N-Channel 100 V (D-S) Super Junction Power MOSFET

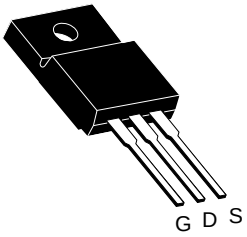
PRODUCT SUMMARY		
V_{DS} (V)	$R_{DS(on)}$ (mΩ)(Typ.)	I_D (A)(Max.)
100	7.8 at V_{GS} = 10 V	70[a]

FEATURES

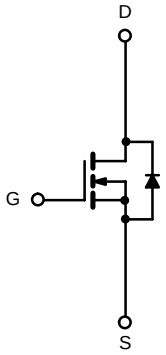
- Super Junction MOSFET
- New Package with Low Thermal Resistance
- 100 % R_g Tested

RoHS COMPLIANT

TO-220 FULLPAK



Top View



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS T_C = 25 °C, unless otherwise noted				
Parameter		**Symbol**	**Limit**	**Unit**
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current (T_J = 175 °C)	T_C = 25 °C	I_D	70[a]	A
	T_C = 125 °C		51[a]	
Pulsed Drain Current		I_{DM}	225	
Avalanche Current		I_{AR}	55	
Repetitive Avalanche Energy[b]	L = 0.1 mH	E_{AR}	160	mJ
Maximum Power Dissipation[b]	T_C = 25 °C	P_D	78[c]	W
	T_A = 25 °C		2.15	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 175	°C

THERMAL RESISTANCE RATINGS				
Parameter		**Symbol**	**Limit**	**Unit**
Junction-to-Ambient	PCB Mount (TO-263)[d]	R_{thJA}	55	°C/W
Junction-to-Case (Drain)		R_{thJC}	4	

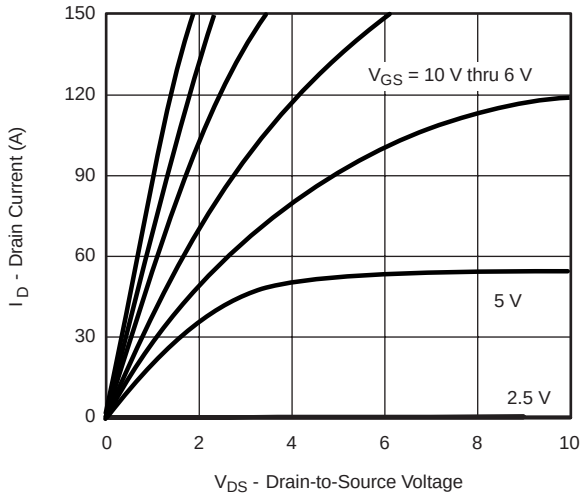
Notes:
a. Package limited.
b. Duty cycle ≤ 1 %.
c. See SOA curve for voltage derating.
d. When mounted on 1" square PCB (FR-4 material).

SPECIFICATIONS T_J = 25 °C, unless otherwise noted						
Parameter	**Symbol**	**Test Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{DS} = 0 V, I_D = 250 µA	100			V
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	2		4	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 100 V, V_{GS} = 0 V			1	µA
		V_{DS} = 100 V, V_{GS} = 0 V, T_J = 125 °C			50	
		V_{DS} = 100 V, V_{GS} = 0 V, T_J = 175 °C			250	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} ≥ 5 V, V_{GS} = 10 V	120			A
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 30 A		7.8	8.5	mΩ
		V_{GS} = 10 V, I_D = 30 A, T_J = 125 °C		9	13	
		V_{GS} = 10 V, I_D = 30 A, T_J = 175 °C		14	20	
Forward Transconductance[a]	g_{fs}	V_{DS} = 15 V, I_D = 30 A	25			S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		3300		pF
Output Capacitance	C_{oss}			350		
Reverse Transfer Capacitance	C_{rss}			22		
Total Gate Charge[c]	Q_g	V_{DS} = 50 V, V_{GS} = 10 V, I_D = 30 A		40		nC
Gate-Source Charge[c]	Q_{gs}			14		
Gate-Drain Charge[c]	Q_{gd}			6		
Gate Resistance	R_g			0.6		Ω
Turn-On Delay Time[c]	$t_{d(on)}$	V_{DD} = 50 V, R_L = 0.6 Ω I_D ≅ 30 A, V_{GEN} = 10 V, R_g = 2.5 Ω		19		ns
Rise Time[c]	t_r			12		
Turn-Off Delay Time[c]	$t_{d(off)}$			35		
Fall Time[c]	t_f			8		
Source-Drain Diode Ratings and Characteristics T_C = 25 °C[b]						
Continuous Current	I_S				70	A
Pulsed Current	I_{SM}				225	
Forward Voltage[a]	V_{SD}	I_F = 30 A, V_{GS} = 0 V		1.0	1.5	V
Reverse Recovery Time	t_{rr}	I_F = 30 A, dI/dt = 100 A/µs		40		ns
Peak Reverse Recovery Charge	$I_{RM(REC)}$			5.5		A
Reverse Recovery Charge	Q_{rr}			190		nC

