N-Channel 650 V (D-S) MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (mΩ)(Typ.)	I_D (A)[a]	Q_g (Typ.)
650	700 at V_{GS} = 10 V	12	37.2nC

FEATURES

- DT-Trench Power MOSFET
- 100 % R_g and UIS Tested
- High Input Resistance
- Excellent FoM (figure of merit)

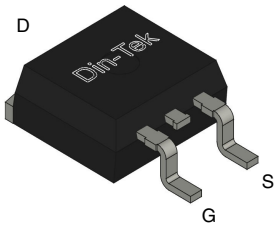
RoHS COMPLIANT

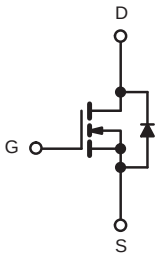
APPLICATIONS

- Electronic Ballast
- Electronic Transformer
- Switch Mode Power Supply

TO-263 Pin Configuration

Top View





N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_C = 25 °C, unless otherwise noted)				
PARAMETER		**SYMBOL**	**LIMIT**	**UNIT**
Drain-Source Voltage		V_{DS}	650	V
Gate-Source Voltage		V_{GS}	± 30	
Continuous Drain Current (T_J = 150 °C)[a]	T_C = 25 °C	I_D	12	A
	T_C = 100 °C		7.7	
Pulsed Drain Current[b]		I_{DM}	48	
Single Avalanche Energy		E_{AS}	600	mJ
Maximum Power Dissipation[c]	T_C = 25 °C	P_D	126	W
	T_C = 100 °C		50.5	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to+150	°C

THERMAL RESISTANCE RATINGS			
PARAMETER	**SYMBOL**	**LIMIT**	**UNIT**
Junction-to-Ambient (PCB Mount)[d]	R_{thJA}	62.5	°C/W
Junction-to-Case (Drain)	R_{thJC}	0.99	

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_J = 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	650	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	2.0	-	4.0	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 30 V	-	-	± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 650 V, V_{GS} = 0 V	-	-	1	µA
		V_{DS} = 520 V, V_{GS} = 0 V, T_J = 125 °C	-	-	10	
On-State Drain Current [a]	$I_{D(on)}$	V_{DS} ≥ 5 V, V_{GS} = 10 V	12	-	-	A
Drain-Source On-State Resistance [a]	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 5.0 A	-	700	900	mΩ
Forward Transconductance [a]	g_{fs}	V_{DS} = 15 V, I_D = 5.0 A	-	12.8	-	S
Dynamic [b]						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	-	1700	-	pF
Output Capacitance	C_{oss}		-	178	-	
Reverse Transfer Capacitance	C_{rss}		-	8	-	
Total Gate Charge [c]	Q_g	V_{DS} = 520 V, V_{GS} = 10 V, I_D = 10 A	-	37.2	-	nC
Gate-Source Charge [c]	Q_{gs}		-	7.6	-	
Gate-Drain Charge [c]	Q_{gd}		-	12.2	-	
Gate Resistance	R_g	f = 1 MHz	-	5.4	-	Ω
Turn-On Delay Time [c]	$t_{d(on)}$	V_{DD} = 325 V, I_D = 10 A, R_g = 25Ω	-	18	-	ns
Rise Time [c]	t_r		-	36	-	
Turn-Off Delay Time [c]	$t_{d(off)}$		-	50	-	
Fall Time [c]	t_f		-	30	-	
Drain-Source Body Diode Ratings and Characteristics [b] (T_J = 25 °C)						
Continuous Source-Drain Diode Current	I_S	T_C = 25 °C	-	-	12	A
Pulsed Current	I_{SM}		-	-	48	A
Forward Voltage [a]	V_{SD}	I_F = 10 A, V_{GS} = 0 V	-	-	1.4	V
Reverse Recovery Time	t_{rr}	I_F = 10 A, di/dt = 100 A/µs	-	420	-	ns
Reverse Recovery Charge	Q_{rr}		-	4.2	-	µC

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 CHARAC TERISTICS (25 °C, unless otherwise noted)

