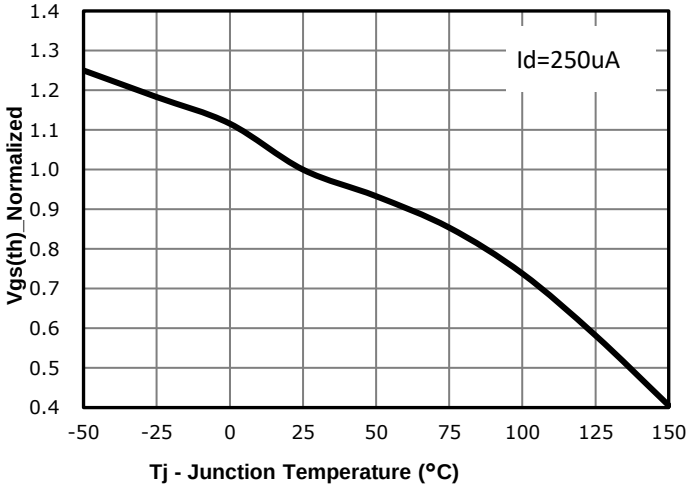


Fig 6: Vgs(th) vs. Temperature



TYPICAL CHARACTERISTICS (25 C, unless otherwise noted)

Fig 7: BVdss vs. Temperature

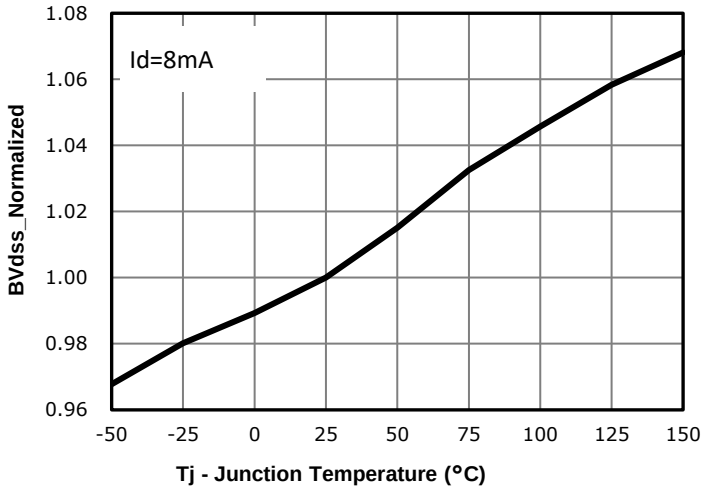


Fig 8: Capacitance Characteristics

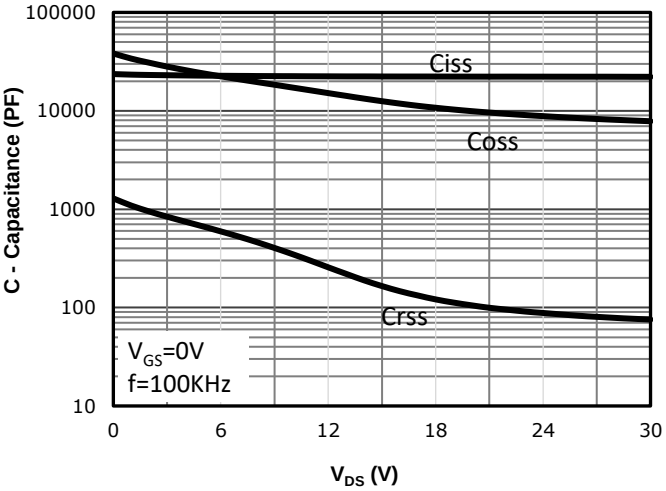


