RBE039N15R1SZPW-VB Datasheet

N-Channel 150 V (D-S) MOSFET

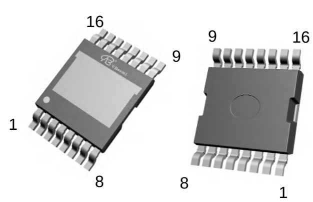
PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (Ω) MAX.	I_D (A)	Q_g (TYP.)
150	0.0062 at V_{GS} = 10 V	150	100 nC

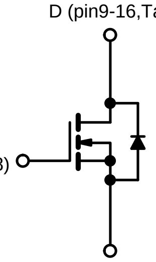
FEATURES

- SGT technology Power MOSFET
- Maximum 175°C junction temperature
- 100 % R_g and UIS tested

RoHS COMPLIANT
HALOGEN FREE

TOLT-16





N-Channel MOSFET

APPLICATIONS

- Power supplies:
  - Uninterruptible power supplies
  - AC/DC switch-mode power supplies
  - Lighting
- Synchronous rectification
- DC/DC converter
- Motor drive switch
- DC/AC inverter
- Solar micro inverter
- Class D audio amplifier

ABSOLUTE MAXIMUM RATINGS (T_C = 25 °C, unless otherwise noted)				
PARAMETER		SYMBOL	LIMIT	UNIT
Drain-Source Voltage		V_{DS}	150	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current (T_J = 150 °C)	T_C = 25 °C	I_D	150	A
	T_C = 100 °C		120	
Pulsed Drain Current (t = 100 μs)		I_{DM}	600	
Avalanche Current	L = 0.5 mH	I_{AS}	75	
Single Avalanche Energy [a]		E_{AS}	1370	mJ
Maximum Power Dissipation [a]	T_C = 25 °C	P_D	375[b]	W
	T_C = 100 °C		187.5[b]	
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) [c]	R_{thJA}	62	°C/W
Junction-to-Case (Drain)	R_{thJC}	0.4	

Notes

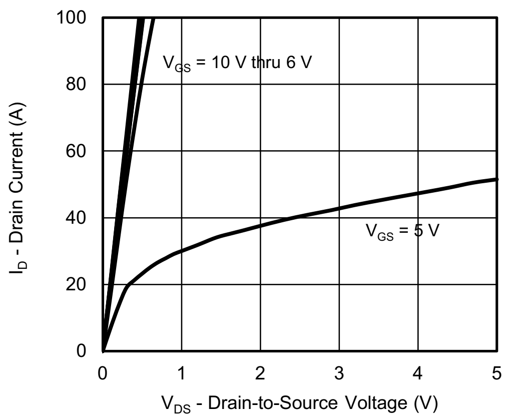
a. Duty cycle ≤ 1 %.
b. See SOA curve for voltage derating.
c. When mounted on 1" square PCB (FR4 material).

SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)						
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{GS} = 0 V, I_D = 250 µA	150	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	2	3	4	V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V	-	-	± 250	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 120 V, V_{GS} = 0 V	-	-	1	µA
		V_{DS} = 120 V, V_{GS} = 0 V, T_J = 125 °C	-	-	100	µA
		V_{DS} = 120 V, V_{GS} = 0 V, T_J = 150°C	-	-	5	mA
On-State Drain Current [a]	$I_{D(on)}$	V_{DS} ≥ 10 V, V_{GS} = 10 V	90	-	-	A
Drain-Source On-State Resistance [a]	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 60 A	-	0.0062	-	Ω
		V_{GS} = 7.5 V, I_D = 25 A	-	0.0069	-	Ω
Forward Transconductance [a]	g_{fs}	V_{DS} = 15 V, I_D = 20 A	-	60	-	S
Dynamic [b]						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 75V, f = 1 MHz	-	5500	-	pF
Output Capacitance	C_{oss}		-	846	-	pF
Reverse Transfer Capacitance	C_{rss}		-	32	-	pF
Total Gate Charge [c]	Q_g	V_{DS} = 7 5 V, V_{GS} = 10 V, I_D = 20 A	-	100	-	nC
Gate-Source Charge [c]	Q_{gs}		-	30	-	nC
Gate-Drain Charge [c]	Q_{gd}		-	25	35	nC
Gate Resistance	R_g	f = 1 MHz	-	0.9	1.2	Ω
Turn-On Delay Time [c]	$t_{d(on)}$	V_{DD} = 75 V, R_L = 1.66 Ω I_D ≅ 50 A, V_{GEN} = 10 V, R_g = 1 Ω	-	18	-	ns
Rise Time [c]	t_r		-	50	-	ns
Turn-Off Delay Time [c]	$t_{d(off)}$		-	75	-	ns
Fall Time [c]	t_f		-	55	-	ns
Drain-Source Body Diode Ratings and Characteristics [b] (T_C = 25 °C)						
Pulsed Current (t = 100 µs)	I_{SM}		-	-	100	A
Forward Voltage [a]	V_{SD}	I_F = 500 A, V_{GS} = 0 V	-	0.84	1.3	V
Reverse Recovery Time	t_{rr}	I_F = 50 A, di/dt = 100 A/µs	-	85	120	ns
Peak Reverse Recovery Charge	$I_{RM(REC)}$		-	11	20	A
Reverse Recovery Charge	Q_{rr}		-	0.8	1.0	µC

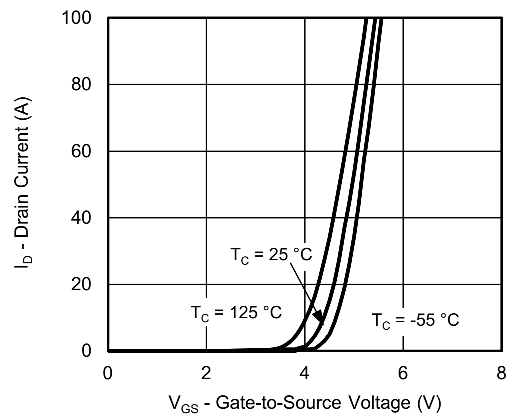
Notes

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

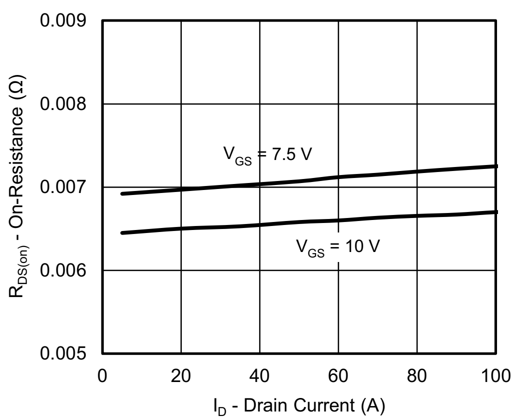
TYPICAL CHARACTERISTICS (T_C = 25 °C, unless otherwise noted)