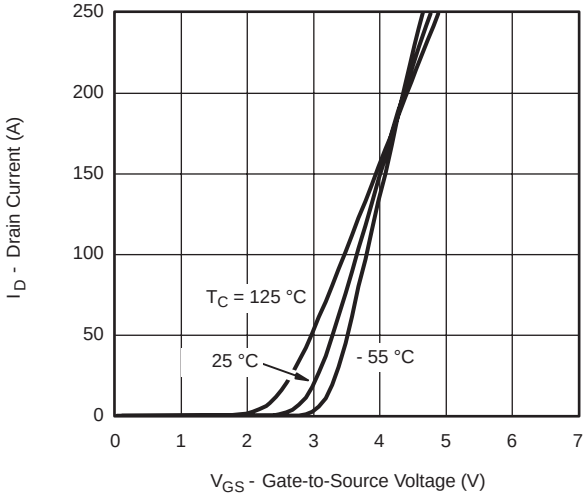
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

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.

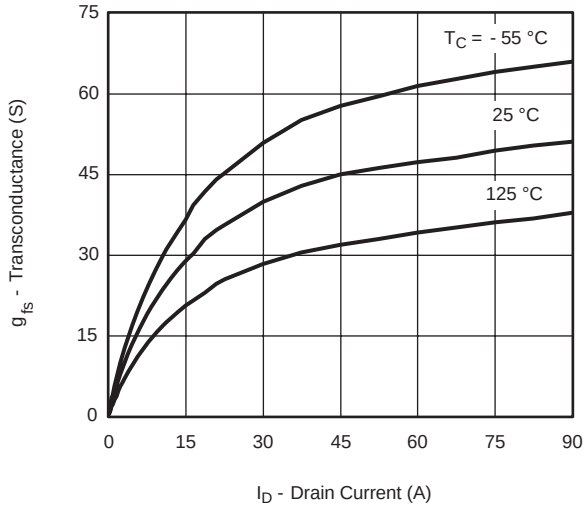
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



