



Normally-ON Trench Silicon Carbide Power JFET

FEATURES:

Die Inside

- Hermetic TO-258 Packaging
- 200°C Maximum Operating Temperature (260°C Contact Factory)
- Available Screening:
 - MIL-PRF-19500 Equivalent
 - Space Level
 - MIL-STD-750 Methods & Conditions
- Inherent Radiation Tolerance >100K TID
- Positive Temperature Coefficient for Ease of Paralleling
- Extremely Fast Switching with No "Tail" Current at 150°C
- 1200 Volt Drain-Source Blocking Voltage
- $R_{DS(on)max}$ of 0.045 Ω
- Voltage Controlled
- Low Gate Charge
- Low Intrinsic Capacitance

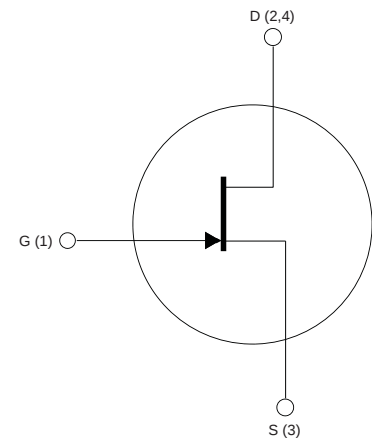
APPLICATIONS:

- Satellite Solar Inverters
- Mil Spec Power Supplies
 - Switch Mode
 - Uninterrupted
- Jet Engine Electronics
- Down-hole Electronics (Motor / Compressor Control)



TO-258

Product Summary		
BV_{DS}	1200	V
$R_{DS(on)max}$	0.045	Ω
$E_{TS,typ}$	TBD	μJ



Internal Schematic

Non-isolated tab version shown.
For isolated tab version, tab (4)
is No Connect.

MAXIMUM RATINGS

Parameter	Symbol	Conditions	Value	Unit
Continuous Drain Current	$I_D, T_J=125$	$T_J = 125^\circ C$	50	A
	$I_D, T_J=150$	$T_J = 150^\circ C$	40	
Pulsed Drain Current ⁽¹⁾	I_{DM}	$T_c = 25^\circ C$	150	A
Short Circuit Withstand Time	t_{SC}	$V_{DD} < 800 V, T_c < 125^\circ C$	50	μS
Power Dissipation	P_D	$T_c = 25^\circ C$	TBD	W
Gate-Source Voltage	V_{GS}	AC ⁽²⁾	-15 to +15	V
Operating and Storage Temperature	$T_J, T_{J, stg}$		-55 to +200*	$^\circ C$
Lead Temperature for Soldering	T_{sld}	1/8" from case < 10 s	260	$^\circ C$

(1) Limited by pulse width

(2) $R_{GEXT} = 1 \text{ ohm}, t_p < 200ns$, see Figure 5 for static conditions

*Consult factory for 260 $^\circ C$

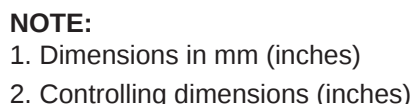
THERMAL CHARACTERISTICS

Parameter	Symbol	Value		Unit
		Typ	Max	
Thermal Resistance, junction-to-case	$R_{th,JC}$	-	TBD	$^\circ C / W$
Thermal Resistance, junction-to-ambient	$R_{th,JA}$	-	TBD	

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ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Conditions	Value			Unit	
			Min	Typ	Max		
Off Characteristics							
Drain-Source Blocking Voltage	BV_{DS}	$V_{GS} = -15\text{ V}, I_D = 600\text{ }\mu\text{A}$	1200	-	-	V	
Total Drain Leakage Current	I_{DSS}	$V_{DS} = 1200\text{ V}, V_{GS} = -15\text{ V},$ $T_J = 25^{\circ}\text{C}$	-	2	20	μA	
		$V_{DS} = 1200\text{ V}, V_{GS} = -15\text{ V},$ $T_J = 150^{\circ}\text{C}$	-	20	400		
Total Gate Reverse Leakage	I_{GSS}	$V_{GS} = -15\text{ V}, V_{DS} = 0\text{ V}$	-	-0.1	-0.6	mA	
		$V_{GS} = -15\text{ V}, V_{DS} = 1200\text{ V}$	-	-0.1	-		
On Characteristics							
Drain-Source On-resistance	$R_{DS(on)}$	$I_D = 40\text{ A}, V_{GS} = 2\text{ V},$ $T_J = 25^{\circ}\text{C}$	-	0.035	0.045	Ω	
		$I_D = 40\text{ A}, V_{GS} = 2\text{ V},$ $T_J = 100^{\circ}\text{C}$	-	0.07	-		
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = 1\text{ V}, I_D = 34\text{ mA}$	-6.00	-	-4.00	V	
Gate Forward Current	I_{GFWD}	$V_{GS} = 2\text{ V}$	-	0	-	mA	
Gate Resistance	R_G	$f = 1\text{ MHz}, \text{ drain-source shorted}$	-	4	-	Ω	
	$R_{G(on)}$	$V_{GS} > 2.7\text{ V}$	-	0.25	-	Ω	
Dynamic Characteristics							
Input Capacitance	C_{iss}	$V_{DD} = 100\text{ V}$	-	1340	-	pF	
Output Capacitance	C_{oss}		-	206	-		
Reverse Transfer Capacitance	C_{rss}		-	194	-		
Effective Output Capacitance, energy related	$C_{o(er)}$	$V_{DS} = 0\text{ V to } 600\text{ V},$ $V_{GS} = 0\text{ V}$	-	110	-		
Switching Characteristics							
Turn-On Delay	t_{on}	$V_{DS} = 600\text{ V}, I_D = 40\text{ A},$ Inductive Load, $T_J = 25^{\circ}\text{C}$	-	TBD	-	ns	
Rise Time	t_r		-	TBD	-		
Turn-Off Delay	t_{off}		-	TBD	-		
Fall Time	t_f		-	TBD	-		
Turn-On Energy	E_{on}		$V_{DS} = 600\text{ V}, I_D = 40\text{ A},$ Inductive Load, $T_J = 150^{\circ}\text{C}$	-	TBD	-	μJ
Turn-Off Energy	E_{off}	-		TBD	-		
Total Switching Energy	E_{ts}	-		TBD	-		
Turn-On Delay	t_{on}	$V_{DS} = 600\text{ V}, I_D = 40\text{ A},$ Inductive Load, $T_J = 150^{\circ}\text{C}$		-	TBD	-	ns
Rise Time	t_r			-	TBD	-	
Turn-Off Delay	t_{off}		-	TBD	-		
Fall Time	t_f		-	TBD	-		
Turn-On Energy	E_{on}		$V_{DS} = 600\text{ V}, I_D = 5\text{ A},$ $V_{GS} = +2.5\text{ V}$	-	TBD	-	μJ
Turn-Off Energy	E_{off}	-		TBD	-		
Total Switching Energy	E_{ts}	-		TBD	-		
Total Gate Charge	Q_g	$V_{DS} = 600\text{ V}, I_D = 5\text{ A},$ $V_{GS} = +2.5\text{ V}$		-	65	-	nC
Gate-Source Charge	Q_{gs}			-	4	-	
Gate-Drain Charge	Q_{gd}		-	54	-		



DOCUMENT TITLE

Normally-ON Trench Silicon Carbide Power JFET

<u>Rev #</u>	<u>History</u>	<u>Release Date</u>	<u>Status</u>
0.0	Initial Release	December 2010	Advanced Information
0.1	Replaced TO-257 package with TO-258 package	June 2011	Advance Information