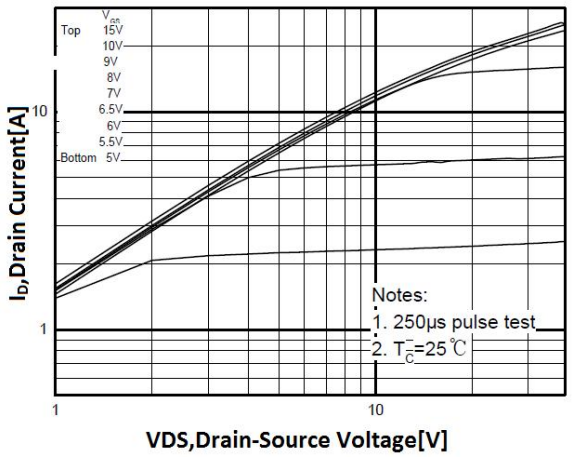


Fig1 Typical Output Characteristics, Tc=25°C

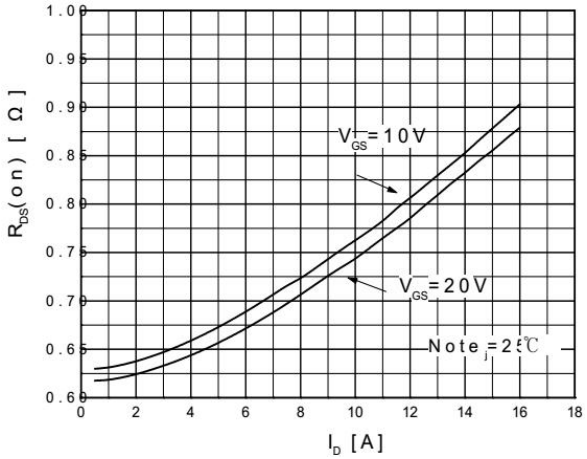


Fig2 On-Resistance Vs.Drain Current and Gate Voltage

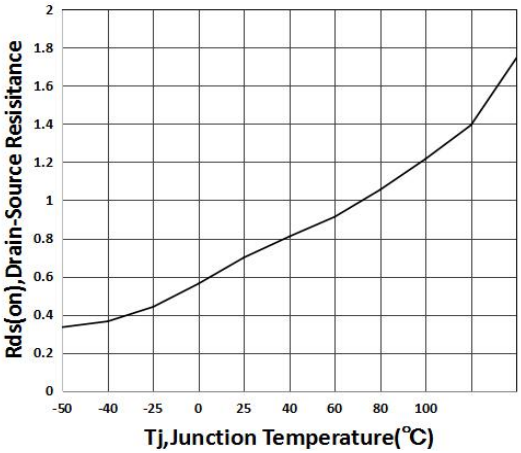


Fig3 On-Resistance Vs.Temperature

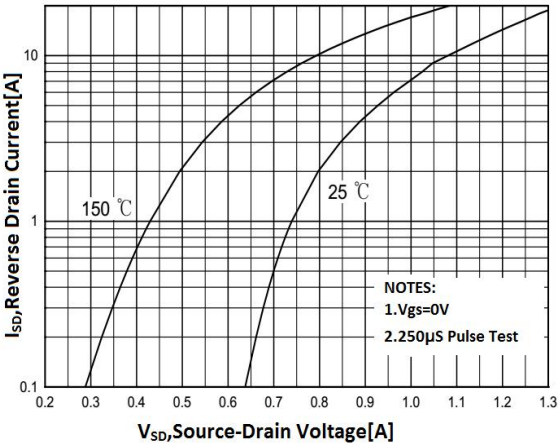


Fig4 Typical Source-Drain Diode Forward Voltage

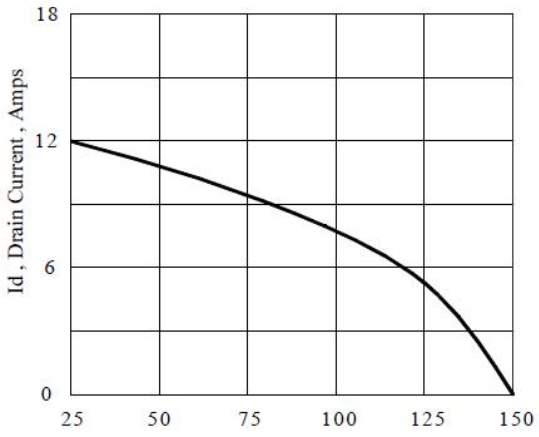


Fig5 Maximum Drain Current Vs.Case Temperature

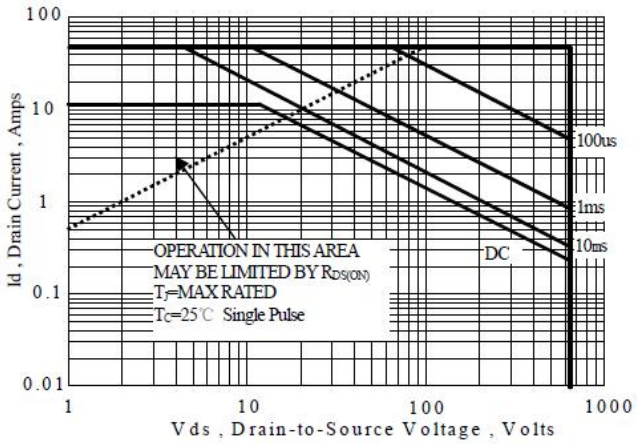
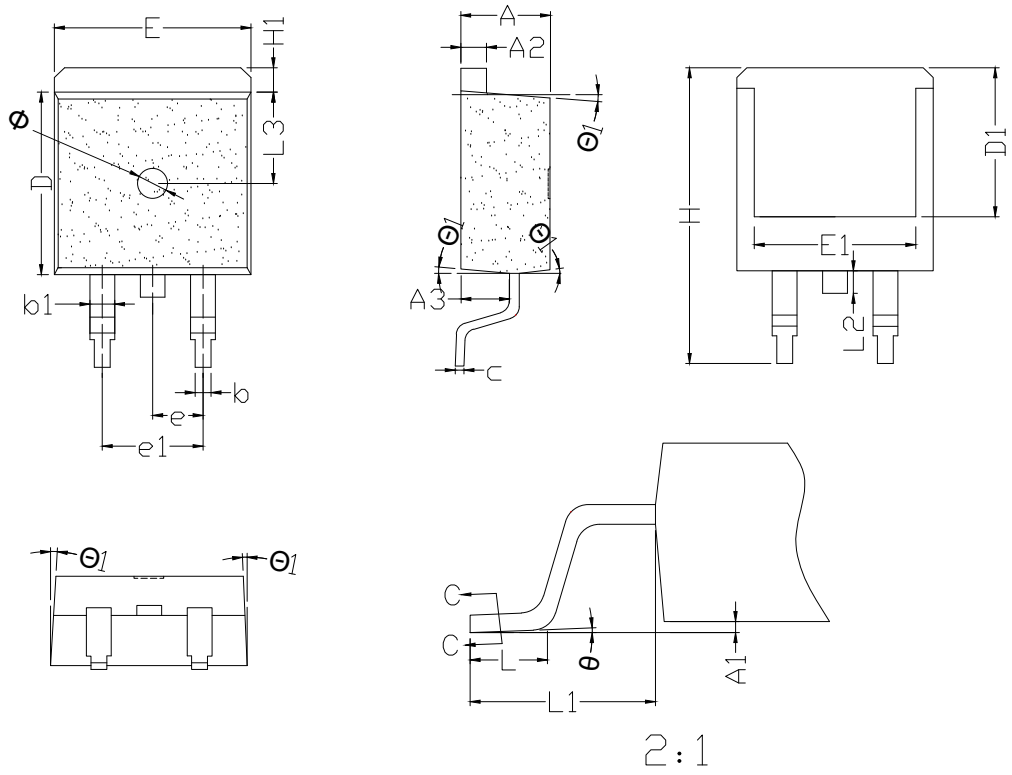


Fig6 Maximum Safe Operating Area

TO-263 PACKAGE OUTLINE



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	TYP	MAX	SYMBOL	MIN	TYP	MAX
A	4.10	4.50	4.80	e	2.35	2.54	2.75
A1	0.00	0.10	0.30	e1		5.08REF	
A2	1.10	1.30	1.50	H	14.50	15.15	16.00
A3	2.15	2.50	3.10	H1	1.00	1.28	1.75
b	0.60	0.80	1.05	L	1.80	2.23	2.90
b1	1.05	1.33	1.50	L1	4.30	4.75	5.50
c	0.33	0.50	0.66	L2	1.00	1.30	1.85
D	8.40	9.20	9.60	L3	0.90	4.65	9.00
D1		7.50REF		ϕ	0°	2°	5°
E	9.60	10.02	10.80	ϕ1	2°	-	7°
E1	7.60	9.88	10.30	Φ		1.5BSC	

Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION ORDESIGN OR OTHERWISE.

Din-Tek Intertechnology, Inc., its affiliates, agents, and employee s, and all persons acting on it s or their behalf (collectively, "Din-Tek"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any o ther disclosure relating to any product.

Din-Tek makes no warranty, represe ntation or guarantee regarding the suitabilit y of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Din-Tek disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation specia l, consequential or incidental damages, and (iii) any and all implied warranties, including warra nties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain type s of applications are based on Din-Tek's knowledge of typical requirements that are often placed on Din-Tek products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsib ility to validate that a particu lar product with the properties descri bed in the product specification is suitable fo r use in a particular application. Parameters provided in datasheets and/or specification s may vary in different applications an d performance may vary over time. All operating parameters, including typical pa rameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Din-Tek's terms and condit ions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicate d in writing, Din-Tek products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Din-Tek product could result in personal injury or death. Customers using or selling Din-Tek products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Din-Tek personnel to ob tain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual prope rty rights is granted by this document or by any conduct of Din-Tek. Product names and markings noted herein may be trad emarks of their respective owners.

Material Category Policy

Din-Tek Intertechnology, Inc. hereby certifies that all its products that are id entified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The Euro pean Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.

Please note that some Din-Tek documentation may still make reference to RoHS Directive 2002/95/ EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.

Din-Tek Intertechnology, Inc. hereby certifies that all its products that are identified as Ha logen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Din-Tek documentation may still make reference to the IEC 61249-2-21 definition. We co nfirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.