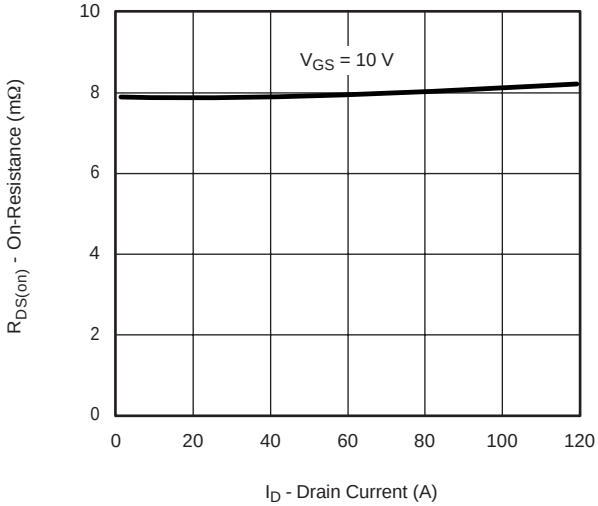
Output Characteristics



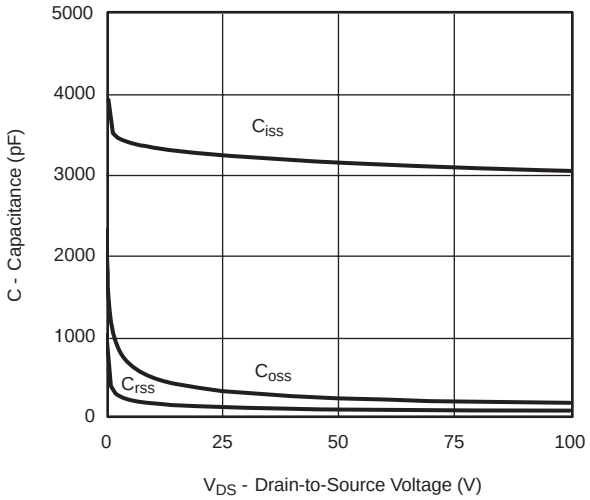
Transfer Characteristics



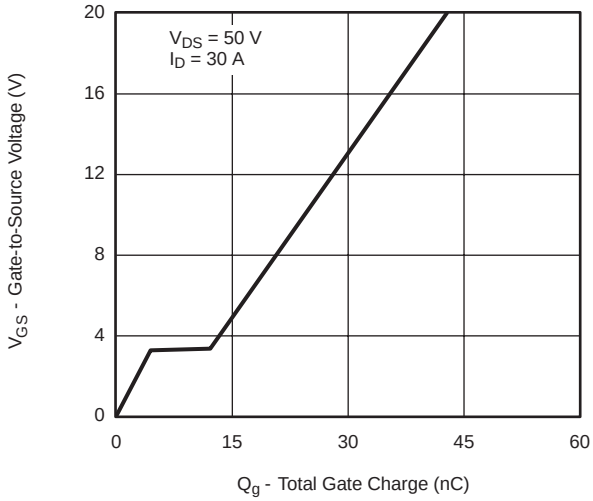
Transconductance



On-Resistance vs. Drain Current

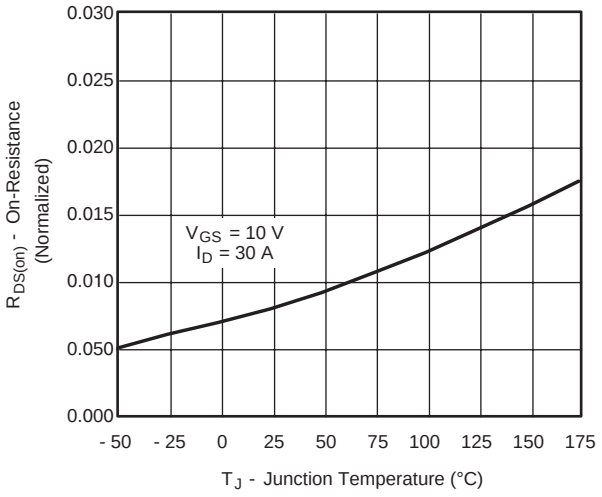


Capacitance

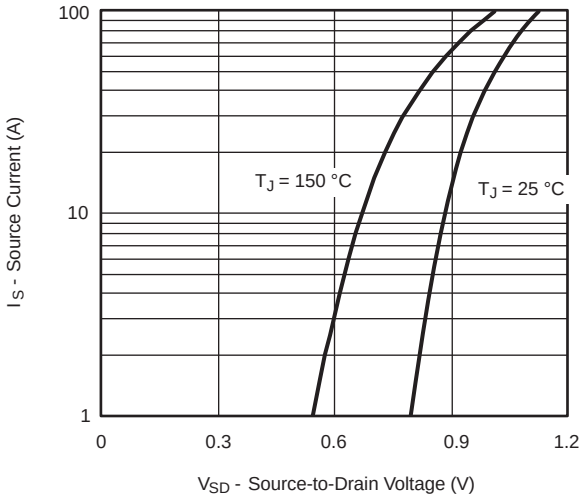


Gate Charge

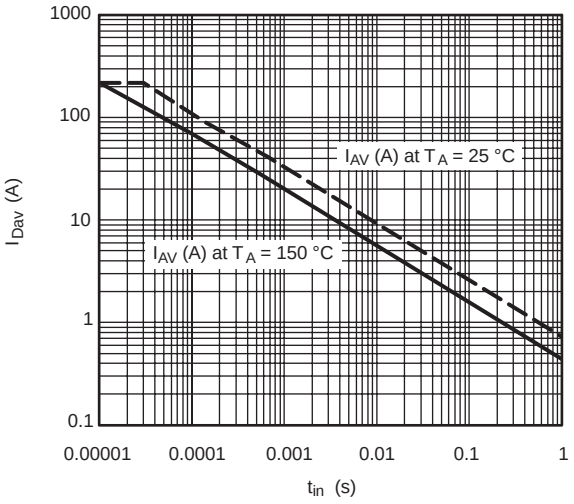
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