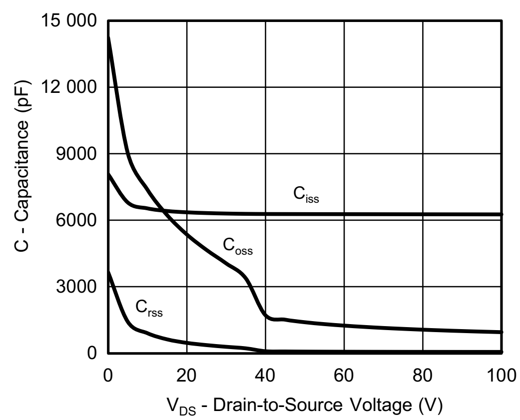
Output Characteristics



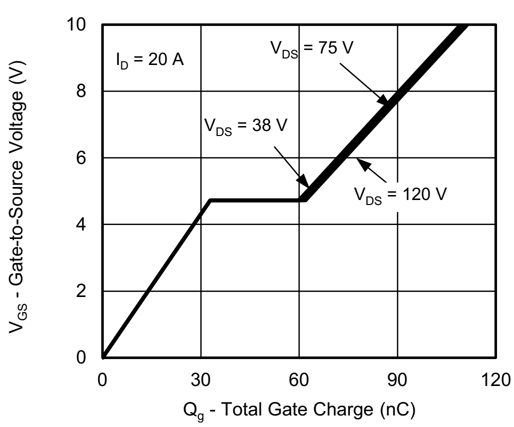
Transfer Characteristics



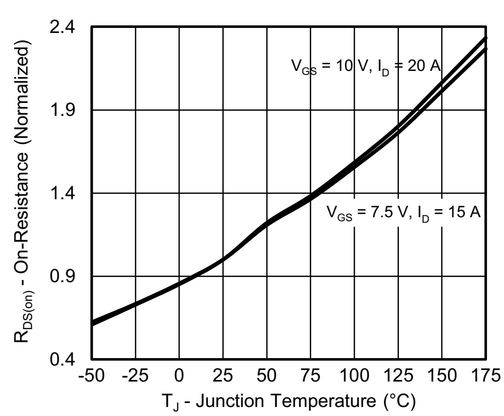
On-Resistance vs. Drain Current and Gate Voltage