Fig 9: Gate ChargeCharacteristics

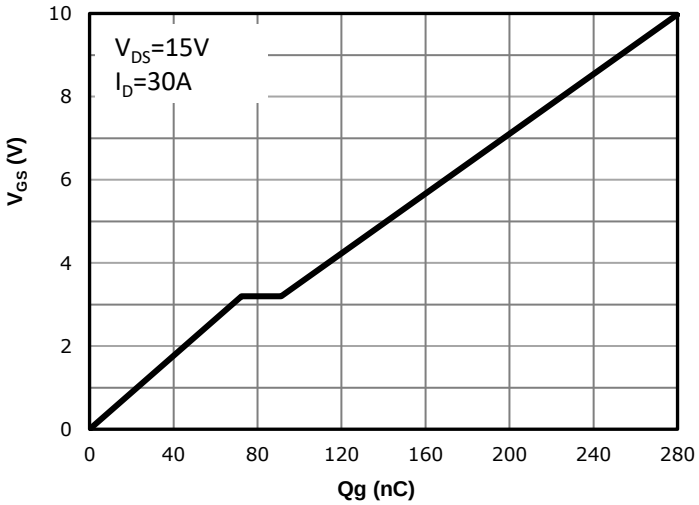


Fig 10: Body-diode Forward Characteristics

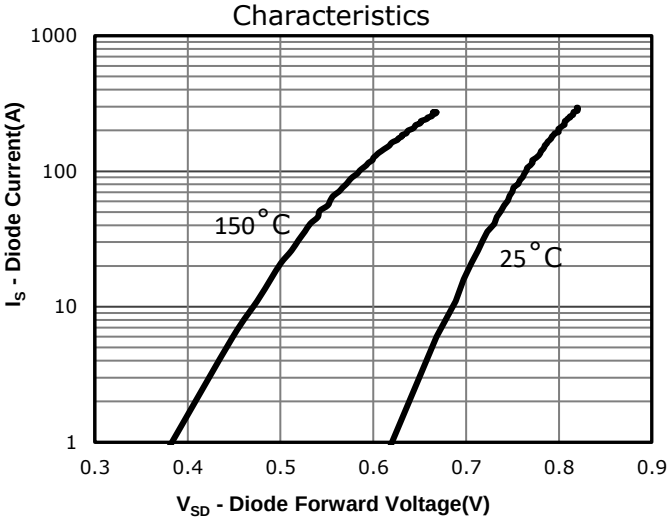


Fig 11: Power Dissipation

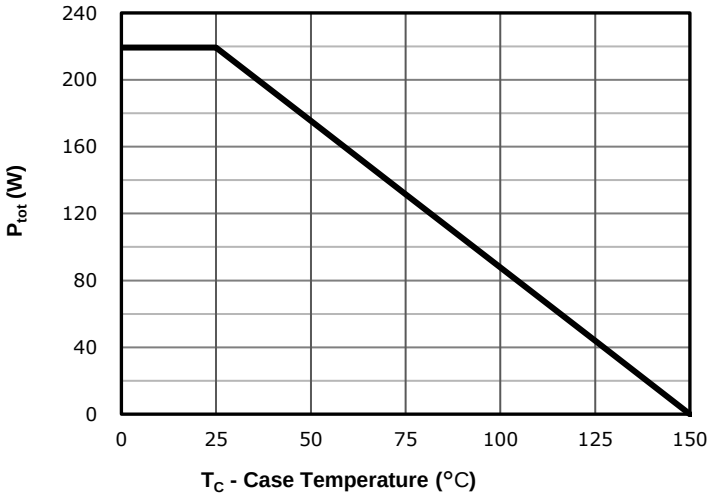
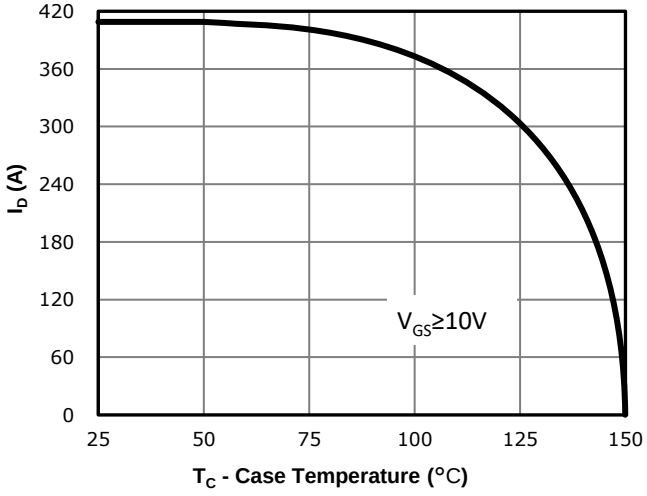


