Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	-12	V
Gate-Source Voltage			V_{GSS}	±8	V
Continuous Drain Current (Note 6) V_{GS} = -4.5V	Steady State	T_A = +25°C T_A = +70°C	I_D	-9.1 -7.2	A
	t<5s	T_A = +25°C T_A = +70°C	I_D	-11.2 -9.0	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I_{DM}	-90	A
Continuous Source-Drain Diode Current		T_A = +25°C T_C = +25°C	I_S	-2.5 -7.1	A
Pulsed Source-Drain Diode Current (10µs Pulse, Duty Cycle = 1%)			I_{SM}	-50	A

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T_A = +25°C	P_D	0.66	W
	T_A = +70°C		0.42	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	189	°C/W
	t<5s		123	
Total Power Dissipation (Note 6)	T_A = +25°C	P_D	2.03	W
	T_A = +70°C		1.3	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	61	°C/W
	t<5s		40	
Thermal Resistance, Junction to Case (Note 6)	Steady State	$R_{\theta JC}$	9.3	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Notes: 5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal vias to bottom layer 1-inch square copper plate.

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	-12	—	—	V	V_{GS} = 0V, I_D = -250µA
Zero Gate Voltage Drain Current (T_J = +25°C)	I_{DSS}	—	—	-200	nA	V_{DS} = -12V, V_{GS} = 0V
Zero Gate Voltage Drain Current (T_J = +55°C) (Note 8)	I_{DSS}	—	—	-2	µA	V_{DS} = -12V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±2	µA	V_{GS} = ±5V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	-0.35	—	-0.8	V	V_{DS} = V_{GS}, I_D = -250µA
$V_{GS(TH)}$ Temperature Coefficient	$\Delta V_{GS(TH)}/\Delta T_J$	—	2.5	—	mV/°C	I_D = -250µA
On-State Drain Current	$I_{D(ON)}$	-10	—	—	A	V_{GS} = -4.5V, V_{DS} < -5A
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	12	16	mΩ	V_{GS} = -4.5V, I_D = -8.2A
			15	21.5		V_{GS} = -2.5V, I_D = -7.2A
			20	26		V_{GS} = -1.8V, I_D = -6.6A
			23	32		V_{GS} = -1.5V, I_D = -1A
			80	160		V_{GS} = -1.2V, I_D = -1A
Forward Transfer Admittance	$\|Y_{fs}\|$	—	12	—	S	V_{DS} = -4V, I_D = -8.2A
Diode Forward Voltage	V_{SD}	—	-0.8	-1.2	V	V_{GS} = 0V, I_S = -8A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	2,953	—	pF	V_{DS} = -4V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	756	—		
Reverse Transfer Capacitance	C_{rss}	—	678	—		
Gate Resistance	R_g	—	8.6	18	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge	Q_g	—	28.4	42.6	nC	V_{GS} = -5V, V_{DS} = -4V, I_D = -10A
Total Gate Charge	Q_g	—	25.3	38		V_{GS} = -4.5V, V_{DS} = -4V, I_D = -10A
Gate-Source Charge	Q_{gs}	—	2.3	—		
Gate-Drain Charge	Q_{gd}	—	7.2	—		
Turn-On Delay Time	$t_{D(ON)}$	—	20	30	ns	V_{DS} = -4V, V_{GS} = -4.5V, R_G = 1Ω, R_L = 0.4Ω, I_D = -9.8A
Turn-On Rise Time	t_R	—	28	42		
Turn-Off Delay Time	$t_{D(OFF)}$	—	117	176		
Turn-Off Fall Time	t_F	—	93	139		
BODY DIODE CHARACTERISTICS						
Diode Forward Voltage	V_{SD}	—	-0.8	-1.2	V	V_{GS} = 0V, I_S = -9.8A
Continuous Source-Drain Diode Current (Note 6)	I_S	—	—	-2.5	A	T_A = +25°C
		—	—	-7.1		T_C = +25°C
Pulse Diode Forward Current (Note 8)	I_{SM}	—	—	-50		—
Body Diode Reverse Recovery Time (Note 8)	t_{RR}	—	28	56	ns	I_S = -9.8A, dI/dt = 100A/µs
Reverse Recovery Fall Time	t_A	—	10	—		
Reverse Recovery Rise Time	t_B	—	18	—		
Body Diode Reverse Recovery Charge (Note 8)	Q_{RR}	—	13	26	nC	

Notes: 7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to production testing.