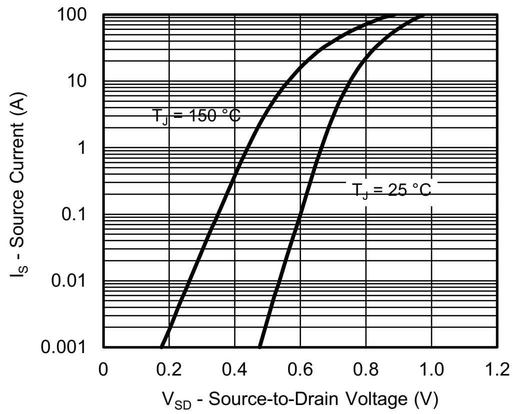
Capacitance



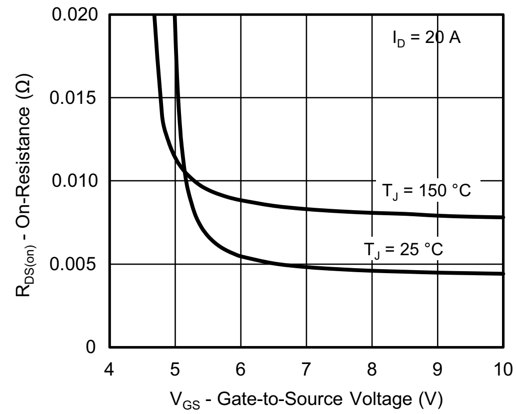
Gate Charge



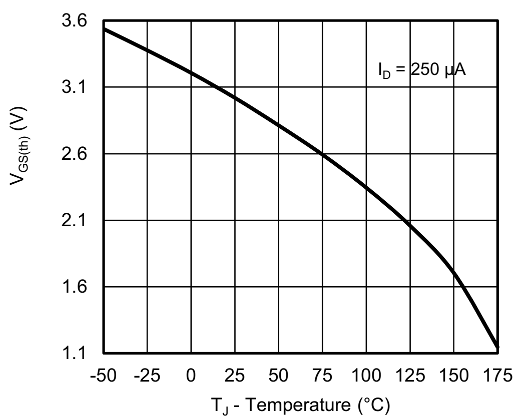
On-Resistance vs. Junction Temperature



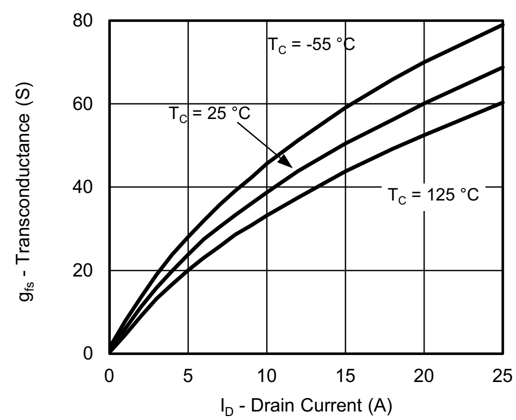
Source-Drain Diode Forward Voltage



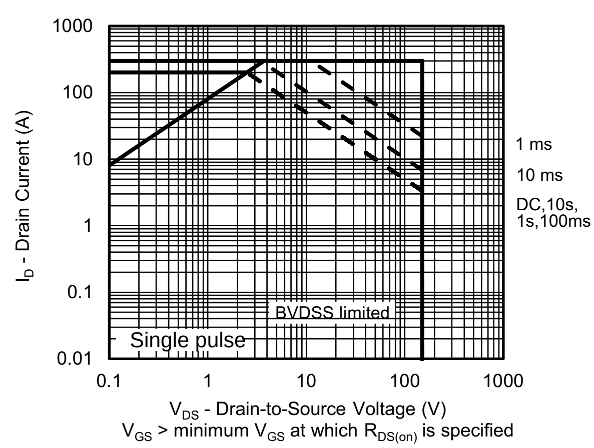
On-Resistance vs. Gate-to-Source Voltage



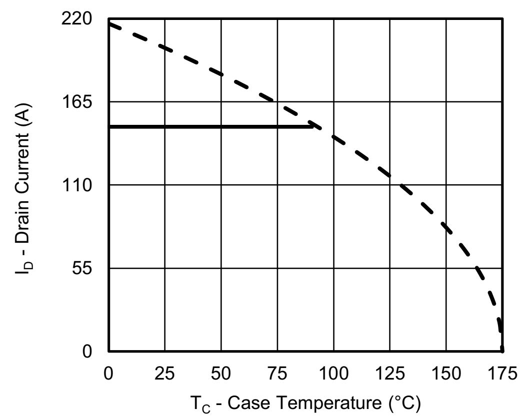
Threshold Voltage



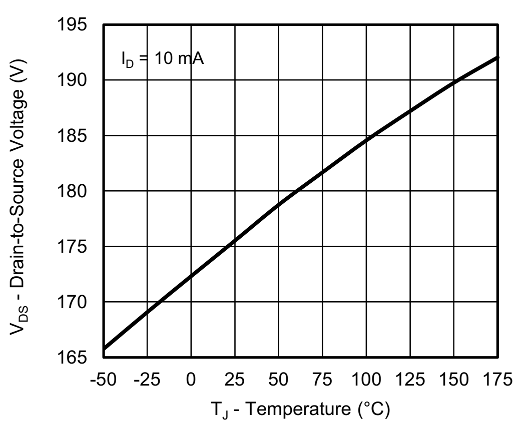
Transconductance



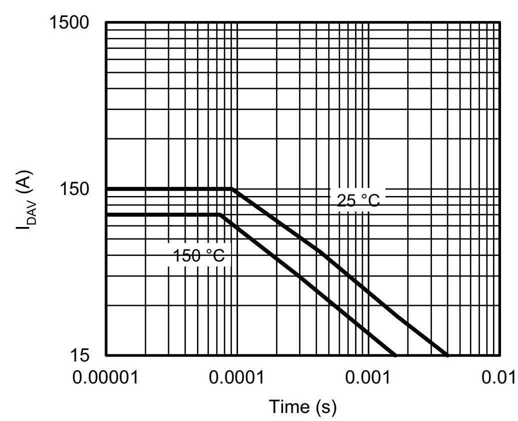
Safe Operating Area, Junction-to-Ambient