Fig 12: Drain Current Derating



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

Fig 13: Safe Operating Area

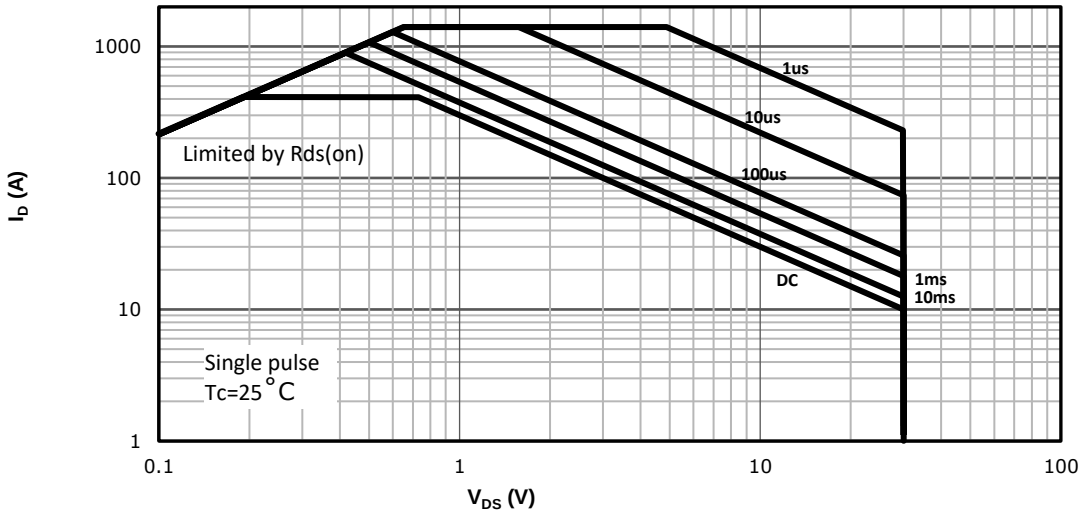
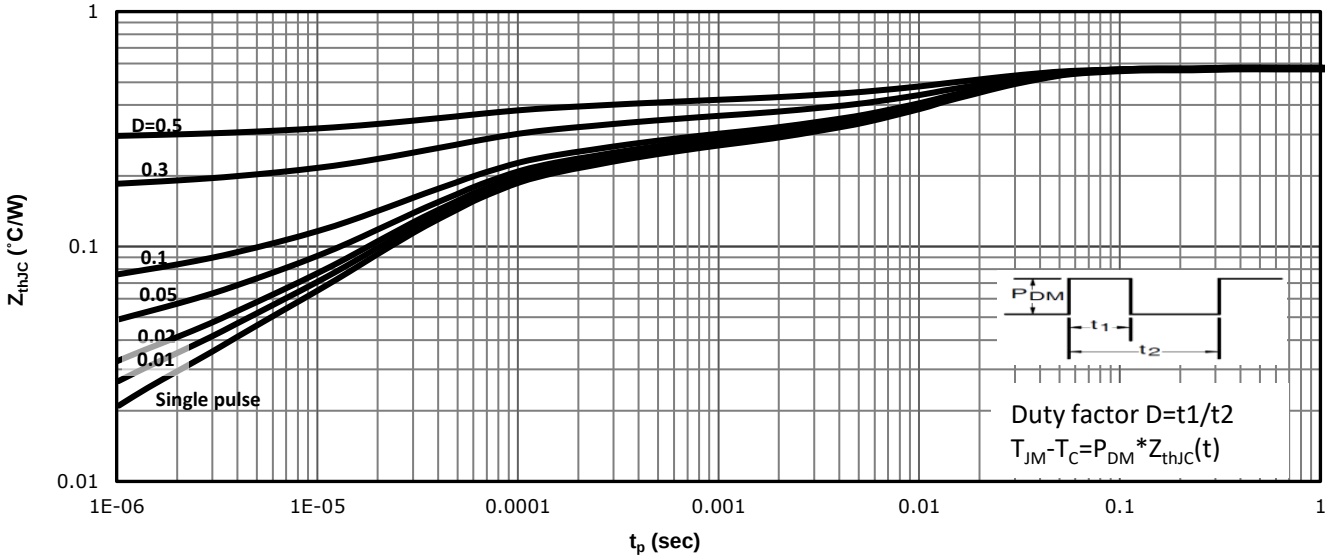
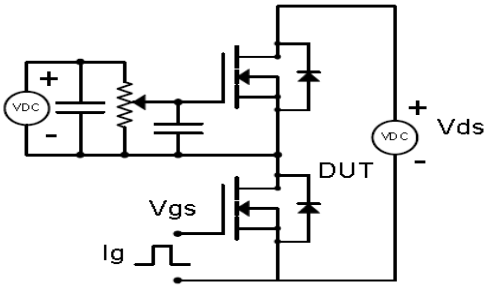


