N-Channel 650-V (D-S) MOSFET

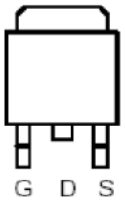
Key Features:
- Low $r_{DS(on)}$ technology
- Low thermal impedance
- Fast switching speed

Typical Applications:
- Power Supplies
- Motor Drives
- Consumer Electronics

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (mΩ)	I_D (A)
650	380 @ V_{GS} = 10V	23

Pb-free
RoHS COMPLIANT
HALOGEN FREE

TO-263



Top View

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)				
Parameter		**Symbol**	**Limit**	**Units**
Drain-Source Voltage		V_{DS}	650	V
Gate-Source Voltage		V_{GS}	±30	
Continuous Drain Current [a]	T_C=25°C	I_D	23	A
Pulsed Drain Current [b]		I_{DM}	100	
Continuous Source Current (Diode Conduction) [a]	T_C=25°C	I_S	23	A
Power Dissipation [a]	T_C=25°C	P_D	300	W
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 175	°C

THERMAL RESISTANCE RATINGS			
Parameter	**Symbol**	**Maximum**	**Units**
Maximum Junction-to-Ambient [c]	$R_{\theta JA}$	62.5	°C/W
Maximum Junction-to-Case	$R_{\theta JC}$	0.5	

Notes
a. Package Limited
b. Pulse width limited by maximum junction temperature
c. Surface Mounted on 1” x 1” FR4 Board.

Electrical Characteristics

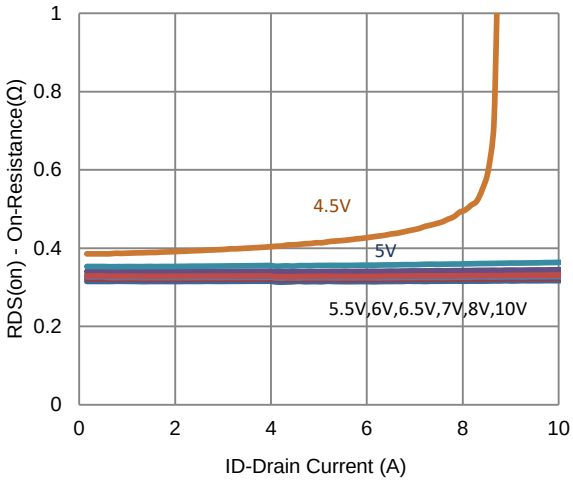
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 uA	1			V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±30 V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 520 V, V_{GS} = 0 V			1	uA
		V_{DS} = 520 V, V_{GS} = 0 V, T_J = 55°C			10	
On-State Drain Current [a]	$I_{D(on)}$	V_{DS} = 5 V, V_{GS} = 10 V	35			A
Drain-Source On-Resistance [a]	$r_{DS(on)}$	V_{GS} = 10 V, I_D = 10 A			380	mΩ
Forward Transconductance [a]	g_{fs}	V_{DS} = 50 V, I_D = 10 A		12		S
Diode Forward Voltage [a]	V_{SD}	I_S = 15 A, V_{GS} = 0 V		1		V
Dynamic [b]						
Total Gate Charge	Q_g	V_{DS} = 325 V, V_{GS} = 10 V, I_D = 10 A		20		nC
Gate-Source Charge	Q_{gs}			4.7		
Gate-Drain Charge	Q_{gd}			7.7		
Turn-On Delay Time	$t_{d(on)}$	V_{DS} = 325 V, R_L = 32.5 Ω, I_D = 10 A, V_{GEN} = 10 V, R_{GEN} = 6 Ω		10		ns
Rise Time	t_r			12		
Turn-Off Delay Time	$t_{d(off)}$			96		
Fall Time	t_f			57		
Input Capacitance	C_{iss}	V_{DS} = 50, V_{GS} = 0 V, f = 1 Mhz		734		pF
Output Capacitance	C_{oss}			121		
Reverse Transfer Capacitance	C_{rss}			12		

Notes

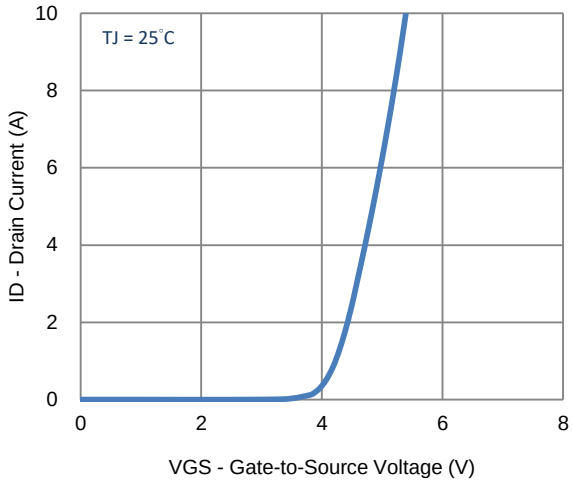
a. Pulse test: PW <= 300us duty cycle <= 2%.

b. Guaranteed by design, not subject to production testing.