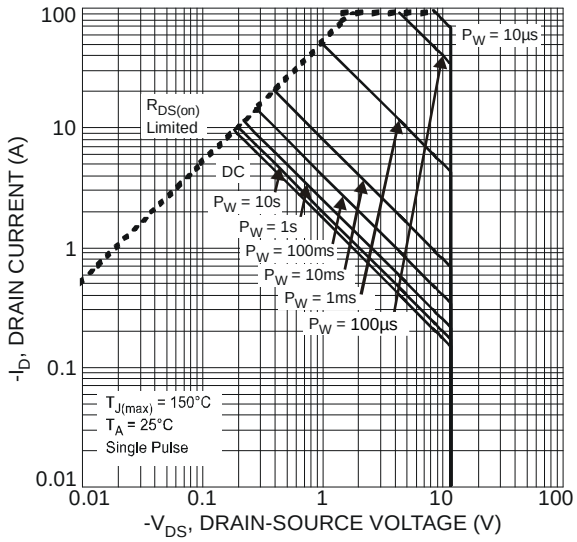

Fig. 1 SOA, Safe Operation Area

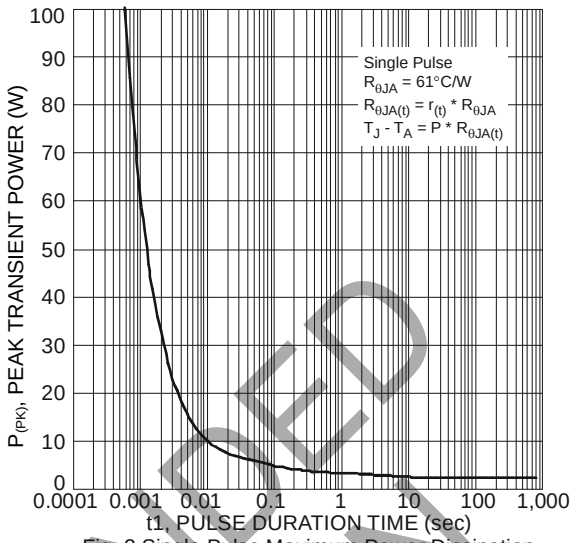

Fig. 2 Single Pulse Maximum Power Dissipation

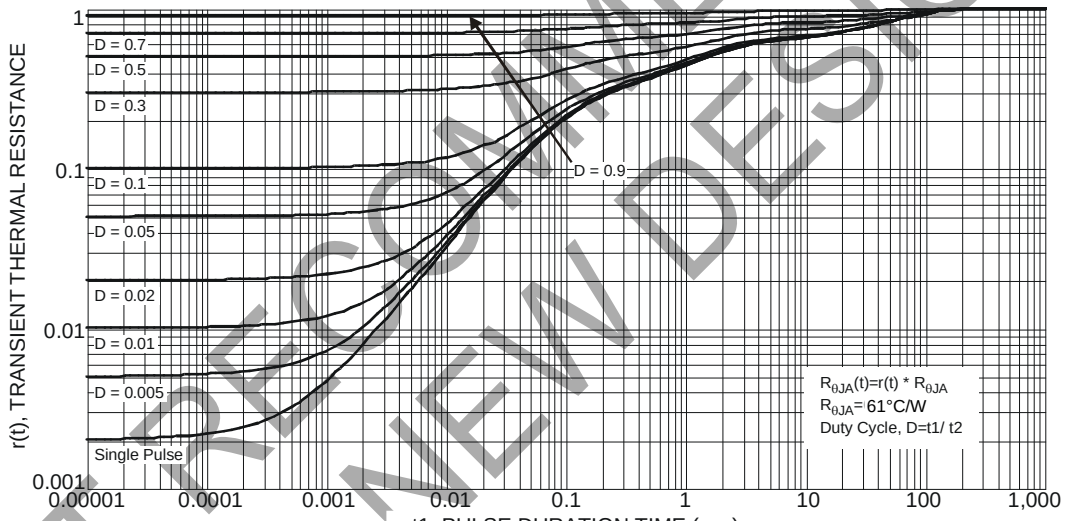

Fig. 3 Transient Thermal Resistance

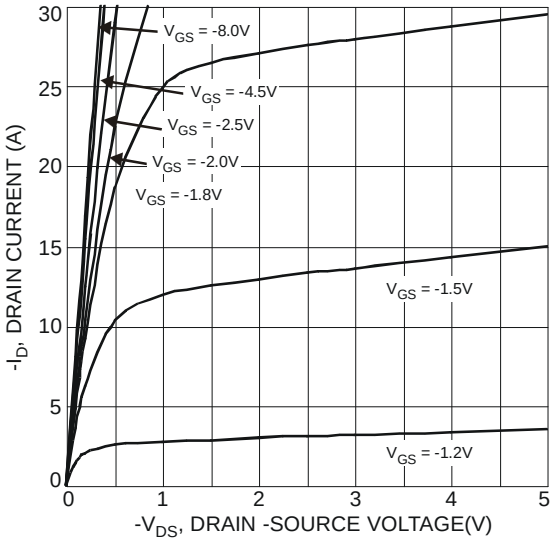

Fig. 4 Typical Output Characteristics

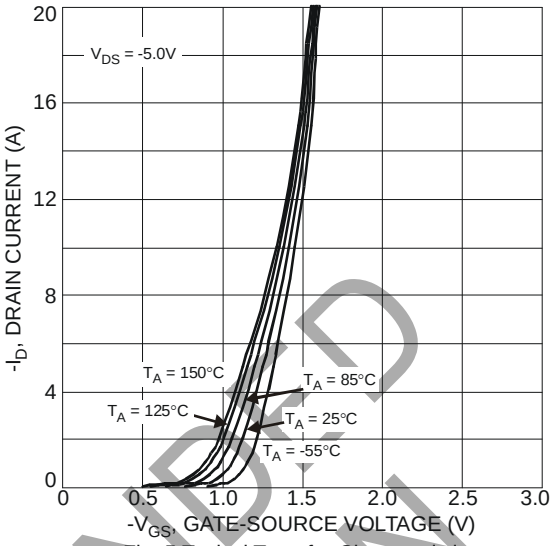

Fig. 5 Typical Transfer Characteristics