Current Derating [a]



Drain Source Breakdown vs. Junction Temperature

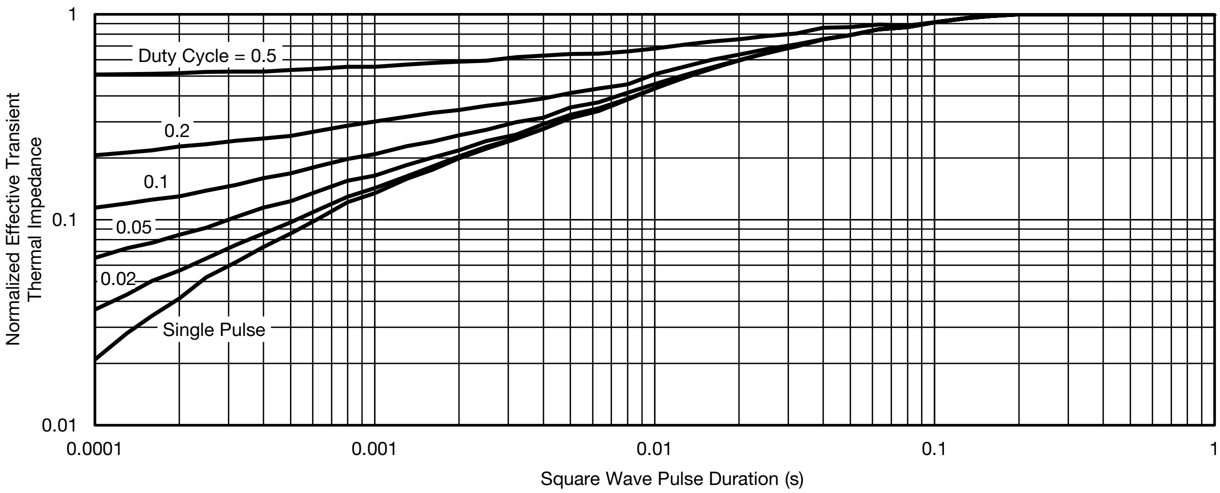


I_{DAV} vs. Time

Note

a. The power dissipation P_D is based on T_J max. = 25 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

THERMAL RATINGS (T_C = 25 °C, unless otherwise noted)