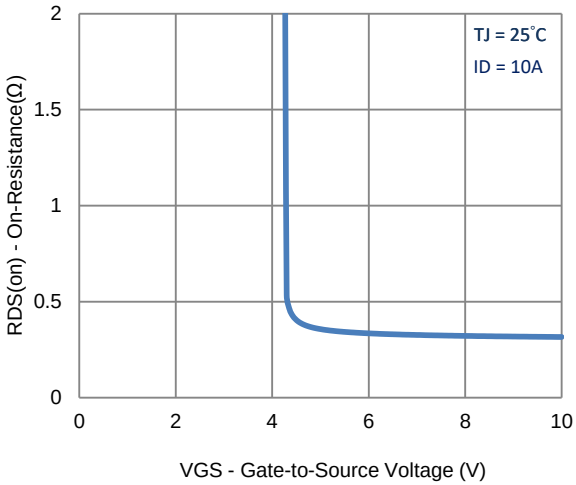
Typical Electrical Characteristics



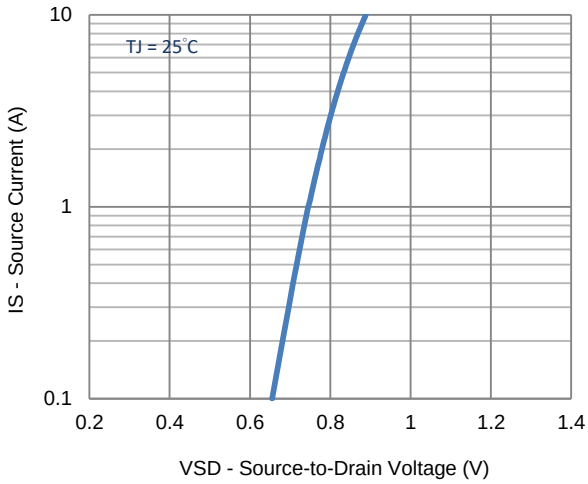
1. On-Resistance vs. Drain Current



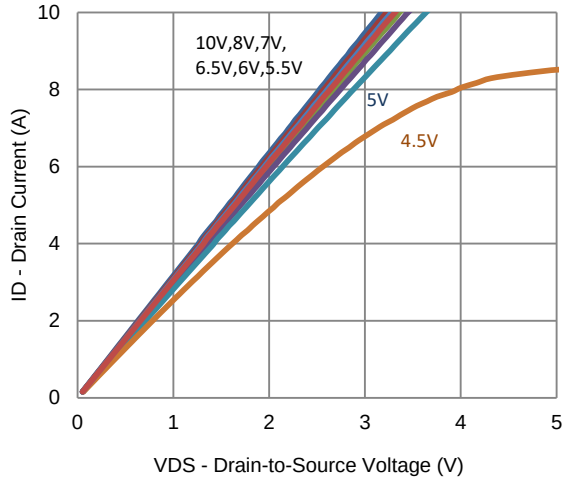
2. Transfer Characteristics



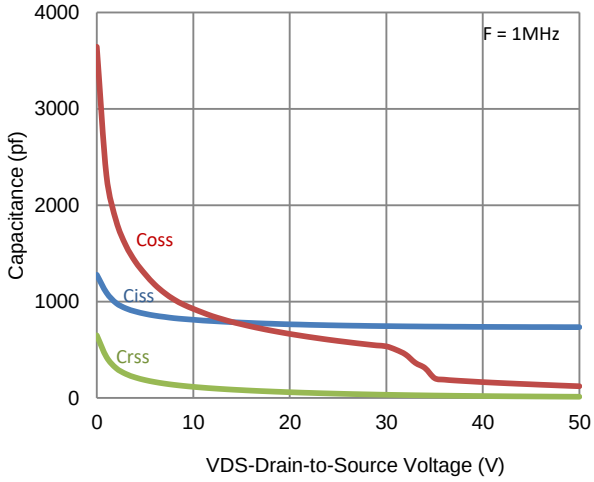
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