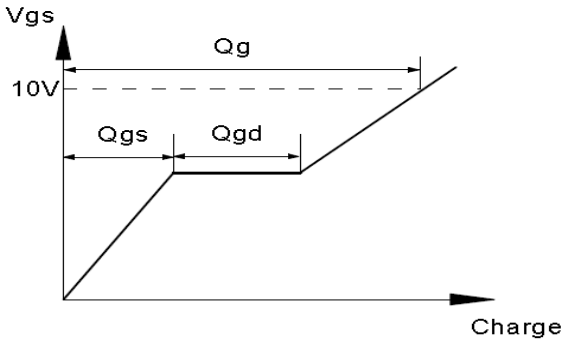
Fig 14: Max. Transient Thermal Impedance



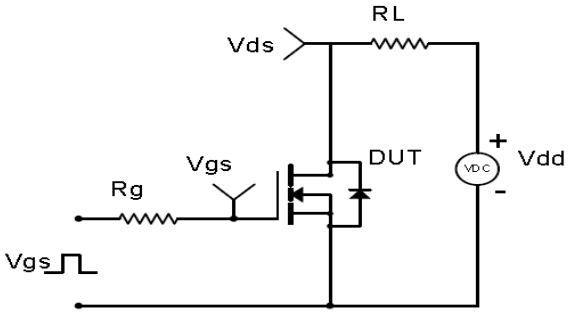
Test Circuit & Waveform

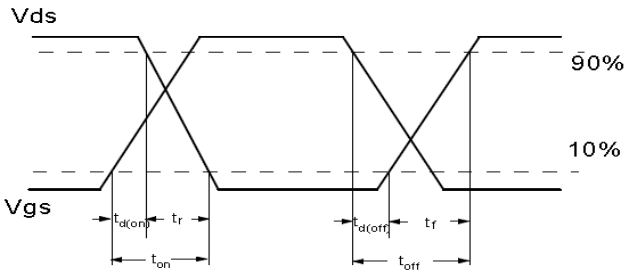
Gate Charge Test Circuit & Waveform



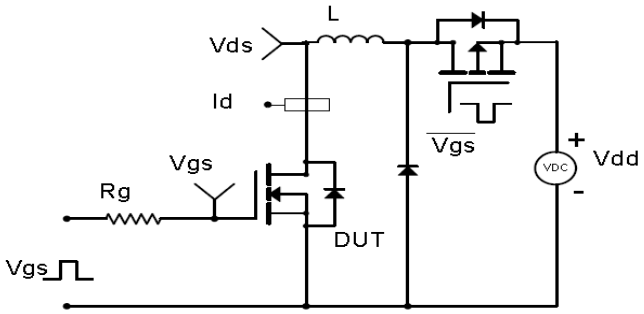


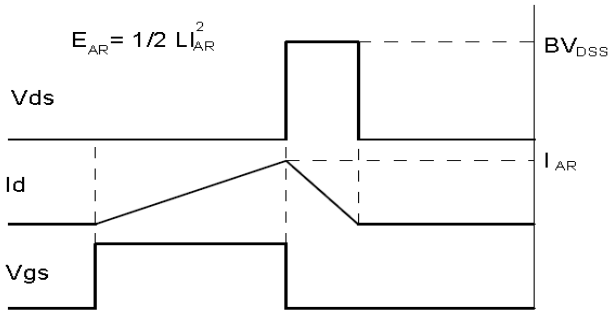
Resistive Switching Test Circuit & Waveforms