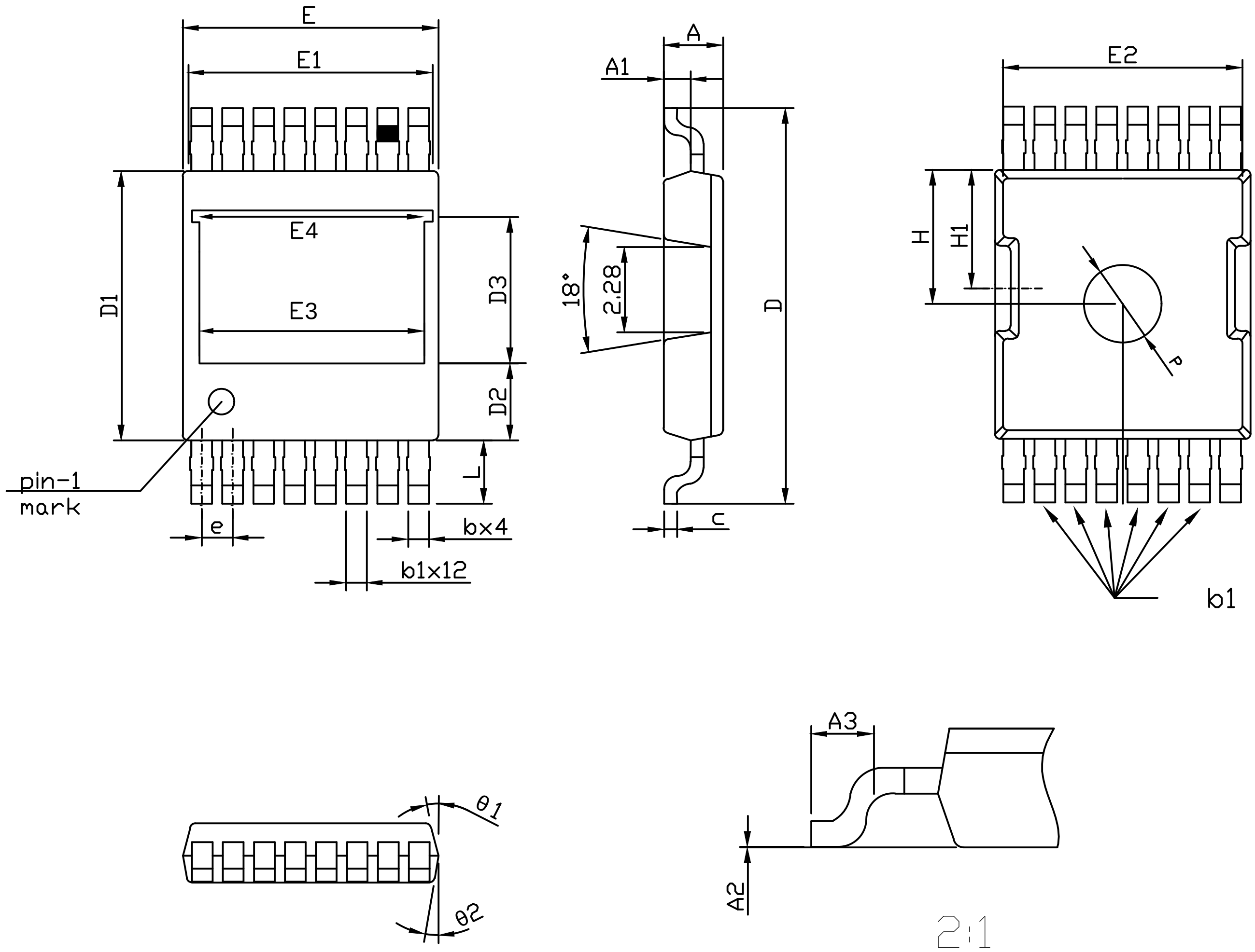
Normalized Thermal Transient Impedance, Junction-to-Case

Note

- The characteristics shown in the two graphs
  - Normalized Transient Thermal Impedance Junction to Ambient (25 °C)
  - Normalized Transient Thermal Impedance Junction to Case (25 °C)

  are given for general guidelines only to enable the user to get a “ball park” indication of part capabilities. The data are extracted from single pulse transient thermal impedance characteristics which are developed from empirical measurements. The latter is valid for the part mounted on printed circuit board - FR4, size 1" x 1" x 0.062", double sided with 2 oz. copper, 100 % on both sides. The part capabilities can widely vary depending on actual application parameters and operating conditions.

Package Outlines



UNIT：mm

SYMBOLS	A	A1	A2	A3	b	b1	C	D
MIN	2.25	1.00	0.01		0.68	0.75	0.45	14.80
NOM	2.30	1.04	0.08	1.50REF	0.70	0.85	0.50	15.00
MAX	2.35	1.08	0.16		0.74	0.95	0.55	15.20
SYMBOLS	D1	D2	D3	E	E1	E2	E3	E4
MIN	10.00	2.40		9.70				
NOM	10.10	2.60	5.77REF	9.90	9.46REF	9.25REF	8.25REF	8.70REF
MAX	10.30	2.80		10.10				
SYMBOLS	e	H	H1	L	P	ф1	ф2	
MIN	1.18	5.00	4.40	2.40	2.80	7 °	7 °	
NOM	1.20	5.20	4.60	2.45	3.00	-	-	
MAX	1.22	5.40	4.80	2.50	3.20	9 °	9 °	

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