

MTP3055E

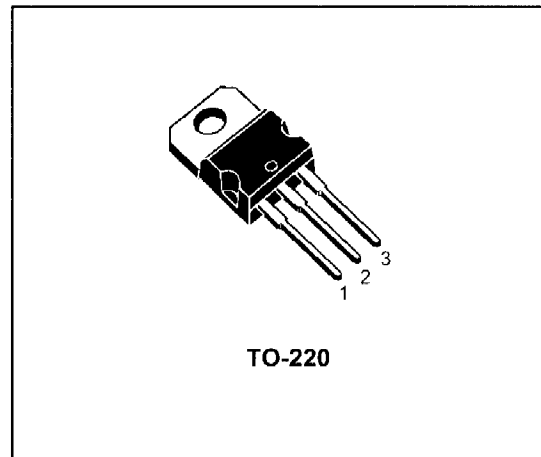
N - CHANNEL 60V - 0.1Ω - 12A TO-220 STripFET™ MOSFET

TYPE	V _{DSS}	R _{DS(on)}	I _D
MTP3055E	60 V	< 0.15 Ω	12 A

- TYPICAL R_{DS(on)} = 0.1 Ω
- AVALANCHE RUGGED TECHNOLOGY
- 100% AVALANCHE TESTED
- 175°C OPERATING TEMPERATURE
- APPLICATION ORIENTED CHARACTERIZATION

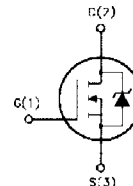
APPLICATIONS

- HIGH CURRENT, HIGH SPEED SWITCHING
- SOLENOID AND RELAY DRIVERS
- REGULATORS
- DC-DC & DC-AC CONVERTERS
- MOTOR CONTROL, AUDIO AMPLIFIERS
- AUTOMOTIVE ENVIRONMENT (INJECTION, ABS, AIR-BAG, LAMPDRIVERS, Etc.)



TO-220

INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _{DS}	Drain-source Voltage (V _{GS} = 0)	60	V
V _{DGR}	Drain- gate Voltage (R _{GS} = 20 kΩ)	60	V
V _{GS}	Gate-source Voltage	± 20	V
I _D	Drain Current (continuous) at T _c = 25 °C	12	A
I _{DM}	Drain Current (pulsed) at T _c = 100 °C	9	A
I _{DM} (*)	Drain Current (pulsed)	48	A
P _{tot}	Total Dissipation at T _c = 25 °C	40	W
T _{stg}	Storage Temperature	-65 to 175	°C
T _j	Max. Operating Junction Temperature	175	°C

(*) Pulse width limited by safe operating area

First digit of the datecode being Z or K identifies silicon characterized in this datasheet.

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THERMAL DATA

$R_{thj-case}$	Thermal Resistance Junction-case	Max	3.75	$^{\circ}C/W$
$R_{thj-amb}$	Thermal Resistance Junction-ambient	Max	62.5	$^{\circ}C/W$
R_{thc-s}	Thermal Resistance Case-sink	Typ	0.5	$^{\circ}C/W$
T_j	Maximum Lead Temperature For Soldering Purpose		300	$^{\circ}C$

AVALANCHE CHARACTERISTICS

Symbol	Parameter	Max Value	Unit
I_{AR}	Avalanche Current, Repetitive or Not-Repetitive (pulse width limited by T_j max)	12	A
E_{AS}	Single Pulse Avalanche Energy (starting $T_j = 25^{\circ}C$, $I_D = I_{AR}$, $V_{DD} = 25 V$)	50	mJ

ELECTRICAL CHARACTERISTICS ($T_{case} = 25^{\circ}C$ unless otherwise specified)

OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source Breakdown Voltage	$I_D = 250 \mu A$ $V_{GS} = 0$	60			V
I_{DSS}	Zero Gate Voltage Drain Current ($V_{GS} = 0$)	$V_{DS} = \text{Max Rating}$ $V_{DS} = \text{Max Rating} \times 0.8$ $T_c = 125^{\circ}C$			1 10	μA μA
I_{GSS}	Gate-body Leakage Current ($V_{DS} = 0$)	$V_{GS} = \pm 20 V$			± 100	nA

ON (*)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$ $I_D = 250 \mu A$	2	2.9	4	V
$R_{DS(on)}$	Static Drain-source On Resistance	$V_{GS} = 10V$ $I_D = 7 A$		0.1	0.15	Ω
$I_{D(on)}$	On State Drain Current	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$ $V_{GS} = 10 V$	12			A

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$g_{fs} (*)$	Forward Transconductance	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$ $I_D = 6 A$	4	6		S
C_{iss}	Input Capacitance	$V_{DS} = 25 V$ $f = 1 MHz$ $V_{GS} = 0$		760		pF
C_{oss}	Output Capacitance			100		pF
C_{rss}	Reverse Transfer Capacitance			30		pF

ELECTRICAL CHARACTERISTICS (continued)
SWITCHING RESISTIVE LOAD

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Time	$V_{DD} = 30\text{ V}$ $I_D = 7\text{ A}$		20		ns
t_r	Rise Time	$R_G = 50\ \Omega$ $V_{GS} = 10\text{ V}$		65		ns
$t_{d(off)}$	Turn-off Delay Time	(see test circuit)		70		ns
t_f	Fall Time			35		ns
Q_g	Total Gate Charge	$I_D = 12\text{ A}$ $V_{GS} = 10\text{ V}$		15		nC
Q_{gs}	Gate-Source Charge	$V_{DD} = 40\text{ V}$		7		nC
Q_{gd}	Gate-Drain Charge	(see test circuit)		5		nC

SOURCE DRAIN DIODE

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain Current				12	A
$I_{SDM}(\bullet)$	Source-drain Current (pulsed)				48	A
$V_{SD}(\ast)$	Forward On Voltage	$I_{SD} = 12\text{ A}$ $V_{GS} = 0$			2.0	V
t_{rr}	Reverse Recovery Time	$I_{SD} = 12\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$ $V_{DD} = 30\text{ V}$ $T_j = 150\text{ }^\circ\text{C}$		65		ns
Q_{rr}	Reverse Recovery Charge			0.17		μC

(\ast) Pulsed: Pulse duration = 300 μs , duty cycle 1.5 %

(\bullet) Pulse width limited by safe operating area