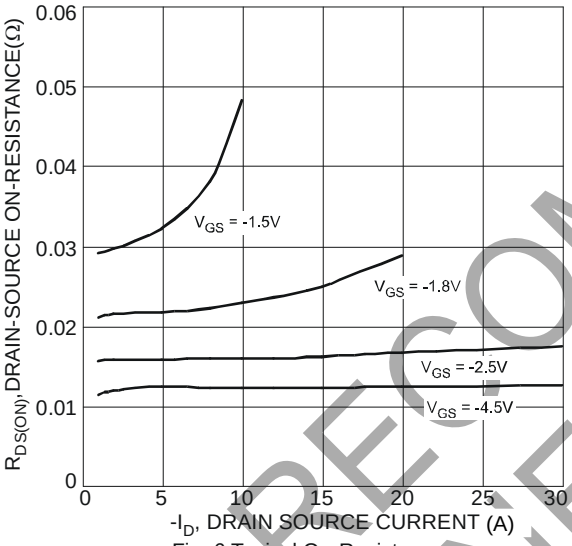

Fig. 6 Typical On-Resistance vs. Drain Current and Gate Voltage

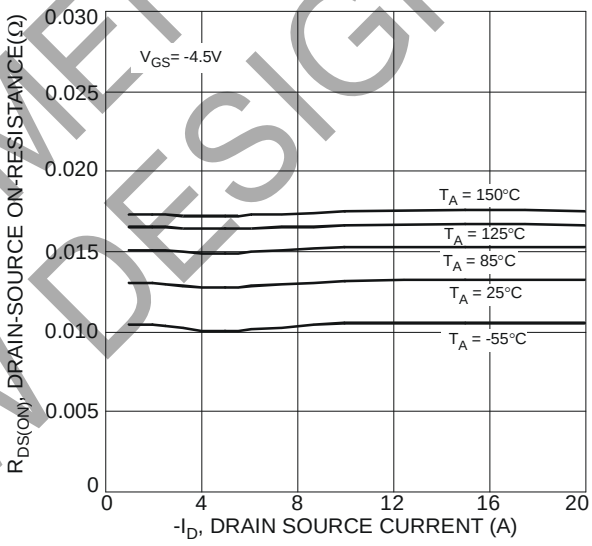

Fig. 7 Typical On-Resistance vs. Drain Current and Temperature

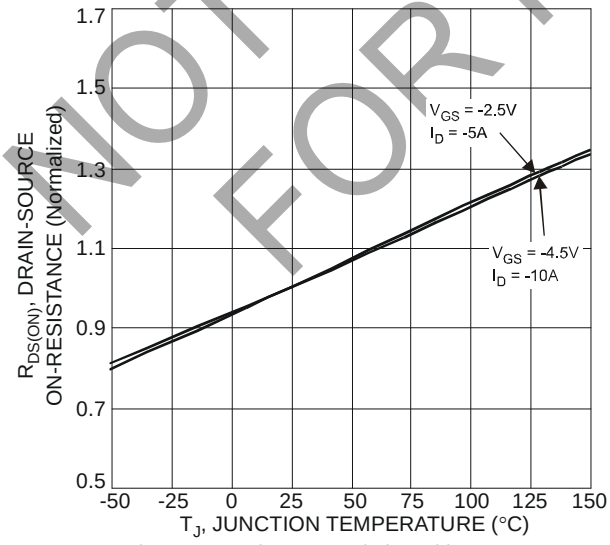

Fig. 8 On-Resistance Variation with Temperature

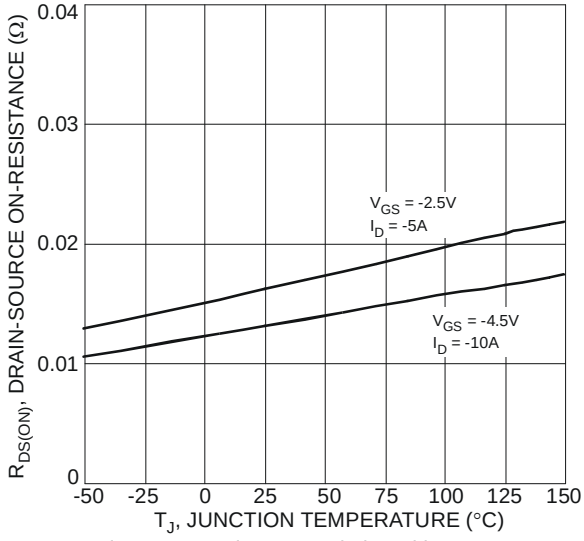

Fig. 9 On-Resistance Variation with Temperature