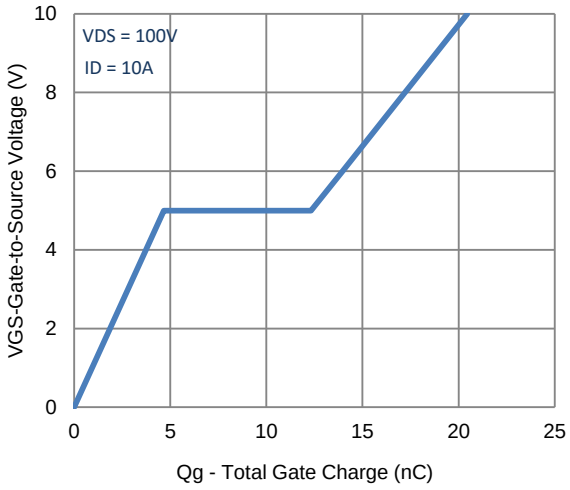


5. Output Characteristics

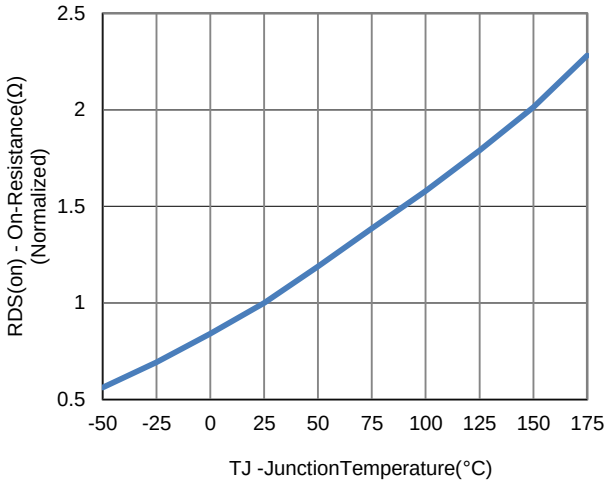


6. Capacitance

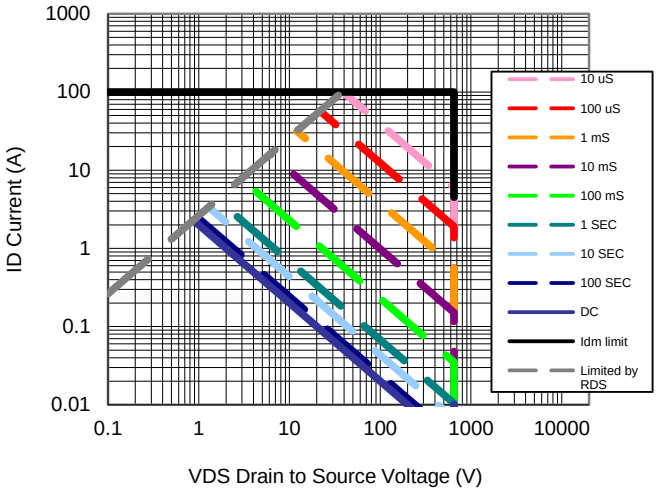
Typical Electrical Characteristics



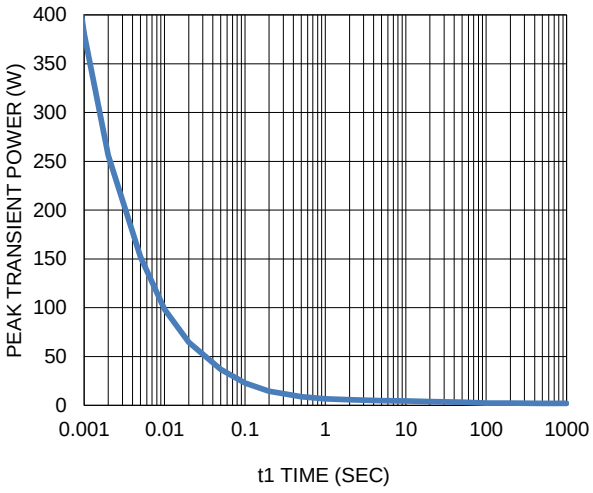
7. Gate Charge



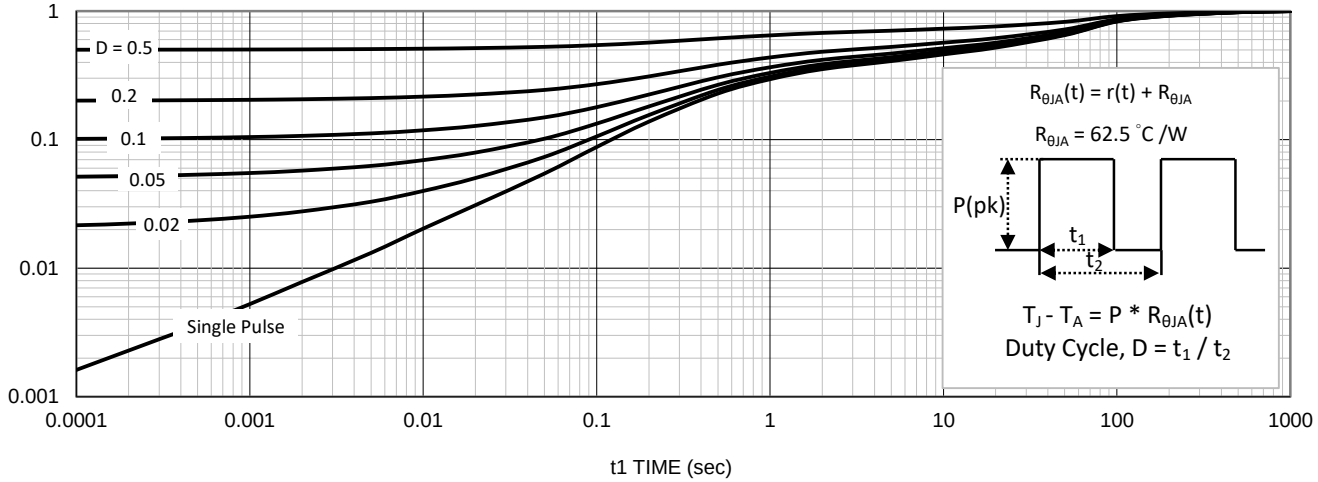
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area

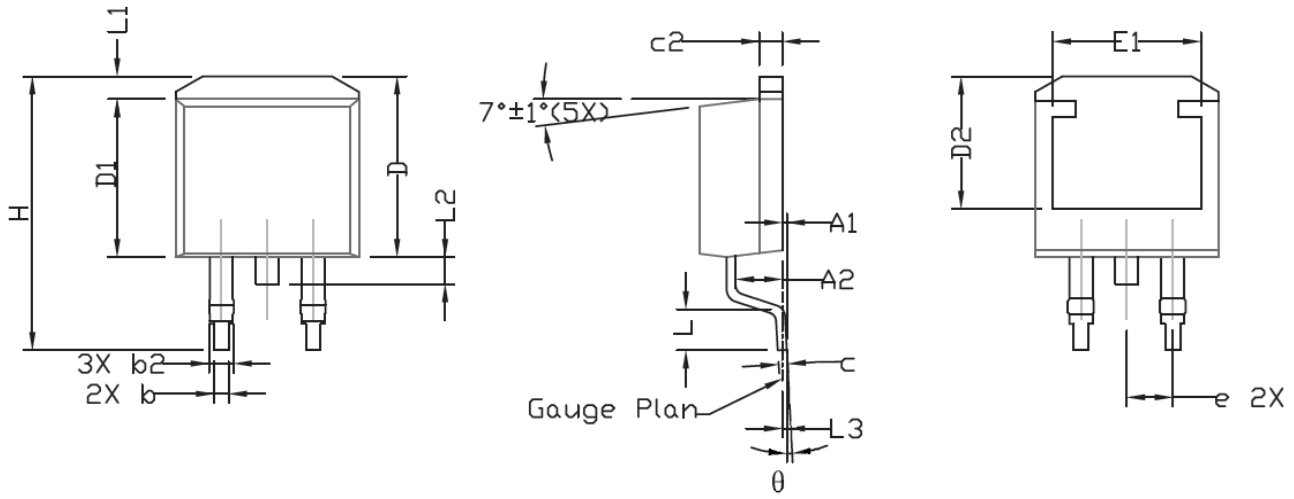


10. Single Pulse Maximum Power Dissipation



11. Normalized Thermal Transient Junction to Ambient

Package Information



SYMBOL	DIMENSIONAL REQMTS			INCHES REQMTS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.30	4.57	4.72	0.169	0.180	0.186
A1	0	---	0.25	0	---	0.010
A2	2.47	2.57	2.67	0.097	0.101	0.105
b	0.69	0.813	0.94	0.027	0.032	0.037
b2	1.17	1.27	1.45	0.046	0.050	0.057
c	0.48	0.50	0.60	0.019	0.020	0.024
c2	1.17	1.27	1.37	0.046	0.050	0.054
D	9.80	10.05	10.30	0.386	0.396	0.406
D1	8.64	8.78	9.65	0.340	0.346	0.380
D2	7.12	7.37	7.62	0.280	0.290	0.300
E	9.70	10.15	10.54	0.382	0.400	0.415
E1	8.00	8.20	8.40	0.315	0.323	0.331
e	2.54 BSC			0.100 BSC		
H	14.99	15.24	15.49	0.590	0.600	0.610
L	1.78	2.29	2.79	0.070	0.090	0.110
L1	1.02	1.27	1.52	0.040	0.050	0.060
L2	---	---	1.75	---	---	0.069
L3	---	0.254	---	---	0.010	---
θ	0°	---	8°	0°	---	8°