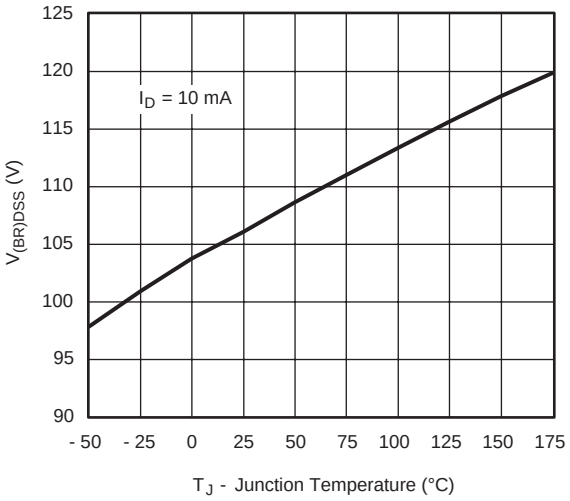
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage

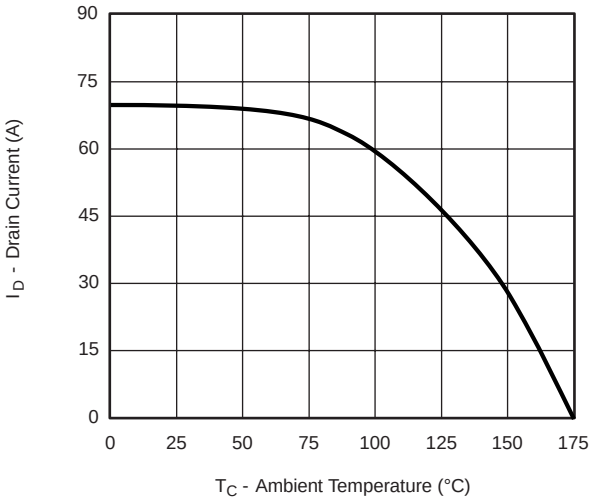


Avalanche Current vs. Time

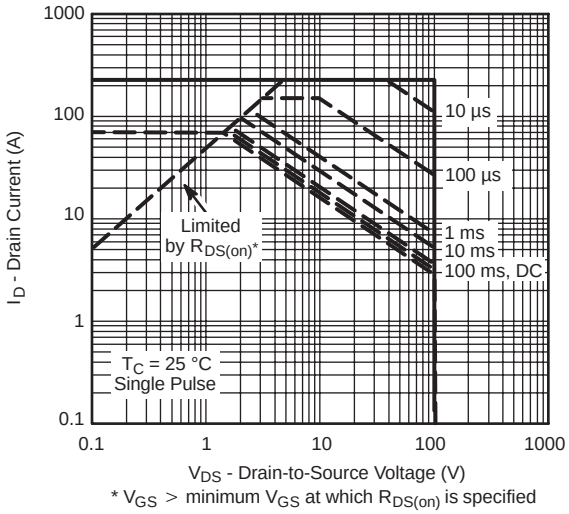


Drain Source Breakdown vs. Junction Temperature

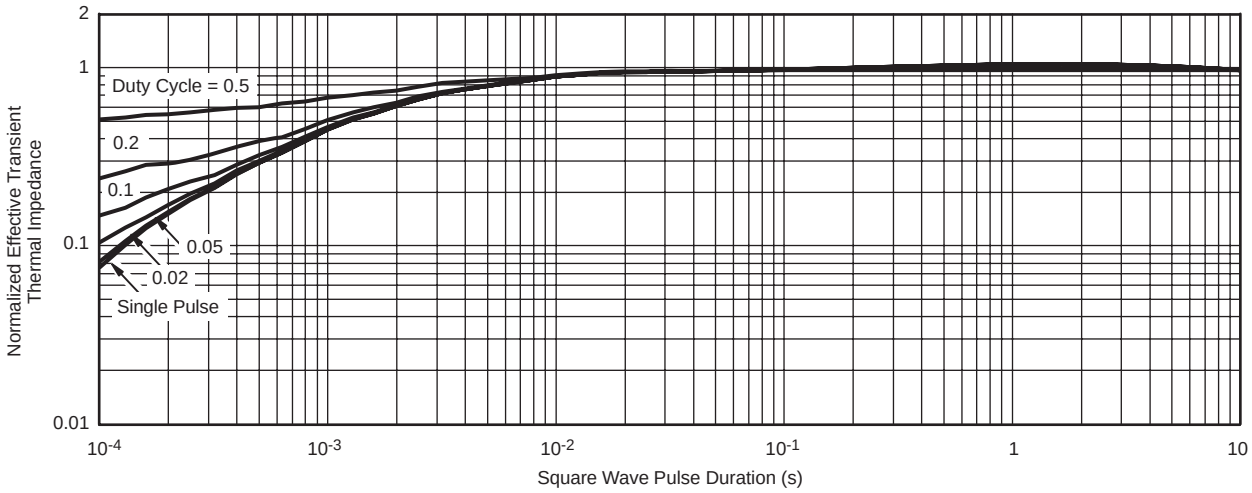
THERMAL RATINGS



Maximum Avalanche and Drain Current vs. Case Temperature

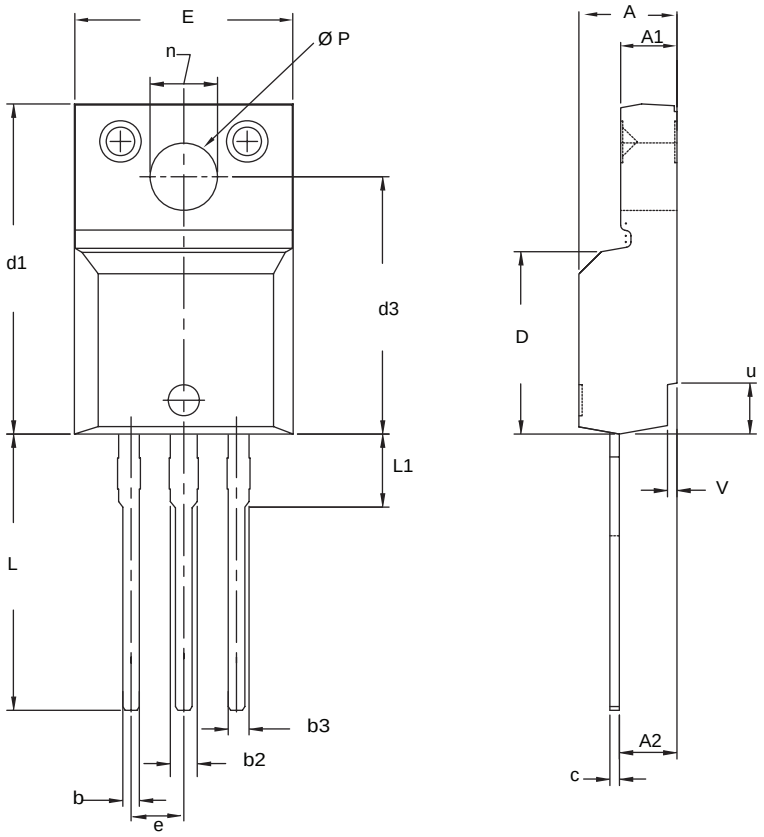


Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

TO-220 FULLPAK (HIGH VOLTAGE)



	MILLIMETERS	
DIM.	**MIN.**	**MAX.**
A	4.270	4.830
A1	2.450	2.830
A2	2.510	2.850
b	0.622	0.890
b2	1.229	1.450
b3	1.229	1.400
c	0.440	0.629
D	8.650	9.800
d1	15.68	16.220
d3	12.300	12.920
E	9.360	10.630
e	2.54 BSC	
L	12.200	13.730
L1	3.100	3.500
n	6.050	6.150
Ø P	3.050	3.450
u	2.400	2.500
v	0.400	0.500

Notes

1. To be used only for process drawing.
2. These dimensions apply to all TO-220, FULLPAK leadframe versions 3 leads.
3. All critical dimensions should C meet $C_{pk} > 1.33$.
4. All dimensions include burrs and plating thickness.
5. No chipping or package damage.

Disclaimer

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

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

Din-Tek makes no warranty, representation or guarantee regarding the suitability 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 special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types 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 responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, 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 conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated 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 obtain written terms and conditions regarding products designed for such applications.

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

Material Category Policy

Din-Tek Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European 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 Halogen-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 confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.