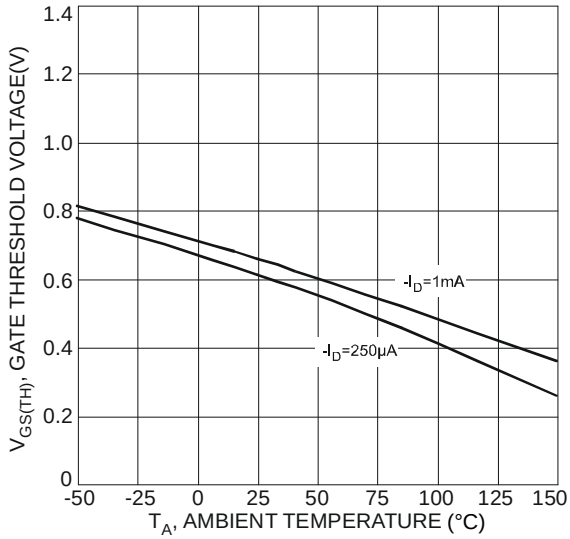

Fig. 10 Gate Threshold Variation vs. Ambient Temperature

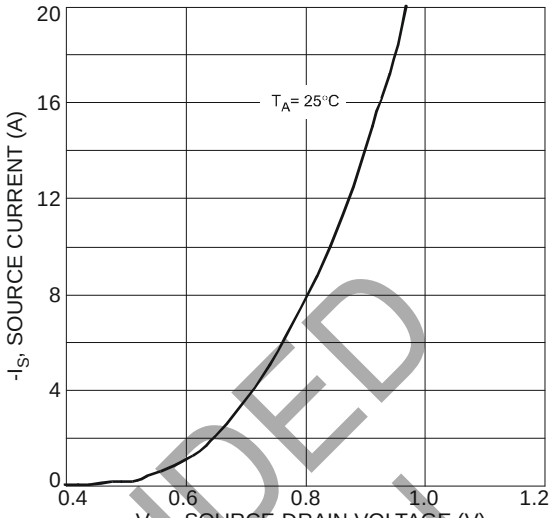

Fig. 11 Diode Forward Voltage vs. Current

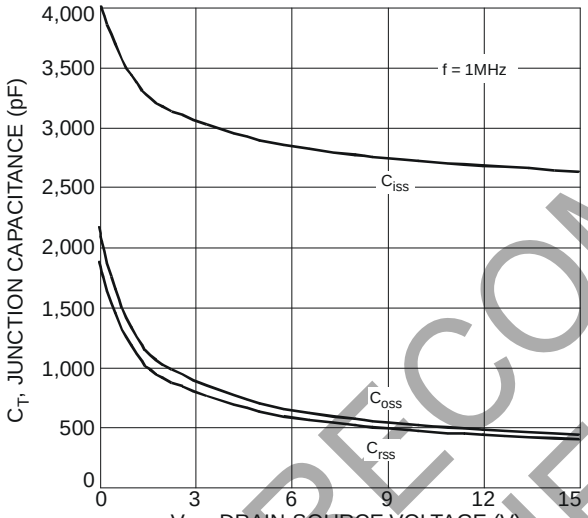

Fig. 12 Typical Junction Capacitance

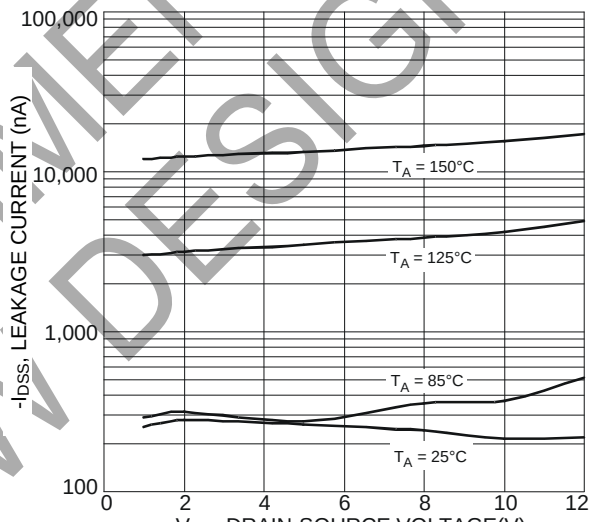

Fig. 13 Typical Drain-Source Leakage Current vs. Voltage