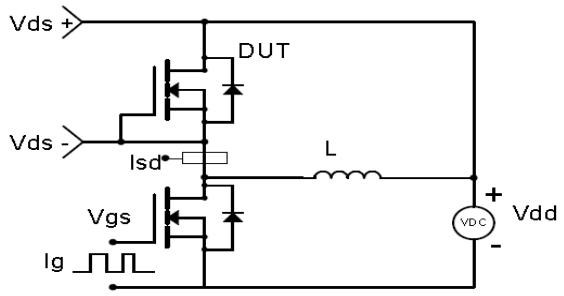


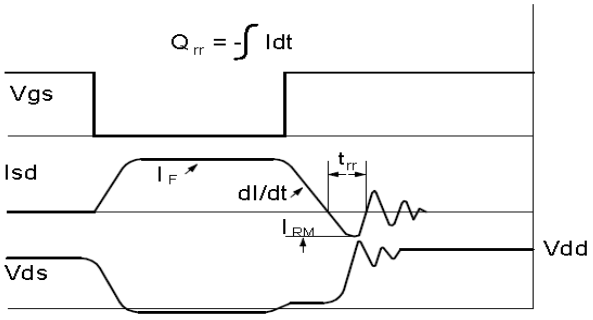
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



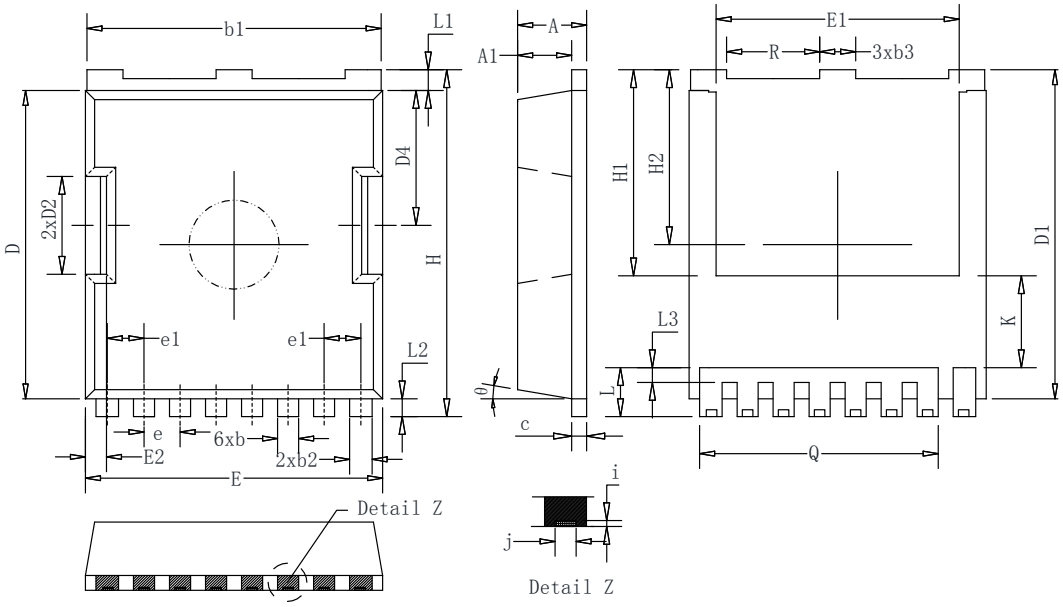


Diode Recovery Test Circuit & Waveforms





TOLL PACKAGE OUTLINE



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

Symbol	Min	Typ	Max		Symbol	Min	Typ	Max
A	2.05	2.30	2.65		E2	0.40	0.70	0.90
A1	1.50	1.80	2.10		H	11.30	11.70	12.10
b	0.50	0.70	0.90		H1	6.95 BSC		
b1	9.50	9.80	10.05		H2	5.90 BSC		
b2	0.50	0.75	1.00		i	0.10 REF		
b3	1.00	1.20	1.45		j	0.35 REF		
c	0.30	0.50	0.75		K	3.10 REF		
D	10.10	10.40	10.70		L	1.45	1.65	1.85
D1	10.80	11.10	11.40		L1	0.50	0.70	0.90
D2	3.10	3.30	3.50		L2	0.40	0.60	0.80
D4	4.35	4.55	4.80		L3	0.30	0.50	0.70
e	1.20 BSC				Q	7.95 REF		
e1	1.225 BSC				R	2.80	3.10	3.35
E	9.65	9.90	10.15		θ	10°REF		
E1	7.80	8.10	8.50					

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