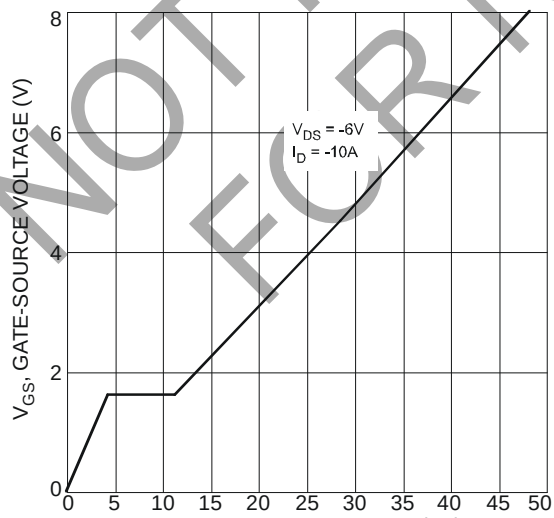

Fig. 14 Gate-Charge Characteristics

Package Outline Dimensions

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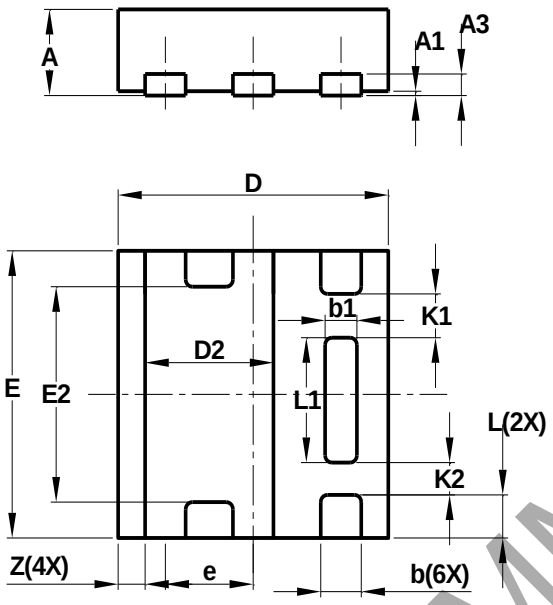
U-DFN2020-6 (Type E)



U-DFN2020-6 (Type E)			
Dim	Min	Max	Typ
A	0.57	0.63	0.60
A1	0	0.05	0.03
A3	–	–	0.15
b	0.25	0.35	0.30
b1	0.185	0.285	0.235
D	1.95	2.05	2.00
D2	0.85	1.05	0.95
E	1.95	2.05	2.00
E2	1.40	1.60	1.50
e	–	–	0.65
L	0.25	0.35	0.30
L1	0.82	0.92	0.87
K1	–	–	0.305
K2	–	–	0.225
Z	–	–	0.20
All Dimensions in mm			

Suggested Pad Layout

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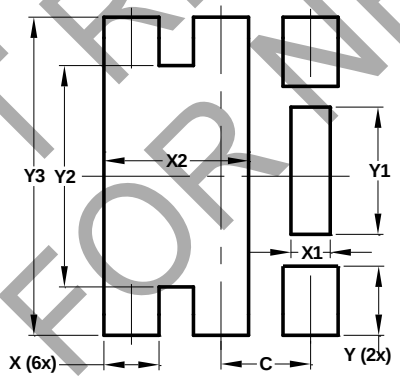
U-DFN2020-6 (Type E)



Dimensions	Value (in mm)
C	0.650
X	0.400
X1	0.285
X2	1.050
Y	0.500
Y1	0.920
Y2	1.600
Y3	2.300

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